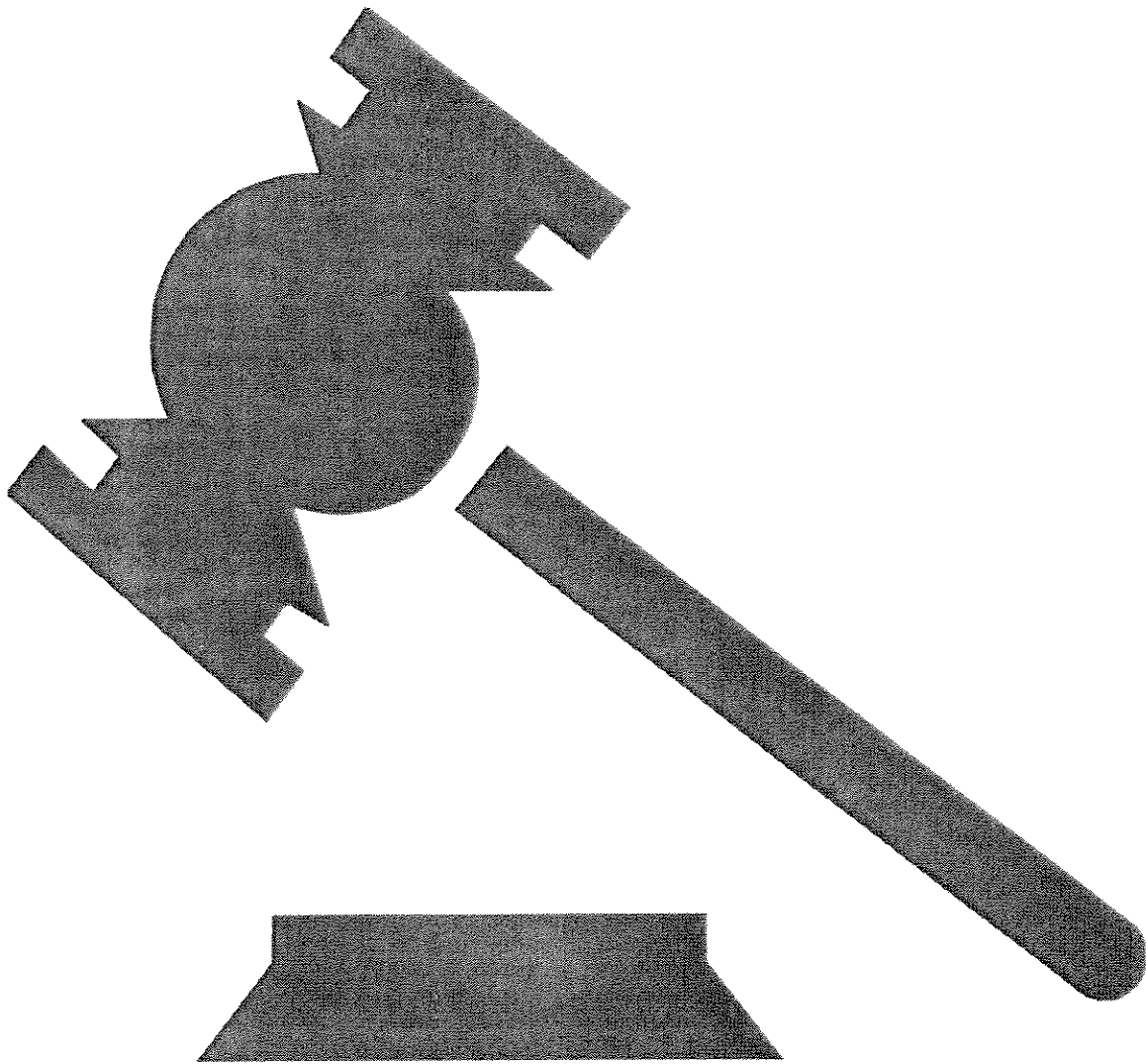
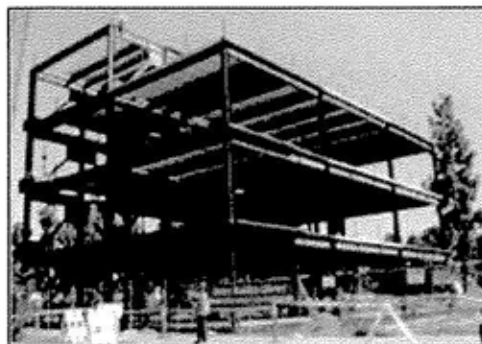




***TRANSPORTATION
ACTION/DISCUSSION ITEMS
AGENDA ITEM III. A.***

Fresno Regional Traffic Mitigation Fee Technical Report Draft Final Report



Submitted to:



Submitted by: PB Americas, Inc.

June 2008

Fresno Regional Traffic Mitigation Fee
TECHNICAL MEMORANDUM
PROJECT IDENTIFICATION & COST ESTIMATE REVIEW

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List of Acronyms

AB	Assembly Bill
AC	Asphaltic Concrete
CCFI	Central California Future Institute
COG	Council of Governments
CTC	California Transportation Commission
FCOG	Council of Fresno County Governments
FDOT	Florida Department of Transportation
FIDS	Fresno Madera Freeway Interchange Deficiency Study
HBW	Home-Based Work
HBNW	Home-Based Non-Work
ITE	Institute of Transportation Engineers
LF	Linear Foot
NCHRP	National Cooperative Highway Research Program
LOS	Traffic Level-of-Service
NHB	Non-Home-Based
PB	Parsons Brinckerhoff
PDT	Project Development Team
PM	Post Meridian (after twelve noon)
ROW	Right-of-Way
SR	State Route
STIP	State Transportation Improvement Program
V/C	Volume-to-Capacity Ratio
VMT	Vehicle-Miles Traveled

1. INTRODUCTION

Regional Transportation Mitigation Fee Study

This report is one of a series of documents that were prepared as part of the Fresno County Regional Transportation Mitigation Fee (RTMF) Study. The implementation of the RTMF is part of the Measure "C" Extension approved by Fresno County voters in 2006. The RTMF is intended to ensure that future development contributes its fair share towards the costs of infrastructure to mitigate the cumulative indirect regional transportation impacts of new growth, in accordance with the Mitigation Fee Act¹. The purpose of the RTMF Study is to develop the framework for the RTMF including developing criteria for project selection, estimating the fair share of costs attributable to new development, and recommending an appropriate level of fee to be charged to each unit of new development.

The overall structure of the RTMF Study is shown in Figure 1. The study was comprised of six major tasks as follows:

Validate Traffic Model - The main analytical tool used in the deficiency analysis is the Council of Fresno County Governments' (Fresno COG's) traffic model. The first step in the study was to perform a series of tests to ensure that the model functioned properly and could be used as a basis for the fee calculation.

Determine Existing and Future Levels of Service (LOS) - The existing and future levels-of-service for the projects covered by the study were determined using the travel demand model.

Estimate Project Costs - The estimated cost for each project was checked and updated using cost data from recent projects.

Determine Funding Shortfall - Future levels of funding that could be available for funding the projects of interest were estimated for the twenty-year period of the RTMF.

Attribute Demand to Sources - The extent to which the demand for each project stems from existing traffic or future development was determined.

Compute RTMF Fees and Revenues - The final task was to compute the level of fee for different land uses and the total amount of funding that would be generated by the RTMF under several different sets of policy assumptions.

This report describes the methodology used for the analysis and presents the results of the study. Further details can be found in the three technical reports² produced in the course of this study.

Scope of the Analysis

Parsons Brinckerhoff's original proposal to Fresno COG was to make an open-ended analysis of roads of regional significance throughout the county to determine which segments are likely to be impacted by future development and whose improvements might be considered eligible for funding by the RTMF program. However, the Project Development Team (PDT) later concluded that the open-ended approach was not consistent with the original intent of the Measure "C" Extension. The PDT felt that the intent of the voters in passing Measure "C" Extension was that

¹ Assembly Bill 1600, which forms the basis for Sections 66000-66008 of the California Government Code

² *Deficiency Analysis* dated December 2007, *Project Identification and Cost Review* dated May 2008, and *Fee Calculation* dated June 2008, all by Parsons Brinckerhoff.

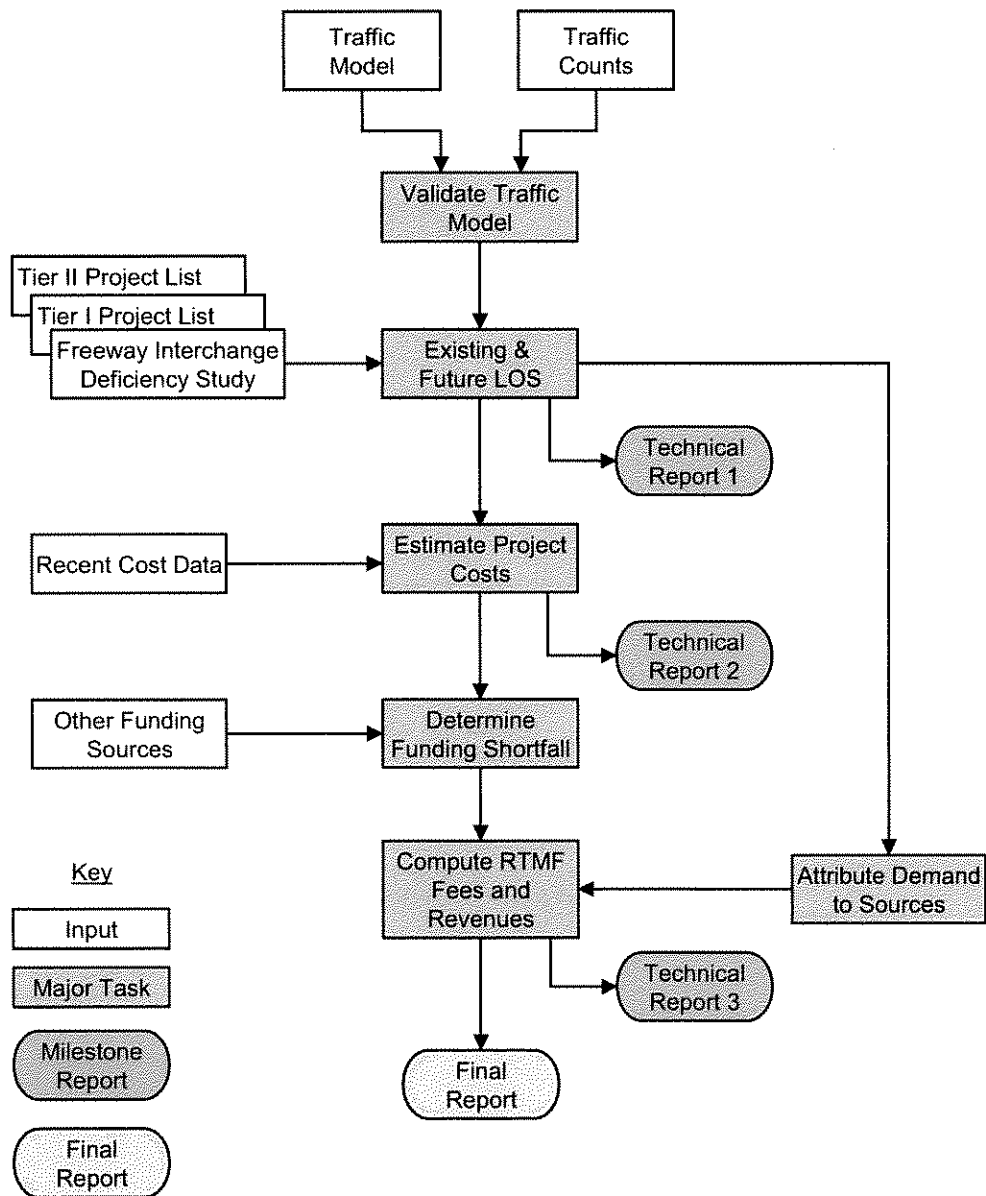


Figure 1: Overall Structure of the RTMF Study

the funds raised by the measure should be utilized for the projects specifically named in Tables 2 through 5 of the Measure "C" Extension brochure which covered, respectively, the Urban Tier 1, Rural Tier 1, Urban Tier 2, and Rural Tier 2 projects of the Measure "C" Extension Expenditure Plan. Appendix D of the Measure "C" Extension brochure also allows for consideration of projects identified in the Fresno-Madera County Freeway Interchange Deficiency Study (FIDS), and so those projects were also included in the analysis.

At the PDT's direction the scope of the current study was therefore limited to projects named in Tables 2 through 5 of the Measure "C" Extension brochure and those identified in the Fresno-Madera County Freeway Interchange Deficiency Study (the projects in Fresno County only). The consultants were directed to analyze these projects to determine the extent to which each was suitable for RTMF funding.

The reader should note that the RTMF was only one of several types of funding named in Measure "C" Extension. The suitability or unsuitability of any project for RTMF funding is not related to its suitability for funds from the Measure "C" Extension sales tax or other funding sources, but is dependent on the relative share of project need and the related cost attributable to the impacts of new development in Fresno County.

2. VALIDATING THE TRAFFIC MODEL

Because the Fresno COG traffic model is a key analytical tool in this study, it was important to verify that it is capable of producing reasonable forecasts before using it as the basis for the nexus calculation. Details of the model can be found in *Fresno County Traffic Model Calibration/Validation Report and Model Documentation*³. The tests used to validate the model and the adjustments made to the model are described in the sections below.

Tests of the Traffic Model – Forecasts of Daily Volumes

Fresno COG's traffic model produces both forecasts of daily traffic volumes and forecasts of evening peak-hour volumes. These were tested separately.

The study team selected a sample of recent traffic count data from twenty-five sites (a total of fifty counts, since each site was counted in both directions) and compared the model's forecast of traffic to the actual traffic volumes found in the counts. Figure 2 shows a comparison of the model forecast of daily traffic to the actual counted traffic. The shaded area shows the acceptable deviation set forth in Caltrans' model validation guidelines⁴. Figure 2 indicates that there is no apparent bias in the daily model (under-estimates and over-estimates occur about equally), that none of the errors is very large, and that more than three-quarters of the sites lie within Caltrans' allowable deviations.

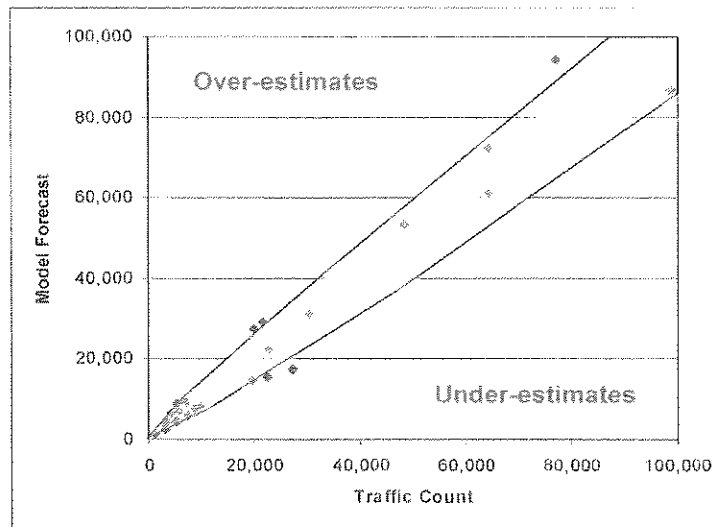


Figure 2: Model Forecast of Daily Traffic versus Traffic Counts

Table 1 shows the results of the tests of the daily forecasts with respect to Caltrans' validation guidelines. As can be seen in the table, the daily forecasts produced by the Fresno COG traffic model exceed every standard for acceptability.

³ Dowling Associates, September 2001

⁴ *Travel Forecasting Guidelines*, Caltrans, November 1992

Table 1: Validation Test Results for Daily Forecasts		
Validation Item	Criterion for Acceptance	Daily Model
% of Links within Caltrans' Deviation Standard	At least 75%	76% ✓
Sum of 2-way Volume of All Counted Links	Within 10% of Actual	Within 2% ✓
Correlation between Counts and Model Forecast	At least 88%	98% ✓

Tests of the Traffic Model – Forecasts of PM Peak-Hour Volumes

A similar set of performance tests were run on the PM peak-hour forecasts produced by the COG traffic model. In this case, however, the results (see Figure 3) were not favorable. The errors are larger and there appears to be a definite tendency towards over-estimating traffic. The original PM peak hour model therefore did not meet the acceptance criteria for use in the study.

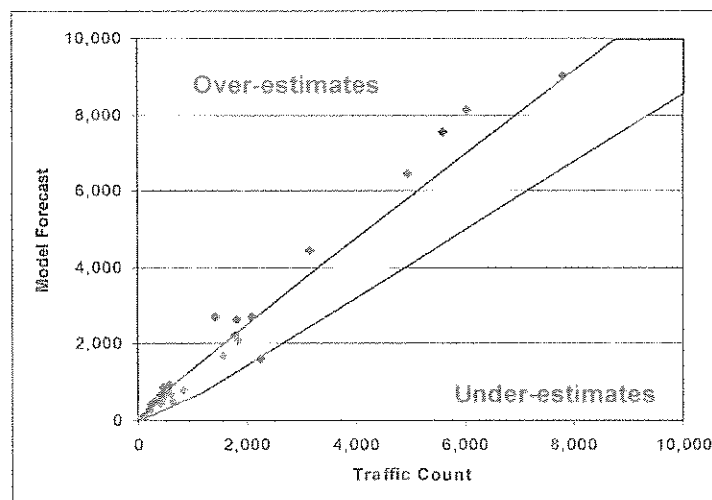


Figure 3: Original PM Peak Hour Forecasts versus Traffic Counts

In consultation with COG staff, it was determined that the most likely source of error in the peak-hour model was the peak-hour factor, which is a model parameter that distributes daily traffic among different hours of the day. It was found that by adjusting the peak-hour factor a version of the model could be created that more accurately reflected traffic use in peak-hour LOS calculations. This is shown in Figure 4, which compares the revised model forecast of peak hour traffic to the actual counted traffic. The shaded area shows the acceptable deviation found in Caltrans' validation guidelines. Figure 4 indicates that there is no apparent bias in the revised model (under-estimates and over-estimates occur about equally), that none of the errors are very large, and that ninety percent of the validation results lie within Caltrans' allowable deviations.

Table 2 shows the results of these tests with respect to Caltrans' validation guidelines. As can be seen in the table, the modified version of the model exceeds every standard for acceptability.

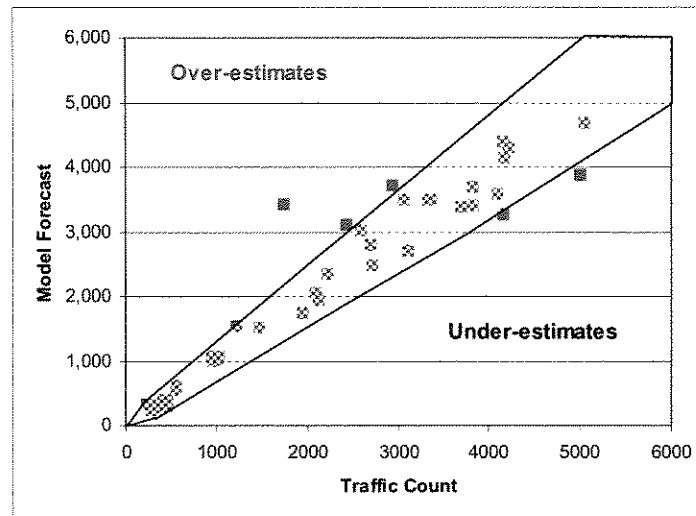


Figure 4: Adjusted PM Peak Hour Forecasts versus Traffic Counts

Table 2: Validation Test Results for PM Peak-Hour Model			
Validation Item	Criterion for Acceptance	Original PM Peak Model	Revised PM Peak Model
% of Links within Caltrans' Deviation Standard	At least 75%	52% X	90% ✓
Sum of 2-way Volume of All Counted Links	Within 10% of Actual	27% X	within 1% ✓
Correlation between Counts and Model Forecast	At least 88%	99% ✓	95% ✓

Source: Caltrans, Parsons Brinckerhoff

Once the traffic model had been independently tested and found to meet the acceptance criteria recommended by Caltrans it was accepted by the PDT as a reasonable basis for the RTMF nexus analysis.

3. DEFICIENCY ANALYSIS

The Mitigation Fee Act permits agencies to collect impact fees based on the degree that new development is expected to contribute to deficient traffic conditions. There are several key aspects to this, including the definition of what constitutes deficient conditions, the amount of traffic generated by new development, and the separation of the traffic associated with new development from the traffic associated with existing developments. The sections below describe how the deficiencies associated with new development were determined.

Traffic Level-of-Service

Traffic conditions are often described in terms of traffic level of service (LOS) which ranges from LOS "A" indicating that drivers experience little delay, to LOS "F" indicating that drivers are likely to encounter traffic congestion with low speeds and stop-and-go conditions. Like many agencies, Fresno COG has elected to use the LOS tables developed by the Florida Department of Transportation (FDOT) for general planning studies such as this one. The FDOT tables are documented in FDOT's *2002 Quality/Level of Service Handbook*⁵ and were developed using the methodologies found in the most recent edition of the *Highway Capacity Manual*⁶. The RTMF study makes use of the tables that define the threshold volumes for the range LOS's for various types of roads. These are shown in Tables 3 through 12. The values shown in the tables are the maximum traffic volumes for each level of service (LOS). For example, the first value shown in Table 3 is "11,200", which means that an average 2-way daily volume of 11,100 would be LOS "C" while a 2-way volume of 11,300 would be LOS "D" since it exceeds the maximum volume of 11,200 for LOS "C".

Table 3: State Class II Urban Arterials (2.0-4.5 intersections per mile)							
Number of Lanes	Divided Roadway?	Daily Volume (2-way)			Hourly Volume (1-way)		
		LOS "C"	LOS "D"	LOS "E"	LOS "C"	LOS "D"	LOS "E"
2	Undivided	11,200	15,400	16,300	590	810	850
4	Divided	26,000	32,700	34,500	1,360	1,710	1,800
6	Divided	40,300	49,200	51,800	2,110	2,570	2,710
8	Divided	53,300	63,800	67,000	2,790	3,330	3,500

⁵ State of Florida Department of Transportation, 2002

⁶ *Highway Capacity Manual 2000*, Transportation Research Board, 2000.

Table 4: State Class III Urban Arterials (more than 4.5 intersections per mile)							
Number of Lanes	Divided Roadway?	Daily Volume (2-way)			Hourly Volume (1-way)		
		LOS "C"	LOS "D"	LOS "E"	LOS "C"	LOS "D"	LOS "E"
2	Undivided	5,300	12,600	15,500	280	660	810
4	Divided	12,400	28,900	32,800	650	1,510	1,720
6	Divided	19,500	44,700	49,300	1,020	2,330	2,580
8	Divided	25,800	58,700	63,800	1,350	3,070	3,330

Table 5: Major City/County Urban Roads							
Number of Lanes	Divided Roadway?	Daily Volume (2-way)			Hourly Volume (1-way)		
		LOS "C"	LOS "D"	LOS "E"	LOS "C"	LOS "D"	LOS "E"
2	Undivided	9,100	14,600	15,600	480	760	810
4	Divided	21,400	31,100	32,900	1,120	1,620	1,720
6	Divided	33,400	46,800	49,300	1,740	2,450	2,580
8	Divided	<i>44,133⁷</i>	<i>61,250</i>	<i>63,800</i>	<i>2,310</i>	<i>3,200</i>	<i>3,330</i>

Table 6: Urban Freeways, Interchanges Less Than 2 Miles Apart							
Number of Lanes	Divided Roadway?	Daily Volume (2-way)			Hourly Volume (1-way)		
		LOS "C"	LOS "D"	LOS "E"	LOS "C"	LOS "D"	LOS "E"
4	Divided	52,000	67,200	76,500	2,660	3,440	3,910
6	Divided	81,700	105,800	120,200	4,180	5,410	6,150
8	Divided	111,400	144,300	163,900	5,700	7,380	8,380

⁷ Italicized values are extrapolated from other figures in the Florida DOT tables.

Table 7: Urban Freeways, Interchanges More Than 2 Miles Apart							
Number of Lanes	Divided Roadway?	Daily Volume (2-way)			Hourly Volume (1-way)		
		LOS "C"	LOS "D"	LOS "E"	LOS "C"	LOS "D"	LOS "E"
4	Divided	55,200	67,100	74,600	2,940	3,580	3,980
6	Divided	85,300	103,600	115,300	4,550	5,530	6,150
8	Divided	115,300	140,200	156,000	6,150	7,480	8,320
10	Divided	175,500	213,500	237,100	7,760	9,440	10,480

Table 8: Uninterrupted Flow Rural Highways							
Number of Lanes	Divided Roadway?	Daily Volume (2-way)			Hourly Volume (1-way)		
		LOS "C"	LOS "D"	LOS "E"	LOS "C"	LOS "D"	LOS "E"
2	Undivided	7,900	13,700	27,500	420	730	1,470
4	Divided	40,800	52,400	58,300	2,200	2,830	3,140
6	Divided	61,200	78,600	87,400	3,330	4,240	4,710

Table 9: Rural Highways with Isolated Signalized Intersections							
Number of Lanes	Divided Roadway?	Daily Volume (2-way)			Hourly Volume (1-way)		
		LOS "C"	LOS "D"	LOS "E"	LOS "C"	LOS "D"	LOS "E"
2	Undivided	8,000	10,700	12,100	430	580	650
4	Divided	17,400	23,000	25,200	940	1,240	1,360
6	Divided	27,100	35,500	43,100	1,460	1,910	2,320

Table 10: Rural Interrupted Flow Arterials							
Number of Lanes	Divided Roadway?	Daily Volume (2-way)			Hourly Volume (1-way)		
		LOS "C"	LOS "D"	LOS "E"	LOS "C"	LOS "D"	LOS "E"
2	Undivided	11,000	13,900	14,900	590	740	800
4	Divided	25,500	29,400	31,200	1,360	1,570	1,660
6	Divided	39,400	44,200	46,800	2,100	2,360	2,500

Table 11: All Rural Freeways							
Number of Lanes	Divided Roadway?	Daily Volume (2-way)			Hourly Volume (1-way)		
		LOS "C"	LOS "D"	LOS "E"	LOS "C"	LOS "D"	LOS "E"
4	Divided	47,900	56,600	63,000	2,740	3,240	3,600
6	Divided	73,900	87,400	97,200	4,230	5,000	5,560
8	Divided	1,000	118,400	131,400	5,720	6,770	7,520

Table 12: Freeway Ramps ⁸						
Ramp Type	Daily Volume (2-way)			Hourly Volume (1-way)		
	LOS "C"	LOS "D"	LOS "E"	LOS "C"	LOS "D"	LOS "E"
Loop Ramp	11,200	12,600	14,000	933	1,050	1,167
Diamond Ramp	13,600	15,300	17,000	1,133	1,275	1,417
Freeway-to-Fwy Loop	12,800	14,400	16,000	1,067	1,200	1,333
Freeway-to-Fwy Diamond	16,000	18,000	20,000	1,333	1,500	1,667

A key feature of these tables is that a distinction is made between rural and urban areas reflecting the fact that drivers' expectations vary depending on the type of area they are driving through. Fresno COG directed the RTMF study team to consider all road segments located within the sphere of influence of any incorporated city as "urban" and those located outside of the sphere of influence of an incorporated city as "rural".

The FDOT level-of-service tables do not cover freeway ramps. For projects in this functional class the LOS thresholds developed for Fresno COG's Regional Transportation Plan were used.

Existing and Future Deficiencies

For the purposes of the RTMF Study, a "capacity deficiency" is defined as a condition where a facility would not meet the level-of-service threshold mandated by Fresno COG, which is LOS "D". One of the first major steps in the RTMF Study is to identify where deficiencies are likely to occur in the regional road network if the expected level of future development were to take place.

Fees collected under the Mitigation Fee Act must be based on a nexus between the projects to be funded by mitigation fees and the impacts resulting from the development that is being assessed the fee. Mitigation fees cannot be used to correct existing deficiencies and therefore the analysis must distinguish between deficiencies that exist today and those that will arise only if development takes place.

⁸ LOS thresholds for freeway ramps were provided by VRPA Technologies. These figures are consistent with those used to develop the Fresno COG Regional Transportation Plan.

Overview of the Deficiency Analysis Methodology

The methodology used in the deficiency analysis is outlined in Figure 5 below. The major steps include:

- 1) The main analytical tool used in the deficiency analysis is the Fresno COG traffic model. This model was first developed in 2001 and is frequently updated by the COG staff. Existing land uses are classified by type and location and stored in a data file as a major input to the model.
- 2) A second major input into the model is a file containing details of the location, capacity, and free-flow speed of the existing roads in the Fresno County. The model also has other input parameters, such as trip generation rates, that were left unchanged during the deficiency analysis.
- 3) The existing land use file, the existing road network file, and several other parameters were used as inputs to the model to generate an estimate of existing traffic volumes on each road section in Fresno County.
- 4) Fresno COG provided the study team with the results of recent traffic counts taken in throughout the county
- 5) The traffic counts were compared to the traffic estimates from the Fresno COG traffic model to determine whether the model was sufficiently accurate for use in the RTMF study. This was described in the previous chapter.
- 6) The PM peak-hour component of the model was revised to correct for a tendency to over-forecast traffic volumes prior to use in the study.

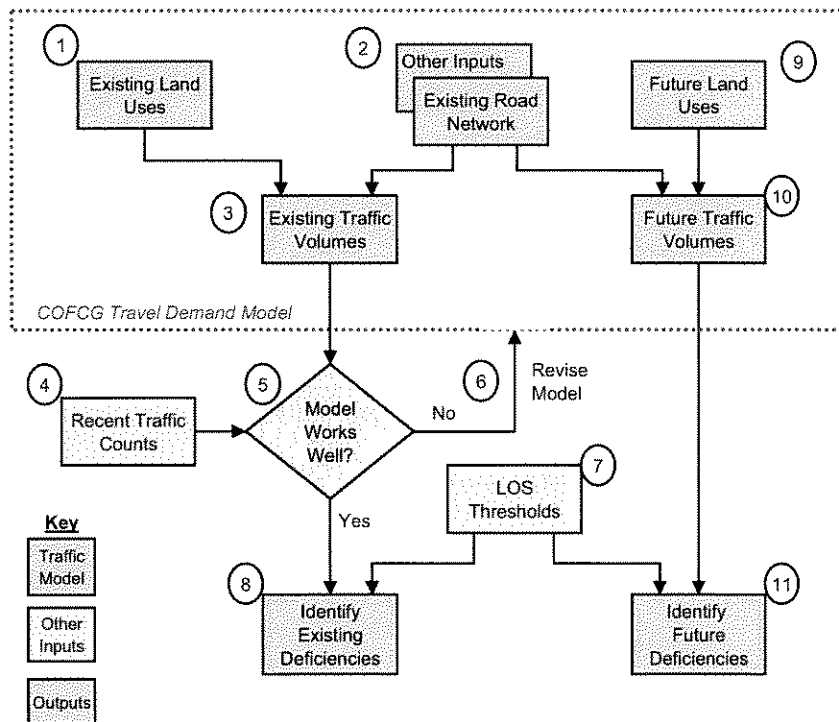


Figure 5: Steps in the Deficiency Analysis

- 7) Fresno COG established its level-of-service (LOS) thresholds based on the threshold tables developed by the Florida Department of Transportation. The Florida DOT tables are widely used throughout the country as a transparent and easily-administered version of the *Highway Capacity Manual* LOS methodology.
- 8) The existing traffic volumes were then compared to the LOS thresholds to determine where deficiencies already exist.
- 9) Fresno COG's assumptions regarding future development were then entered into the traffic model.
- 10) The model was run assuming future land uses (existing land uses plus future development) but no changes to the existing road network. The output was a forecast of future traffic volumes under these conditions.
- 11) The traffic volumes were then compared to the LOS tables to determine where future roadway capacity deficiencies were likely to occur.

The next section describes the future year land use assumptions used in this analysis.

Land Use Assumptions

Fresno COG's responsibilities for long-term planning entail the use of population and employment forecasts. The forecasts currently used by Fresno COG were prepared for the 2000-2025 period by the Central California Future Institute (CCFI) and were later extrapolated to 2030 by Fresno COG staff⁹. These forecasts are summarized in Table 13 below.

Table 13: Summary of Development Assumptions					
Forecast Item	2005	2015	2025	Total Growth	Average Annual Growth Rate
Population	899,288	1,086,432	1,290,264	43.5%	1.8%
Households	302,621	370,089	443,195	46.5%	1.9%
Total Employment	373,494	461,541	557,364	49.2%	2.0%
Retail	56,041	69,454	83,868	49.7%	2.0%
Service	81,760	115,412	151,442	85.2%	3.1%
Government	36,152	44,370	53,636	48.4%	2.0%
Educational	36,246	48,189	61,252	69.0%	2.7%
Other	163,288	184,548	207,166	26.9%	1.2%

⁹ See 2006 Fresno COG Conformity Analysis Model Documentation

The CCFI forecasts project an overall long-term rate of population growth of 1.8% which is the same as the growth actually measured between the 1990 and 2000 U.S. Census for Fresno County. These forecasts also predict a slightly higher rate of growth for employment than for households, which is a continuation of an existing trend in California.

Other forecasts of population and employment are available from the State Department of Finance and the State Department of Transportation Office of Transportation Economics. The CCFI growth forecasts fall between the forecasts of these two agencies.

In terms of spatial distribution, the forecasts assume that most population growth will be concentrated within the spheres of influence of the cities of Fresno and Clovis. However, moderate population growth is expected in a wide swath on both sides of Highway 99 (see Figure 6 below). The fastest growth in employment is expected to occur along the eastern edges of the cities of Fresno and Clovis (see Figure 7 below). Outside of the metropolitan area the growth of employment is distributed more evenly than the growth in population.

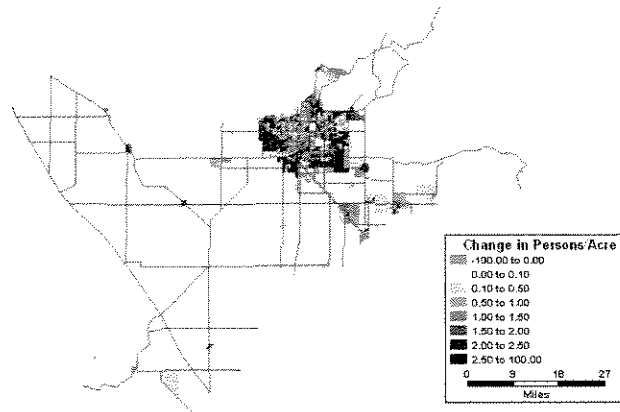


Figure 6: Spatial Distribution of Anticipated Population Growth, 2005-2030

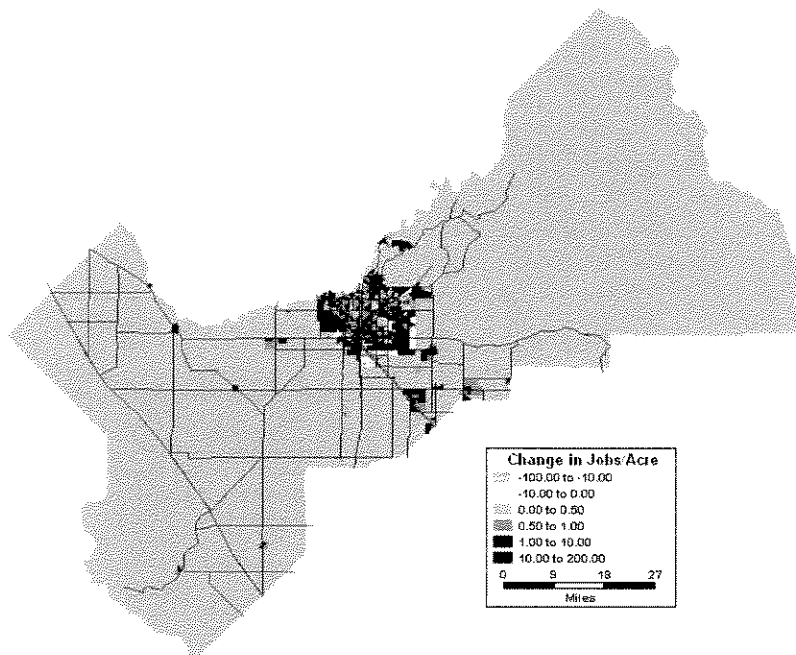


Figure 7: Spatial Distribution of Anticipated Employment Growth, 2005-2030

Determining Average Daily Volume and Volume-to-Capacity (V/C) Ratio

As stated earlier, the average daily volumes for each project were taken from model runs of the Fresno COG traffic model. Most projects consisted of more than one link in the model which raised the issue of which link or links should be used to represent the project in the analysis. For the purposes of this analysis the most congested link, as measured by the V/C ratio, was used to represent the facility, based on the reasoning that the congested portion of the facility represents the primary deficiency and therefore prompts consideration of an improvement project.

There were several special cases that required a somewhat different approach. The traffic signal synchronization project and the traffic management center (Urban Tier 2 Projects EE and NN) are not associated with identifiable links and so cannot be analyzed through an LOS test. They were therefore excluded from the analysis. Certain other projects involve entirely new facilities and so there is no existing traffic or V/C ratio. In such cases the volumes, capacities and V/C ratios of the existing alternate routes that most closely serve the same function as the proposed project were substituted. For example, for the SR-180 eastward extension (Urban Tier 1 Project A) the traffic conditions on Olive Avenue and Belmont Avenue were used since those would be the alternate routes if SR-180 was not extended.

Results to the Deficiency Analysis

The results of the deficiency analysis are shown in Tables 14, 15, and 16. The key results from the point of view of levying a traffic mitigation fee are shown in the shaded cells in the tables. The yellow-shaded cells in these tables indicate facilities that currently meet the Fresno COG's LOS standard of "D", but will not meet that standard in the future if land development occurs as

expected and additional road capacity is not provided. This combination of conditions indicates a nexus between land development and a capacity deficiency and therefore indicates a project that would meet the legal requirement for eligibility for funding through mitigation fees.

The green-shaded cells indicate facilities that already fail to meet Fresno COG's LOS standard of "D" and whose V/C ratio would worsen in the future if land development proceeds as expected and additional road capacity is not provided. For such projects, a distinction will need to be made between the portion of the future deficiency that is attributable to existing traffic and the portion attributable to future land development. Only the latter portion has a nexus to mitigating the impact of new development and therefore would be eligible for funding through a mitigation fee.

Projects with no shading are expected to meet Fresno COG's LOS standard of "D" even without capacity improvements. By definition there is no deficiency requiring correction, so these projects would not be eligible for funding through a traffic mitigation fee. However, this does not mean that the project may not be justified under some other criteria used for a different funding source.

Table 14: V/C ratio and LOS for Tier 1 Projects

Project ID	Project Name	Existing		Future	
		V/C Ratio	LOS	V/C Ratio	LOS
URBAN TIER 1	A SR-180 East Seg II *	1.79	F	2.62	F
	B SR-180 West Seg II *	1.59	F	2.11	F
	C SR-41/SR-168/SR-180	0.90	D	1.42	F
	D Willow Avenue	0.77	D	1.80	F
	E Temperance Avenue	0.79	D	1.54	F
	F Ventura Boulevard	0.67	C or better	1.03	E
	G SR-99 Monterey Bridge Retrofit	0.61	C or better	1.01	E
	H California Ave Widening	0.54	D	1.28	F
	I Peach Ave Widening	1.40	F	1.76	F
	J SR-41 Auxiliary Lane	0.51	C or better	0.70	C or better
	K Herndon Ave Widening	0.66	D	1.09	E
	L Shaw Ave Upgrades	1.28	F	2.29	F
	M SR-99 North & Cedar Interchanges	0.17	C or better	0.65	C or better
	N Veteran's Boulevard	1.91	F	3.17	F
RURAL TIER 1	A SR-180 West	0.62	D	0.99	D
	B SR-180 East Seg III	0.95	D	2.62	F
	C SR-180 East Seg IV	1.00	E	1.34	E
	D SR-180 East Seg V	0.96	D	1.31	E
	E Friant Road Widening	0.24	C or better	0.39	C or better
	F Golden State Boulevard	0.18	C or better	0.47	C or better
	G SR-269 Bridge Improvement	0.57	C or better	0.90	D
	H SR-180 West I5 Extension	0.35	C or better	0.57	C or better
	I Mountain View Ave Widening	0.68	D	1.26	E
	J Mendocino Ave Widening	0.22	C or better	0.30	C or better
	K SR-99 American Ave Interchange	0.15	C or better	0.50	C or better
	L I-5/SR-198 Interchange Improvement	0.17	C or better	0.28	C or better

Table 15: V/C Ratio and LOS for Tier 2 Projects

Project ID	Project Name	Existing		Future	
		V/C Ratio	LOS	V/C Ratio	LOS
URBAN TIER 2	AA SR-99 Ramp Improvement	0.63	C or better	1.10	E
	BB SR-41 O Street Auxiliary Lanes	0.24	C or better	0.31	C or better
	CC Friant Road Widening	0.83	D	1.11	F
	DD SR-99 Shaw Ave Interchange	0.49	D	0.97	D
	EE Traffic Synchronization	-	-	-	-
	FF Herndon Ave Widening	0.39	C or better	0.87	D
	GG SR-99 Auxiliary Lanes	0.61	D	0.86	D
	HH Blackstone Ave Turn Lanes	1.35	F	1.47	F
	II SR-99 Shields Ave Overcrossing*	0.22	C or better	0.45	C or better
	JJ McCall Widening	0.12	C or better	0.30	C or better
	KK Shepherd Ave Widening	0.26	C or better	0.61	C or better
	LL SR-41 Auxiliary Lanes	0.69	C or better	0.82	D
	MM SR-99 Widening	0.53	C or better	0.84	D
	NN Traffic Management Center	-	-	-	-
	OO Minnewawa 4-Lane Project	0.71	C or better	1.61	F
RURAL TIER 2	AA SR-99 Interchange Improvement	0.84	D	1.42	F
	BB SR-145 Widening	0.60	C or better	0.84	D
	CC SR-33 Widening	0.44	C or better	0.72	C or better
	DD Academy Parkway*	0.41	C or better	0.69	C or better
	EE SR-41 Central & American Interchange	0.45	D	1.41	F
	FF Millerton Road Widening	0.63	D	0.79	D
	GG Manning Ave Widening	0.68	D	0.94	D
	HH SR-43 Widening	0.96	D	1.41	E
	II McCall Ave Connection*	0.17	C or better	0.73	C or better
	JJ SR-180 E Seg VI	0.94	D	1.28	E

Table 16: V/C Ratio and LOS for FIDS Projects

Project ID	Project Name	Existing		Future	
		V/C Ratio	LOS	V/C Ratio	LOS
PROJECTS IN THE FREEWAY INTERCHANGE DEFICIENCY STUDY	1 SR-99/Mountain View	0.34	C or better	0.47	C or better
	2 SR-99/Floral	0.23	C or better	0.24	C or better
	3 SR-99/Manning	0.27	C or better	0.49	C or better
	4 SR-99/Central	0.43	C or better	0.32	C or better
	5 SR99/Ventura	0.44	C or better	0.86	C or better
	6 SR99/Fresno	0.56	C or better	0.91	D
	7 SR99/Stanislaus	0.21	C or better	0.71	C or better
	8 SR99/Belmont	0.72	C or better	1.14	F
	9 SR99/Olive	0.12	C or better	0.78	C or better
	10 SR99/Clinton	0.59	C or better	0.88	C or better
	11 SR99/Ashlan	0.81	C or better	0.91	D
	12 SR99/Shaw	0.44	C or better	0.71	C or better
	13 SR99/Herndon	0.26	C or better	0.57	C or better
	14 SR41/Van Ness	0.36	C or better	0.67	C or better
	15 SR41/Tulare&Divisadero	0.77	C or better	1.16	F
	16 SR41/McKinley	0.65	C or better	0.77	C or better
	17 SR41/Shields	0.59	C or better	0.84	C or better
	18 SR41/Ashlan	0.65	C or better	1.06	E
	19 SR41/Shaw	0.57	C or better	1.00	D
	20 SR41/Bullard	0.64	C or better	1.19	F
	21 SR41/Friant	1.04	E	1.27	F
	22 SR180/N. Fulton & Van Ness	0.68	C or better	1.04	E
	23 SR168/Bullard	0.19	C or better	0.78	C or better
	24 SR168/Shaw	0.53	C or better	1.02	E

4. COST REVIEW METHODOLOGY

Purpose of the Cost Estimate Review

The cost estimate review undertaken as part of this study is intended to serve several purposes:

- To provide agencies an opportunity to update project cost estimates in light of situations that may have changed since the Measure “C” Extension brochure was developed
- To provide an independent check on the reasonableness of the estimates. This will lessen the risk that the cost estimates are outside of reasonable parameters resulting in the RTMF either over- or under-charging new development for required mitigations
- To ensure that project cost components meet the legal eligibility requirements set forth in the Mitigation Fee Act and were handled in a reasonably consistent manner for projects from different jurisdictions, taking into consideration the differences in settings

The cost estimate review was undertaken in the knowledge that Measure “C” Extension is a twenty-year program with projects in different stages of preparation ranging from little more than a vague concept all the way to final designs ready for construction. In many cases detailed information was not available because projects are still in the concept stage. Nevertheless, an effort was made to accomplish the three goals described above to the extent possible. The RTMF program is expected to incorporate a mechanism for regular periodic reviews of the project list that will enable further refinement of project cost estimates as projects progress through the various stages of design

An overview of the methodology used to develop the forecasts is provided in the section below.

Overview of the Cost Review Methodology

The methodology used in the deficiency analysis is outlined in Figure 8 below. The major steps include:

- 1) The first step was to contact each project’s lead to request their most recent information on the cost of Measure “C” Extension projects. This request was made either through the agency representatives on the PDT, direct contact by telephone, or at meetings at the agencies’ offices.
- 2) Two types of information were requested; namely cross-sections and layouts showing what the project entailed and the cost estimates prepared by the agency
- 3) The consultants used the project layouts and cross-sections to estimate the quantities of various components of the project, such as cubic feet of earth moved, square feet of pavement constructed, and linear feet of curb and gutter to be provided. These quantities were compared to the quantities used in the agency cost estimates and discrepancies were identified.
- 4) Next, the various components of the project were reviewed to determine if any were clearly ineligible under the Mitigation Fee Act. For example, an otherwise eligible capacity expansion project might include a beautification component whose costs are not allowable under the RTMF.

The agency budgets were also checked to determine if any allowable cost was omitted, such as environmental mitigations during construction or the cost of relocating utilities.

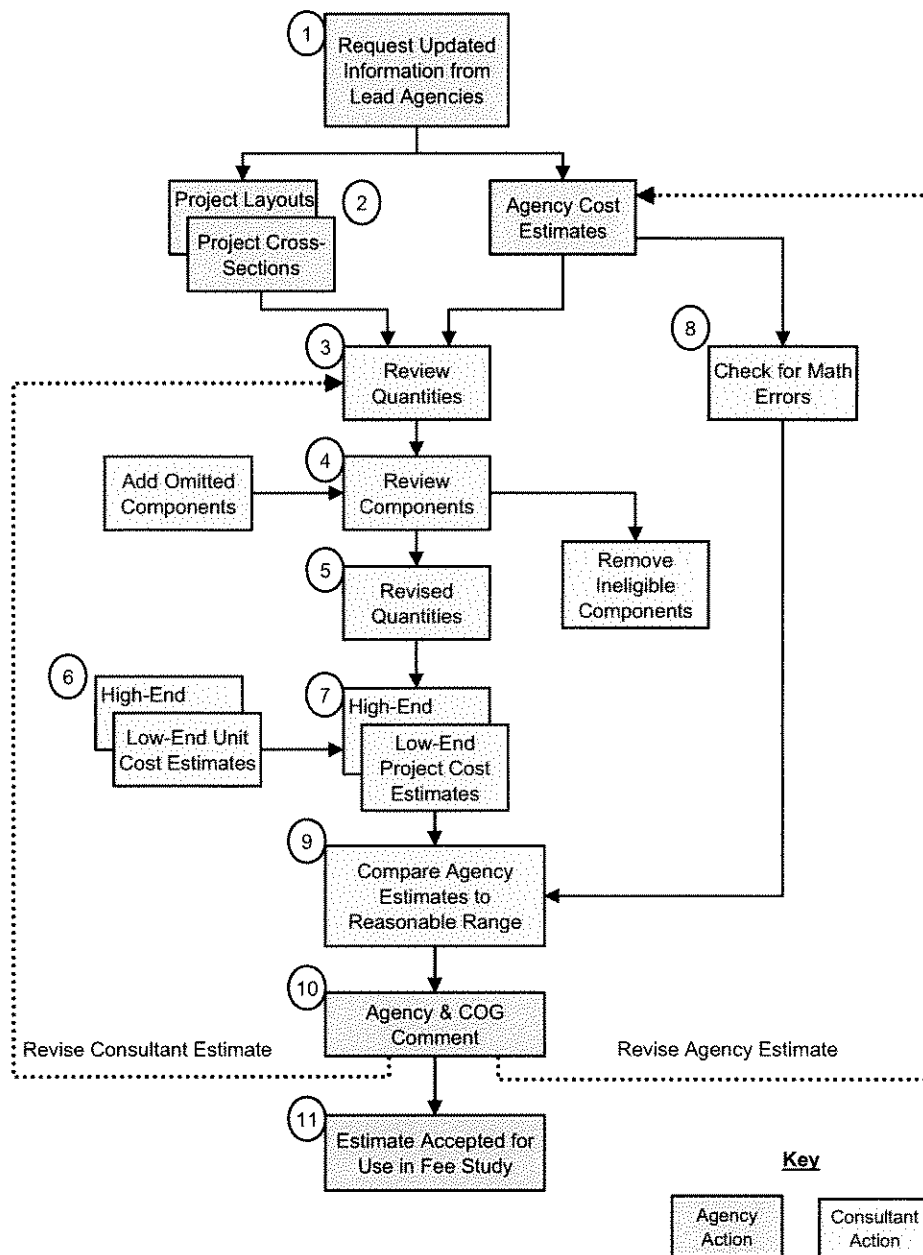


Figure 8: Steps in the Project Cost Review

- 5) The product of the review of quantities and components was a revised estimate of quantities.
- 6) Unit costs for such things as asphaltic concrete, storm drainage, and lane striping were taken from a variety of sources, and high- and low-end unit costs were determined for each.
- 7) The high- and low-end unit costs were then multiplied by the revised quantities to produce high- and low-end cost estimates for each project. The high- and low-end costs defined the "expected range" of cost estimates for each project.
- 8) The agency cost estimates were checked for math errors.
- 9) The agency project cost estimates were then compared to the "expected range" to gauge whether the agency estimates could be considered reasonable.
- 10) The draft cost review analysis for each project was sent to the lead agency and to the COG for comment. In some cases the cost reviews were revised in light of agency comments while in other cases the agency estimates were revised in light of the reviewing engineers' comments.
- 11) Once a project cost estimate was considered reasonable by all three parties (the COG, the agency, and the reviewing consultants) it was considered complete and acceptable as the basis for the fee analysis.

The next sections provide additional detail regarding some of the key steps in the cost review process.

Review of Quantities

Each lead agency was asked to provide project information, including preliminary cost estimates, a complete project description and typical section. The information provided for each project ranged greatly, from nothing more than the project description listed in the Measure "C" Extension brochure to detailed tables using the Basic Engineering Estimate System. The information provided for each project dictated the method of approach used to generate a project cost estimate.

Little or no detailed information was available for about half of the projects beyond the project description in the Measure "C" Extension document. In such cases independent cost estimates were generated by the reviewing engineer using this project description and generic unit cost information for similar facilities (e.g. \$4.7 million per mile for new 2-lane roads).

The baseline conditions for each project were determined using aerial photographs. In some cases this task was complicated by the fact that the landscape had changed or was changing due to development activities. In some images, construction equipment could be seen and so the extent of existing improvements was not clear. A limited number of field checks were made to supplement the aerial imagery. In cases where construction seemed to be occurring in Measure "C" Extension project locations, that portion of the project was assumed complete, or at least funded, and was removed from the revised cost estimates and noted in the project assumptions. Roadway standards for each jurisdiction were used to determine the typical section of the proposed improvement for the purpose of establishing roadway quantities and associated costs. The typical sections were also determined by examining adjacent roadway segments that have already been improved and assuming that the roadway would have a consistent geometric design. Agency design standards were used when available, otherwise Caltrans standards were assumed. If no specific project information was provided, the typical section used to generate pavement costs was assumed to be 6.5" of asphaltic concrete over 23" of aggregate base.

The aerial imagery programs were also used to determine other potential impacts, such as utility relocations, structure widening, signal improvements, full right-of-way takes, and potential retaining and sound wall locations.

Review of Components

The cost estimates provided by the lead agencies were also checked to verify that the cost of all major items were included such as erosion control, traffic control, environmental mitigation, and right of way. In addition, 31% was added to construction budgets to account for “soft” costs such as design, environmental clearance, and construction management. A contingency factor of 20%-35% was used depending on the quality of the available data, with higher contingencies for projects where the data was less complete. The cost for all roadway items includes clearing and grubbing, roadway excavation and placement of improvement, unless otherwise noted.

High- and Low-End Unit Costs

An independent reviewer's cost estimate was generated using this information with a range of costs associated with specific improvements. This range of costs was developed using standard industry unit pricing. In some instances, the improvement costs were dependent on whether the project was in a rural or urban area. For example, utility adjustments for rural locations tend to cost less in urban areas because underground utilities are more common in urban areas than rural areas. Table 17 illustrates the improvement line items that were typically used in estimating the Measure “C” Extension projects and the costs associated with each.

Table 17: Summary of Per-Unit Cost Assumptions				
Typical Costs	Urban		Rural	
	Low	High	Low	High
12' Lane (AC) (Per additional Lane)	\$90/LF	\$120/LF	\$90/LF	\$120/LF
12' Lane (PCCP) (Per additional Lane)	\$120/LF	\$150/LF	\$120/LF	\$150/LF
Curb, Gutter and Sidewalk (Both sides)	\$120/LF		\$120/LF (If required)	
Storm Drainage (Both Side)	\$34/LF	\$40/LF	-	-
Drainage (Ditch Excavation)	-	-	\$12.50/LF	\$15/LF
Signing and Striping	\$7/LF	\$20/LF*	\$7/LF	\$20/LF*
Traffic Control	5%	10%	2%	5%
Erosion Control	1%	3%	1%	3%
Shoulder (/ft Shoulder Width/LF of Project)	\$15		\$15	
14' Landscaped Median (w/ curb & irrigation)	\$60/LF		\$60/LF	
Signal Interconnect	\$10/LF		\$10/LF	
Utility Adjustment	\$15/LF	\$60/LF	\$15/LF	\$20/LF
Lighting	\$40/LF	\$60/LF	120,000/Intersection	
Note: * The high end for signing and striping is typically used for freeways and expressways.				

A direct comparison was made to the cost estimate provided by the lead agency along with a check of the quantities using an assumed typical section if more detailed information was not provided. The Caltrans 2006 Contract Cost Data was used to determine unit costs for specific line items. Both statewide and district averages were compared to give a range of costs, for those items where such data was available. This check provided guidance on items that may be under- or over-estimated. For example, some projects' original cost estimates used \$60/ton for asphalt concrete when this item typically costs \$80/ton. If the \$60/ton estimate was used in funding the project and the bids came at \$80/ton, then these projects could potentially have substantial budget shortfalls.

Selecting Which Cost to Use

Once the expected range of costs was defined, the next step was to determine a single cost figure for use in the computation of the RTMF. It should be stressed that the only purpose of these cost estimates was to provide a reasonable basis for collecting an impact fee; the estimates do not imply official approval, nor are they meant to preclude future revisions as each project's situation evolves.

The method used for selecting the cost estimate is outlined in the form of a decision tree in Figure 9 below:

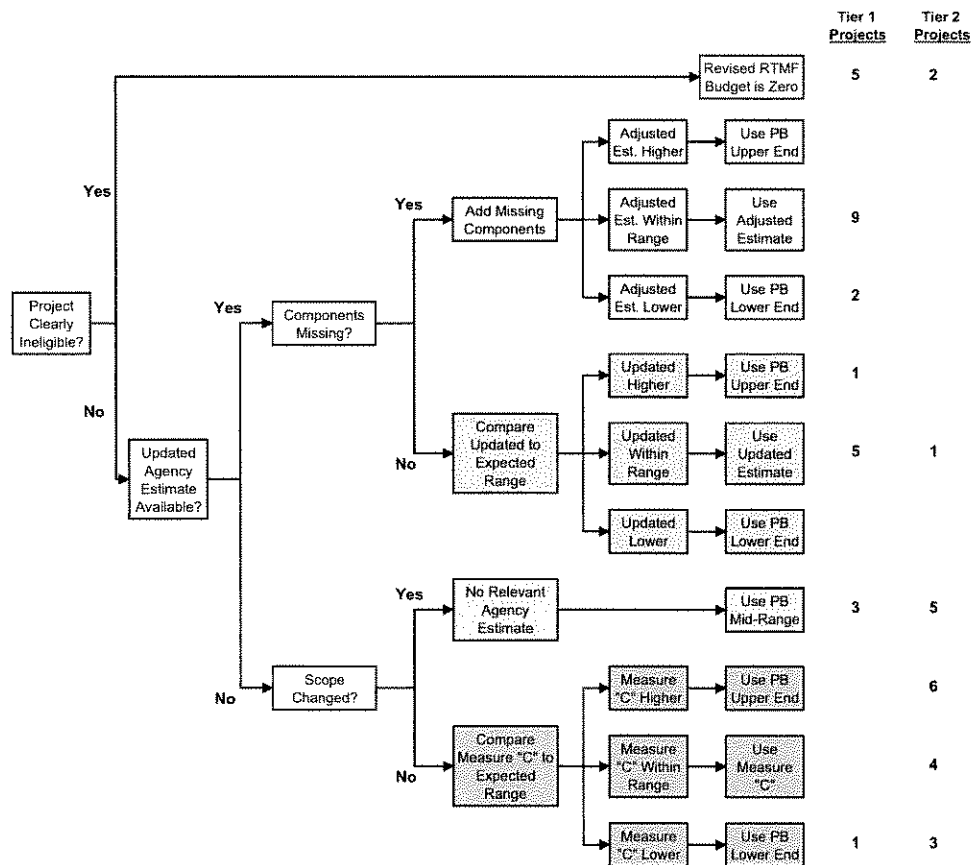


Figure 9: Decision Tree for Selecting Cost Estimate

The first branch in the decision tree is whether the project was clearly ineligible for funding under the Mitigation Fee Act. If the project was clearly ineligible then no cost review was performed. Then next question was whether or not the sponsoring agency provided an updated project cost estimate. If an updated estimate was available, the next question was whether the updated estimate covered all project components whether some were missing. For example, in some cases agencies estimated construction costs but did not include soft costs such as environmental clearance and design, while in other cases a project was to be implemented in stages and estimates were made only for the initial stages. If components were missing, then PB estimated the costs of the missing components and used these to produce an adjusted estimated. In either case the estimate was then compared to the expected range to see whether it fell within the range and, if not, whether it was higher or lower. If the agency estimate fell within the expected range then the agency estimate was used. If not, then if the agency estimate was above the range then the upper limit of the expected range was used, and if it was below the range then lower limit of the expected range was used.

In cases where the lead agency did not provide an updated cost estimate then the cost review centered on the cost estimate in the original Measure "C" Extension material. If the scope of the project had changed since Measure "C" Extension was passed but the agency had not yet updated its cost estimate, then the middle of the range of the PB estimate was used. If there were no changes to the project scope then the Measure "C" Extension estimate was compared to the expected range to see whether it fell within the range and, if not, whether it was higher or lower. If the Measure "C" Extension estimate fell within the expected range then the Measure "C" Extension estimate was used. If not, then if the Measure "C" Extension estimate was above the range then the upper limit of the range was used, and if it was below the range then lower limit of the range was used.

Updated Costs for Each Project

The updated costs produced through the cost review process described in the previous section are shown in Tables 18 through 21 below.

Table 18: Updated Costs for Urban Tier 1 Projects			
Project ID	Project Name	Measure "C" Cost Estimate	Updated Cost Estimate
A	SR 180 East Segment II	\$33,479,701	\$0
B	SR 180 West Segment II	\$6,995,758	\$1,967,000
C	SR41/168/180	\$29,981,821	\$114,000,000
D	Willow Avenue	\$13,991,517	\$19,656,767
E	Temperance Avenue	\$5,996,364	\$4,098,477
F	Ventura Boulevard	\$5,000,000	\$5,000,000
G	SR99 Monterey Bridge Retrofit	\$1,000,000	\$1,000,000
H	California Ave Widening	\$7,995,152	\$12,548,738
I	Peach Ave Widening	\$24,984,851	\$17,300,000
J	SR41 Auxiliary Lane	\$3,000,000	\$11,400,000
K	Herndon Ave Widening	\$30,000,000	\$42,200,000
L	Shaw Ave Upgrades	\$31,580,852	\$17,500,000
M	SR 99 North & Cedar Interchanges	\$24,984,851	\$81,220,000
N	Veteran's Boulevard	\$60,000,000	\$117,978,600
Total for Urban Tier 1		\$278,990,867	\$449,352,582

Table 19: Updated Costs for Rural Tier 1 Projects			
Project ID	Project Name	Measure "C" Cost Estimate	Updated Cost Estimate
A	SR 180 West	\$9,993,940	\$8,614,915
B	SR 180 East Segment III	\$14,491,214	\$42,600,000
C	SR 180 East Segment IV	\$38,976,368	\$46,460,819
D	SR 180 East Segment V	\$42,674,126	\$59,915,560
E	Friant Road Widening	\$16,490,002	\$5,900,000
F	Golden State Boulevard	\$34,978,792	\$34,978,792
G	SR 269 Bridge Improvement	\$16,989,699	\$16,989,699
H	SR 180 West I5 Extension	\$39,975,762	\$183,000,000
I	Mountain View Ave Widening	\$5,496,667	\$25,632,000
J	Mendocino Ave Widening	\$1,998,788	\$3,350,000
K	SR99 American Ave Interchange	\$24,984,851	\$24,300,000
L	I-5 Interchange Improvement	\$7,995,152	\$12,012,000
Total for Rural Tier 1		\$255,045,361	\$463,753,785

Table 20: Updated Costs for Urban Tier 2 Projects			
Project ID	Project Name	Measure "C" Cost Estimate	Updated Cost Estimate
AA	SR-99 Ramp Improvement	\$7,995,152	\$45,000,000
BB	SR-41 O Street Ramps	\$162,000,000	\$63,500,000
CC	Friant Road Widening	\$9,993,940	\$8,100,000
DD	SR-99 Shaw Ave Interchange	\$34,978,792	\$34,978,792
EE	Traffic Synchronization	\$24,984,851	\$24,984,851
FF	Herndon Ave Widening	\$5,796,485	\$16,411,238
GG	SR-99 Auxiliary Lanes	\$59,963,643	\$59,963,643
HH	Blackstone Ave Turn Lanes	\$1,998,788	\$2,200,000
II	SR-99 Shields Ave Overcrossing	\$59,963,643	\$59,963,643
JJ	McCall Widening	\$10,993,334	\$10,993,334
KK	Shepherd Ave Widening	\$15,490,608	\$37,500,000
LL	SR-41 Auxiliary Lanes	\$9,993,940	\$0
MM	SR-99 Widening	\$29,981,821	\$0
NN	Traffic Management Center	\$993,940	\$993,940
OO	Minnewawa 4-Lane Project	\$34,978,792	\$17,900,000
Total for Urban Tier 2		\$470,107,729	\$382,489,441

Table 21: Updated Costs for Rural Tier 2 Projects			
Project ID	Project Name	Measure "C" Cost Estimate	Updated Cost Estimate
AA	SR99 Interchange Improvement	\$24,984,851	\$50,000,000
BB	SR 145 Widening	\$22,986,063	\$12,800,000
CC	SR 33 Widening	\$8,245,001	\$9,069,501
DD	Academy Parkway	\$23,386,250	\$6,100,000
EE	SR 41 Interchange Upgrade	\$49,969,702	\$32,000,000
FF	Millerton Road Widening	\$11,992,729	\$29,034,327
GG	Manning Ave Widening	\$3,697,758	\$15,200,000
HH	SR 43 Widening	\$89,945,464	\$47,500,000
II	McCall Ave Connection	\$34,978,792	\$19,100,000
JJ	SR 180 E Segment VI	\$40,975,156	\$53,267,703
Total for Rural Tier 2		\$311,161,766	\$274,071,531

The results are shown in a different format in Figures 10 and 11. In the figures the X-axis is the original cost estimate used in the Measure "C" Extension brochure and the Y-axis is the updated cost. An "equal cost line" is shown to indicate where the updated cost equals the cost in the Measure "C" Extension ballot materials. Dots shown above the equal cost line are cases where the updated costs are higher than the original estimates while dots below the equal cost line are cases where the updated costs are lower. As can be seen in the figure, project cost estimates were revised in both directions since the passage of Measure "C" Extension. However, for Tier 1 projects in particular, the magnitude of the upward revisions for projects with cost increases tends to be larger than the magnitude of the downward revisions for projects with cost decreases.

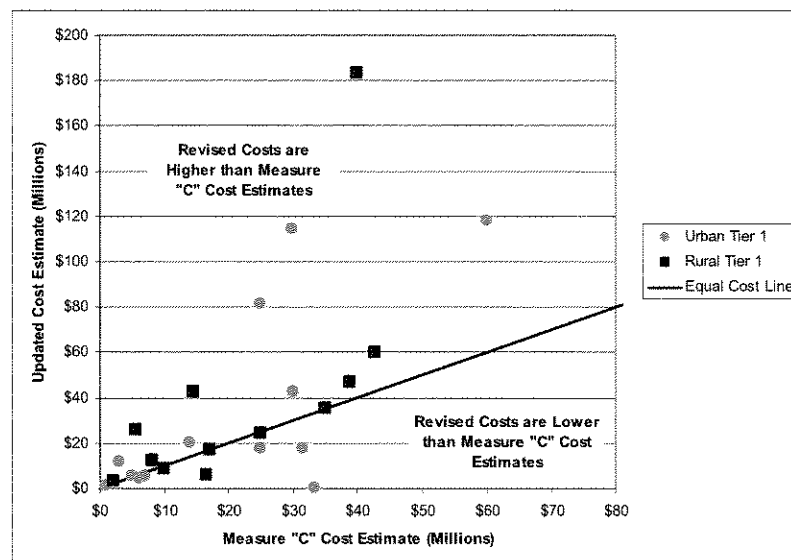


Figure 10: Comparison of Measure "C" and Updated Cost Estimates, Tier 1 Projects

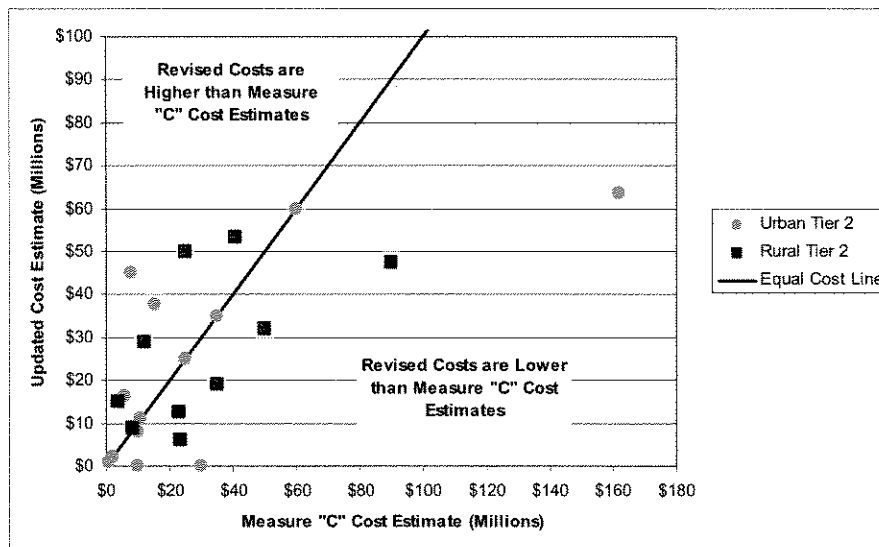


Figure 11: Comparison of Measure "C" and Updated Cost Estimates, Tier 2 Projects

There were many reasons why the costs changed significantly between the time the Measure "C" Extension ballot materials were being prepared and today. Some of the reasons include:

- The cost of construction materials has escalated rapidly in recent years as China switched from being a major exporter of cement, steel, and plywood to being an importer of such goods. The weakening U.S. dollar caused the price increases for other imported construction inputs, particularly gasoline. This can be seen in Figure 12, which shows Caltrans' construction price index for the every year since 1990. Note that prices rose more in 2004 than they did in the previous twenty years *combined*, followed the next year by a second similarly large price increase. Although prices have since fallen slightly, they are still about double what they were when the original cost estimates were made for most Measure "C" Extension projects.

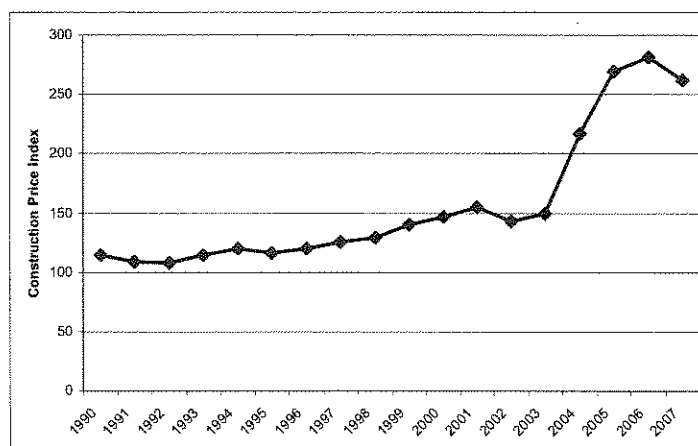


Figure 12: Caltrans Construction Price Index (1987 prices = 100)

- Some of the cost estimates used in the Measure “C” Extension materials appear to have been used by mistake. For example three totally unrelated projects (California Avenue widening, the replacement of the North and Cedar Avenue interchanges, and improvements to the American Avenue interchange) are all listed as having identical costs of \$24,984,851. In another example, the \$3 million estimate given for the SR-41 auxiliary lanes between Tulare Street and O Street appears to have been the budget for a much smaller project to improve the O Street off-ramp that had a similar-sounding name.
- Some projects have moved forward using other funding sources since the Measure “C” Extension materials were prepared, and so the remaining budget request is for less than the original request. For example, the City of Clovis used funds from its own impact fees to implement most of the Shaw Avenue widening project, reducing the funding needed from Measure “C” Extension from \$31.5 million to \$17 million.
- In several cases additional information has come to light that resulted in changes to the project scope. For example, the City of Parlier found that the plan to widen Mendocino Avenue would have been considerably more expensive than originally thought due to the need to remove several commercial gas storage tanks. The City is therefore revising their plan to widen a parallel road, Academy Avenue, to serve the same purpose as the original project. Similarly, for the case of the extension of SR-180 to I-5, the original alignment along Nees Avenue has been dropped in favor of a new alignment with different cost characteristics.
- In other cases the lead agency changed the phasing of a project with consequent changes to costs. For example, SR-180 East Segments IV and V were originally scoped to be 2-lanes expressways within a right-of-way capable of accommodating later expansion to a 4-lane facility. Upon reconsideration Caltrans believes that the rapid growth of demand in the area justifies implementing the extension as 4-lanes from the start, especially as the additional cost of doing so is relatively low.

In all cases the approach used in this study was that it is the role of the sponsoring agency, not the consultant, to define or redefine the project. For example, if the lead agency's concept for the project has evolved away from the concept originally used to prepare Measure “C” then there would be little point in basing the costs used for the RTMF on superseded information. Note, however, that this does not mean that the updated costs will be automatically approved for implementation; such a step could only be taken by the Measure “C” Extension oversight committee.

Conclusions Regarding Project Costs

Measure “C” Extension is a long-term program that will require periodic adjustments as the situation evolves over time. The original Measure “C” Extension materials incorporated the best cost information available at the time. However since that time some projects have dropped out of Measure “C” Extension as funds became available from other sources, other projects have changed in scope, and prices for construction materials and right-of-way have escalated rapidly. The overall estimated cost for the Tier 1 program has risen from about \$534 million in uninflated 2006 dollars to about \$913 million; an increase of 71%. Sixty percent of the 71% increase can be attributed to two projects, namely:

- 38% of the net increase is attributable to the extension of SR-180 west to I-5. The original alignment followed an existing road so much of the ROW had already been purchased; while the new alignment would require the purchase of entirely new ROW.
- Another 22% of the increase is attributable to the SR-41/168/180 braided ramps project. As this project moves through its design stages it is becoming clear both that the project will require more structure than was originally thought and that the materials to be used in these structures have increased in price.

The estimated costs for most Tier 2 projects had a net reduction of 16% due to the fact that several projects have already been fully or partially implemented using other funding sources. The net reduction is also due in part to the fact that few Tier 2 projects have reached the design stage, where unexpected cost items are most likely to come to light.

5. OTHER (NON-RTMF) SOURCES OF FUNDING

Measure "C" cites three sources of funding for projects, namely the Measure "C" sales tax, the State Transportation Improvement Program (STIP), and the RTMF. This section describes the levels of funding that can be expected from the first two sources so that the size of the expected unfunded portion can be determined. The figures used in this section are all expressed in uninflated 2008 dollars.

Measure "C" Sales Tax

The most important effect of the original Measure "C" was to establish a sales tax that could be used to fund improvements to the transportation system. The sales tax raised \$671 million over the life of the original Measure "C", \$480 million (71.6%) of which was used for capital projects¹⁰.

Sales tax revenues grew steadily over the course of the original Measure "C" and are expected to continue to grow during the period of the extension, though a short downturn is expected in the near term due to the current weak condition of the economy. The key difference between the sales tax revenues in the original Measure "C" and the extension, from the perspective of road improvement programs, is that 71.6% of sales tax revenues were available for capital projects during the original measure compared to only 29.4% being made available for road improvements during the period of the measure extension¹¹. The overall effect is shown in Figure 13 below.

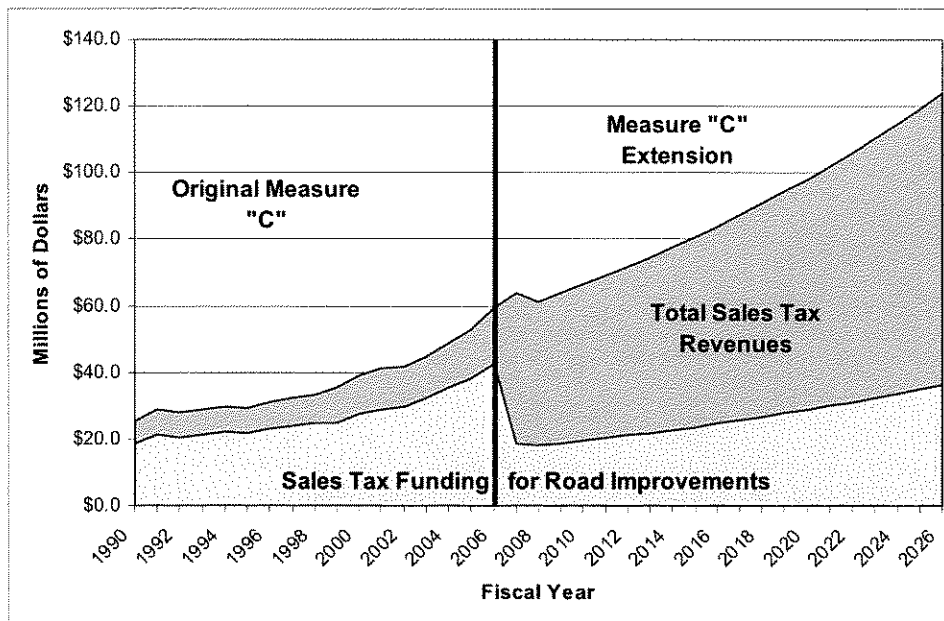


Figure 13: Measure "C" Sale Tax Revenue

¹⁰ Another 25.0% was used to support local transportation and the remaining 3.4% was used to cover administrative costs.

¹¹ The Measure "C" Extension also includes funding for public transit and transit-supportive measures, local street maintenance and improvement, bicycle and pedestrian trails, and rail consolidation, among other things.

Based on the most recent estimates it appears that the Measure "C" sales tax will raise approximately \$517 million for road improvements over the life of the extension. In nominal terms this is slightly more than was raised during the original Measure "C", but when the doubling of construction costs are considered the real level of sales tax support for road improvements will be about half of what it was under the original measure.

State Transportation Improvement Program (STIP)

State and federal funds for transportation improvements are channeled through the STIP, which is administered by the California Transportation Commission (CTC). For the purposes of this study there are two key features of the STIP; namely that the CTC allocates a share of statewide funding to Fresno County which the Fresno COG then allocates among individual projects, subject to later review by the CTC, and that STIP funding is difficult to predict and varies widely from year to year depending on the budget situation on the state level.

Table 22 below shows the STIP funds for projects analogous to those in the Tier 1 and Tier 2 lists for the period of the original Measure "C".

Table 22: Original Measure "C" STIP Funding for Road Projects		
Year	Project	STIP Funds (millions)
1990	SR 180 - SR 99 to SR 41	\$72.4
1990	SR 180 - SR 41 to Chestnut	\$75.9
1992	SR 168 - SR 180 to Bullard	\$53.2
1992	SR 41 - Audubon to Madera Co. Line	\$18.2
1998	SR 180 - Chestnut to Clovis	\$90.2
1999	SR 180 - SR 99 to Hughes/West Diagonal	\$39.3
2007	SR 180 - Clovis to Temperance	\$11.9
Projected	SR 180 - Temperance to Academy	\$25.1
Total for 20-Year Measure Period =		\$386.1
Average STIP Funding Per Year =		\$19.3

The CTC's current estimate for STIP funding for the first half of the Measure "C" Extension period¹² is \$16.8 million per year. The Measure "C" Extension ballot materials state that 75% of STIP funds will be made available for Tier 1 projects, which would mean that \$12.6 million per year¹³ would be available for the projects relevant to the RTMF study. STIP funding would thus be about 35% less during the Measure "C" Extension period than it was during the period of the original Measure "C"¹⁴ in nominal terms. Moreover, since project costs have approximately doubled in recent years, in terms of purchasing power for road construction the STIP will only provide about one-third of the funding support that it did during the period of the original Measure "C".

¹² Estimates are not yet available for the second half of the period

¹³ 75% of \$16.8 million is \$12.6 million

¹⁴ \$12.6 million is approximately 65% of \$19.3 million

Comparing Project Costs to Funding Available

Taken together, the STIP and the Measure “C” sale tax are expected to generate approximately \$769 million over the course of the Measure “C” extension period¹⁵. This figure is compared to the estimated costs of projects in Table 23 below.

Table 23: STIP and Sales Tax Revenues Compared to Project Costs			
Projects Included	Project Costs	STIP & Sales Tax Revenues	Funding Shortfall
Tier 1 Only	\$947	\$769	\$178
Tier 1 and FIDS	\$1,066	\$769	\$297
Tier 1, Tier 2, and FIDS	\$1,753	\$769	\$984

The table shows that the STIP and sales tax allocations would cover approximately 80% of the costs of the Tier 1 projects, leaving a shortfall of approximately \$178 million to be funded from other sources. Fresno COG believes this to be a very conservative estimate of the shortfall since it does not include an allowance for further inflation of project costs; if construction prices continue to rise, the shortfall for Tier 1 projects could be as much as \$500-\$600 million. The clear conclusion is that there will be no surplus of STIP and sales tax allocations for Tier 2 and FIDS projects; if they are to be implemented they would have to be funded entirely from other sources that could include RTMF.

This calculation is intended to provide readers with a context for judging the role of the RTMF as a source of funds for roadway improvements in Fresno County. Readers should note, however, that the maximum fee that can be charged under the RTMF is based solely on the traffic impacts attributable to new development and thus is unrelated to the size of the funding shortfall. In other words, if the maximum revenues from the RTMF are insufficient to cover the funding shortfall then the fees cannot be simply factored up to the desired level; by state law the fees cannot go beyond the constraints stipulated in the Mitigation Fee Act.

¹⁵ Assuming that 75% of the STIP and 29.4% of the sale tax revenues are devoted to road improvements, as stated in the Measure “C” Extension ballot materials.

6. POLICY ISSUES CONSIDERED BY THE PDT

The Project Development Team (PDT) considered a variety of issues in monthly meetings held over the course of the project. These discussions provided guidance to the consultants on how these issues should be handled within the context of calculating the fee. The issues that generated the greatest amount of discussion are described in the sections below.

Commitments Made in the Measure "C" Extension Ballot Materials

Perhaps the most important issue raised at the PDT meetings was the fact that the Measure "C" Extension ballot materials included items that may have been consistent at the time the materials were prepared, but now apparently contradict each other. Most pertinent to this study is the fact that the RTMF is described in one section as providing, "*Approximately \$102 million from developer fees*" while another section says that, "*Funds collected through the RTMF will provide an anticipated 20% of Urban and Rural Measure "C" funds to deliver Tier 1 Projects over the Measure "C" period*". The contradiction occurs because construction costs have since risen to the point where \$102 million now represents about 10% of Tier 1 costs instead of the 20% originally anticipated. Some PDT members believe that the ballot materials imply a commitment to the \$102 million figure, while other members believe that they imply a commitment to see that new development bears 20% of Tier project costs.

Some PDT members also raised the issue of whether there was an implied commitment to maintain an acceptable degree of mobility in the county. The COG has a policy of maintaining at least LOS "D" on the regional road system, and the projects listed in the Measure "C" Extension materials were intended to ensure that congestion does not exceed this threshold. If the RTMF failed to raise sufficient revenues to fund these projects, then portions of the system would operate at lower levels of service than current policy allows.

A consensus could not be reached on which of these commitments should take precedence. Instead, the PDT chose to submit several options to the Fresno County Transportation Commission so that the commission could make the determination as to which target level of funding is most appropriate.

Conflicts with Existing Fee Programs

Several of the jurisdictions in Fresno County already collect fees from developers that are used to mitigate impacts on the major street system. To the extent that these programs cover the same projects that would be funded under the RTMF there would be an overlap that would need to be resolved, because the Mitigation Fee Act does not allow the cost of any particular mitigation measure to be charged twice.

The extent of the potential overlap varies by jurisdiction. The City of Fresno's Major Street Impact Fee was purposefully designed not to include funding for any Measure "C" Extension projects, so there would be no overlap. In contrast, the City of Clovis's impact fee program includes several projects on the Measure "C" Extension list that would either have to be dropped from the city's fee program, dropped from the RTMF, or dealt with in some other way to eliminate the overlap. Fresno County represents a third situation, in that it does not have a formal traffic fee program in place, but instead analyzes each project's impacts separately and then negotiates a settlement for traffic impact mitigations. In some cases this could lead to an overlap, but not in all cases.

The PDT dealt with this issue by recommending that the RTMF be applied only to state facilities and exclude local roads, which would still be eligible for other Measure "C" Extension funds (sales tax revenues, etc.). Local impact fee programs could then be applied to local road projects with

no overlap. Limiting the RTMF to state facilities would also remove any questions about whether the proposed improvement was regional in impact as opposed to purely local.

Affordability

Another issue raised at PDT meetings was the extent to which the market could accept the cost of a new fee program, especially given the recent downturn in the housing market. The PDT could not reach a consensus on this issue, with some members citing anecdotal examples of houses being sold below cost, while others questioned whether current market conditions will be representative of the 20-year life of the program.

This issue was ultimately resolved through a PDT decision not to recommend a single plan to the Fresno COG board but instead to present several options to the board allowing the board to consider different levels of fees.

Comparability with Other Counties

An issue closely related to affordability was whether the proposed RTMF would be higher or lower than analogous fees in other counties. This was viewed as an indicator of what the market will bear and also address the specific issue of whether a fee in Fresno County would cause investment to shift to a lower-priced location.

Figure 14 below compares mitigation fees for regional traffic impacts in eight other counties in California. The fees vary significantly, depending on how ambitious the construction program is, and also by how long the fee has been in place. There has been a definite trend towards increasing impact fees as other potential sources of project funds appear to be in a long-term decline. Nevada County, for example, is replacing its \$576 traffic mitigation fee per single family home with a new fee structure that charges \$4,205 per single family home.

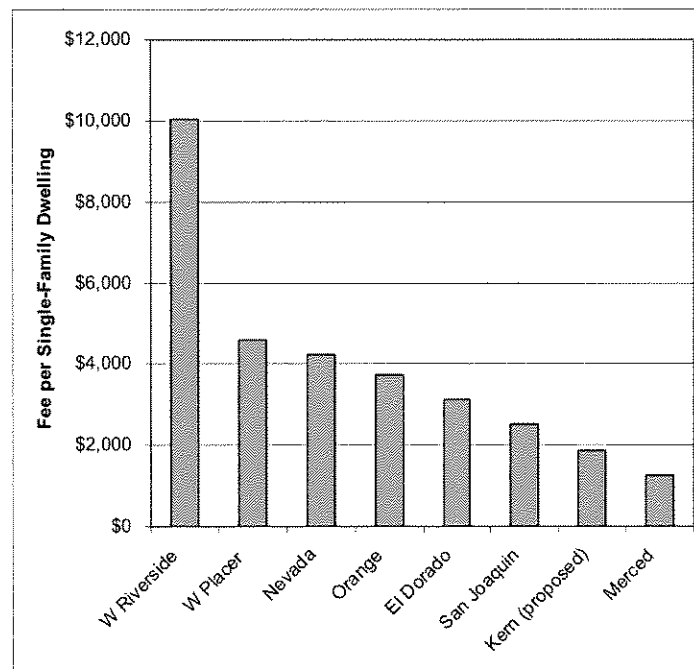


Figure 14: Comparison of Regional Traffic Impact Fees

Based on Figure 14 it appears that county-level traffic mitigation fees are typically in the range of \$2,000-\$4,000 per single-family dwelling.

Return-to-Source Issues

Some members of the PDT expressed a concern that RTMF monies would be collected in certain parts of the county but spent in other parts, which would be politically unacceptable to the donor areas. Concern over this issue diminished over time as the analysis revealed that the imbalance was much smaller in magnitude than originally supposed. Moreover the imbalance (namely that more RTMF money would be collected in the metropolitan area than would be spent on projects there) would be offset to some degree by other parts of Measure "C" Extension that disproportionately favor projects in the metropolitan area (airport improvements, transit improvements, etc.).

This issue was dealt with by conducting an analysis of where RTMF funds would be collected and spent and, when the program was found to be reasonably balanced, not pursuing the issue further.

Administrative Complexity and Administrative Costs

The costs involved in administering the RTMF program were the subject of debate in three or four PDT meetings. There are several facets to this issue, including:

- The Fresno County Transportation Commission has no funds to administer this program other than whatever funds are raised within the program itself.
- Programs in other counties in California have established a precedent that administrative costs for a fee program can be recovered as part of the fee. Administrative costs are typically on the order of 3% of project revenues. For example, 3.4% of the revenues for the original Measure "C" was used to cover the cost of administering the program.
- Most PDT members felt that the RTMF should be collected by the local jurisdiction as part of their regular development approval process, thus saving the developers the need to go through a separate process at the transportation commission.
- The cost to the local jurisdiction to process the fee will vary from jurisdiction to jurisdiction. The cost would be low for agencies that already collect fees (it would just be one more fee on the list along with fees for fire protection, libraries, parks, etc.) but could be substantial for local agencies that do not currently administer fee programs.
- There is a trade-off between accuracy (in the immediate term) and administrative costs. The most accurate system for computing the fee would be to categorize the proposed development to the most detailed land use sub-category for which a trip generation rate existed; for example, distinguishing "Convenience Mart with Gas Pumps (ITE code 853)" from "Gasoline/Service Station with Convenience Mart (ITE code 945)". The difficulty is that such categorizations are open to debate and challenge and, moreover, might only be accurate for the building's first tenant. Aggregating land use categories into major groups such as "retail", "service", and "other commercial" would reduce administrative complexity, preclude disputes for minor changes in building use, and lower the overhead costs for everyone.
- In addition to at-the-counter administrative costs, the program would also incur costs for consultants involved in periodic updates, possibly banking fees for financial transactions, and auditing costs.

The consensus of the PDT was to set the administrative fee initially at 2%, and then subsequently review the appropriateness of this level during the program's first update after the first two years of operation. The 2% would be used to cover the transportation commission's costs to administer the program; local jurisdictions could choose to add a transaction fee if they felt it was needed to cover their own costs of administering the program.

Pass-By Trips

The issue of pass-by trips was raised a number of times in the PDT meetings because of its importance to developers of retail properties. Most jurisdictions allow retail uses to have some reduction in the computed traffic impacts, either because they accept the theoretical justification for such a reduction or because, as a practical matter, failing to provide some relief may cause retail uses to locate out of the jurisdiction which would reduce future sales tax revenues.

This issue is complicated by the fact that some retail uses, for example fast food restaurants or video rentals, have a much higher rate of pass-by trips than other retail uses, such as appliance stores. Given that retail space has a much faster turnover than other land uses, it is difficult to determine what pass-by rate to use for a long-term calculation even if the first tenant can be correctly identified, which is not always the case.

The PDT recommended including a flat-rate pass-by reduction of 43% for retail uses. The 43% figure is the median recommended pass-by reduction for the retail land uses in *ITE Trip Generation* for which a pass-by rate is given.

Exempt and Favored Land Uses

The terms of the Measure "C" Extension stipulate that essential public services will be exempt from the fee. The PDT therefore exempted education and government developments from payment of the RTMF. The terms of the Measure "C" Extension also stipulate that affordable housing will pay only half of the fee collected from higher-priced housing of a similar type. This is included in the calculations shown in the next chapter.

Vested Maps

Another issue raised in the PDT meetings was the fact that approximately ten thousand residential lots have already been approved for development and are thus unlikely to be paying the RTMF (since their project approvals predate the enactment of the fee). The term "unlikely" is used because development approval for some of these lots may expire before anything is constructed on them, in which case subsequent proposals for new development would be subject to the RTMF. The PDT concluded that there was not much that could be done about this issue other than to take it into account when computing the amount of revenue likely to be raised by the RTMF program.

Period Used to Determine Level-of-Service

Traffic impact fees can be based either on traffic conditions throughout the day or limited to traffic conditions during the peak period. The PDT decided early in the study that daily traffic volumes were the appropriate measure of traffic conditions on most roads in Fresno County, and made a decision to use daily traffic volumes as the basis for the level-of-service calculations.

As the study progressed, more attention came to be focused on the freeway ramps as critical bottlenecks in the regional road system. Congestion on this type of facility tends to be limited to peak periods, so LOS calculations based on daily conditions tend to under-state the impact that congestion at interchanges has on the overall traffic situation in the county. For this reason the

PDT ultimately recommended using daily traffic volumes to determine the LOS for most types of facilities and using PM peak hour traffic volumes to determine LOS specifically for freeway interchanges.

Selection of Scenarios for Testing

Based on the considerations described above, the PDT recommended that three options move forward for further consideration, namely:

Option 1: The RTMF would be used to fund whatever portion of the cost of improvements to state facilities (only) on the Measure "C" Extension Tier 1 and Tier 2 lists, and those projects recommended in the Freeway Interchange Deficiency Study, that could be attributed to new development. Educational and governmental developments would be exempt from the RTMF, and a flat 43% reduction would be allowed for retail developments to account for pass-by trips. The rationale behind this option is that it represents the best chance for funding all of the projects listed in Measure "C" Extension within the constraints of political acceptability.

Option 2: This is the same as Option 1, but projects on the Tier 2 list would not be considered in computing the fee and would not be eligible for RTMF funding. The rationale for this scenario is that the RTMF collections are unlikely to be sufficient over the life of the program to cover the full cost of some projects on the Tier 2 list and that no alternate source of funding has been identified that could make up the unfunded portion. Proponents of Option 2 feel that they cannot justify collecting money that is earmarked for a project that has little apparent prospect of being built.

Option 3: This is the same as the Option 2, except that the RTMF would be phased in over three years. The rationale for this option would be to reduce any negative impacts that the RTMF might have on real estate development during the current weak market.

The results for these three scenarios are described in the next chapter.

7. COMPUTING THE RTMF FEES AND REVENUES

An overview of the methodology used to compute the RTMF is provided in the section below, followed by sections describing the resulting fees and the revenues that would be raised by the RTMF under the three sets of policy options described in the previous chapter.

Overview of the Fee Computation Methodology

The methodology used in the fee computation is outlined in Figure 15 below.

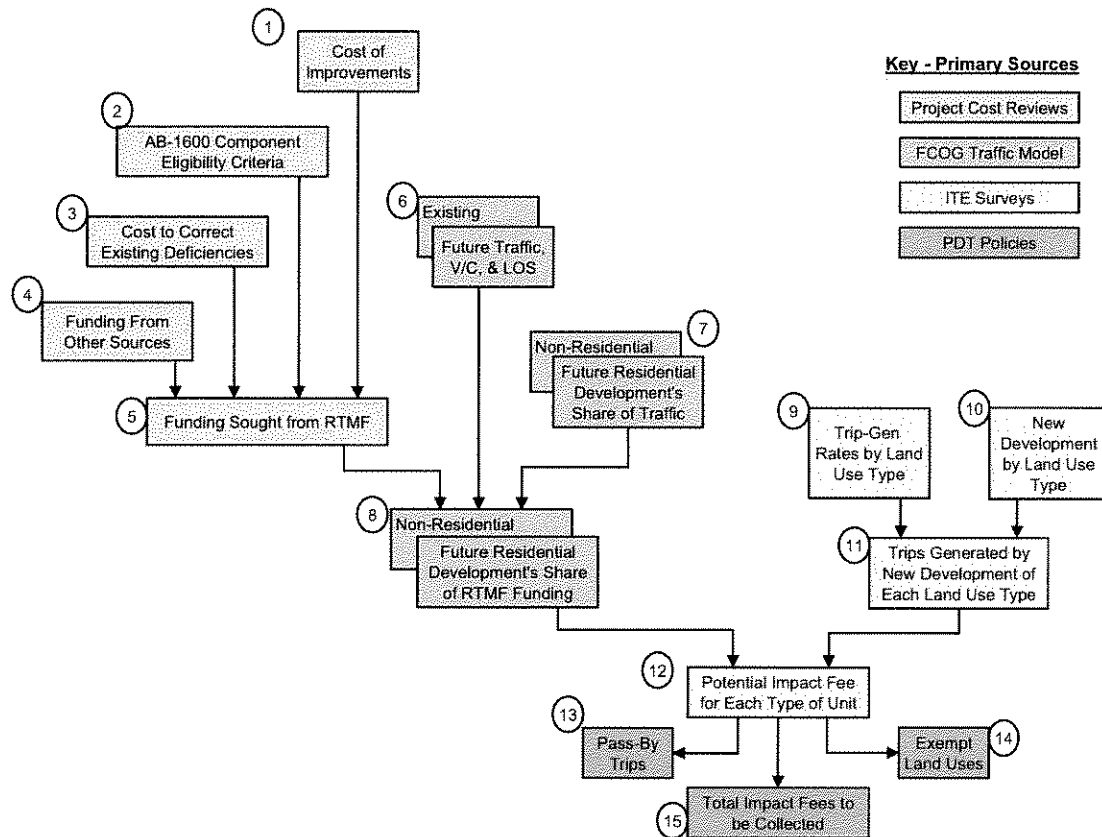


Figure 15: Steps in the Fee Computation

The major steps include:

- 1) The starting point was the set of revised cost estimates prepared for each project as described in Chapter 4.

- 2) The costs of certain project components such as beautification work were deducted because they are ineligible by law to receive impact fee revenue. There are only a few of such cases.
- 3) Next, certain items such as the cost to replace a flooded bridge or the cost to replace a structurally deficient bridge were deducted since the purpose of the project is to correct an existing deficiency. The Mitigation Fee Act does not permit the use of impact fees to correct existing deficiencies.
- 4) Next, funding from other sources that is expected to be available for the listed projects was deducted from the amount needed from the RTMF.
- 5) The product of the previous four steps was the interim maximum amount of funding that can be sought from the RTMF. This interim amount was later finalized in Step 8.
- 6) The outputs from the Fresno COG traffic model were used to determine the volume-to-capacity (V/C) ratio and level-of-service (LOS) for each project under existing and 2030 conditions.
- 7) The Fresno COG traffic model was also used to determine the growth in vehicle-miles traveled (VMT) that will be associated with residential and non-residential development.
- 8) The results of Steps 5, 6, and 7 were then combined to determine the portion of each project's budget that could be attributed to new residential and non-residential development. This is the maximum amount allowable by law that could potentially be collected using the RTMF.
- 9) Next, the trip generation rate was determined for each land use type. For residential land uses the unit of measurement was VMT per day per dwelling unit, while for non-residential uses, trip-generation was measured in terms of VMT per day per job.
- 10) The number of new units of each land use type was taken from the Fresno COG traffic model.
- 11) The number of new units for each development type was then multiplied by the trip generation rate to produce the total number of new trips associated with each type of land use development.
- 12) The project funding attributable to residential and non-residential developments (from Step 8) was then divided by the expected number of new trips (from Step 11) to produce the maximum potential impact fee for each type of unit.
- 13) A percentage of trips was deducted from the certain land use types to account for pass-by trips.
- 14) The PDT established a policy, based on language in Measure "C" Extension, that certain types of land uses would be exempt from the RTMF. The fees from these land uses types were therefore deducted from the expected RTMF revenues.
- 15) The total amount of RTMF revenues to be collected were then computed by multiplying the expected number of new units of each type of non-exempt development by the fee charged to each unit.

The next sections describe several key steps in the process in more detail.

Trip-Generation Rates by Land Use Type

Trip generation (trip-gen) rates are a key connection between future land development and its expected traffic impacts. Fresno COG's travel demand model bases its trip-gen equations for residential land uses on the vehicle ownership of the household, with different rates for

households with zero, one, and two vehicles. While this approach makes sense for a traffic model, it is impractical to use for an impact fee program because when a new development is proposed the only known quantities are the number of dwellings to be constructed; neither the developer nor the jurisdiction has any way of knowing what the vehicle ownership rates of the future residents will be. A similar situation occurs for non-residential development. The developer and the jurisdiction only know the floor area of the buildings proposed for construction; they have no way of knowing the number of employees who will work in the building (which is likely to vary from year to year regardless of the size of the building). The employee-based trip-gen rates used in the traffic model would be awkward to try to use for collecting an impact fee. For these reasons, a different source of information on trip-gen rates is required.

By far the most commonly used reference for trip generation rates in the U.S. is ITE's *Trip Generation*¹⁶ handbook, which was chosen by the PDT as the reference to be used in this study.

Residential and Non-Residential Shares of New Traffic

The amount of traffic generated by a new development is a function of the number of new trips associated with the development and the average length of those trips. Together, these two produce the total vehicle-miles-traveled (VMT) associated with the development.

Outputs from the Fresno COG Travel Demand Model were used to forecast the growth in VMT for five different types of trips. The growth in VMT from new development was attributed to residential and non-residential developments based on trip type. In this case, the PDT chose to attribute all trips beginning or ending at the traveler's home to the residential trip purpose while all trips not involving a residential location were attributed to non-residential land uses. This approach is consistent with the state of the practice for estimating trip generation as described in NCHRP Report 187¹⁷, which is a primary reference for travel estimation techniques used in travel demand modeling. Chapter 2 of the NCHRP report, which details trip generation estimation, states that "HBW (Home Based Work) and HBNW (Home Based Non Work) trips are generated at the households, whereas the NHB (Non-Home Based) trips are generated elsewhere."

The growth in VMT for residential and non-residential land uses are shown Table 24.

Table 24: Growth in VMT				
Trip Purpose	VMT in 2007	VMT in 2030	Growth in VMT	
			Residential	Non-Res
Home-Work VMT	5,824,570	9,312,158	6,975,177	-
Home-Shop VMT	2,465,152	4,151,433	3,372,562	-
Home-Other VMT	6,702,090	11,038,334	8,672,487	-
Other-Work VMT	2,300,702	3,804,637	-	3,007,870
Other-Other VMT	6,409,288	10,709,570	-	8,600,565
Total Vehicle Trips	23,701,802	39,016,133	19,020,227	11,608,434
Percent of the Growth in VMT >			62%	38%

Source: Fresno COG Travel Demand Model, Parsons Brinckerhoff

¹⁶ *Trip Generation 7th Edition*, Institute of Traffic Engineers, 2003

¹⁷ *Quick Response Urban Travel Estimation Techniques and Transferable Parameters User's Guide*, Transportation Research Board, 1978

Based on this calculation, 62% of VMT growth was attributed to residential development and 38% was attributed to non-residential development.

Pass-By Trips

Some analyses of traffic impacts provide an allowance for what are termed “pass-by” trips. These are stops at intermediate destinations (coffee shops, gas stations, etc.) that occur in the course of a longer trip taken primarily for some other purpose, such as a home-to-work trip. It could be argued that such trips add little to the overall mileage driven and therefore have only a minor impact on traffic conditions. The PDT chose to use a flat reduction rate of 43% for all retail developments.

Revenues Raised by the RTMF Program

Table 25 below shows the estimated amount of revenue that would be generated under the three Options.

Table 25: Potential RTMF Revenues Under Different Options					
Project or Cost Category	Total Project Costs	Costs Allowable Under Mitigation Fee Act	Potential RTMF Revenues		
			Option 1	Option 2	Option 3
Tier 1	\$947 M	\$458 M	\$247 M	\$247 M	\$235 M
Tier 2	\$687 M	\$254 M	\$170 M	\$0 M	\$0 M
FIDS	\$125 M	\$41 M	\$31 M	\$31 M	\$29 M
Admin. Costs	-	\$23 M	\$9 M	\$6 M	\$5 M
Total	\$1,758 M	\$753 M	\$447 M	\$278 M	\$264 M
As a % of Total Project Costs >			25%	16%	17%
As a % of Allowable Costs >			59%	37%	35%

Source: Parsons Brinckerhoff

As can be seen from the table, all three of the options under discussion could raise more revenue than the \$102 million figure used in the Measure “C” Extension ballot materials. Option 1 would be above the 20% figure used in the Measure “C” Extension ballot materials for RTMF’s contribution to project funding, while Options 2 and 3 would contribute less than 20%. In every case the amount collected would be well below the maximum amount that could theoretically be collected under the Mitigation Fee Act due to the effects of restricting funding to state projects, exemptions of some land use categories, and the pass-by trip reduction for retail developments.

Results in Terms of Fees Applied

Another way of comparing the options is by looking at the resulting fees for different land use categories. This information is provided in Table 26. The land use categories shown in Table 26 reflect the categories cited in Appendix D of the Measure “C” Extension ballot materials. The table includes a fifty percent discount for affordable housing, which is mandated in Appendix D. The fees charged under Options 2 and 3 would be the same, except that for Option 3 the fees in

the first year after the RTMF was enacted would be reduced by two-thirds, and in the second year would be reduced by one-third.

Table 26: RTM Fee Levels under Different Options		
Land Use Category	Option 1	Options 2 & 3
Residential Developments (\$/dwelling unit)		
Single-Family Dwelling (market-rate)	\$2,781	\$1,727
Single-Family Dwelling (affordable)	\$1,390	\$863
Multi-Family Dwelling (market-rate)	\$1,953	\$1,212
Multi-Family Dwelling (affordable)	\$976	\$606
Non-Residential Developments (\$/sq.ft.)		
Education	Exempt	Exempt
Government	Exempt	Exempt
Commercial/Retail	\$3.16	\$1.96
Commercial/Office/Service	\$1.98	\$1.23
Light Industrial	\$0.79	\$0.49
Heavy Industrial	\$0.17	\$0.10
Other Non-Residential	\$0.67	\$0.42

Source: Parsons Brinckerhoff

6. CONCLUSIONS

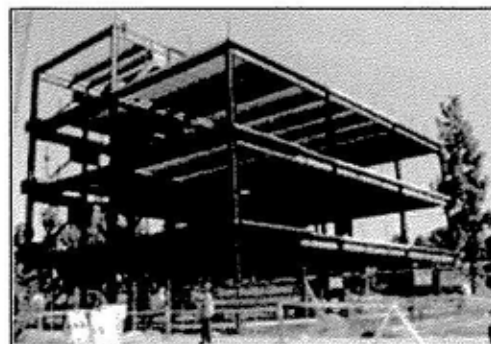
The amount of revenue raised by the RTMF will depend on certain key policy decisions to be made by the Fresno County Transportation Commission. The PDT was able to reach consensus on most policies, but was unable to reach consensus as to whether the RTMF should be used to raise funds for projects on the Tier 2 list. There was also a lack of consensus on the more minor issue of whether the fee should be fully applied from the start or if it should be phased in over several years. The PDT therefore decided to submit three options to the Fresno County Transportation Commission for their consideration.

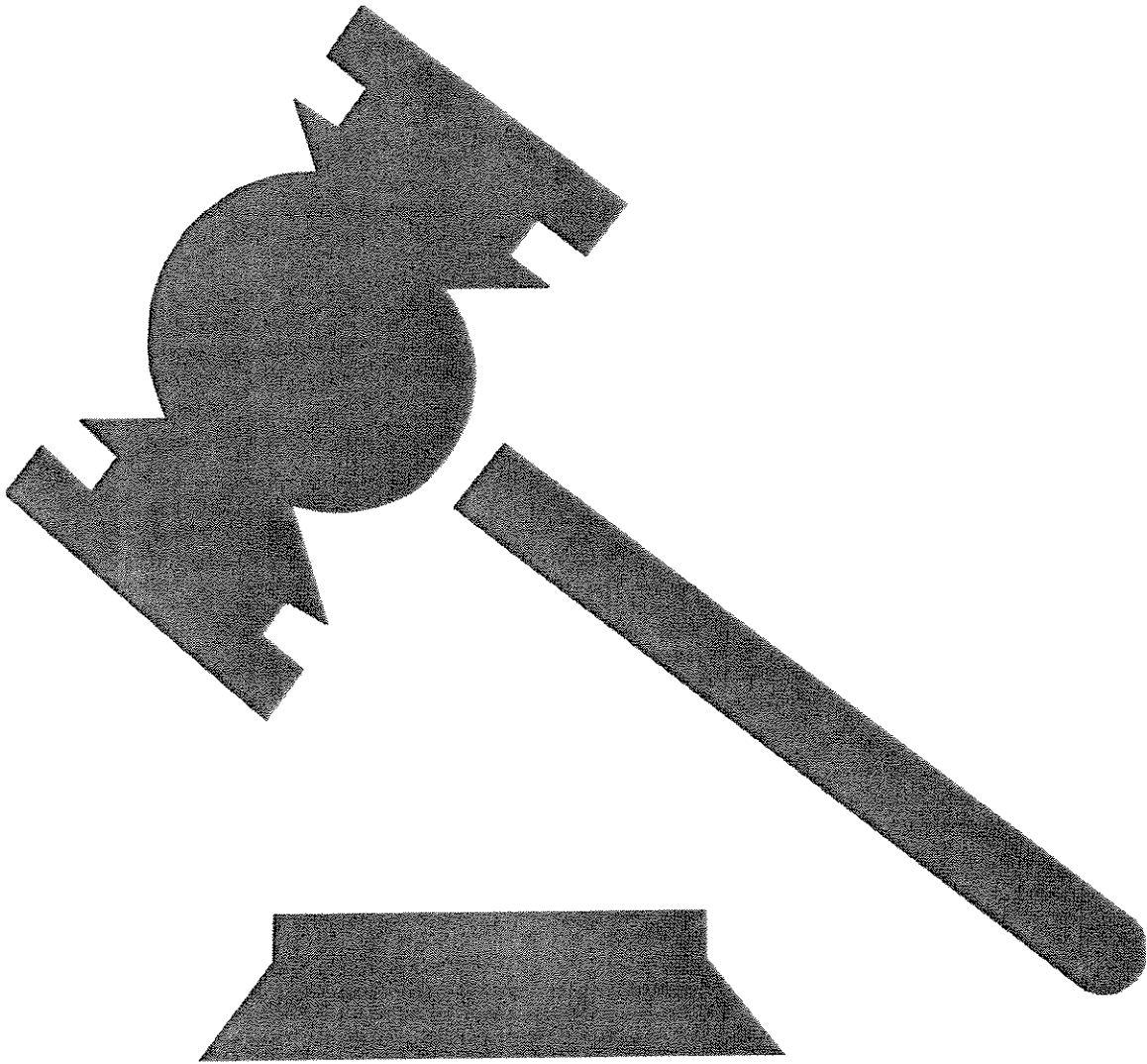
Depending on the policy option selected, the RTMF has the potential to raise between \$300 million and \$580 million, which is far more money than the \$102 million originally estimated in the Measure "C" Extension ballot materials. There are three reasons for the difference:

- The original figure was made in the absence of a detailed study and represents a placeholder for planning purposes rather than an estimate of what could actually be collected.
- Project costs have risen rapidly in recent years and new development's share of those costs have risen proportionately
- Some projects have changed in scope and will involve more construction than originally anticipated.

The Mitigation Fee Act imposes constraints on the maximum amount that can be charged for an impact mitigation fee, but does not impose a minimum (an agency is not required to charge any fee at all). Any of the three options described above would be permissible under the Mitigation Fee Act. However, if the RTMF is set at a level insufficient to fund projects that later prove to be necessary, the opportunity to have collected fees from early developments will have been lost, and the burden of funding these projects will be passed to others.

It is up to the Fresno Transportation Commission to determine which of the options is most likely to fulfill the goals of Measure "C" Extension.





***TRANSPORTATION
ACTION/DISCUSSION ITEMS
AGENDA ITEM III. B.***

BEFORE THE
COUNCIL OF FRESNO COUNTY GOVERNMENTS
RESOLUTION NO. 2008- 35

In the Matter of:)
)
FRESNO COUNTY COORDINATED)
HUMAN SERVICES TRANSPORTATION)
PLAN)

RESOLUTION OF SUPPORT
FOR THE FRESNO COUNTY
COORDINATED HUMAN
SERVICES TRANSPORTATION
PLAN, PROJECT MANAGEMENT PLAN

WHEREAS, the Council of Fresno County Governments (Fresno COG) is the designated Regional Transportation Planning Agency (RTPA), the designated Metropolitan Planning Organization (MPO), and the designated Council of Governments (COG) for the Fresno County Region; and

WHEREAS, The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users—better known as SAFETEA-LU—signed into law in 2005, *requires that metropolitan planning agencies such as Fresno COG applying for federal funding through the Federal Transportation Administration's Transportation for Elderly Persons and Persons with Disabilities (section 5310), Public Transportation for non-urbanized areas (section 5311), Jobs Access and Reverse Commute (section 5316), and New Freedom (section 5317) programs, complete a Coordinated Human Services Transportation Plan, Project Management Plan and*

WHEREAS, SAFETEA-LU legislation also requires Fresno COG, when applying for federal funding through any of the above mentioned programs, to prioritize and coordinate the grading process through a Coordinated Human Services Transportation Plan for Fresno County. Toward this end, this Coordinated Human Services Transportation Plan inventories existing human services transportation resources, identifies important projects, and identifies funding priorities; and

WHEREAS, Fresno COG staff has sought input from member agencies, citizens, affected public agencies, representatives of transportation agency employees, private providers of transportation, other interested parties and affected organizations, advisory committees, organizations representing the traditionally underserved, low-income and minority households; and

WHEREAS, the proposed Coordinated Human Services Transportation Plan, **Project Management Plan** has undergone the required 45-day review and comment period; and

WHEREAS, the public hearing was held on January 24, 2008 to consider and hear comments on the draft Coordinated Human Services Transportation Plan, Project Management Plan; and

WHEREAS, the Coordinated Human Services Transportation Plan, **Project Management Plan** document is considered to be a guide for work activity and may be considered for amendment by the Fresno COG Policy Board at any time deemed appropriate by Fresno COG's management staff and Policy Board; and

NOW, THEREFORE, BE IT RESOLVED, that the Fresno COG adopts the Coordinated Human Services Transportation Plan, **Project Management Plan**.

BE IT FURTHER RESOLVED, that the adoption of the Coordinated Human Services Transportation Plan, **Project Management Plan** will become effective on July 31, 2008 and any comments received will be made available via the COG website and by mail upon request.

THE FOREGOING RESOLUTION was passed and adopted by the Council of Fresno County Governments this 31st day of July 2008.

AYES:

NOES:

ABSTAIN:

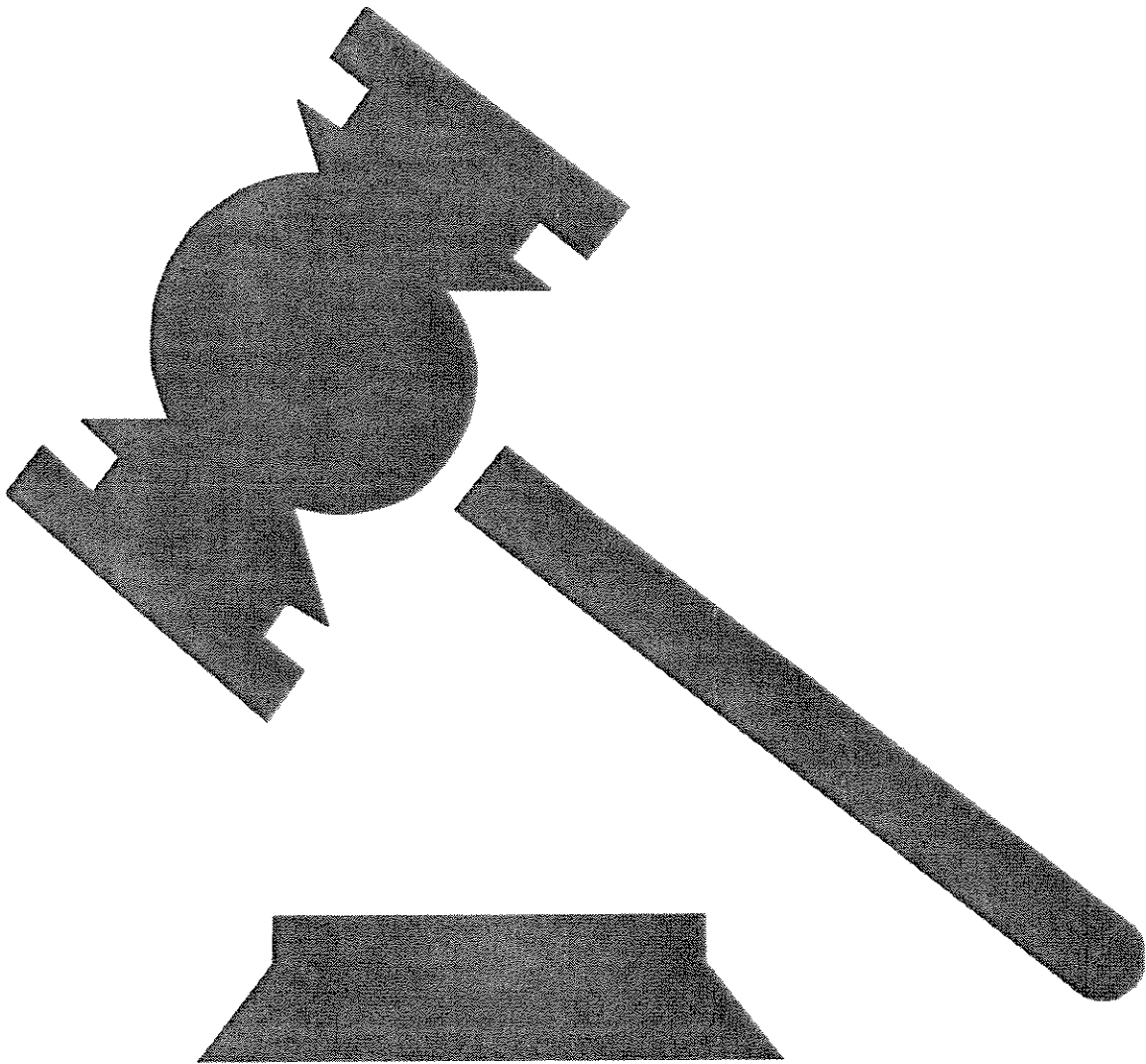
ABSENT:

ATTEST:

Signed: _____
Trinidad M. Rodriguez, Chairman

I hereby certify that the foregoing is a true copy of a resolution of the Council of Fresno County Governments duly adopted at a regular meeting thereof held on the 31st day of July 2008.

Signed: _____
Tony Boren, Executive Director



***TRANSPORTATION
ACTION/DISCUSSION ITEMS
AGENDA ITEM III. C.***

Interim Transportation Improvement Program

Final 2009 Interim TIP

To Be Adopted July 31, 2008

***Council of Fresno County Governments
2035 Tulare Street, Suite 201
Fresno, CA 93721-2111
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www.fresnocog.org***

Document available on website www.fresnocog.org

***The preparation of this report has been financed in part through grants from the
United States Department of Transportation***

2007 Regional Transportation Plan

Administrative Modification #1

The Long-Range Transportation Vision
for the Fresno County Region
for the Years 2007 to 2030



INTRODUCTION

The Council of Fresno County Governments (Fresno COG) is the Regional Transportation Planning Agency (RTPA) for the Fresno County region, a designation given by the State of California. Under federal legislation, it is also designated as the Metropolitan Planning Organization (MPO). Working with technical advisory committees, interested citizens, and other government agencies, a coordinated effort has been made to develop a multimodal regional transportation system plan for Fresno County.

The 2007 Regional Transportation Plan (RTP), adopted in May 2007, is a comprehensive assessment of all forms of transportation available in Fresno County and of needs for travel and goods movement projected into the future until the year 2030. Development of the RTP is a process of intergovernmental cooperation, coordination and long-range planning which has involved the fifteen cities, Fresno County, staff from related local public agencies, the Air District, Caltrans, and the public. This process has been accomplished within the framework of the Fresno COG, which is the Regional Transportation Planning Agency (RTPA) for the Fresno County area. Updated editions are required every four years and are refinements of the original and subsequent plans. It is required under state and federal planning regulations; projects cannot be programmed for state or federal funding, nor implemented, unless identified in the RTP.

Federal and State legislation mandate that long range transportation planning be done every four years for a period of at least 20 years into the future. The 2007 version of the Regional Transportation Plan is a reflection of the federal directives embodied in Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) and the Clean Air Act Amendments of 1991. These acts require that Regional Transportation Plans include only those projects which can actually be delivered with funds expected to be available, and that those projects will help attain and maintain air quality standards.

This plan specifies those projects and programs that can be funded throughout the life of the plan, and evaluates them through a process of computer modeling, to determine their impacts upon air quality. This is called demonstrating “conformity” with adopted air quality targets. Projects will only be evaluated for conformity if they have a strong likelihood of being funded. The financial element of the plan will advocate for a stable and equitable approach to statewide funding, so that the entire Valley can respond appropriately to the needs of a growing population, environmental quality, and the continuing needs of both maintenance and innovation in transportation systems.

2007 RTP Administrative Modification #1

Policy Element

The Policy Element of the RTP addresses legislative, planning, financial and institutional issues and requirements, as well as any areas of regional consensus. The Policy Element provides guidance to decision-makers regarding the implications, impacts, opportunities and options that will result from RTP implementation. The proposed Administrative Modification #1 continues to support the goals, policies, and actions of the 2007 RTP.

Needs Assessment & Action Element

The Needs Assessment & Action Element establishes a plan of action for the region to meet identified transportation needs and issues consistent with the goals and policies of the RTP. Administrative Modification #1 updates the Urban Mass Transportation section to address the potential for Bus Rapid Transit within the City of Fresno.

Financial Element

The proposed modification incorporates changes in the FTIP project listing Exhibit 5-5. This exhibit was updated to reflect new identification numbers, project costs, descriptions, and information contained in the 2009 Interim FTIP.

Additionally, this modification incorporates changes in the financially unconstrained project list to reflect priorities of local jurisdictions and regional agencies. Attached are several projects added to the Unconstrained Project List, which incorporates the region's unbudgeted "vision". These projects represent alternatives that could be moved to the constrained program if proper funding can be identified. Status as an unconstrained project does not imply that the project is not needed; rather, it simply cannot be accomplished given the fiscal constraints facing the Fresno region. Unconstrained projects are not included in the air quality conformity analysis.

Chapter 4

Needs Assessment and Action Element

4.4 Urban Mass Transportation

4.4.1 Overview

The purpose of the Regional Transportation Plan's Mass Transportation section is to review the existing and planned transit services and determines those improvements that will provide the greatest benefit while maintaining a high level of system efficiency. The following section has been updated to incorporate Bus Rapid Transit into the discussion

4.4.5 Proposed Actions

Short-Range Transit Plan

Fresno Area Express

The most recent Short-Range Transit Plan (SRTP) for the Fresno-Clovis Metropolitan Area was adopted on June 30, 2005. The Plan represents a short-range evaluation of transit needs and proposes specific recommendations for implementing the long-range objectives of the RTP. The Plan guides the provision of transit services in the FCMA over a five-year period, and sets forth an action plan commensurate with reasonable needs and available funding. The SRTP and this RTP are being amended to reflect the findings and recommendations of the Long-Range Transit Master Plan that was completed February 2002.

In order to achieve the goal of maintaining financial stability, FAX must continuously seek improvements in service productivity and cost effectiveness. Since the majority of FAX's budget is spent to provide service on the street, it is critical that service be regularly monitored to ensure these resources are being utilized to the fullest extent possible. FAX has addressed system productivity by instituting an ongoing program of service evaluation to identify inefficient use of resources and respond with corrective measures.

The primary assessment of transit service is accomplished by measuring individual route performance using FAX's route evaluation process. When appropriate, corrective action is taken to modify route alignments, change the service schedule to ensure that resources are used in the most productive manner. There are many methods for evaluating the efficiency and effectiveness of public transportation service. Because each method has unique strengths and weaknesses, FAX employs several service evaluation methods. Among the methods used are: peer review analysis, system minimum/maximum standards assessment, and passenger surveys.

Peer Review Analysis uses standard service measurement criteria to compare one agency's system performance against another. This kind of analysis is most valuable when standard, well controlled data sets are available, and when the systems being evaluated have similar operating environments.

The System Minimum/Maximum Standards Assessment uses standards that are established both through legislation and local effort. From a legislative perspective, Federal and State regulations require public transit operators to provide and maintain service in some very specific ways. The Federal Transit Administration has regulations governing the provision of "Charter Service." Also, Title VI of the Civil Rights Act of 1964 states the following:

"No person in the United States shall, on the grounds of race, color, or national origin be excluded from participation in, be denied the benefits of, or be subjected to discriminations under any program or activity receiving Federal financial assistance."

As part of the Title VI regulations, FAX must provide a Title VI Evaluation Report every three years. There are two sections to this report. The first section, *General Reporting Requirements*, contains information concerning active lawsuits and complaints, a description of any pending applications for Federal financial assistance, a summary of civil rights compliance review activities, FTA civil rights assurances, and fixed-facility impact analysis. The second section, *Program Specific Requirements*, contains information regarding the Title VI internal review process for service delivery, the internal monitoring process, the service standard policies, and a description of service changes specific to the Fresno Area Express fixed-route transit system and its impacts on the minority population. The Title VI assessment is designed to ensure that FAX provides its services equally among various population groups. Specifically, census tracts designated as "Minority Census Tracts" must be evaluated and compared to Non-Minority Census Tracts to determine whether any discriminatory practices are evident.

The State Transportation Development Act (TDA) regulations require FAX to maintain a minimum 20 percent farebox recovery ratio. The TDA also places restrictions on the use of State Transit Assistance (STA) Funds. Regulations require transit agencies to keep cost increases under the State Cost of Living Index (CPI). If cost increases exceed the State CPI, transit agencies are not allowed to use STA Funds for operating expenses. Finally, local and regional concerns are used to develop minimum productivity standards. For FAX, these standards are developed through a coordinated, comprehensive, continuous process carried out by the Council of Fresno County Governments (COFCG). The COFCG's Regional Transportation Plan (RTP) and Short-Range Transit Plan for the Fresno-Clovis Urbanized Area (SRTP), set guidelines for service evaluation. Additionally, each year the COFCG prepares the Annual Transit Productivity Analysis. This document assesses all public transit operators in Fresno County, and reviews the most recent Triennial Audit recommendations.

In 1981, a Transit Corridor Analysis was completed which evaluated the efficiency and effectiveness of service on a route-by-route basis. At that time, service measures were developed to assist in evaluating individual route performance in relation to the system-wide performance. Those minimum performance measures continue to be the basis of local service evaluation. At a minimum, an individual route should exceed 60 percent of the system-wide average for a number of key passenger productivity indicators. The 60 percent figure is an overall industry standard that assumes a transit system may tolerate some low performing routes if they provide an important component of the system, and especially if the component helps meet the needs of the transit dependant riders. Cost performance measures should not exceed 140 percent of the total system average, with 140 percent representing the system maximum.

Passenger surveys allow public transit operators to include human aspects of service in the evaluation mix. Measurements of satisfaction, friendliness, and of opinions about services provided are most appropriately collected through customer surveys. Additionally, customer surveys provide an effective way to measure customer expectations and needs, and provide valuable information for quality decision making.

FAX utilizes a variety of survey methods including inexpensive self-administered surveys that are provided in every schedule guide, and more detailed and expensive on-board interviews. These surveys are used to collect information that is required by Federal and State agencies including passenger demographics, origin/destination information, and travel habits. This data also provides FAX with insights into the concerns of our passengers. For example, it was one of these passenger surveys that allowed FAX to prioritize service improvement options and select night service in 1999.

Clovis Transit

Clovis Transit has also been affected by limited funding, which necessitated changes with an added emphasis on efficiency. Route changes will be implemented based upon demand, reducing transfers and

elimination of unproductive routes or portions of routes. Increased emphasis will continue to be placed on peak-hour service.

Clovis Transit will continue to monitor existing services for productivity and internal efficiencies. Efforts to coordinate services among transit systems for maximum delivery of service throughout the region will also continue. Ongoing coordination and consolidation of all Clovis transportation service for social service agencies will continue to be the focus of Clovis' specialized services.

Long-Range Improvement Plan

Fresno, like other Central California cities, is expected to continue experiencing a high rate of growth and development over the next twenty years. This growth will bring both opportunities (new jobs, new housing and increased prosperity) and problems (increased traffic congestion, air pollution and general over-crowding).

The Fresno urban area is no stranger to some of these problems. Fresno has experienced explosive growth, especially in the northern neighborhoods abutting Herndon Avenue. On one hand, this growth has been good because it has increased the stock of affordable housing and created thousands of jobs in construction and related industries. On the other hand, the increase in automobile traffic associated with this growth is having an effect on both traffic congestion (collector streets and arterials) and air pollution.

Will things get worse? The population of the FCMA, according to the State Department of Finance, is expected to surpass 1 million within the next twenty years. According to the COG Travel Model, traffic congestion throughout the FCMA will reach a 'significant' level by 2010 and 'serious' level 2020.

Increased congestion impacts not just cars but buses as well. How? An increase in congestion increases the time it takes for a bus to make a round-trip, which, in turn, increases the number of buses, needed just to maintain the current level of service. In other words, it ends up costing more to keep doing the same thing. Even a small decrease in the average speed along a corridor can translate into the need to one or two extra buses on a route. This in turn can increase annual operating costs by several hundred thousand dollars. In the near future as much as 25% of a bus' total round-trip time could be spent waiting at red lights or creeping along in stop and go traffic.

Public transit operators and policy makers must give serious consideration to how competitive transit can or should be with private automobiles. If FAX, or any other transit operator, is expected to play an earnest role in economic development, environmental justice or improving air quality, then it will be necessary to offer a system which is competitive with the private automobile. If so, that system will look vastly different from the system on the street today. The question then becomes, is the community ready to commit the resources needed for transit to be a viable alternative to the ubiquitous automobile?

The Fresno Area Express (FAX) Long-Range Transit Master Plan (FAX LRTP) provides a vision of what public transit might/should look like in twenty years based on adopted regional and local goals and objectives. The Plan presents an evaluation of current and future transit needs and issues, plus recommendations for creating a system to address those needs in an effective and efficient manner. The Plan has two primary components: A long term (2020) vision for public transit, and a five-year short-term plan that supports the longer term vision.

The current FAX system, as with many other areas around the county including those within Fresno County, is one that primarily addresses social service transportation needs. The typical FAX passenger tends to come from a transit dependent household and has few, if any options other than riding the bus. If public transit is going to play a role in addressing mobility and air pollution challenges, the system will need to be structured, or restructured, in a manner that can attract choice riders. It must become competitive with the automobile.

With limited resources, shifting the service objectives of the FAX system could result in the need to make some difficult trade-offs. A system that is designed to be competitive with the automobile is not always

appropriate for serving social service needs. This could become an issue for current riders and social service agencies. The question is, how limited resources will be distributed between competing needs. The FAX LRTP identifies two short-term scenarios as well as long-term strategies that build upon these scenarios.

(1) *Short-term scenario A* focuses all resources toward maximizing system-wide ridership. This scenario reduces service in areas that currently generate low ridership, while increasing the frequency of service to every 15 minutes all day in areas of high ridership. The service assumes a 25 percent increase in resources and suggests that ridership growth in the range of 35-50% is conceivable.

(2) *Short-term scenario B* retains coverage to all areas now served, and even expands the coverage area to include most developed parts of the city. Relatively few improvements are made to increase productivity, although some frequencies are improved. This scenario is likely to increase the growth rate in ridership slightly, but at a rate below that of Scenario A. To date, this has been the scenario of choice for FAX and other Fresno County service providers.

For long-term growth, the service plan recommends the implementation of either of the short-term scenarios, and then to grow service only as funding resources permit. The approach presumes that the 30% growth in travel projected for the region will occur overwhelmingly in the form of single-occupant auto trips. The long-term recommendations urge Fresno to aggressively seek funding for a major expansion and "reinvention" of the rubber-tired transit system, as well as for major high capacity transit projects.

The 2002 FAX LRTP identified four corridors that could potentially support high capacity transit to be considered in a future Federal Major Investment Study. The corridors include Ventura/Kings Canyon, Shaw Avenue, Cedar Avenue and Blackstone Avenue. Data collected during the preparation of the FAX LRTP including residential and employment densities, current and planned land uses, and current FAX ridership travel demand analysis showed these corridors to be the most viable within the FCMA. As recommended in the Plan, the City of Fresno completed an Alternative Mass Transportation Pre-Major Investment Study. (PreMIS). This study was completed in two phases. Phase I of the study, "Developing a Vision for High Capacity Transit", conducted the outreach necessary to inform the public and key stakeholders about the realistic potential for high capacity transit service within the study areas. This phase also developed a set of policy and strategy recommendations that will enhance transit supportive development. Phase II of the study focused on the choice corridor for more detailed cost, ridership and mode-split projections.

FAX undertook an update of the Long-Range Transit Master Plan (LRP) update in January 2007. Much of the work was the development of a Bus Rapid Transit (BRT) Plan for the FCMA. The work has included public outreach, corridor selection as well as ridership and cost modeling. The final plan includes an evaluation of the steps necessary to seek federal Small Starts funding. In addition to the service planning, the LRP includes a task to evaluate 'Urban Growth Management Transit District' or similar development fees to support transit infrastructure.

The preferred corridor for the FAX's first BRT line will operate on Ventura/Kings Canyon Boulevard between Fowler Avenue on the east and the CBD following the current FAX Route 28 alignment. A possible interlined corridor traveling from the CBD to Manchester Transit Center via Fresno City Collage is being considered as part of this first BRT service. The proposed corridor is comprised of segments of FAX's most productive routes. Other corridors identified in the Plan include Cedar Avenue (FAX Route 38); Shaw Avenue (FAX Route 9) including service to Clovis; and Blackstone Avenue (FAX Route 30)

The current FAX system, as with many other areas around the county including those within Fresno County, is one that primarily addresses social service transportation needs. The typical FAX passenger tends to come from a transit dependent household and has few, if any options other than riding the bus. If public transit is going to play a role in addressing mobility and air pollution challenges, the system will need to be structured, or restructured, in a manner that can attract choice riders. BRT service promises to

provide significant reductions in travel time and improvements in service reliability that will attract more choice riders.

The Fresno COG is also undertaking Phase II of the Public Transportation and Infrastructure Study (PTIS). The purpose of the PTIS is to evaluate mobility needs and opportunities, and to identify strategies for public transit and transit supportive infrastructure development that will result in wider acceptance and use of non-automobile transportation modes such as public transit, bicycle and pedestrian travel. In addition to the development of viable alternative public transportation options for Fresno County, this study seeks to develop ridership projections and cost estimates for various scenarios that will be used to establish a long-range plan leading to optimum connectivity within the region.

Phase I of the PTIS evaluated existing and planned land uses, mapped residential and employment densities, and identified primary travel corridors for communities outside of the Fresno/Clovis Metropolitan Area (FCMA). Phase I also reviewed existing land use policies and developed a set of transit supportive recommendations.

Discussion

Coordination of Fares and Schedules

Management and staff from FAX, Clovis Transit, Fresno County Rural Transit Agency, and Fresno County Economic Opportunities Commission meet regularly to discuss ongoing planning projects and reports, service issues, and connectivity among systems. Coordination of fares and schedules is an ongoing topic at these meetings. FAX now includes Clovis Roundup schedules with the FAX Schedule Guide, and in October 2004, Clovis Roundup and FAX initiated the Metro Pass, a new regional pass that is accepted on both systems. Information for both systems is available by phone at 559-621-RIDE.

In addition, a regional farebox system that could facilitate a regional pass program was included as part of the COG's "One Voice" program. FAX is the lead agency in the procurement of a new Automated Fare Collection System that will accomplish many of the benefits of forming a regional transit agency without the necessity of forming a new regional political structure.

Transit Interface

COG continues to publish the *Fresno County Transportation Guide*. The Guide is a bilingual (English/Spanish), user friendly booklet which describes in detail the availability of mass transportation services throughout the county. The Guide includes information on regional, inter-city, and local transportation providers; information on transportation services to many popular destinations; and clear direction on how to plan trips and make connections within and between systems and modes. The document includes several colored maps. The COG continues to revise the document each time it is published.

Public/Private Sector Coordination

FAX continues to contract with the private sector for many services which can be provided more reliably and economically. The maintenance department contracts to private firms for a variety of services including major overhauls and vehicle painting. FAX also contracts with private firms for special studies, surveys, marketing projects, technical training and administrative equipment servicing. Planning and related services are now contracted with the Council of Fresno County Governments. Many administrative support services such as legal, personnel, communications, finance, data processing and purchasing are performed by other city departments. Municipal code and labor contracts preclude some outside service contracting.

Inter-city Rail

Amtrak currently provides inter-city passenger rail service for six round trips daily. Freight is carried along both the Burlington Northern Santa Fe and the Union Pacific railroads.

Passenger Rail Project Priorities:

Passenger rail priorities currently facing Fresno include:

- Preservation of abandoned railroad right-of-way and trackage
- The California High Speed Rail Project
- Assessment of future light rail potential

A more detailed discussion of rail issues can be found elsewhere in this document (Section 4.8) under the heading *Rail*.

Chapter 5

Financial Element

5.1 Introduction

The Financial Element of Fresno COG's 2007 Regional Transportation Plan (RTP) is intended to provide the costs and revenue assumptions necessary for decision makers to implement the RTP. These assumptions include revenue estimates for specific governmental funding programs, local contributions and tax initiatives. The intent of the financial assumptions is to provide a level of financial detail adequate for options to be exercised by State and local decision makers.

5.6 Financially Constrained Project Lists

The financially constrained projects within Fresno COG's current Federal Transportation Improvement Program are programmed between the years 2008/09 thru 2011/12. Costs are current total project costs, including a Rate of Growth of 3.5%, as required to be submitted to Fresno COG at the time of application. Projects identified include those from the current and future Measure C programs, Regional Choice program, RSTP, CMAQ, TE, SHOPP and various assorted federal and state programs. All candidate projects are consistent with those identified in the Caltrans Interregional Improvement Program (IIP) and the Regional Transportation Improvement Program (RTIP). In addition, all candidate projects are considered with the regional goals, policies, and objectives identified in Chapter 3.

Exhibit 5-5 has been revised and includes the complete listing of all projects contained in the 2009 Interim FTIP.

Exhibit 5-6(a) lists projects that have been added to the "vision", or financially unconstrained project list for Fresno County.

Exhibit 5-10 is the multi-modal list of projects that have been identified for funding through the reauthorization of Measure "C". All projects on this \$1.7 billion list are to be funded by future Measure "C" revenue. In total, all of the identified projects add up to approximately \$4.48 billion, including 3.5% Rate of Growth. Additional information on the implementation of Measure C projects and programs is available in Appendix E of the 2007 RTP and the Measure C Expenditure Plan.

Exhibit 5-11 shows the financial constraint summary for the 2007 RTP, including Administrative Modification #1.

Program	Agency	Project Description/Limits	Total Cost	ID	FRE
Federal Transit Administration Section 5317	Various Agencies	Costs associated with the competitively selected projects derived from the Coordinated Human Services Transportation Plan for Fresno County.	\$ 365,480	20300000486	FRE072302
Congestion Mitigation and Air Quality Program (Non-transit)	Central Unified School District	Lease to purchase and/or purchase- to replace eight diesel school buses with eight compressed natural gas school buses.	\$ 2,317,300	20300000383	FRE070101
Congestion Mitigation and Air Quality Program (Non-transit)	Clovis Unified School District	Lease to purchase and/or purchase- 10 CNG powered school buses to replace existing diesel school buses.	\$ 3,132,700	20300000387	FRE070105
Congestion Mitigation and Air Quality Program (Non-transit)	Clovis, City of	In Clovis - Lump-Sum Traffic Flow Improvements. Consistent with 40 CFR part 93.126, 127, 128, exempt tables 283.	\$ 1,010,100	20300000206	FRE020105
Congestion Mitigation and Air Quality Program (Non-transit)	Clovis, City of	In Clovis - Lump-Sum Traffic Signal Synchronization. Consistent with 40 CFR part 93.126, 127, 128, exempt tables 283 ITS project.	\$ 223,500	20300000207	FRE020106
Congestion Mitigation and Air Quality Program (Non-transit)	Clovis, City of	Purchase 16 CNG refuse trucks to replace 16 older diesel refuse trucks.	\$ 3,118,000	20300000384	FRE070102
Congestion Mitigation and Air Quality Program (Non-transit)	Clovis, City of	Traffic Flow Improvements along Herndon Ave., Between Willow and Temperance Avenues.	\$ 617,700	20300000351	FRE090101
Congestion Mitigation and Air Quality Program (Non-transit)	Clovis, City of	Installation of shoulder improvements along Clovis Ave., between Santa Ana and Galtysburg.	\$ 145,900	20300000512	FRE090102
Congestion Mitigation and Air Quality Program (Non-transit)	Clovis, City of	Installation of shoulder improvements along Nees Ave., between Sunnyside and Armstrong Avenues.	\$ 338,700	20300000513	FRE090103
Congestion Mitigation and Air Quality Program (Non-transit)	Clovis, City of	Installation of Shaw/ DeWolf traffic signal.	\$ 621,700	20300000514	FRE090104
Congestion Mitigation and Air Quality Program (Non-transit)	Clovis, City of	Installation of Temperance/ Sierra Traffic Signal.	\$ 812,000	20300000515	FRE090105
Congestion Mitigation and Air Quality Program (Non-transit)	Coalinga, City of	In Coalinga - Construct Paved Shoulders for Bike Lane On Monterey Avenue.	\$ 101,900	20300000196	FRE020108
Congestion Mitigation and Air Quality Program (Non-transit)	Fowler, City of	Class II Bicycle Lanes- Construct lanes along the east side of Fowler Ave b/w the State Highway 99 southbound onramp and Merced Street, and along southside Adams b/w Fowler Highschool and Temperance.	\$ 106,400	20300000388	FRE070106
Congestion Mitigation and Air Quality Program (Non-transit)	Fowler, City of	Construct bicycle/pedestrian trail along the Golden State Corridor from the City of Fowler south toward Selma.	\$ 280,000	20300000533	FRE090123
Congestion Mitigation and Air Quality Program (Non-transit)	Fresno Area Express (FAE)	Prioritize traffic signals for certain fixed bus routes to decrease number of buses needed to maintain existing frequencies, and thereby reduce emissions.	\$ 1,565,700	20300000521	FRE090111
Congestion Mitigation and Air Quality Program (Non-transit)	Fresno County	North and Maple intersection improvements. Construct left turn lane for eastbound traffic.	\$ 133,700	20300000324	FRE040118
Congestion Mitigation and Air Quality Program (Non-transit)	Fresno County	Central and Willow intersection improvements. Construct left turn lanes and pavement improvements and remove a four-way stop.	\$ 99,300	20300000325	FRE040119
Congestion Mitigation and Air Quality Program (Non-transit)	Fresno County	Shoulder paving stabilization. Alta Ave. to SR 63 - American Ave.	\$ 684,800	20300000326	FRE040120
Congestion Mitigation and Air Quality Program (Non-transit)	Fresno County	Shoulder paving/stabilization on Cedar Ave. between Lincoln Ave. to Adams Ave.	\$ 363,200	20300000528	FRE090118
Congestion Mitigation and Air Quality Program (Non-transit)	Fresno County	Commute Green Fresno County A travel demand management commuter program for Fresno County employees designed to provide subsidies and incentives for program participants.	\$ 590,300	20300000529	FRE090119
Congestion Mitigation and Air Quality Program (Non-transit)	Fresno County	Lump Sum shoulder improvements paving/stabilization at various locations.	\$ 2,372,100	20300000539	FRE090130
Congestion Mitigation and Air Quality Program (Non-transit)	Fresno Unified School District	Lease to purchase and/or purchase of 6 CNG school buses to replace existing fleet.	\$ 1,777,900	20300000389	FRE070111
Congestion Mitigation and Air Quality Program (Non-transit)	Fresno Unified School District	Expand existing fast-fill CNG facility to include time-filling of 8 ea. dual hose, 3600 psi time-fill posts.	\$ 219,700	20300000531	FRE090121
Congestion Mitigation and Air Quality Program (Non-transit)	Fresno, City of	In Fresno - At intersection of Chestnut Avenue and Kings Canyon Road, install Traffic Flow improvements including Dual Left-Turn Lanes & Intersection Improvements.	\$ 1,717,900	20300000182	FRE020122
Congestion Mitigation and Air Quality Program (Non-transit)	Fresno, City of	In Fresno - Lump-Sum Construction of New Trails to Serve Fresno/Clovis Metropolitan Area Trail System. Consistent with 40 CFR part 93.126, 127, 128, exempt tables 283.	\$ 1,244,000	20300000227	FRE020133
Congestion Mitigation and Air Quality Program (Non-transit)	Fresno, City of	In Fresno - Lump-Sum Pedestrian Facilities to include Sidewalks and Signal Upgrades for Pedestrians. Consistent with 40 CFR part 93.126, 127, 128, exempt tables 283.	\$ 498,300	20300000228	FRE020134
Congestion Mitigation and Air Quality Program (Non-transit)	Fresno, City of	Replace existing 4-way stop control at intersection of North and Cedar with fully activated traffic signal. 4 legs of intersection will be modified.	\$ 998,000	20300000315	FRE040109
Congestion Mitigation and Air Quality Program (Non-transit)	Fresno, City of	Traffic synchronization and signal coordination along Shaw Ave. from Highway 99 to Highway 41. Install ITS conduits, fiber, communication cabinets and 2070L traffic signal controllers.	\$ 4,199,800	20300000389	FRE070107
Congestion Mitigation and Air Quality Program (Non-transit)	Fresno, City of	Completion of the Sugar Pine Trail from Chestnut to Copper, a Class I bikeway and pedestrian trail.	\$ 744,200	20300000391	FRE070109

Exhibit 5-5

Program	Agency	Project Description/Limits	Total Cost	ID	FRE
Congestion Mitigation and Air Quality Program (Non-transit)	Fresno, City of	ITS installation & signal coordination for Clovis Ave. from Dakota to American. Install fiber, cabinets, vaults, cameras, radar, 2070L controllers.	\$ 1,000,000	20300000516	FRE090106
Congestion Mitigation and Air Quality Program (Non-transit)	Fresno, City of	ITS installation & signal coordination for Fresno Street from Herndon to Olive. Install wireless communications and new controllers.	\$ 220,000	20300000517	FRE090107
Congestion Mitigation and Air Quality Program (Non-transit)	Fresno, City of	Bicycle lanes to fill in missing bikeway gaps and connect to existing facilities on Shields Ave. from West Ave. to Maple Ave. for 4 miles of bikeway improvements.	\$ 442,200	20300000518	FRE090108
Congestion Mitigation and Air Quality Program (Non-transit)	Fresno, City of	ITS installation & signal coordination for Willow Ave. from Ashland to International. Install conduit, fiber, cabinets, poles, cameras, radars, 2070L controllers.	\$ 1,400,000	20300000519	FRE090109
Congestion Mitigation and Air Quality Program (Non-transit)	Fresno, City of	Park and Ride Lot construction to accommodate 58 stalls for long distance commuter carpools and carpools near SR 99.	\$ 647,600	20300000520	FRE090110
Congestion Mitigation and Air Quality Program (Non-transit)	Fresno, City of	At intersection of Clovis and Kings Canyon, construct westbound right turn lane.	\$ 315,900	20300000540	FRE090131
Congestion Mitigation and Air Quality Program (Non-transit)	Fresno, City of	Install dual left turn lanes for eastbound Nees Avenue at Cedar Avenue to improve traffic flow.	\$ 125,000	20300000541	FRE090132
Congestion Mitigation and Air Quality Program (Non-transit)	Fresno, City of	ITS installation & signal coordination for Clovis Ave., Dakota to Jensen and for Shaw Ave. 41 to 168.	\$ 1,386,300	20300000542	FRE090133
Congestion Mitigation and Air Quality Program (Non-transit)	Fresno, City of	Bicycle lanes to fill in missing bikeway gaps and connect to existing facilities on Cedar Ave. from Foradora to Los Altos Ave. for 4.5 miles of bikeway improvements.	\$ 467,600	20300000543	FRE090134
Congestion Mitigation and Air Quality Program (Non-transit)	Fresno, City of	Lump Sum Sidewalks for various locations within the City of Fresno.	\$ 500,000	20300000545	FRE090136
Congestion Mitigation and Air Quality Program (Non-transit)	Fresno, City of	ITS on Blackstone Ave. from Herndon Ave. to Nees, and on Friant Road from Nees to Copper Ave.	\$ 2,213,200	20300000550	FRE090137
Congestion Mitigation and Air Quality Program (Non-transit)	Huron, City of	In Huron - Install Traffic Signals on Lassen Avenue at 4th and 5th Streets.	\$ 450,900	20300000022	FRE020135
Congestion Mitigation and Air Quality Program (Non-transit)	Huron, City of	In Huron - On Central Avenue between Huron and 5th Streets - Provide Traffic Flow Improvements and Expand Park and Ride Lot.	\$ 129,300	203000000210	FRE020136
Congestion Mitigation and Air Quality Program (Non-transit)	Kerman, City of	Construct CNG filling station at City Corporate Yard.	\$ 361,800	203000000211	FRE080124
Congestion Mitigation and Air Quality Program (Non-transit)	Kings Canyon Unified School District	Lease to purchase and/or purchase of 9 CNG school buses to replace existing fleet.	\$ 2,932,500	203000000394	FRE070112
Congestion Mitigation and Air Quality Program (Non-transit)	Kingsburg, City of	Construct Class I bike path along Golden State Boulevard from Mountain View Ave to Belier Ave.	\$ 360,000	203000000392	FRE070110
Congestion Mitigation and Air Quality Program (Non-transit)	Kingsburg, City of	Construct pedestrian facilities along Sierra Street at the UPRR track crossing near Simpson Street. Improvements include sidewalks, curb ramps and track platform improvements.	\$ 110,300	203000000395	FRE070113
Congestion Mitigation and Air Quality Program (Non-transit)	Kingsburg, City of	Construct Class I bicycle and pedestrian pathway along Madison Avenue between the eastern edge of shoulder and the Cole Slough.	\$ 235,500	203000000396	FRE070114
Congestion Mitigation and Air Quality Program (Non-transit)	Kingsburg, City of	Construct Class II bicycle pathway along Lewis Street between Simpson Street and 18th Avenue.	\$ 303,900	203000000397	FRE070115
Congestion Mitigation and Air Quality Program (Non-transit)	Kingsburg, City of	Construct transit stop facilities along Sierra Street east of Rader Johnson Drive.	\$ 108,500	203000000524	FRE090114
Congestion Mitigation and Air Quality Program (Non-transit)	Kingsburg, City of	Construct bike lanes along 14th Avenue from Sierra to Stroud Ave.	\$ 153,600	203000000534	FRE090125
Congestion Mitigation and Air Quality Program (Non-transit)	Mendota, City of	In Mendota - Construct At-Grade Pedestrian/Bike Crossing Across 2nd and 5th Streets Over Railroad Tracks.	\$ 445,500	203000000027	FRE020141
Congestion Mitigation and Air Quality Program (Non-transit)	Mendota, City of	Pave three unimproved alleys bounded by 7th Street and 8th Street.	\$ 182,000	203000000398	FRE070116
Congestion Mitigation and Air Quality Program (Non-transit)	Mendota, City of	Rails to Trails project. One and one half mile bike and pedestrian trail along abandoned BNSF rail line at a diagonal between Hills Valley Rd and Adams Ave.	\$ 1,021,000	203000000320	FRE040114
Congestion Mitigation and Air Quality Program (Non-transit)	Orange Cove, City of	Install sidewalks on Fourth and Fifth Streets from South Avenue to Railroad Avenue.	\$ 144,500	203000000535	FRE090126
Congestion Mitigation and Air Quality Program (Non-transit)	Orange Cove, City of	Install sidewalks and ramps on both sides of Manning Ave. between Frankwood and Butternut Willow Ave.	\$ 689,600	203000000321	FRE040115
Congestion Mitigation and Air Quality Program (Non-transit)	Reedley, City of	Construction of a clean air alternative fueling center for compressed natural gas (CNG), ultra Low Sulfur Diesel, bio-diesel and E-85 ethanol fuel to be located in the Regional Transportation Center.	\$ 1,195,200	203000000525	FRE090115
Congestion Mitigation and Air Quality Program (Non-transit)	Reedley, City of	Purchase 3 CNG Garbage Trucks to replace existing fleet.	\$ 528,400	203000000526	FRE090116
Congestion Mitigation and Air Quality Program (Non-transit)	San Joaquin, City of	Lump sum traffic flow improvements.	\$ 96,600	203000000322	FRE040116
Congestion Mitigation and Air Quality Program (Non-transit)	San Joaquin, City of	Install concrete sidewalk at various locations where there is none along Colorado Avenue and Main St.	\$ 52,800	203000000537	FRE090128

Program	Agency	Project Description/Limits	Total Cost	ID	FRE
Congestion Mitigation and Air Quality Program (Non-Transit)	Sanger, City of	In Sanger - Lump-Sum Traffic Flow Improvements at Various Major Intersections. Consistent with 40 CFR part 93.126, 127, 128, exempt tables 2&3.	\$ 366,300	20300000218	FRE020150
Congestion Mitigation and Air Quality Program (Non-Transit)	Sanger, City of	Purchase 2 CNG vehicles.	\$ 73,400	20300000527	FRE030117
Congestion Mitigation and Air Quality Program (Non-Transit)	Sanger, City of	Construct CNG filling station at City Corporation Yard.	\$ 340,500	20300000536	FRE030127
Congestion Mitigation and Air Quality Program (Non-Transit)	Sanger, City of	Purchase 6 GEM electric vehicles and 2 Columbia Electric Vehicles to replace existing city fleet vehicles.	\$ 138,000	20300000538	FRE030129
Congestion Mitigation and Air Quality Program (Non-Transit)	Southwest Transportation Agency	Lease to purchase and/or purchase- 10 CNG school buses to replace 10 diesel school buses.	\$ 3,057,800	20300000400	FRE070118
Congestion Mitigation and Air Quality Program (Non-Transit)	Southwest Transportation Agency	Purchasing a Rule 1186-certified CNG Street Sweeper to replace diesel sweeper.	\$ 150,000	20300000401	FRE070119
Congestion Mitigation and Air Quality Program (Non-Transit)	Various Agencies	Replacement of 2 gross polluting school buses with cleaner Diesel Buses.	\$ 340,000	20300000532	FRE030122
Congestion Mitigation and Air Quality Program (Transit)	Fresno Area Express (FAX)	Purchase 15 CNG buses to replace 14 diesel buses.	\$ 10,266,800	20300000402	FRE070120
Congestion Mitigation and Air Quality Program (Transit)	Fresno Area Express (FAX)	Increase frequency of service from 30 minute intervals to 15 minute intervals on high demand routes. Fresno Street, 1st Street, and Cedar. Three years of funding.	\$ 11,982,600	20300000404	FRE070122
Congestion Mitigation and Air Quality Program (Transit Projects)	Fresno Area Express (FAX)	City of Fresno, FAX, will purchase 6 CNG converted paratransit vehicles to replace non-CNG vehicles in existing fleet.	\$ 617,300	20300000522	FRE090112
Congestion Mitigation and Air Quality Program (Transit Projects)	Fresno Area Express (FAX)	City of Fresno, FAX, will purchase 6 alternate fuel (CNG), low emission buses to replace diesel buses in the current fleet.	\$ 2,442,000	20300000523	FRE090113
Congestion Mitigation and Air Quality Program (Transit Projects)	Fresno County Rural Transit Agency	Purchase of four 35 passenger compressed natural gas powered buses.	\$ 1,650,000	20300000333	FRE041405
Congestion Mitigation and Air Quality Program (Transit Projects)	Fresno County Rural Transit Agency	Purchase 2, 22 passenger CNG Vans to replace fleet.	\$ 288,000	20300000330	FRE090120
Demonstration Projects	Fresno County	Rehabilitation, repair, and/or reconstruction of deficient two-lane roads that connect to Interstate 5, SR 180, SR 41 and SR 99 countywide.	\$ 3,500,000	20300000443	FRE070201
Demonstration Projects	Fresno County	Rehabilitation, repair, and/or reconstruction of deficient two-lane roads that connect to Interstate 5, SR 180, SR 41 and SR 99 countywide.	\$ 1,875,000	20300000449	FRE070202
Demonstration Projects	Various Agencies	Advance Construction Conversion lump sum project for earmarked federal funds reimbursement.	\$ 3,808,000	20300000380	FRE040201
Demonstration Projects	Caltrans	Various locations. Emergency Repair Program. Consistent with 40 CFR part 93.126, 127, 128 Exempt Tables 2 & 3.	\$ 150,000	20300000166	FRE070801
Emergency Repair Program	Fresno Area Express (FAX)	Various Planning Project COFCG Staff/Annual Planning O & M Expenses and Special Projects.	\$ 2,550,000	20300000147	FRE021501
Federal Transit Administration Section 5307 Program	Fresno Area Express (FAX)	FAX Facility Upgrades To Include Portable Life Equipment, Fare Box Systems, Life Pump and Cylinders, Automated Passenger Counters, Bus Washer, Passenger Information Kiosks, etc.	\$ 500,000	20300000148	FRE021509
Federal Transit Administration Section 5307 Program	Fresno Area Express (FAX)	Paratransit Vehicle Service Expansion/Replacement of 17 Vehicles.	\$ 961,500	20300000150	FRE021508
Federal Transit Administration Section 5307 Program	Fresno Area Express (FAX)	Non-Revenue Vehicle Service Expansion/Replacement (18 Vehicles)	\$ 400,000	20300000151	FRE021507
Federal Transit Administration Section 5307 Program	Fresno Area Express (FAX)	Preventive Maintenance Expense	\$ 34,030,900	20300000155	FRE021503
Federal Transit Administration Section 5307 Program	Fresno Area Express (FAX)	Capital Lease-Vehicle Tire Lease	\$ 1,245,200	20300000196	FRE021506
Federal Transit Administration Section 5307 Program	Fresno Area Express (FAX)	Capital Lease-Handy Ride Facility	\$ 653,500	20300000157	FRE021505
Federal Transit Administration Section 5307 Program	Fresno Area Express (FAX)	Contracted Paratransit Service Operations	\$ 14,903,100	20300000158	FRE021504
Federal Transit Administration Section 5307 Program	Fresno Area Express (FAX)	Various Planning Projects/FAX Staff/Annual Planning O & M Expenses and Special Projects.	\$ 2,497,300	20300000259	FRE021502
Federal Transit Administration Section 5307 Program	Fresno Area Express (FAX)	Passenger shelters/structures, benches, trash receptacles and lighting. On-street signs. Bus stop repairs, and miscellaneous amenities to benefit transit passengers.	\$ 600,000	20300000260	FRE021510
Federal Transit Administration Section 5309 Program	Fresno Area Express (FAX)	Purchase of 5 Revenue Vehicles.	\$ 5,814,800	20300000265	FRE022005
Federal Transit Administration Section 5309 Program	Fresno Area Express (FAX)	Purchase low-emission non-revenue transit vehicles.	\$ 300,000	20300000552	FRE092001
Federal Transit Administration Section 5311 Program	Fresno County Rural Transit Agency	Programs FY 2006/07-09 FYA Section 5311 Apportionment. Annual Operating Assistance.	\$ 14,857,807	10300000192	FRE021701
Federal Transit Administration Section 5316	Various Agencies	Costs associated with the competitively selected projects derived from the Coordinated Human Services Transportation Plan in Fresno County.	\$ 1,011,454	20300000484	FRE072202
FTA Reference Projects	Fresno Area Express (FAX)	Lease vans for downtown vanpool program. Final year of three year funding period.	\$ 159,800	20300000328	FRE040122
FTA Reference Projects	Fresno Area Express (FAX)	Bus replacement program. Purchase 20 low emission urban buses to replace 20 1993 diesel vehicles.	\$ 7,227,200	20300000329	FRE041401

Program	Agency	Project Description/Limits	Total Cost	ID	FRE
FTIA Reference Projects	Fresno Area Express (FAX)	Peak Service Program. Increase the frequency of service from 30 min to 15 min intervals on two routes: Route 28 and Route 30. Final year of three year funding period.	\$ 6,401,800		FRE041402
FTIA Reference Projects	Fresno Area Express (FAX)	Downtown Circulator Program provide service throughout downtown Fresno during peak commute hours. Purchase of 4 shuttle vehicles.	\$ 1,200,000	20300000331	FRE041403
FTIA Reference Projects	Fresno Area Express (FAX)	Intermodal Facility Program. Develop and construct intermodal facility in Southeast area of Fresno.	\$ 1,000,000	20300000332	FRE041404
FTIA Reference Projects	Fresno Area Express (FAX)	Purchase one 40 foot hydrogen powered hybrid electric transit bus and one electrolytic hydrogen fueling station.	\$ 3,250,000	20300000403	FRE070121
Hazard Elimination Safety Program	Caltrans	Lump-Sum Highway Safety Improvement Program. Consistent with 40 CFR part 93.126, 127, 128, exempt tables 2&3.	\$ 10,266,320	20300000278	FRE040401
Hazard Elimination Safety Program	Various Agencies	High Risk Rural Road Program lump sum. Codified as section 148 of title 23, United States Code (23 U.S.C. 148).	\$ 558,532	20300000481	FRE040402
Highway Bridge Replacement/Rehabilitation Program	Caltrans	Lump-Sum Highway Bridge Replacement/Rehabilitation Program (No additional travel lanes). Consistent with 40 CFR part 93.126, 127, 128, exempt tables 2&3.	\$ 42,030,400	20300000279	FRE040501
Highway Bridge Replacement/Rehabilitation Program	Caltrans	Planning of Bridge Preventive Maintenance Program by local agencies statewide. Funds available for FY 2005/06 only. Planning only - for developing project lists, not for capital.	\$ 1,000	20300000451	BR_PREV_M
Highway Bridge Replacement/Rehabilitation Program	Caltrans	Scour local agency plan of action statewide. Funds available for current scour critical list for FY 2005/06 only. Small set-aside available for bridges added to list after FY 2005.	\$ 1,000	20300000452	SCOUR_POA
Proposition 1B	Caltrans	In the City of Fresno and within Madera County, from 0.2 miles south of the Grantland Ave. Undercrossing to 0.5 miles north of the Ave 7 overcrossing, widen existing 4-lane Freeway to 6-lane Freeway.	\$ 55,700,000	20300000549	FRE071203
Proposition 1B	Caltrans	In the City of Fresno, from the Ashlan Ave. overcrossing to 0.2 miles north of the Grantland Ave. undercrossing, widen existing 4-lane Freeway to 6-lane Freeway.	\$ 37,300,000	10300000262	FRE071202
Proposition 1B	Fresno Area Express (FAX)	Purchase CNG replacement buses.	\$ 2,500,000	20300000551	FRE092403
Proposition 1B	Fresno, City of	Shaw from Highway 41 to Highway 168. Traffic Synchronization.	\$ 2,100,000	20300000547	FRE092401
Proposition 1B	Fresno, City of	Clovis from Dakota to Kings Canyon. Traffic Synchronization.	\$ 2,100,000	20300000548	FRE092402
Regional Surface Transportation Program	Clovis, City of	Road repair along Peach Ave. between Alhambra and Teague Avenues	\$ 187,800	20300000405	FRE070602
Regional Surface Transportation Program	Clovis, City of	Road repair along Shaw with reconstruction activities between Peach and Minnewawa Avenues	\$ 806,700	20300000406	FRE070603
Regional Surface Transportation Program	Clovis, City of	Road repair along Shaw with reconstruction activities between Peach and Minnewawa Avenues	\$ 1,036,100	20300000407	FRE070604
Regional Surface Transportation Program	Clovis, City of	Reconstruction of Shaw Avenue, between Minnewawa and Clovis Avenues.	\$ 983,000	20300000489	FRE090601
Regional Surface Transportation Program	Coalinga, City of	In Coalinga - Lump-Sum Various AC Overlays/Reconstruction on Eligible Routes. Consistent with 40 CFR part 93.126, 127, 128 exempt tables 2&3.	\$ 274,000	20300000058	FRE020605
Regional Surface Transportation Program	Fresno, City of	Reconstruct 13th Street between N Street (SR 33) to 400 ft east of P Street	\$ 406,300	20300000408	FRE070605
Regional Surface Transportation Program	Fresno County	Manning Ave. from Crawford to Hill Ave. Reconstruct existing 2-lane road to current standards - widening travel way, paving shoulders an improving structural section.	\$ 1,645,200	20300000343	FRE040612
Regional Surface Transportation Program	Fresno County	Lump Sum listing from AC overlay projects in various locations	\$ 3,930,400	20300000509	FRE090621
Regional Surface Transportation Program	Fresno, City of	In Fresno - Lump-Sum AIC Overlays or Cold Recycle Overlays on Various Eligible Routes (No Additional Travel Lanes). Consistent with 40 CFR part 93.126, 127, 128, exempt tables 2&3.	\$ 4,749,900	20300000249	FRE020617
Regional Surface Transportation Program	Fresno, City of	In Fresno - Lump-Sum Sound Walls. Use for City Match To Caltrans Projects On Freeways for Noise Attenuation. Consistent with 40 CFR part 93.126, 127, 128, exempt tables 2&3.	\$ 1,016,800	20300000252	FRE020620
Regional Surface Transportation Program	Fresno, City of	In Fresno - Lump-Sum Landscaping and Plantings in Median Islands, On Trails, and Streetscapes. Consistent with 40 CFR part 93.126, 127, 128, exempt tables 2&3.	\$ 510,000	20300000253	FRE020621
Regional Surface Transportation Program	Fresno, City of	Cold pavement recycling of Clovis Avenue between McKinley Ave. to Shields Ave.	\$ 1,254,000	20300000041	FRE070608
Regional Surface Transportation Program	Fresno, City of	Construct dual left turn lanes for northbound Clovis Avenues at McKinley Avenue.	\$ 489,300	203000000494	FRE090606
Regional Surface Transportation Program	Fresno, City of	Streetscape Beautification project on Broadway between Divisadero and Tuolumne, including diagonal parking, pedestrian improvements and landscaping.	\$ 564,700	203000000495	FRE090607
Regional Surface Transportation Program	Fresno, City of	Installation of a traffic signal at the intersections of McKinley/Hughes and McKinley/Marks.	\$ 1,241,600	203000000496	FRE090608

Program	Agency	Project Description/Limits	Total Cost	ID	FRE
Regional Surface Transportation Program	Fresno, City of	Construct Roundabouts at the intersections of Audubon/Del Mar and Audubon/Exington.	\$ 245,900	20300000497	FRE090609
Regional Surface Transportation Program	Fresno, City of	Traffic flow improvements at Divisadero and SR 41, including new median island and traffic signal modifications.	\$ 245,500	203000000498	FRE090610
Regional Surface Transportation Program	Fresno, City of	Lump Sum AC Overlays on various eligible routes.	\$ 6,085,100	203000000499	FRE090611
Regional Surface Transportation Program	Fresno, City of	Surveying, development of roadway geometrics and preliminary engineering, plus a CEQA process for adoption of the OPL for various roadways within the City of Fresno.	\$ 338,900	203000000500	FRE090612
Regional Surface Transportation Program	Fresno, City of	Streetscape Beautification project on Olive Avenue between Palm Avenue and Van Ness Avenue.	\$ 200,000	203000000553	FRE090604
Regional Surface Transportation Program	Huron, City of	In Huron - Lump-Sum Construction of Median Islands and Landscaping on Eligible Routes. Consistent with 40 CFR part 93.126, 127, 128, exempt tables 283.	\$ 239,700	203000000234	FRE020624
Regional Surface Transportation Program	Kerman, City of	On W. Kearney Blvd. from 3rd St. to Del Norte Ave. Install median islands with landscaping, grind, and regrade existing pavement and install 3" AC pavement.	\$ 392,000	203000000412	FRE070610
Regional Surface Transportation Program	Kerman, City of	Replace rough pavement on Stanislaus Ave. from Madera Ave. to Merlot Ave.	\$ 308,200	203000000510	FRE090613
Regional Surface Transportation Program	Kingsburg, City of	On 18th Ave. from Stroud Ave. to Tulare St. Pavement reconstruction and drainage improvements.	\$ 345,600	203000000413	FRE070611
Regional Surface Transportation Program	Kingsburg, City of	Reconstruction of Sierra Street from Rater Johnson Drive to SR 99.	\$ 249,900	203000000501	FRE090614
Regional Surface Transportation Program	Mendota, City of	On 9th Street from Oiler St. to Marie St. Reconstruction and resurfacing of existing road.	\$ 314,900	203000000414	FRE070612
Regional Surface Transportation Program	Orange Cove, City of	South Ave. from Anchor Ave. to Morrison Ave. □	\$ 977,000	203000000415	FRE070613
Regional Surface Transportation Program	Orange Cove, City of	Reconstruction to standard and widen shoulder.	\$ 237,000	203000000502	FRE090615
Regional Surface Transportation Program	Reedley, City of	Reconstruct East Railroad Avenue from Hills Valley Road to Fourth Street.	\$ 581,300	203000000091	FRE020633
Regional Surface Transportation Program	Reedley, City of	Intersection of Dinuba and Butternutwillow Construct a modern roundabout, widen and improve intersection approaches.	\$ 939,900	203000000340	FRE040609
Regional Surface Transportation Program	Reedley, City of	Frankwood Ave. from 900 ft north of Parlier to Manning. Reconstruct & overlay, remove & replace curb, gutter & sidewalks. ROW acquisition.	\$ 855,100	203000000416	FRE070614
Regional Surface Transportation Program	Reedley, City of	N. Frankwood Ave. between Manning Ave. to the north and North Ave. to the south. Realignment and reconstruction. Move east curb line back to its proper alignment matching the existing curb return.	\$ 564,200	203000000503	FRE090616
Regional Surface Transportation Program	Reedley, City of	Construct medians on North Frankwood Ave. from Manning Ave. to north city limits replacing the center dual turn lane & installing street lights & in-pavement x wall at elementary school.	\$ 396,900	203000000418	FRE070616
Regional Surface Transportation Program	San Joaquin, City of	Main Street from Arizona Ave. to Placer Ave. Remove and replace existing asphalt paving.	\$ 771,500	203000000342	FRE040611
Regional Surface Transportation Program	Sanger, City of	City of Sanger County of Fresno Joint Project. North Ave. from Academy to Beltna Ave. Reconstruct existing two-lane road.	\$ 564,200	203000000504	FRE090617
Regional Surface Transportation Program	Sanger, City of	Reconstruct Fifth Street from Greenwood Ave. to Academy Ave.	\$ 130,600	203000000246	FRE020645
Regional Surface Transportation Program	Selma, City of	In Selma - Reconstruct Floral Ave / Selma Branch Canal Crossing. 6 ft. block wall, wheelchair ramps, in-pavement crosswalk lights, split-rail fencing, warning signs.	\$ 851,000	203000000420	FRE070618
Regional Surface Transportation Program	Selma, City of	Floral Ave. between McCall Ave and Dockery Ave. Cold plane pavement, overlay, construct/reconstruct handicapped access ramps and place in-pavement crosswalk with advance warning lights.	\$ 1,367,600	203000000421	FRE070619
Regional Surface Transportation Program	Selma, City of	Wright St between Arvants St. and Dinuba Ave. Cold plane pavement, construct/reconstruct handicapped access ramps and place in-pavement crosswalk with advance warning lights.	\$ 451,800	203000000508	FRE090620
Regional Surface Transportation Program	Selma, City of	Whitson Ave and Thompson Ave. Intersection. Provide left and right turn channelization and phasing for existing signal. Connect existing signal to interconnect system.	\$ 648,000	203000000480	FRE071901
Safe Routes to School Program	Various Agencies	Safe Routes to School Lump sum listing of projects. 6th cycle projects	\$ 16,102,000	203000000422	FRE071003
State Highway Operating and Protection Program	Caltrans	Lump-Sum "Bridge Preservation" Category SHOPP. Non-capacity increasing projects roadside rehabilitation. Consistent with 40 CFR part 93.126, 127, 128, exempt tables 283.	\$ 22,727,000	203000000423	FRE071004

Program	Agency	Project Description/Limits	Total Cost	ID	FRE
State Highway Operations and Protection Program	Caltrans	Lump-Sum "Collision Reduction" Category SHOPP. Non-capacity increasing projects roadside rehabilitation. Consistent with 40 CFR part 93.126, 127, 128, exempt tables 28.3	\$ 3,313,000		20300000468 FRE071010
State Highway Operations and Protection Program	Caltrans	Lump-Sum "Mandates" Category SHOPP. Non-capacity increasing projects roadside rehabilitation. Consistent with 40 CFR part 93.126, 127, 128, exempt tables 28.3	\$ 6,040,000		20300000546 FRE091001
State Highway Operations and Protection Program	Caltrans	In Fresno- Buland Avenue to Herndon Avenue and northbound Herndon off-ramp- add auxiliary lane	\$ 14,850,000		20300000439 FRE071005
State Highway Operations and Protection Program	Caltrans	Lump-Sum "Roadway preservation" Category SHOPP. Non-capacity increasing projects roadside rehabilitation. Consistent with 40 CFR part 93.126, 127, 128, exempt tables 28.3	\$ 31,894,900		20300000440 FRE071007
State Highway Operations and Protection Program	Caltrans	Lump-Sum "Roadside Preservation" Category SHOPP. Non-capacity increasing projects roadside rehabilitation. Consistent with 40 CFR part 93.126, 127, 128, exempt tables 28.3	\$ 16,009,000		20300000000 FRE041001
STIP - Interregional Program	Caltrans	In the City of Fresno, on Route 41 at and near Friant Road. Tree planting.	\$ 1,745,000		10300000215 FRE041202
STIP - Interregional Program	Caltrans	Near Selma and Kingsburg, from the Junction Routes 99 and 201 to north of Floral Avenue. Replacement planting.	\$ 1,730,000		10300000208 FRE041203
STIP / Regional Choice	Caltrans	Near Centerville, from Temperance Avenue to Academy Avenue. Construct 4 lane expressway, on existing alignment.	\$ 88,871,000		10300000016 FRE021106
STIP / Regional Choice	Caltrans	Near Centerville, from Academy Avenue to Trimmer Springs Road. Construct 4 lane expressway on existing alignment.	\$ 9,249,000		10300000177 FRE021107
STIP / Regional Choice	Caltrans	Near Centerville and Minkler, on Route 180 from Trimmer Springs Road to east of Frankwood Avenue. Construct 4 lane expressway on existing alignment.	\$ 6,812,000		10300000078 FRE021108
STIP / Regional Choice	Council of Fresno County Governments	Planning, Programming and Monitoring.	\$ 2,810,000		10300000044 FRE001101
Transportation Enhancement Activities Program	Clovis, City of	In the City of Clovis, east of Temperance Avenue and south of Nees Avenue along the Enterprise Canal. Construct a class I bicycle/pedestrian trail.	\$ 260,000		10300000223 FRE041812
Transportation Enhancement Activities Program	Clovis, City of	In the City of Clovis, on Ashlan Avenue between Whittier Avenue and McKelvy Avenue. Construct a median island with landscaping and irrigation.	\$ 465,300		10300000224 FRE041813
Transportation Enhancement Activities Program	Clovis, City of	Trial Head Rest Area, SWC, Sunnyside & Shepherd Aves.	\$ 1,772,300		20300000454 FRE071801
Transportation Enhancement Activities Program	Clovis, City of	Enhance "Gateway to the Sierras" Sign, Clovis Ave. between 4th and 5th Streets.	\$ 154,700		20300000455 FRE071802
Transportation Enhancement Activities Program	Fowler, City of	Landscaping & sidewalks, Merced Street between 3rd & 5th Streets.	\$ 203,300		20300000456 FRE071803
Transportation Enhancement Activities Program	Fresno County	Along the San Joaquin River from the Ketchoff Reservoir to the Upper Redinger Reservoir. Construct multi-modal trail.	\$ 537,000		10300000231 FRE041820
Transportation Enhancement Activities Program	Fresno County	Plant Palm Trees, Kearney Blvd. between Marks and Westlawn Aves.	\$ 647,200		20300000457 FRE071812
Transportation Enhancement Activities Program	Fresno, City of	Rehabilitate 2nd Floor of Historic Santa Fe Depot, Santa Fe Ave. and Tulare St.	\$ 1,486,400		20300000458 FRE071813
Transportation Enhancement Activities Program	Fresno, City of	Median Island Landscaping, Clovis Ave. Between Kings Canyon and McKinley Aves.	\$ 485,700		20300000459 FRE071805
Transportation Enhancement Activities Program	Fresno, City of	Median Island Enhancement, Shields Ave. Between Palm Ave. and BNSF Railroad.	\$ 165,000		20300000460 FRE071806
Transportation Enhancement Activities Program	Fresno, City of	Install and landscape median island, Ventura Ave. between Broadway and SR99	\$ 105,000		20300000461 FRE071807
Transportation Enhancement Activities Program	Fresno, City of	Sugar Pine Trail Improvements, Between Nees & Chestnut Aves.	\$ 185,900		20300000466 FRE071804
Transportation Enhancement Activities Program	Kingsburg, City of	In the City of Kingsburg, on 18th Avenue, from Hayward Street to Stroud Avenue. Construct median island with landscaping and irrigation.	\$ 154,100		10300000222 FRE041817
Transportation Enhancement Activities Program	Kingsburg, City of	Install and landscape median island, Sierra Street between Bethel Ave. and SR99	\$ 420,200		20300000462 FRE071808
Transportation Enhancement Activities Program	Mendota, City of	Beautification/Reconstruction of Derrick Ave. (SR33) 7th St. Intersection.	\$ 282,400		20300000463 FRE071809
Transportation Enhancement Activities Program	Selma, City of	In Selma, along the Consolidated Irrigation District's Selma Branch Canal from Floral Avenue to Lincoln Middle School. Construct class I bicycle path.	\$ 752,300		10300000229 FRE041819
Transportation Enhancement Activities Program	Selma, City of	Class I Bikeway and two Rest areas, between North and Third Streets.	\$ 283,600		20300000464 FRE071810
Transportation Enhancement Activities Program	Selma, City of	Class I Bikeway, Selma Branch Canal between Floral Ave. and Stillman Street.	\$ 765,800		20300000465 FRE071811

2007 RTP Amendment #1
Exhibit 5-6(a) Financially Unconstrained Projects

Jurisdiction/ Agency	Facility Name/Route	Project Limits	Type of Improvement	Estimated Cost	Proposed Open to Traffic Date					
					2010	2011	2014	2017	2020	2030
Selma	SR 99/Mountain View Ave.	1000 ft. north to 1000 ft. south on SR 99, 800 ft. east and 800 ft. west on Mountain View Avenue	Construct interchange improvements at SR 99 and Mountain View Avenue	\$45,000,000.00			X			
Selma	SR 99/Dinuba Avenue	0.5 mi. N. of SR99/Floral Ave. Undercrossing to 0.5 mi. S. of SR99/Manning Ave. Overcrossing	Construct local interchange on SR 99 at Dinuba Avenue Alignment	\$60,000,000.00			X			
Kingsburg	SR 99/Bethel Ave.	1000 ft. north to 1000 ft. south on SR 99, 1000 ft. east and 1000 ft. west on Bethel Avenue	Construct interchange improvements including structure replacement, widening, ramp signalization, and railroad grade separation	\$97,000,000.00			X			
Kingsburg	SR 99/Mendochno Ave.	1000 ft. north to 800 ft. south on SR 99, 1000 ft. east and 800 ft. west on Mendochno Avenue	Construct interchange improvements including structure replacement, widening, ramp signalization, and railroad grade separation	\$63,000,000.00			X			
City of Fresno (FAX)	Ventura/Kings Canyon		Bus Rapid Transit along Ventura Ave. and Kings Canyon Ave.	\$35,000,000.00			X			

Exhibit 5-10

MEASURE "C" EXTENSION PLAN Multi-Modal Funding Allocation Program

MEASURE "C" REAUTHORIZATION SALES TAX REVENUE	20 YEAR MEASURE "C" FUNDING TOTAL	AVERAGE ANNUAL MEASURE "C" FUNDING TOTAL	% OF MEASURE "C" FUNDING
	\$1,714,400,000	\$85,720,000	100.00%
FUNDING ALLOCATION PROGRAMS			
1. Regional Public Transit Program	\$412,100,000	\$20,605,000	24.0%
<i>Public Transit Agencies</i>	<i>\$337,100,000</i>	<i>\$16,855,000</i>	<i>19.7%</i>
Fresno Area Express (FAX)	\$235,000,000	\$11,750,000	13.7%
Clovis Transit	\$33,700,000	\$1,685,000	2.0%
Fresno County Rural Transit Agency (FCRTA)	\$68,400,000	\$3,420,000	4.0%
<i>Public Transportation Infrastructure Study (PTIS) / Transit Consolidation</i>	<i>\$5,100,000</i>	<i>\$255,000</i>	<i>0.3%</i>
ADA / Seniors / Paratransit	\$13,700,000	\$685,000	0.8%
Farmworker /Car/Van Pools	\$19,900,000	\$995,000	1.2%
Farmworker Van Pools	\$9,950,000	\$497,500	0.6%
Car/Van Pools	\$9,950,000	\$497,500	0.6%
<i>New Technology Reserve (If construction is not imminent in 15 years, money will be reallocated based on greatest need)</i>	<i>\$36,300,000</i>	<i>\$1,815,000</i>	<i>2.1%</i>
2. Local Transportation Program	\$593,600,000	\$29,680,000	34.6%
<i>Local Allocation</i>	<i>\$525,300,000</i>	<i>\$26,265,000</i>	<i>30.6%</i>
Street Maintenance (50% of Local Allocation)	\$262,650,000	\$13,132,500	15.3%
ADA compliance (1.75% of Local Allocation) ¹	\$9,192,750	\$459,638	0.5%
Flexible Funding (48.25% of Local Allocation)	\$253,457,250	\$12,672,863	14.8%
<i>Pedestrian/Trails</i>	<i>\$53,300,000</i>	<i>\$2,665,000</i>	<i>3.11%</i>
Urban (Clovis and Fresno Spheres of Influence)	\$37,000,000	\$1,850,000	2.16%
Rural	\$16,300,000	\$815,000	0.95%
<i>Bicycle Facilities</i>	<i>\$15,000,000</i>	<i>\$750,000</i>	<i>0.9%</i>
3. Regional Transportation Program	\$520,800,000	\$26,040,000	30.4%
Urban (50%)	\$261,900,000	\$12,595,000	14.7%
Rural (50%)	\$261,900,000	\$12,595,000	14.7%
Fresno Airports	\$17,000,000	\$850,000	1.0%
4. Alternative Transportation Program	\$102,500,000	\$5,125,000	6.0%
<i>Rail Consolidation (If construction is not imminent in 15 years, money will be used for grade separations instead)</i>	<i>\$102,500,000</i>	<i>\$5,125,000</i>	<i>6.0%</i>
5. Environmental Enhancement Program	\$59,800,000	\$2,990,000	3.5%
School Bus Replacement	\$39,900,000	\$1,995,000	2.3%
Transit Oriented Infrastructure for In-Fill ²	\$19,900,000	\$995,000	1.2%
6. Administration/Planning Program	\$25,600,000	\$1,280,000	1.5%
Fresno County Transportation Authority (FCTA)	\$17,000,000	\$850,000	1.0%
Council of Fresno County Governments (Fresno COG)	\$8,600,000	\$430,000	0.5%

¹ Jurisdictions receiving less than \$200,000 annually from the total local transportation funds available will be exempt from the provision. (Likely exempt jurisdictions would be Firebaugh, Fowler, and San Joaquin).

² Name of Funding Program to be determined.

ESTIMATED TOTAL MEASURE "C" PROGRAM ALLOCATIONS - URBAN 67.5%, RURAL 32.5%

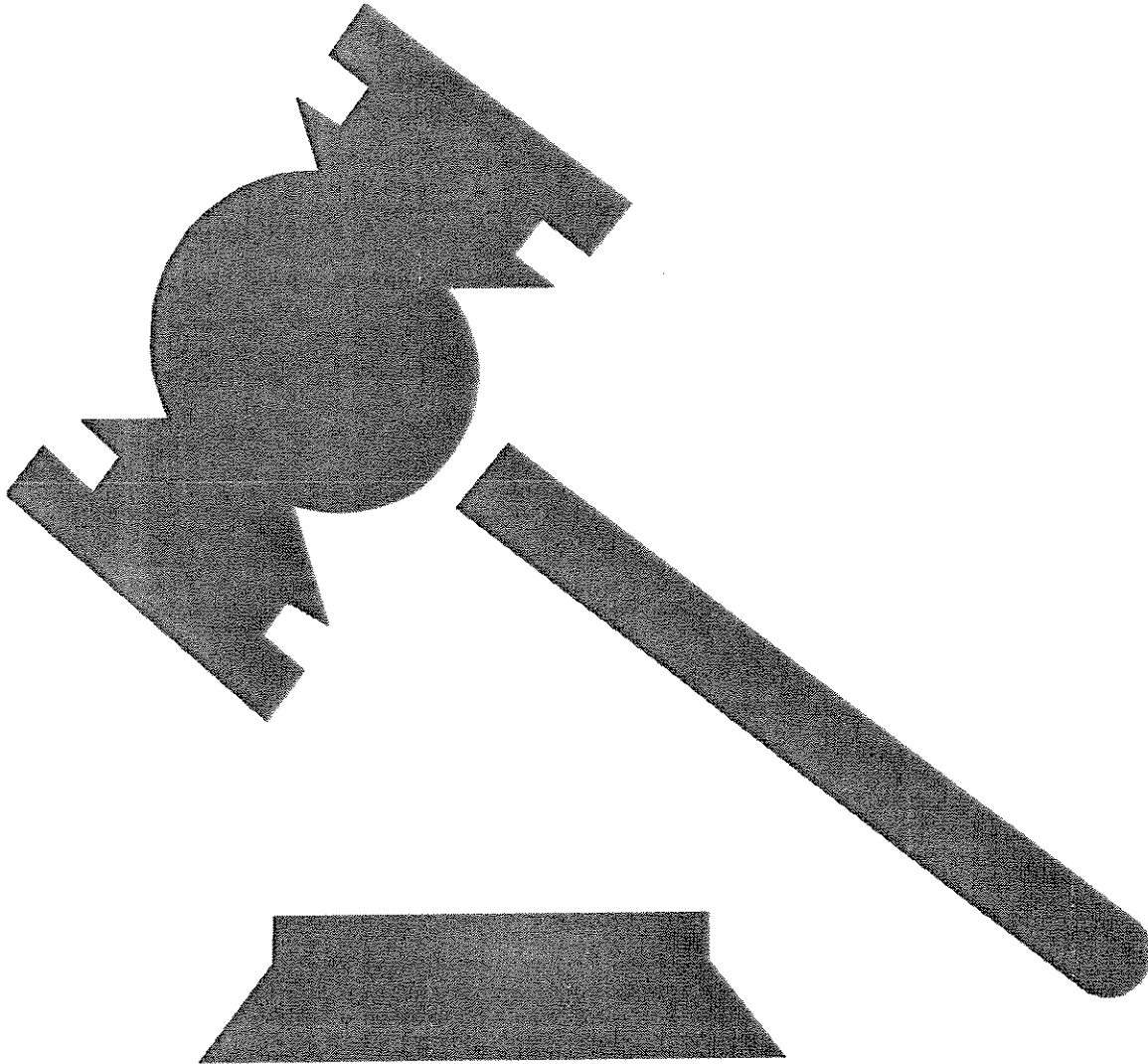
Exhibit 5-11
2007 RTP Amendment #1
Financial Constraint Summary

Projected Revenues
(includes 3% annual inflation)

Funding Source	Life of RTP (24 Year)
Federal	\$1,201,268,589
State	\$2,169,679,605
Local	\$1,815,900,000
Total Revenue (All Sources)	\$5,176,848,194

Projected Expenditures

	Life of RTP (24 Year)
FY 2008/09-2011/12 Federal Transportation Improvement Program	\$287,071,000
Financially Constrained List of RTP Projects-Modeled for Air Quality Conformity	\$2,526,850,000
2006 Measure C Extension Expenditure Plan	\$1,700,000,000
Total Expenditures (All Sources)	\$4,629,711,000



***TRANSPORTATION
ACTION/DISCUSSION ITEMS
AGENDA ITEM III. E.***

BUS RAPID TRANSIT MASTER PLAN (DRAFT)

June 17, 2008



Prepared for:



Prepared by:

Kimley-Horn and Associates, Inc.



**Kimley-Horn
and Associates, Inc.**

In association with:

**Wilbur Smith Associates, Inc.
Cambridge Systematics, Inc.**

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Chapter 1 – Introduction

The Council of Fresno County Governments (COFCG) has retained the firm of Kimley-Horn and Associates, Inc., along with subconsultants Wilbur Smith Associates, and Cambridge Systematics, to develop a Bus Rapid Transit Master Plan (BRT Master Plan). The BRT Master Plan has been prepared in association with the Technical Advisory Committee (TAC), comprised of staff members from COFCG, Fresno Area Express, City of Fresno, City of Clovis, and Caltrans.

This report is divided into the following chapters:

- Chapter 1 – Introduction. Provides brief introductions of the BRT Master Plan, Fresno Area Express, and Bus Rapid Transit.
- Chapter 2 – Regional Planning Context. Provides current planning conditions in the Fresno region and their potential impact on the BRT Master Plan.
- Chapter 3 – Stakeholder and Public Participation. Provides a summary of outreach to community leaders in Fresno with regards to BRT in Fresno and public comments/recommendations from the Community Open House.
- Chapter 4 – Proposed Rapid Transit (BRT) Network. Identifies potential corridors in the Fresno/Clovis metropolitan area for BRT implementation both in the short- and long-term. Provides recommendation for initial BRT implementation in Fresno and eventual build-out of a full BRT network.
- Chapter 5 – Ventura Avenue / Kings Road BRT Implementation Plan. Provides description of a potential corridor for initial BRT implementation and proposed stations along the corridor. Describes improvements to the corridor, BRT stops/stations, and vehicles to improve access to key destinations and minimize travel time for riders. And includes probable cost estimates for various forms of BRT implementation in Fresno.
- Chapter 6 – Funding Mechanisms for Implementing Bus Rapid Transit. Identifies funding mechanisms to support the proposed capital and operating costs associated with a BRT system.

1.1 Bus Rapid Transit Master Plan Motivation and Overview

The Bus Rapid Transit Master Plan provides a new perspective on rapid transit service in the Fresno/Clovis metropolitan area. The COFCG has been studying the implementation of rapid transit services in Fresno with rail modes as the proposed means of transportation. Unfortunately, due to high costs of implementing rail modes, it has been difficult to justify local investment in rapid transit. Today however, with the introduction of the bus rapid transit (BRT) concept, implementation of rapid transit is now more of a reality for many metropolitan areas from communities wanting a rapid transit network, like Fresno, to communities expanding their transit network such as Los Angeles or Boston.

Fresno is expected to grow and develop at a high rate over the next twenty years. As experienced over the last ten years, growth can bring both opportunities and challenges to the region. With the increase in employment and housing opportunities there is an increase in traffic congestion on both local roads and highways and the related increase in air pollution. Traffic congestion and air pollution are serious issues for the Central Valley, particularly air quality in Fresno and Clovis.

BUS RAPID TRANSIT MASTER PLAN

Council of Fresno County Governments (COFCG)

These issues have led to community groups emphasizing the mitigation of poor air quality through improved transit.

The overall vision of the BRT Master Plan is to demonstrate how improved efficiency, speed, and service can attract new transit ridership, improve customer satisfaction, and benefit the broader community by providing a quality of service similar to light rail systems through the use of bus technology.

This master plan will assess the potential implementation of bus rapid transit in Fresno with the following goals to support the above-mentioned vision:

1. Service Level – FAX will provide public transportation service to a maximum number of people in the Fresno-Clovis Metropolitan Area. This goal includes 90% coverage of the population within one-half mile of a FAX route; a maximum headway of 60 minutes and service seven days a week.
2. Service Quality – FAX will provide quality, convenient public transit service. This goal describes reliable service, clean and attractive vehicles and facilities and system safety.
3. Provide Efficient and Effective Service – FAX will operate an efficient and effective bus system. This goal describes a minimum fare box recovery ratio of 28% and minimum productivity of 40 passenger boardings per hour of bus service.
4. System Image – FAX will promote its service and image in the community. This goal describes marketing and community relations efforts.
5. Private Sector and Citizen Involvement – FAX will provide opportunities for citizens and private business to participate in public transportation operations.
6. Integrated Multi-modal Transportation – FAX will provide integrated multimodal transportation which facilitates the movement of people. This goal is targeted at connecting FAX services with the airport and passenger rail station.
7. Coordinate Transportation, Land Use and Air Quality Policies. This goal describes support for transportation investments that work towards accomplishing air quality goals, optimize utilization of land and encourage a stable economic base.

1.2 Fresno Area Express

Fresno Area Express (FAX) is the City of Fresno's public transit system. FAX operates both fixed bus routes and paratransit service seven days a week. The system consists of 20 bus routes carrying over 12 million passenger per year. Many routes currently operate on 30-minute headways in the peak hour; however, recently several routes have been increased to 15-minute headways due to passenger demand.

Three of FAX's routes currently serve more than 4,500 passengers each on a daily basis. Passenger demand on Route 28 is approaching 8,000 passengers per day and is quickly filling buses now operating every 15 minutes during the peak hour. The system has experienced significant peak loads on these higher frequency routes; FAX anticipates that these routes will

continue to grow substantially over the next five to ten years. FAX will need to implement innovative and cost effective ways to address the increased demand.

1.3 *Bus Rapid Transit*

Definition

“Bus Rapid Transit” (BRT) is an integrated system of facilities, equipment, services, and amenities that improve the speed, reliability, and identity of bus transit. BRT is, in many respects, rubber-tired light rail transit (LRT) with greater operating flexibility and potentially lower costs. The BRT mode is quickly becoming an effective way to move people efficiently and in a cost effective manner—in terms of both capital and operating costs.

Why BRT as a rapid transit option?

There are many reasons why the COFCG should consider BRT as a rapid transit option for the region:

1. BRT can be implemented much quicker than rail modes and can be done in phases as the passenger demand dictates. This provides the greatest flexibility in meeting transit demand.
2. BRT provides flexibility for extending a line or developing branched services with the existing road infrastructure.
3. BRT provides operating flexibility since it can operate on arterial streets; in freeway medians, on freeway shoulders and alongside freeways; or in railroad and other separate right-of-way.
4. It can effectively provide express and local services at a single transit facility.
5. Due to improved speed and reliability, BRT can provide the same levels of service as LRT. In some cases, BRT can provide the same capacity as light rail transit.
6. It can be significantly less costly to implement than a rail transit line while providing similar benefits—especially in locations where right-of-way increases are constrained.
7. It can be effectively integrated into the surrounding environment and can generate significant urban development benefits.

Elements of BRT Systems:

Bus rapid transit is a mode of transportation offering a great deal of flexibility. That flexibility is brought about through the various elements of BRT systems. These elements consist of:

- Running ways (exclusive transitways, HOV lanes on freeways, dedicated transit lanes, transit malls, mixed traffic, or bus only queue jump lanes at congested intersections.
- Fewer stops and faster service through higher station spacing to consolidate boarding and alighting locations and reduce dwell time and delays.
- Accessible, safe, secure, and attractive stations from sheltered stops to stations with raised platforms and encompassing structures.
- Easy-to-board, attractive, and environmentally friendly vehicles
- Efficient (i.e., off-vehicle, on-board through any door) fare collection
- ITS applications to provide real-time passenger information and transit signal priority for improved travel times
- Frequent, all-day service
- Distinctive system identity such as branding of vehicles/station or unique design elements
- Flexibility in route structure from a single linear route to a route with branching to local (or suburban) destinations.

BUS RAPID TRANSIT MASTER PLAN

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The above list of BRT features should be regarded as a menu from which features can be selected to suit local requirements. Typically BRT systems include most, but not all, of the features listed.

Three BRT Investment Alternatives

For planning purposes, three levels of BRT investment were considered to simplify the evaluation of corridors for the master plan. These tier or investment alternatives are not meant to be restrictive of the BRT options—this is contrary to the BRT concept— but instead the alternatives are intended to show how varying levels of investment can impact capital and operating costs, ridership, and implementation feasibility—particularly the travel way of the BRT. These investment alternatives are defined as follows:

1. Basic Investment

Commonly known as “Rapid Bus”, this level of investment is considered a minimum investment to achieve the benefits of BRT. This investment alternative includes:

- Substantial transit stations or shelters. These are generally larger than standard bus shelters and usually architecturally designed to contribute to the “branding” of the line.
- Traffic signal priority and signal coordination for improved travel times.
- Off-board fare collection to allow passenger to enter and exit through any door, consequently reducing time at stations/stops.
- Low-floor vehicles and level boarding, which minimizes the amount of dwell time at stops by facilitating passenger entry into the vehicle, with particular benefit for passengers with special needs such as wheelchairs or walkers.
- Branded vehicles and stations providing a unique identity for BRT service, which allows for casual transit users to identify the system easily.
- High frequency (every 10 minutes in the peak hour / 15 minutes off-peak), which provides a higher level of service and ensures that BRT is implemented in corridors that can support the minimum level of investment. This has also been established by FTA as the minimum frequency that allows patrons to arrive randomly without having to consult a schedule.
- Queue jumper lanes where necessary, which allow BRT vehicles to bypass traffic queues at intersections to improve travel time reliability. Buses move to the front of the queue in a dedicated lane, and then receive an advance signal allowing them to proceed in front of other traffic.

For system operators wishing to obtain federal New Starts or Small Starts funding, all of the above features, with the exception of off-vehicle fare collection and queue jumper lanes, are mandatory project elements. For this level of investment, most or all of the BRT alignment operates in mixed flow within general traffic lanes.

2. Moderate Investment

This level of investment focuses on incremental improvements to both right-of-way for vehicles and passenger amenities at stations:

- Dedicated side-running lanes for BRT vehicles. This minimizes the amount of time BRT vehicles are delayed by general traffic.
- Enhanced station investment such as landscaping, special paving, or way-finding signage.
- Real time arrival information system (e.g. Next bus technology)

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- Larger stations to accommodate more passengers with additional seating and amenities such as bicycle parking.

3. High Investment

The high level of investment takes into consideration a full light-rail concept but with BRT vehicles.

- At-grade median running in dedicated lanes that are horizontally separated from general traffic conditions. Grade separation may be considered at railroad crossings.
- Full signal pre-emption at intersections to maintain a minimum operating speed.
- Major station investment to accommodate large pedestrian traffic and passenger loads.
- More amenities for passengers, such as information kiosks, newspaper racks, wireless access, or other amenities not common to bus transit.

The three levels of investments are not the only options for BRT but provide points of reference in the wide range of possible BRT systems that can be implemented and improved upon over time. The advantage of implementing a BRT system is the ability to phase the investment and transition from a “low” to a “higher” BRT. However, in the case of Fresno/Clovis area where BRT is being considered as *the* rapid transit mode, it is important that the implementation of BRT avoids the resemblance of an ordinary bus service already being provided by FAX. The goal of BRT as a rapid transit alternative to rail based service is the ability to attract new transit riders to the system in a cost effective manner.

Chapter 2 – Regional Planning Context

2.1 Market Characteristics

Population and employment information in the metropolitan area is maintained by the Council of Fresno County Governments (COFCG) for planning purposes. COFCG projects distributions for the year 2030. As population and employment are two major determinants of travel demand, these distributions are helpful in understanding potential markets for public transit services. It should be noted that the land use and population inputs to the travel model reflect where local agencies anticipate growth to occur and this distribution is subject to land use policy changes. For example, if development of high capacity transit service is seen as an efficient and environmentally friendly strategy to support growth, current land use and development policies can be amended to distribute more growth into the transit corridor(s). **Figure 2.1** displays the current vision of 2030 population distribution within the region. Noteworthy in this depiction is the growth occurring in fringe development areas and the lack of pronounced development along major transit corridors.

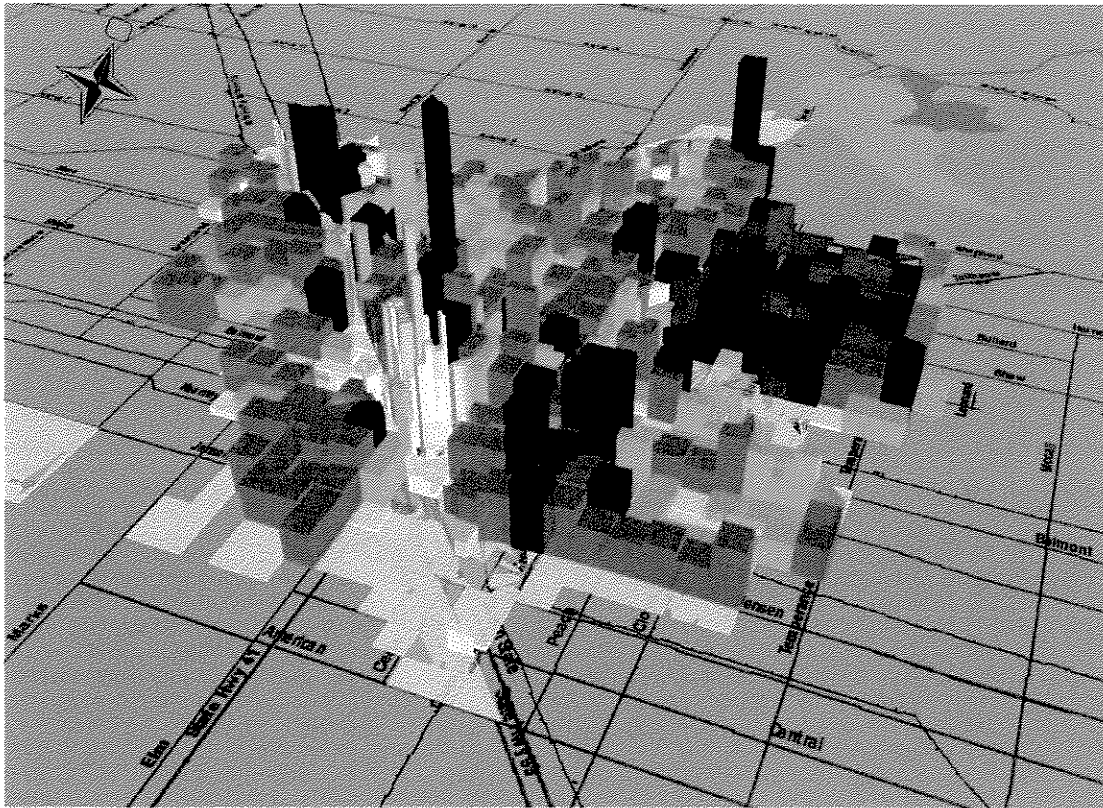


Figure 2.1 - Projected 2030 Population Distribution

BUS RAPID TRANSIT MASTER PLAN

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Substantial growth is envisioned for the southeast area of the city (South East Growth Area - SEGA). This area is generally bounded by Temperance Avenue, Shields Avenue, Highland Avenue and Jensen Avenue. It is located about one mile east of the Fancher Creek development. Large scale development of the Southeast Growth Area is not envisioned for another ten years.

There are a number of trip types and trip-makers that do not lend themselves to transit use or have no inclination to use public transit. This element of the travel market is generally referred to as the “auto captive” market. There are other trip-makers that do not have access to a car and have no choice but to use public transit. This element of the market is typically referred to as the “transit captive” segment. A third segment of the market would use transit under the “right” conditions. This is the “choice rider” market segment. Currently most FAX riders are transit captives. Attraction of more choice riders requires provision of a better transit product, better pricing, disincentives to car use, or some combination of these measures. A primary purpose of BRT is to attract choice riders with an improved product. It should also be noted that travel patterns are not independent of features of the transportation system. Good features not only can change the geographic distribution of trips, but they can increase the number of trips made. Improved transportation services can result in latent demand for travel being transformed into new trips.

2.2 Existing Transit Services

Fixed-route local public transit services in the metropolitan area are provided by Fresno Area Express (FAX) and by Clovis Stage Lines. These operators generally provide services within their municipal boundaries. The FAX network of bus routes is shown in **Figure 2.2**. Of the 20 routes FAX operates, 12 routes serve downtown Fresno. The structure of FAX’s route network is grid-like which simplifies passenger understanding of the service and tends to maximize opportunities to transfer between bus routes. Many communities operate this type of “modified grid” bus route network. What is unusual about the Fresno network is that the downtown is not near the center of FAX’s service. As development has continued to spread northward, the downtown transit hub has slid towards the southwestern edge of the FAX service network. Almost all of FAX’s bus routes are interlined through downtown (connected to another bus route rather than terminating downtown). While this is good practice, it complicates insulating the performance of each “leg” of the route and also it has implications for structuring BRT services.

FAX bus service operates seven days a week from generally 6 am to 10 pm. On weekdays, service frequencies on most routes are generally 30 minutes, with buses on routes 28, 30, 34, and 38 operating on 15 minute headways. Uniform headways make it easier for passengers to remember the schedules and facilitates coordination of schedule pulses that makes it easier for passengers to transfer between lines. On weekends, the service frequencies for routes 28 and 30 increase to 30 minutes and the headways for routes 20, 22 and 26 increase to between 45 and 60 minutes.

Basic descriptors of FAX service are:

- Annual operating costs: \$22 million
- Annual fare revenues: \$6.4 million
- Annual operating subsidy: \$15.6 million
- Annual bus-hours of service operated: 295,000
- Annual passenger boardings: 12,400,000
- Average bus operating speed: 13.4 mph

BUS RAPID TRANSIT MASTER PLAN

Council of Fresno County Governments (COFCG)

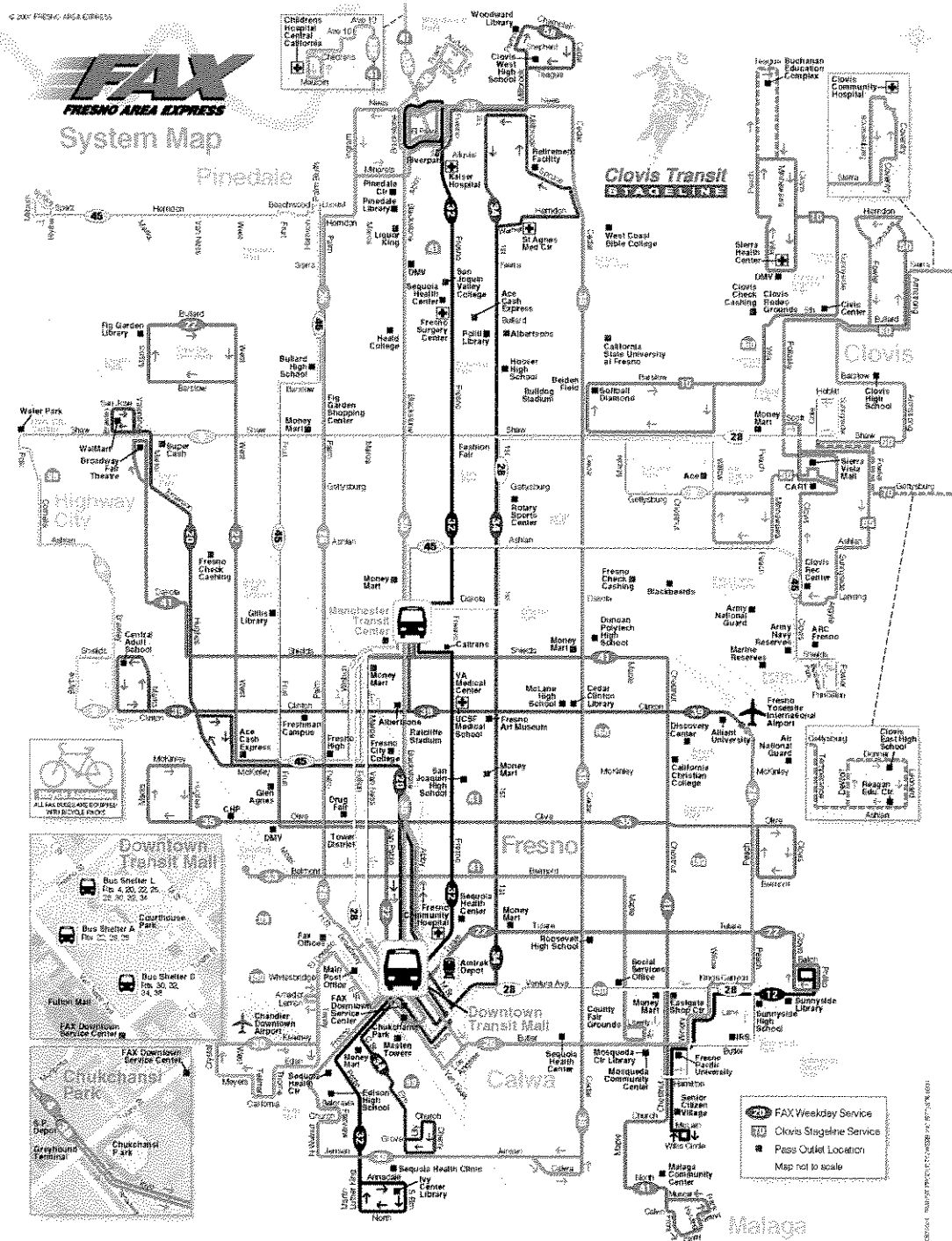


Figure 2.2 Fresno Area Express System Map

BUS RAPID TRANSIT MASTER PLAN

Council of Fresno County Governments (COFCG)

Figures 2.3 and 2.4 from FAX's Long Range Transit Master Plan describe the most heavily patronized bus routes and the most productive (measured in boardings per bus hour). Bus stop spacing for local service is reported to be about three stops per mile, which is fairly normal in the bus industry.

FAX buses are maintained and stored overnight at their facility located on G Street near Divisadero Street. This facility has a capacity to maintain about 150 buses; however, parking is limited to about 100 buses. The facility is currently at capacity regarding parking. The facility also is not designed to support maintenance of articulated buses. Thus, parking constraints and limitations on servicing articulated buses are key factors affecting early implementation of an expanded service plan featuring BRT. FAX is looking for a second operating base to support expanded service and to reduce its deadhead costs. Deadhead costs result from unproductive shuttling of buses into and out of service from the garage each day. The optimum location for this second garage appears to be the SR-41 corridor somewhere near Shaw Avenue in a compatibly zoned area. Opportunities to upgrade the current garage to service articulated buses have not been identified but probably exist.

2.3 *Downtown Transportation and Infrastructure Study*

The City of Fresno has recently completed its Downtown Transportation and Infrastructure Study (DTIS). As the downtown is a major market for potential BRT services, this plan is very important to planning bus rapid transit. Key recommendations of the DTIS include:

- Increasing the importance of public transit as an access mode to downtown via the establishment of policy targets for transit mode share. BRT would help achieve these targets and therefore is supportive of the DTIS plan.
- Transitioning away pulse operations at the current Courthouse Transit Center to a more urban street corridor service with bus stops on both curbsides of Van Ness Avenue. This recommendation would eliminate the need for BRT to make circuitous turns to use current transit center passenger bus stops.
- Relocating the BNSF service onto the UPRR corridor. This would help to minimize train delays to BRT services that cross the BNSF tracks.
- Reducing downtown bus layovers by interlining services.
- Supporting transit priority treatments, improved pedestrian facilities and improved wayfinding in the downtown area.

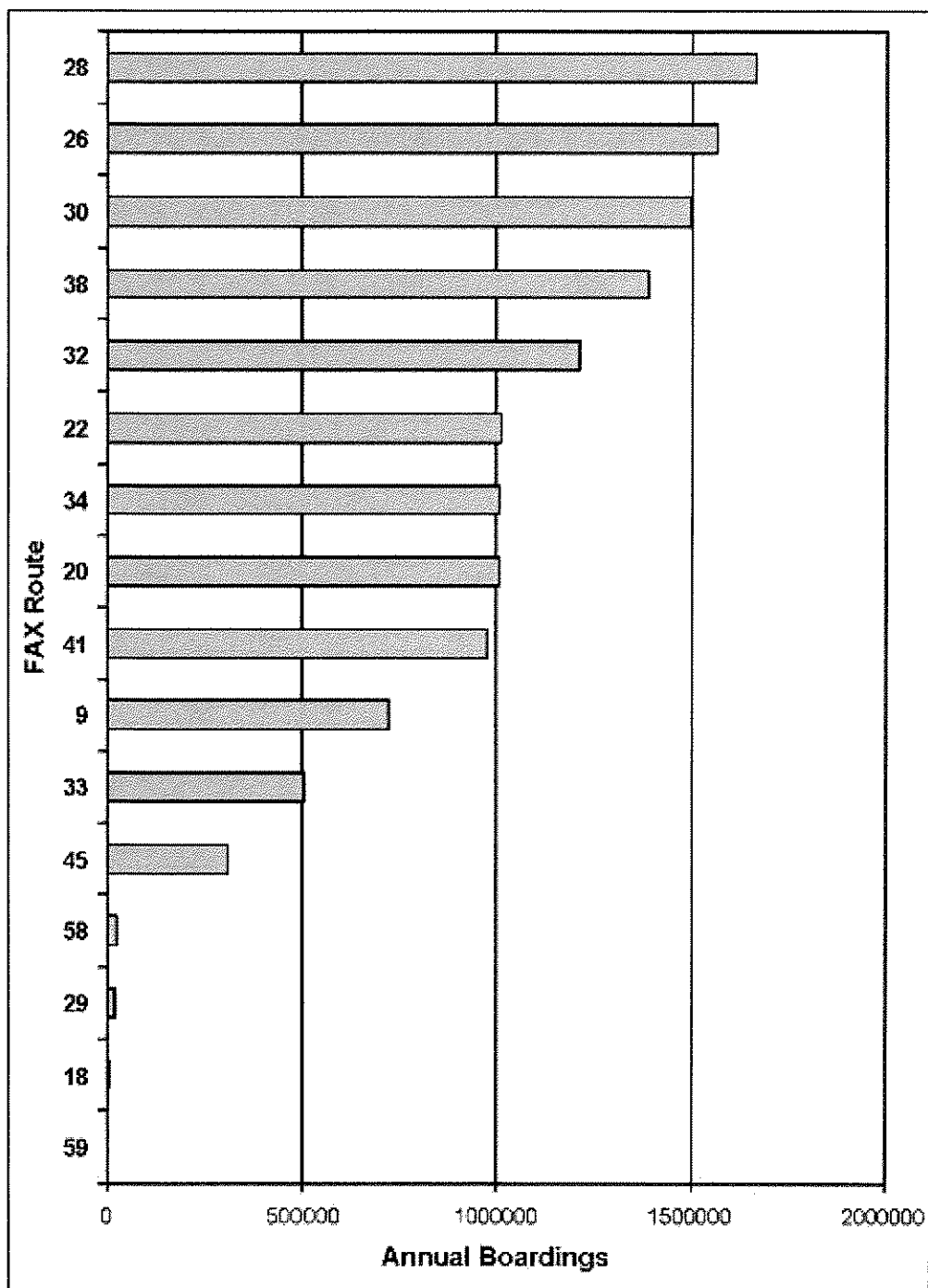


Figure 2.3 FAX Passenger Boardings by Route, FY 2000/2001

Source: City of Fresno Long Range Transit Master Plan Final Report

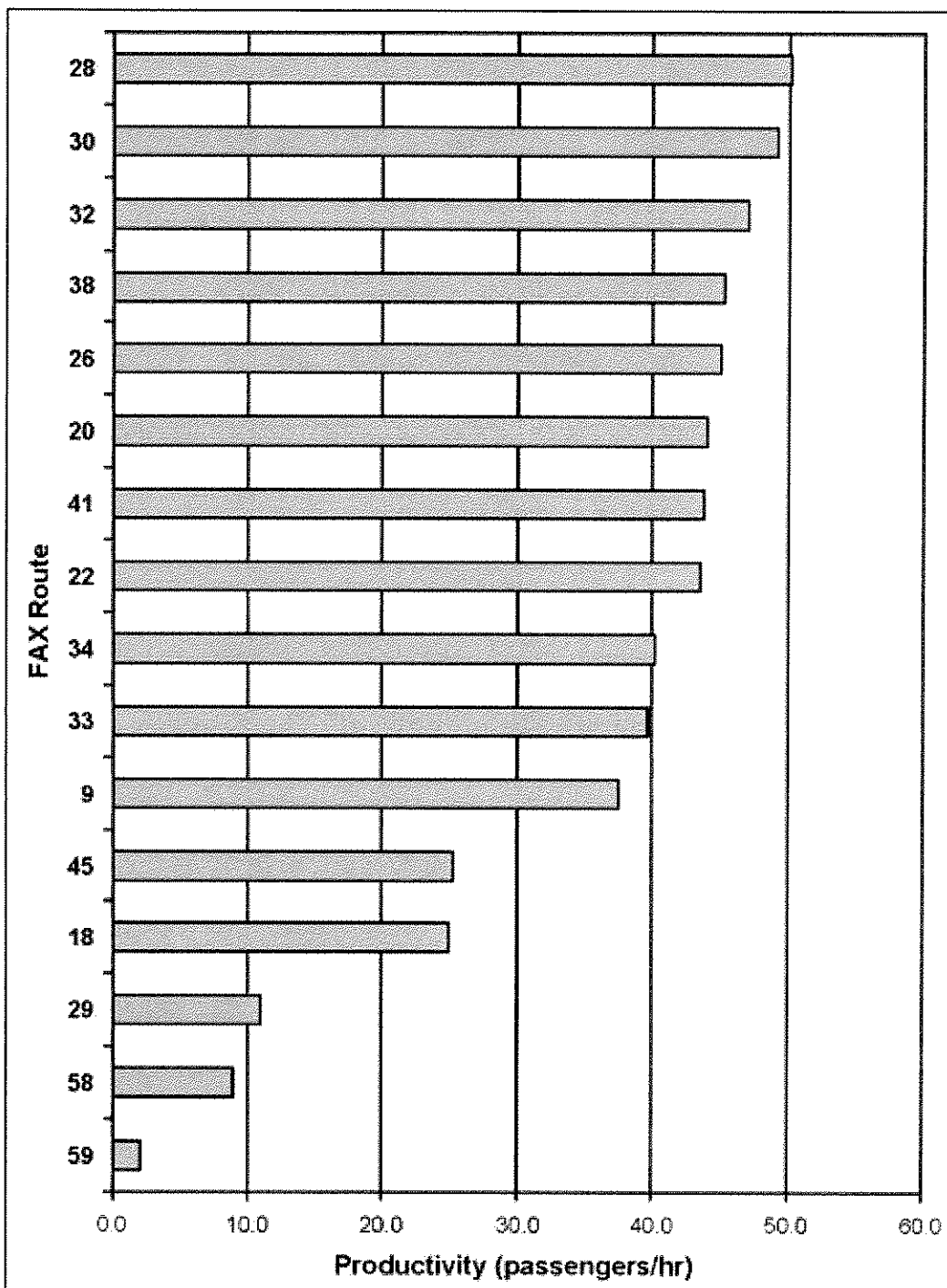


Figure 2.4 FAX Productivity by Route, FY 2000/2001

Source: City of Fresno Long Range Transit Master Plan Final Report

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Increase Transit Market Capture

The DTIS recommended adopting targets for transit capture for the region as well as for the downtown. Downtowns are generally the major markets for high capacity transit services and of particular interest for planning transit improvements.

Daily trips to, from and within downtown Fresno by all modes of travel are forecast to increase 52 percent between 2006 and 2030, based on planned development. Some of today's current capacity is unused and might be available to accommodate a portion of the projected future demand. It is also true that as development density in the downtown area increases, a high proportion of new trips will be captured by public transit. The DTIS targeted a transit mode share of 6 percent by 2030, which when combined with the increase in the total trips by all modes, would result in a 120 percent increase in the number of transit trips to, from and within downtown. By 2050 the number of trips served by transit to, from and within downtown is targeted to increase fourfold from today's ridership. The capacity to serve this increased demand could come in a variety of forms including:

- Increasing the frequency of service on existing bus routes,
- Deploying larger buses (articulated buses), and/or
- Introducing new bus routes.

There is a desire to reduce the proportion of future trips by car for environmental, highway/interchange capacity and livability reasons. Thus, the challenge is not just to accommodate a 50 percent increase in ridership but also to attain a 50 percent higher capture rate by transit. This would translate to more than a doubling of transit trips to, from and within downtown. From today's base of about 17,000 daily transit trips, 2015 would experience an increase to 28,000 daily transit trips, 2030 would increase to 37,000 daily transit trips, and 2050 would increase to 68,000 daily transit trips. These projections represent a conservative vision for development and transit service growth in the downtown area. DTIS's vision would increase daily transit usage to/from downtown by 11,000 trips in 2015, by 20,000 trips in 2030 and by 41,000 trips in 2050. Introduction of BRT and other service enhancements would help to achieve these targets.

Downtown Transit Center Transitioning to Urban Street Passenger Stops

The current Downtown Transit Center provides a number of functions. For passengers, the facility is a comfortable, secure place to transfer between lines. Due to its central location it also provides a convenient place to start and end trips to downtown. The current FAX route structure reduces the need for transfers for most trips to downtown Fresno. This structure also simplifies operations for the bus operator. However, the current Downtown Transit Center suffers from a number of problems and its capacity limitations do not permit full pulsing of all bus routes. Wait times between the three shelter locations at the transit center make it difficult for many passenger transfers to be made within the pulse time period (several minutes). A full pulse of buses would also adversely impact downtown intersections. Thus the current Downtown Transit Center has its strengths and its weaknesses.

To support the target transit capture for downtown trips, bus service frequencies will increase, with perhaps several new routes added for downtown service. Service frequencies are likely to be 10 minutes or better for BRT. The capacity limitations of the Downtown Transit Center will not support major increases in bus volumes. The DTIS concluded that normal curb loading along both sides of Van Ness Street would be a more effective concept for passenger loading.

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The best downtown alignment for BRT services seems to be Van Ness Avenue, which is near the center of downtown and is at the heart of other bus services. Formalizing bus lanes on Van Ness Avenue might be desirable to support a higher quality of bus service. Other options include N Street, M Street, and H Street. However, N street is too remote from the Fulton Mall. Use of M Street would further confuse the circulation system and is also not close to the Fulton Mall. H Street is on the edge of the downtown core and therefore not very attractive. Van Ness Avenue, however, does not have these drawbacks.

Consolidation of BNSF Rail Services to the UPRR Corridor

The DTIS supports plans to relocate BNSF and Amtrak service to the UPRR corridor. It also recommends trenching the UPRR corridor to serve the increased level of conventional rail service and accommodate planned high speed passenger rail service. These recommendations have two important bearings for BRT planning. First, they would eliminate at-grade rail crossings downtown as well as outlying BNSF crossings. These at grade crossing currently adversely impact existing bus schedule adherence and would complicate reliable BRT schedule adherence. Second, with the relocation of rail traffic from the BNSF corridor, an opportunity would arise for operating high capacity transit services in this corridor. Public sentiment is understood to favor use of this corridor as a multiuse trail rather than as a transit corridor, but an opportunity might exist for transit use of the corridor. It is unlikely that the relocation will occur within the next ten years. It is also unlikely that high speed rail will be constructed in the next ten years. Thus for the next decade, buses will need to continue using at-grade crossings.

Interlining of Buses Downtown

Almost all FAX bus routes currently are routed through downtown, with very few vehicles laying over at an end-of-line downtown terminus. FAX buses do, however, pause at the Downtown Transit Center for two to five minutes to adjust schedules and facilitate passenger transfers as part of the pulse operations. With the anticipated increase in bus volumes and possible introduction of 60-foot articulated buses, operating difficulties will increase due to the transit center being near capacity, which would lead to deterioration in the quality of service within downtown. The DTIS recommended that all local bus routes to/from downtown Fresno be through-routed and scheduled with enough time to only board and alight passengers.

Transit Priority Treatments

The DTIS traffic circulation and parking elements attempt to re-direct traffic to the perimeter of downtown without denying traffic the use of core area streets. Transit priority treatments (undefined) are suggested for Van Ness Street, Fresno Street and other key transit streets. Among the recommendations from the DTIS for downtown traffic control are to maximize the use of short two-phase signal cycles which are pedestrian, bicycle and transit friendly, and to not use left turn phases and long cycles, which are car oriented.

Chapter 3 – Stakeholder and Public Participation

The Fresno BRT Master Plan encompasses the metro area of Fresno/Clovis, which includes a wide variety of communities. To effectively understand the issues affecting these communities with respect to public transportation and the BRT concept, stakeholder outreach to leaders of community groups and a city-wide community open house were undertaken. The following is a synopsis of stakeholder interviews and the community open house.

The key objectives of the public outreach were to:

- Gauge the current pulse of the community with respect to transit and mobility needs in the Fresno region.
- Introduce the concept of BRT and ask the public's opinion on the feasibility of BRT in Fresno.
- Elicit specific stakeholder perceptions of how transit is working in the community today and a vision of what transit should be like in the future.
- Determine what corridors would be most suited for rapid transit, specifically BRT.

3.1 Stakeholders

The following is a list of community leaders who were personally interviewed for this report:

Community Leader	Agency
Steve Geil, President & CEO	Fresno Economic Development Corporation
Al Smith, President & CEO	Fresno Chamber of Commerce
John Hernandez, Executive Director	Hispanic Chamber of Commerce
Julie Hornbeck, Executive Director (including five staff members)	Fresno County Employment and Temporary Assistance
Ashley Swearengin, Director	Office of Community and Economic Development, CSU Fresno
Harry Armstrong, Chairman	Fresno County Transportation Authority Member, Clovis City Council
Lupe Perez, Sr. Project Coordinator (including one staff member)	City of Fresno Redevelopment Agency
Bob Boyd, Director (including two staff members)	CSU Fresno, Facilities Management,
Keith Kelley, President/CEO	West Fresno Coalition for Economic Development

3.2 Stakeholder Interviews

This section provides a summary of the community stakeholder interviews. The interviews, done with each individual community stakeholder, intended to gauge the current political and community sentiment for implementing BRT in the Fresno/Clovis area. While their answers were oriented towards the community the stakeholders represent, it was clear that there was a prevailing desire to improve mobility (through travel time savings on transit) across the metropolitan area especially for home-to-work based trips. The following reflects the majority of comments received during the stakeholder interviews.

Fresno Transit/Mobility Needs

Transportation is a high priority.

Stakeholders were supportive of public transit. Stakeholders had an overall perception that public transit is well designed to meet basic transportation needs, particularly for those who are transit dependent. However, another perception was that public transit's role will become increasingly important for the mobility needs of Fresno. Consequently, there were two areas of improvement emphasized by stakeholders: 1) improving the frequency of service and travel time reliability for existing customers—especially those dependent on the service for work-based trips; and 2) providing a service (other than local bus) that overcomes the negative perception sometimes associated with public transportation. The latter would attract additional riders to the transit system and serve a new type of Fresno customer.

Travel time must be competitive with automobiles.

The stakeholders felt that public transit's challenge in the community is competing with the personal automobile, since it is still relatively easier and quicker than public transit. Many felt that transit trip times must be reduced to effectively compete for non-captive riders and that increased bus frequencies are needed.

Think outside of the conventional transit bus.

Stakeholders mentioned that using more innovative or more attractively designed vehicles and improved technology would be advantageous. Some feel that we need to “get out of the box” with a new and exciting concept and with an emphasis on amenities and service quality. Several alternative public transit concepts were mentioned, including monorail, Personal Rapid Transit (PRT) technology, BRT, and feeder vans. Those who suggested these alternatives, however, generally were not familiar with what it would cost to implement them. One community leader stated that it was more important to “do it the right way,” not rush implementation, and not let cost dictate the decision.

Specific Agency Transportation Needs

Reliable transit can help improve employment reliability.

Two stakeholders commented that access to reliable transportation is a very high priority for their clients. The Fresno County Employment and Temporary Assistance Department helps low-income and unemployed clients find jobs and improve their quality of life. This agency stated that public transportation is the lifeline for many of its clients, and a transit system that is unreliable leads to inability to maintain consistent employment. Clients would benefit greatly from increased FAX bus frequencies and increased hours of operation, including non-traditional work hours, to provide more effective and reliable access to employment centers. Both employee and employer would benefit from improved public transportation.

Reliable transit is important to the region's short- and long-term economic development.

The Office of Community and Economic Development of California State University Fresno (Fresno State), leading a consortium of over 600 companies and non-profit groups, found that the

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greatest barrier to employment is the lack of adequate transportation--childcare being the second highest barrier. Effective public transportation is one of the keys to the success of their five-year plan to create jobs and economic vitality in the Fresno region.

Bus Rapid Transit in Fresno

Bus Rapid Transit is a relatively new transportation concept in the United States, thus stakeholders were not familiar with BRT technology. An overview of BRT was provided, including (1) an explanation of the different levels of BRT implementation, (2) its lower costs compared to more expensive rail modes, (3) potential to use specialized BRT vehicles on existing roadways or guideways, and (4) BRT amenities such as level platform loading, advance payment systems, etc., to efficiently transport riders to their destinations.

BRT can be Fresno's rapid transit mode.

The majority of stakeholders supported the concept of BRT implementation in Fresno. Stakeholders agreed that rapid transit would improve mobility in the region, particularly when a larger rapid transit network is established. BRT can be the mode to implement rapid transit service in Fresno.

Corridor recommendations for Bus Rapid Transit.

Stakeholders were asked to comment on specific corridors that have been identified in previous FAX studies as high-capacity transit priority corridors—including Blackstone Avenue, Cedar Avenue, Shaw Avenue, and Ventura Avenue/Kings Canyon Road—and to identify other streets they perceived to be feasible transit corridors. Many stakeholders agree with the four identified key corridors, commenting that the Ventura Avenue/Kings Canyon Road corridor would be a reasonably favorable corridor on which to initiate BRT. This was particularly true given lower property values relative to other areas, higher density of low-income residents who would readily utilize the service, and relatively easier implementation within the existing road configuration and infrastructure. Some stakeholders mentioned Herndon Avenue, Clovis Avenue, Peach Avenue, and Tulare Street as important thoroughfares. Most stakeholders were in favor of developing a phased BRT network with the Ventura Avenue/Kings Canyon Road corridor and/or Blackstone Avenue corridor as the first phase of a BRT network.

Focus on destinations along with corridors.

Some stakeholders recommended the need for transit service “destinations” to complement the “corridors”. Examples of such destinations were: Fresno Yosemite International Airport, with primary transit access possibly via Peach Avenue and to two large employers—Pelco and the GAP, on Clovis Avenue; telephone call centers located on Herndon Avenue at North Palm and in Southeast Fresno; Fresno City College; and CSU Fresno.

Political and Institutional Barriers to BRT in Fresno

When asked about potential political and institutional barriers to implementing BRT in Fresno, stakeholders agreed that key leaders must be engaged in the process. There was general consensus that public outreach is critical to this process and that it needs to be both positive and powerful.

Stakeholders believed an effective public outreach campaign must be launched making BRT “top of the mind.” They favored newspaper articles on BRT early in the process and continuously during the planning and implementation of the BRT system. They emphasized the need to focus on the positive aspects of BRT, such as improved travel time, marketing (branding), and facilities, and to allow the private sector, such as developers and local businesses, to help drive partnerships.

3.3 Community Open House

On June 27, 2007, COFCG hosted a day of community and stakeholder outreach. The goal of the community open house was to formally introduce the BRT concept to the public. To provide a tangible element of a BRT system, a 60-foot articulated BRT demonstration vehicle was provided through the cooperation of North American Bus Industries (NABI)—see **Figures 3.1 and 3.2**.



Figure 3.1: NABI 60' Stylized BRT Vehicle – Front View

The BRT vehicle was toured to three different sites in downtown to provide maximum exposure to Fresno City residents, FAX customers, and transportation stakeholders/advocates. People were allowed to board the vehicle and ask questions of COFCG and NABI representatives throughout the day. FAX customers noted the amount of space in the vehicle since many were familiar with the crowding on buses currently. Stakeholders viewed it as a step in the right direction for the design of a transit system which can attract choice riders.

After touring the BRT vehicle through downtown, a community open house was held at Sunnyside High School to formally introduce the BRT concept to the public. The forum was also opened to public comment on which corridors in the Fresno region should be included in the master plan and the order of their implementation. These comments were incorporated into the screening of potential BRT corridors discussed in the following chapter.



Figure 3.2: NABI 60' Stylized BRT Vehicle – Side View

While many people were intrigued by the idea of BRT being implemented in Fresno however there were several concerns:

1. "It is not a rail mode." Those commenting that BRT is not the same level of service as rail were informed of how BRT is being used in California and across the United States as a cost-effective alternative to light- and heavy-rail modes. The elements of BRT are designed to reduce travel time—the number one factor for riding public transportation for choice riders—and can be designed to achieve the same benefits of rail modes without the high cost of a rail line. For some time Fresno has been discussing rapid transit options, with light rail on Ventura Avenue/Blackstone Avenue as a desired project; however, the cost and political barriers to implement light rail have made the project infeasible.
2. "Why BRT in Fresno?" Because a BRT system can be designed to closely emulate rail level of service, this provides an opportunity to provide rapid transit service in Fresno. Currently, on local buses it can take three to four times longer than driving to go from one point of town to another. A BRT network would significantly reduce that travel time, making public transportation a more favorable option for choice riders. More importantly, the BRT mode is cost effective compared to rail. For the \$1-3 billion cost of one light rail line, FAX and COFCG would be able to implement a full network of BRT lines in the Fresno/Clovis area.

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3. "How soon can BRT be in Fresno?" It was explained that implementation of BRT is very much dependent on the level of investment the community wants. For example, a very basic form of BRT with minimal construction could be implemented within two years; however, a BRT with dedicated lanes could take three to six years depending on the environmental and design constraints. However, it was also mentioned that BRT can be implemented faster than light rail due to the significant constraints with constructing and operating trains in the middle of high-traffic arterial streets. Also, light rail systems are under the jurisdiction of the California Public Utilities Commission, which imposes significant constraints on train movements and safety measures. BRT is not affected by the regulations for light rail systems.

Chapter 4 – Proposed Rapid Transit (BRT) Network

Recommendations for a network of BRT services and their relationships to the basic FAX local bus services are presented in this chapter. A service concept is described for the BRT services along with ridership estimates. This chapter begins with an overview of relevant public transit planning goals and concludes with identification of the most promising corridor for early implementation of BRT. This process of defining the recommended BRT network and early implementation corridor built heavily on current FAX patronage profiles, inputs from the stakeholders and the public open house meeting as well as land use coordination opportunities in the region.

What is a network and why is it important for BRT implementation? FAX's current local bus routes operate as a system, making it easy for passengers to transfer between bus lines. This network approach substantially increases the number of passenger trip origins and destinations that can be made by public transit. The local bus network is structured in a "grid" with many transfer opportunities. Most of the local bus lines also converge at their outlying terminus to afford transfer opportunities. For maximum success Fresno's future bus network needs to "knit" the BRT mode into the local bus network and desirably work towards a group of regional BRT services that allow passenger interchanges between these frequent and fast public transit corridors. As described in Chapter 1, there are many forms of BRT services just as there are many forms of light rail services. Over time lower forms of BRT service can transition into higher forms as travel demand and ridership warrant. The BRT network and the overall bus network therefore will likely change over time, but it is important that both modes maintain seamless transfer opportunities to maximize their potential travel market.

4.1 Planning Parameters and Goals

As discussed in Chapter 2, The Fresno-Clovis Metropolitan Area population is projected to grow to 1,000,000 by 2050. While some of this growth will occur as infill development much of it will be on the fringe of the current urbanized area. Thus, more trips will be made and many of these trips will be longer distance due to the expanding geographic area of development. This adds to more congestion and increases concerns about air quality. Public transit therefore will be asked to increase its role in the overall multimodal transportation system and will need to provide enhanced service to attract "choice riders". With the longer distance trips, speed will become more important for transit to be viable and effectively serve developments in outlying parts of the region.

In order to maximize transit's potential to capture higher shares of the travel market, integration of public transit service planning with land use planning will be important. To the extent possible, growth should be located proximate to major transit corridors and pedestrian access elements of developments and transit stops should be closely coordinated.

The Downtown Transportation and Infrastructure Study (DTIS) set forth a goal to increase transit ridership to/from and within the downtown. It seems reasonable to strive for a similar goal for non downtown trips in the region as well, perhaps looking at increases in current passenger boardings along principal transit service corridors such as Ventura Avenue/Kings Canyon Road and Blackstone Avenue. This might result in 15 minute headways on many of the current 30 minute headway routes and 10 minute or better headways on current 15 minute headway routes (FAX Routes 28 and 30). While moving from 30 minute to 20 minute or even 15 minute service rarely sustains current boardings per bus hour of service productivity levels, getting to less than 15 minute service begins to attract "choice riders" to the service. The extent of choice rider patronage

benefits depends highly on regional parking policies and employer/school partnerships with transit service providers.

4.2 BRT Corridor Identification and Selection

Prior studies and plans developed for FAX and the City of Fresno have identified four promising corridors for implementing BRT or other high capacity transit services. These four corridors are:

- **Blackstone Avenue**
- **Shaw Avenue**
- **Cedar Avenue**
- **Kings Canyon Road / Ventura Avenue**

These promising corridors formed the starting point for the current Master Plan project but did not limit corridors for consideration. This section reviews the findings of previous studies and identifies the corridors to be evaluated as potential rapid transit corridors.

Transit Master Plan (1994)

The development process of selecting these corridors dates back to the 1994 Transit Master Plan. This document recommended that the City of Fresno define transit-specific corridors and include them in its General Plan. It also recommended that Principal Transit Corridors be established so future recommendations of high density development and major activity centers could occur. At that time, the major corridors for consideration were identified as:

- Kings Canyon Road – Ventura Avenue
- Shaw Avenue / Barstow Avenue
- Palm Avenue
- Blackstone Avenue
- Cedar Avenue
- Clovis Avenue, and
- Shields Avenue

Although the concept of BRT was not yet mainstream in 1994, Cedar Avenue and Kings Canyon Road were further identified as potential corridors for future light rail service. The BNSF rail corridor was also considered for potential high capacity transit if the BNSF rail services are relocated to the UPRR corridor.

Transit Long Range Master Plan (2001)

The 2001 Transit Long Range Master Plan (TLRMP) called out three corridors as candidates for high frequency or BRT service. These corridors were selected based upon the density (population and employment) of the corridor or its potential for redevelopment and input obtained from various stakeholders. The corridors were identified as Blackstone Avenue, Shaw Avenue (between Brawley and Clovis) and Ventura Avenue. Ventura Avenue was further identified as the best selection due to the demographics of the surrounding neighborhoods and the overcrowding that was experienced on FAX Route 28.

The concept of BRT was first introduced in this 2001 TLRMP following the published success of worldwide BRT examples in cities like Curitiba, Brazil and Ottawa, Canada. The system was viewed as favorable for many communities because of the mobility gains achieved through low capital investments.

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The 2001 TLRMP also identified similar corridors to be used for other high frequency service such as monorail and light rail. Although the plan did not describe the methodology for selecting these corridors, it identified Blackstone Avenue as the preferred location of the mainline, with five east-west intersecting lines running approximately along:

- Kings Canyon Road
- Dakota/Shields Avenues
- Shaw Avenue
- Herndon Avenue (east and west)

The plan went on to state that many other corridors would be candidates for any type of rail service. These corridors were selected based solely on demand and not the availability of right-of-way. The approximate ranking (highest to lowest potential) of these corridors based upon demand was:

- Downtown to Blackstone & Nees via some combination of Blackstone and SR 41, possibly approaching downtown via the Tower District.
- A branch of the Downtown to Blackstone Line, traveling east on Shaw to CSU Fresno and perhaps Clovis.
- West Shaw from Blackstone to a new Regional shopping center at Shaw & Grantland (see General Plan).
- East Ventura Avenue/Kings Canyon Road to Chestnut, or eventually to Clovis Avenue.
- Herndon Avenue east from Blackstone to Chestnut. (Unlikely as LRT, conceivable as monorail)
- Herndon Avenue west from Blackstone to Palm. (Unlikely as LRT, conceivable as monorail)

2025 Fresno General Plan (2002)

The 2025 Fresno General Plan incorporated the recommendations of the 1994 Transit Master Plan and specifically called out transit corridors/routes, and areas where increased development should be focused to encourage transit usage. **Figure 4.1** shows the principal and non-principal transit corridors and transit routes in Fresno that are identified in the General Plan. According to the map, the existing and proposed principal corridors in Fresno include Blackstone Avenue, Shaw Street (east of Polk), Kings Canyon Road (west of Clovis), Ventura Avenue, and Fresno Street (from Divisadero Street to California Avenue).

The land use element of the General Plan also designates the areas surrounding Highway 41 as mid and high rise mixed-use corridor. **Figure 4.2** shows this designated area, as well as other activity center corridors that might lend themselves to enhanced public transit services. This area includes the properties along the Blackstone corridor and those within the downtown core. The Highway 99 corridor and the Shaw Avenue corridor are prominently highlighted in this map.

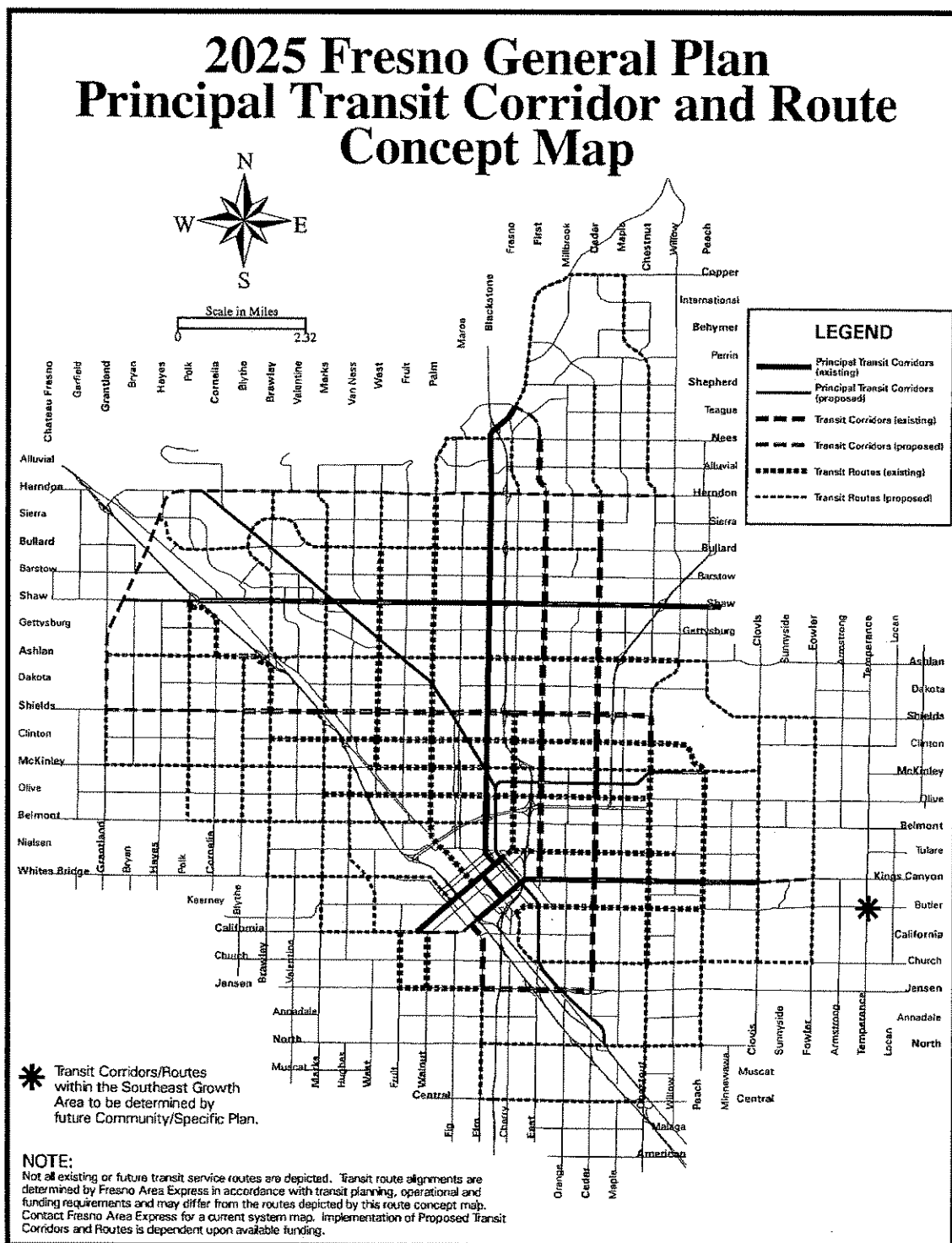
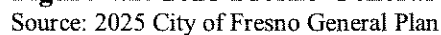


Figure 4.1: 2025 Fresno General Plan Principal Transit Corridor and Route Concept Map; Source: 2025 City of Fresno General Plan



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Fresno Alternative Mass Transportation Pre-MIS (2004)

The most thorough attempt to identify preferred transit corridors in metropolitan Fresno was developed in the Fresno Alternative Mass Transportation Pre-MIS. The study used findings from the 2001 TLRMP to identify four high capacity corridors to be studied in greater detail. These four corridors were Blackstone Avenue, Shaw Avenue, Cedar Avenue, and Kings Canyon Road/Ventura Avenue. Although Cedar was not directly pinpointed as a high-capacity potential corridor in the 2001 TLRMP, it was added due to the strong current transit ridership, the available right-of-way, the continuous north-south alignment, and the presence of several key trip generators including CSUF, two high schools, the University Medical Center, and a regional shopping center.

The study did not identify BRT specifically for these corridors but rather left it open to “high capacity transit” such as light rail, BRT, enhanced bus, and monorail. The objective was to determine which of the four corridors is the most viable for implementation of “high capacity transit” and also to identify the elements required to make the corridors more favorable for implementation.

Corridors Identified by Previous Studies

From the previously described studies, there are corridors that have consistently performed well. These corridors have been identified as candidates for rapid transit improved that are considered primary candidates for this study and investment as BRT lines:

- Kings Canyon Road / Ventura Avenue
- Blackstone Avenue
- Shaw Avenue
- Cedar Avenue

BRT Master Plan Stakeholder Suggestions

As described in Chapter 3, stakeholders were interviewed to gain an understanding of their views on potential BRT services. These interviews led to a number of other corridors being identified for possible BRT services. In addition to the four primary corridors that were identified at the outset of Chapter 4 the following corridors were mentioned by stakeholders:

- Clinton-Peach Avenue
- Herndon Avenue
- BNSF rail corridor
- Palm Avenue
- Chestnut/Willow Avenue
- Clovis Avenue
- Highway 168

4.3 Proposed Bus Rapid Transit Network

In the development of the Master Plan the four highest ranked transit corridors from prior studies and corridors suggested by stakeholder interviews were reviewed. Each corridor was field reviewed and analyzed in terms of current FAX patronage. FAX currently does not provide any service on Highway 168, BNSF rail corridor, and Highway 99; and only provides short sections of service on Herndon, and Clovis Avenues. Therefore, ridership data is not available or limited in these instances. The assessment of potential BRT corridors is summarized as follows (see **Figure 4.3 - Metropolitan Corridor Identification Map**).

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Kimley-Horn
and Associates, Inc.

METROPOLITAN CORRIDOR IDENTIFICATION MAP
Fresno Transit Master Plan

Figure 4.3 - Metropolitan Corridor Identification Map(Not to scale)

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Current Ridership (Qualitative Assessment)

The designation of transit corridors in the various plans and studies described above was based on multiple factors, including transit-supportive land use, roadway capacity and right-of-way availability, stakeholder input, and existing ridership. Ridership data from fiscal year 2006 provides additional useful information for identifying high demand transit corridors. **Table 4.1** below shows the top ten FAX routes in terms of ridership. Three of the top four run along proposed BRT corridors.

Table 4.1: Top Ten FAX Annual Ridership Routes - FY 2006

FAX Route #	FY 2006 Annual Ridership	Primary Corridors		
28	1,789,025	Ventura/Kings Canyon	Fulton/Van Ness	Shaw
26	1,367,566	Palm	Broadway	Butler
30	1,309,978	Blackstone		
38	1,204,772	Cedar	Jensen	Fresno
32	1,077,497	Fresno	MLK	
41	945,758	Shields	Chestnut	
34	903,298	1 st		
22	776,969	West	Tulare	
20	634,969	Blackstone	Hughes	
9	621,047	Shaw		

The routes generating the highest ridership tend to be those serving the major north/south corridors. This reflects the shifting land use patterns that have displaced jobs and residences to the north, away from the traditional downtown city center. There has also been an increase in capacity along many of these north/south corridors with the diversion of regional traffic to newly constructed Highway 41 and Highway 168.

Four Highest Ranked Rapid Transit Corridors from Previous Studies

Kings Canyon Road/Ventura Avenue – Downtown to near Fowler Avenue. -----

FAX's Route 28 serves this corridor with 15 minute headways on weekdays. The entire route, which continues north of downtown to Fresno City College, CSUF and downtown Clovis, is FAX's most successful route. One way running time for the entire route is one hour and 40 minutes. Despite its length and long run times, the route nearly 90% on schedule. Few people ride the route from end to end. The southern segment between downtown Fresno and Winery Avenue/Kings Canyon is 35 minutes. The BNSF at-grade crossing near downtown can adversely impact schedule reliability when long freight trains pass through. The Ventura Avenue/Kings Canyon Road leg of Route 28 serves the fairgrounds, Sunnyside High School and a number of other activities/centers. Substantial opportunities exist for infill development and substantial development is envisioned for the Fancher Creek project and ultimately the Southeast Growth Area. Much of the traffic on Ventura Avenue and Kings Canyon Road has been siphoned off by the opening of the Highway 180 in 2012, leaving opportunities for a more pedestrian and transit oriented use of the public right-of-way. Implementation of BRT services would help brand the corridor as a transit priority corridor and help shape land use proposals to be more pedestrian and transit friendly. Implementation of BRT in this corridor appears to offer promise due to existing high ridership and future development potential.

Blackstone Avenue – Downtown to Riverpark or Audubon.

This is a strong transit corridor with good patronage and numerous activity centers. FAX operates 15 minute weekday service on its Route 30, so the corridor already has a high level of bus resources allocated to it. Significant opportunities for land use intensification exist, and the location of the Manchester Center along the corridor enhances its connectivity with local FAX services. It has one at-grade railroad crossing near McKinley Avenue. Traffic is generally heavier on the segment north of Ashlan Avenue. The running time from Nees Avenue to downtown is scheduled at about 45 minutes, and therefore improved speed might attract more long distance riders. If a Route 30 BRT is implemented, it will be important to coordinate it with local Route 30 service, including the West Fresno leg. Blackstone Avenue is a good candidate for BRT services. After the completion of the 41 Freeway, most of the high speed traffic will be diverted from Blackstone Avenue to the new freeway. Blackstone Avenue is expected to remain a high volume facility but it is mostly for locally destined traffic whose speeds are more compatible with transit and pedestrian activity.

Shaw Avenue – Highway 99 to Fowler Avenue.

Route 9 service along Shaw Avenue is not one of FAX's stronger performing bus routes. It operates on a 30 minute frequency. Schedule reliability is reportedly a problem. Traffic conditions are largely the cause of reliability problems and the right-of-way in the corridor is fully used for traffic lanes. While Shaw Avenue is in many ways a linear, auto-oriented suburban downtown for North Fresno, it is not very pedestrian friendly. Crossing the street is not easy as the traffic signal cycle lengths are long and the high volumes of left turns at intersections limit the amount of signal time allowed for pedestrians. Bus riders need to cross streets at least once for most roundtrips on buses. Even the pedestrian links along the street and between developments are not particularly inviting. Existing conditions are not conducive or supportive of public transit service. However, there are opportunities for improving transit service. The location of the California State University campus along the corridor is a major positive factor; also, pedestrian-oriented downtown Clovis is a logical eastern terminus for the corridor. Shaw Avenue seems a good candidate for enhanced Route 9 local bus service, using signal and minor traffic engineering tactics to expedite service and to improve running times as well as deployment of better passenger stop amenities.

Cedar Avenue – Sheppard Avenue to near Butler Avenue.

FAX Route 38 serves this corridor and Jensen Avenue (east/west corridor south of Ventura and Butler Avenues) on 30 minute headways. It is the fourth best performing FAX route. In addition to the California State University campus, several high schools and middle schools are located along the corridor. Beside the university campus, the corridor is mostly residential with little to no retail or employment centers. Route 38 is circuitous in reaching its terminus in downtown and thereby adding about four miles to the total route length (or 15 minutes for trips starting north of Ventura Avenue into downtown). A BRT service on Cedar Avenue should either terminate at the corner Cedar and Butler Avenues (south of Ventura Avenue) or in downtown via Ventura Avenue. Route 38 can remain as a local service overlay maintaining the existing local bus service on Jensen Avenue.

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Stakeholder Proposed Rapid Transit Corridors

Palm Avenue – Downtown to near Nees Avenue.

This corridor is served by FAX's 26 line. It has the second highest passenger boardings (behind Route 28), with the majority of the 4,800 boardings occurring on the southern segment, which runs along Butler Avenue. Palm Avenue runs parallel to the Blackstone Avenue, one mile to its west. Fresno High School and Bullard High School are both located along Palm Avenue. It is not as commercially developed as Blackstone Avenue and does not have as much opportunity for infill development as Blackstone Avenue. Blackstone Avenue is therefore the more attractive BRT alignment within North Fresno corridor. Enhancements to bus stops and existing local service are merited for the Palm Avenue corridor.

Clovis Avenue – Downtown Clovis to Kings Canyon Road.

Very limited bus service is currently provided on Clovis Avenue south of Shields Avenue, and service on the northern segment is not continuous. South of Shields Avenue, Clovis Avenue functions as a high speed, high volume arterial road with no pedestrian emphasis. The section between Shields and Tulare Avenues also has little development along its east side from which to draw bus patrons. Thus, Clovis Avenue is not currently a very promising BRT corridor. However, the absence of development along the corridor can be an opportunity for future transit and pedestrian oriented development. Advance planning for a BRT corridor could facilitate right-of-way for BRT to be set aside by the proposed development for future installation of BRT facilities. Also, with the development of the Southeast Growth Area east of Clovis Avenue, the corridor becomes a favorable alignment for integrating the developments north to south.

Clinton Avenue/Peach Avenue

This corridor is a combination of two cross-town markets. Cross-town transit markets historically are weaker than service oriented to downtowns. FAX's Route 39 serves the Clinton Avenue corridor, and the eastern end of Route 26 serves the Peach Avenue corridor. These routes currently operate 30 minute on headways on weekdays and on hourly headways on weekends. While this corridor exhibits low ridership, it provides a connection to the Fresno Yosemite International Airport with an opportunity for additional ridership when faster and more frequent service to the rest of the city is offered through the BRT network. The corridor may provide be an opportunity for transit oriented development along Peach and Clinton Avenues concurrently with the long term implementation of BRT service.

Herndon Avenue

FAX Route 45 provides the only substantial bus service on Herndon Avenue. This service is on the portion west of Blackstone Avenue. It is not heavily patronized. The road itself is a high speed auto-oriented highway with limited pedestrian crossings and generally an unfriendly pedestrian environment. The corridor is likely to remain highway oriented in the foreseeable future based on current planning. Since Shaw Avenue functions as the east-west urbanized corridor in northern Fresno, investments in BRT should be focused on it rather than Herndon Avenue.

Chestnut Avenue/Willow Avenue

FAX Route 41 operates on the Chestnut Avenue section of this corridor. No bus service operates on the Willow Avenue portion of the corridor. Service operates on 30 minute headways on weekdays and 50 minute headways on weekends. The Chestnut/Willow corridor does not have as many major activity centers as the nearby Cedar Avenue corridor and therefore is less promising for BRT services.

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BNSF Corridor

If and when the BNSF and Amtrak trains are relocated to the UPRR rail corridor, the BNSF rail corridor could be used for BRT or other forms of transit services. The corridor is in a high growth area and directly connects to downtown on an exclusive right-of-way that could support high speed transit services. It also directly serves City College and the Regional Medical Center. It could make an excellent transit corridor. Disadvantages are that relocation of BNSF trains is not within the control of COFCG and that the community might have other non-transit preferences for the corridor. Given the outstanding long-term potential of this corridor for transit, it should remain a candidate for future study if the railroad relocation becomes a reality. The BNSF corridor is not feasible as an early-action BRT corridor.

Highway 168

Highway 168 is the most direct connection between Downtown Fresno and Downtown Clovis, also passing near the California State University campus. These are the region's three largest pedestrian oriented activity centers. No bus service currently operates on this alignment. An illustrative service would originate in downtown Fresno and terminate in downtown Clovis, following an alignment along Fresno Street (Regional Medical Center); Tulare Street, Highway 41, Highway 180, Highway 168, Shaw Avenue, (Save Mart Center, CSUF), Chestnut Avenue, and Bullard Avenue. The current option (Route 28) for travel between the two downtowns requires one hour. A limited stop bus service with BRT-like stations might have merit in this corridor.

Other Potential Rapid Transit Corridors

Shields Avenue – Airport to Highway 99.

This corridor was suggested in the 1994 Transit Master Plan as a potential high capacity corridor. FAX Route 41 presently serves the corridor on 30 minute headways. In terms of patronage and boardings per hour, Route 41 is FAX's most successful non downtown bus route, with more riders than Route 9 on Shaw Avenue. The corridor is successful with local bus and with the airport as a terminal it may be a candidate for BRT (or express) service for potential customers on the north side of Fresno if Clinton is not selected as the corridor to access the airport from downtown or from the north. At this time, Shields Avenue is under consideration as a complimentary route to a proposed BRT network.

Highway 99

No bus services currently operated along Highway 99, which is centrally located within a high growth corridor. Current market conditions do not appear to support a limited stop bus service in this corridor. It is possible that future development would strengthen the market for Highway 99 bus service, perhaps extending into Madera County. At this time, the City of Fresno and FAX should monitor market demands and ensure that any redesign of Highway 99 interchanges provide for potential future express bus service in the corridor.

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Summary of Recommended BRT Network

Four corridors stand out as the most promising corridors for introducing BRT services:

- Ventura Avenue/Kings Canyon Road
- Blackstone Avenue
- Shaw Avenue
- Cedar Avenue

The first two corridors have benefited from the diversion of traffic onto freeways constructed parallel to their alignments. Thus, they tend to have retail oriented land uses along former state highways with somewhat reduced traffic congestion. Also, both corridors provide opportunities for coordinated development of pedestrian/transit oriented land uses in conjunction with enhanced BRT transit services. The two corridors could eventually develop into branch BRT services. For example, the Ventura Avenue/Kings Canyon Road corridor could start with a single BRT line terminating in or near the Fancher Creek development and upgrade with a future line continuing past Fancher Creek to serve the Southeast Growth Area. The Blackstone Avenue corridor could start with a single line operating between downtown and Nees Avenue and upgrade in the future with a second branch to CSUF. These two corridors are considered a potential “spine” for the rapid transit network. As such, the ridership assessment combined these two arterial streets into one corridor.

The latter two corridors are adjacent to the California State University, Fresno—a major employment center in the region. Shaw Avenue has substantial commercial and residential uses along the corridor and can provide direct service into downtown Clovis. Cedar Avenue on the other hand is mostly residential with several schools along the corridor—students are a major customer market for FAX.

4.4 Ridership Assessment of Potential Corridors for Early Implementation

Transit ridership and revenue forecasts were performed for three City of Fresno stand-alone BRT alternatives to facilitate the phasing of BRT implementation. The stand-alone alternatives include new BRT services in:

- Kings Canyon Road/Ventura Avenue/Blackstone Avenue
- Shaw Avenue
- Cedar Avenue

The assessment of ridership on potential BRT corridors is preliminary. As the BRT implementation program advances, more refined forecasts will be made. Service enhancements were similarly broadly defined. As such ridership forecasts for this master plan were to support overall project feasibility, to help screen the range of alternatives, and to facilitate the selection of a preferred corridor for implementation.

To screen the three corridors, four ridership forecasts were developed for each corridor. These alternative forecasts are: 1) Fast Bus, and the three level of BRT investment – 2) Basic, 3) Moderate, and 4) High. The goal of these forecast alternatives was to determine whether BRT or more limited improvement was best suited for the corridor.

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Current FAX Ridership

Council of Fresno County Governments (COFCG) Travel Demand Model

COFCG's multimodal model was used for this study. This model is documented in the 2003 report, *Fresno County Travel Model Mode Choice Update*, available from the COFCG. The current model structure assumes Year 2000 as the base year and generates travel demand forecasts for Year 2030. The model does cover all of Fresno County.

Transit Ridership Data

Two types of transit ridership data were obtained from FAX: 1) automated passenger count (APC) statistics of boardings and alightings by bus stop, and 2) monthly patronage data for every month between 1999 and early 2007. The two sets of data were used to determine the weekday ridership totals per route.

Establishing FAX Ridership Trends

These data were useful in establishing ridership trends – particularly when plotted against service hours and revenues. The monthly data were also summed to annual totals. Daily ridership was calculated using the available APC data by route and day of week to obtain weekday versus weekend ridership patterns.

Breaking out the weekday from weekend ridership patterns allowed for development of route-level annualization factors.¹ Typical annualization factors for operators like FAX range from 280 to 310, and the FAX system average was calculated to be 282. Ridership on routes missing APC data was estimated using the FAX average annualization factor. Given total annual ridership and the route-level annualization factors, weekday daily ridership totals were established. **Table 4.2** shows average weekday observed boardings per route for all years between 2000 and 2006.

Table 4.2 – FAX Observed Ridership by Route and Calendar Year – Top Ten Routes

FAX Route	Average Weekday Ridership						
	2000	2001	2002	2003	2004	2005	2006
Route 28	5,904	5,488	5,206	5,025	5,005	6,344	7,534
Route 30	5,204	4,712	4,446	4,260	4,162	4,645	5,214
Route 26	5,635	5,037	4,816	4,729	4,691	4,849	4,803
Route 38	4,908	4,365	4,258	4,085	4,105	4,272	4,340
Route 32	4,352	4,020	3,835	3,925	3,736	3,821	3,761
Route 41	3,519	3,239	3,151	3,119	3,236	3,354	3,546
Route 34	3,587	3,198	3,028	2,965	3,075	3,203	3,215
Route 22	3,546	3,097	2,805	2,788	2,720	2,755	2,765
Route 9	2,544	2,258	2,159	2,098	2,101	2,202	2,352
Route 20	3,601	3,386	3,219	3,008	2,886	2,252	1,732
Total All	44,800	40,801	38,925	38,005	37,721	39,702	41,268

¹ An annualization factor is a multiplier or divider used to convert average weekday daily ridership to annual ridership. A route with weekday-only service has an annualization factor of 252, while a route with equal daily ridership on all seven days of the week has an annualization factor of 356.

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BRT Ridership Forecasts

As mentioned in Chapter 1, many of the features and elements of BRT service (i.e. Transit Signal Priority, Off-board fare collection, and increased stop spacing) are oriented at shorter travel times and more efficient travel for transit customers. Currently, passengers in the Ventura Avenue/Kings Canyon Road experience a travel time of 25-30 minutes from Peach Avenue to downtown Fresno on the local Route 28 bus—this translates to approximately 9 mph average travel speed. BRT features and elements will be able to reduce the travel time closer to 14-17 minutes within the same segment—a cumulative savings of about 11-13 minutes in travel time for an average travel speed of approximately 17 mph.

This potential travel time savings and other BRT amenities can have a significant impact on ridership. This section addresses the alternatives modeled and the modeling approach taken in estimating the ridership impacts.

Alternatives within BRT Corridor: Fast Bus and BRT Investment Alternatives

The Fast Bus Alternative is a bus service that is faster than current local bus service through traffic signal priority only. This alternative helps to estimate the general impact of implementing transit signal priority and limited queue jumpers for faster travel speeds and shorter travel times. The Fast Bus Alternative included a new bus route overlay (no other services were decreased or deleted) at 10 minute peak headways and 15 minute off-peak headways. In all cases, this additional Fast Bus service was a substantial improvement over existing service levels.

The COFCG model is not capable of modeling BRT amenities other than improved travel time. Consequently, *TRB's Transit Cooperative Research Program (TCRP) Report 118: Bus Rapid Transit Practitioner's Guide 2007* was utilized to generate ridership changes associated with BRT amenities not accounted for in the COFCG model. Ridership changes are based on actual experiences of other transit properties in the United States that have implemented BRT services.

Three BRT investment options were evaluated—basic, moderate and high. Ridership forecasts were prepared each of these options along with the Fast Bus Alternative for each corridor.

Three BRT Investment Alternatives

For planning purposes, three levels of BRT investment were considered to simplify the evaluation of corridors for the master plan. These tier or investment alternatives are not meant to be restrictive of the BRT options—this is contrary to the BRT concept—but instead the alternatives are intended to show how varying levels of investment can impact capital and operating costs, ridership, and implementation feasibility. These investment alternatives are defined as follows:

1. Basic Investment

Commonly known as “Rapid Bus”, this level of investment is considered a minimum investment to achieve the benefits of BRT. This investment alternative includes:

- Substantial transit stations or shelters. These are generally larger than standard bus shelters and usually architecturally designed to contribute to the “branding” of the line.
- Traffic signal priority and signal coordination for improved travel times.
- Off-board fare collection to allow passenger to enter and exit through any door, consequently reducing time at stations/stops.

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- Low-floor vehicles and level boarding, which minimizes the amount of dwell time at stops by facilitating passenger entry into the vehicle, with particular benefit for passengers with special needs such as wheelchairs or walkers.
- Branded vehicles and stations providing a unique identity for BRT service, which allows for casual transit users to identify the system easily.
- High frequency (every 10 minutes in the peak hour / 15 minutes off-peak), which provides a higher level of service and ensures that BRT is implemented in corridors that can support the minimum level of investment. This has also been established by FTA as the minimum frequency that allows patrons to arrive randomly without having to consult a schedule.
- Queue jumper lanes where necessary, which allow BRT vehicles to bypass traffic queues at intersections to improve travel time reliability. Buses move to the front of the queue in a dedicated lane, and then receive an advance signal allowing them to proceed in front of other traffic.

For system operators wishing to obtain federal New Starts or Small Starts funding, all of the above features, with the exception of off-vehicle fare collection and queue jumper lanes, are mandatory project elements. For this level of investment, most or all of the BRT alignment operates in mixed flow within general traffic lanes.

2. Moderate Investment

This level of investment focuses on incremental improvements to both right-of-way for vehicles and passenger amenities at stations:

- Dedicated side-running lanes for BRT vehicles. This minimizes the amount of time BRT vehicles are delayed by general traffic.
- Enhanced station investment such as landscaping, special paving, or way-finding signage.
- Real time arrival information system (e.g. Next bus technology)
- Larger stations to accommodate more passengers with additional seating and amenities such as bicycle parking.

3. High Investment

The high level of investment takes into consideration a full light-rail concept but with BRT vehicles.

- At-grade median running in dedicated lanes that are horizontally separated from general traffic conditions. Grade separation may be considered at railroad crossings.
- Full signal pre-emption at intersections to maintain a minimum operating speed.
- Major station investment to accommodate large pedestrian traffic and passenger loads.
- More amenities for passengers, such as information kiosks, newspaper racks, wireless access, or other amenities not common to bus transit.

Methodology

A methodology for estimating ridership was devised for the alternatives listed above using the COFCG Travel Demand Model, the monthly ridership data provided by FAX, and the TCRP Report 118: Bus Rapid Transit Practitioner's Guide (BRT Practitioner's Guide)². The COFCG

² See Appendix B for detailed ridership estimation methodology and ridership increases attributed to BRT amenities as defined by TCRP Report 118.

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Travel Demand Model was used to determine the ridership generated by the year 2030 Fast Bus Alternative in each corridor—since the model is only capable of defining frequency and travel time, and not the variety of amenities that can be offered by a BRT service. The demand model generated the growth trends for the network and the Fast Bus corridor and was then adjusted according to the ridership trends from data collected by FAX.

Estimating ridership for the three levels of BRT investments (Basic, Moderate, and High) used the Fast Bus Alternative ridership and the TCRP Report 118. The Fast Bus Alternative model accounts for the increase in frequency and decrease in travel time attributes of BRT service. However, the BRT Practitioner's Guide was used to include the potential ridership increase from other BRT amenities and features that are not accounted for in the travel demand model— (e.g. next vehicle arrival information or route branding and marketing). Table A-1 in Appendix B defines which attributes are included in the three levels of BRT investment for ridership estimation.

Table 4.3 presents total system-wide ridership and within corridor ridership by route for all alternatives and BRT investment packages.

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Table 4.3 – Daily Ridership Within Corridor and System-wide Ridership by Alternative and Investment

Daily Ridership Estimation	Year 2000	Year 2006	Year 2030 Baseline	2006-2030 Annual Pct. Growth	Year 2030 Fast Bus	% Change from Baseline	Year 2030 Basic BRT	Year 2030 Mod. BRT	Year 2030 High BRT
Kings Canyon Road - Ventura Avenue - Blackstone									
Routes in Corridor	11,100	12,700	14,500	0.6%	10,800	-26%	10,800	10,800	10,800
Fast Bus/BRT					9,400		12,600	17,300	18,800
Corridor Total	11,100	12,700	14,500	1.5%	20,200	39%	23,400	28,100	29,600
Other Routes	34,800	34,200	54,200	1.7%	50,800	-6%	50,800	50,800	50,800
System Total	45,900	46,900	68,700	1.6%	71,000	3%	74,200	78,900	80,400
Shaw Avenue									
Routes in Corridor	2,500	2,400	3,700	1.8%	1,800	-51%	1,800	1,800	1,800
Fast Bus/BRT					5,800		7,700	10,600	11,500
Corridor Total	2,500	2,400	3,700	0.5%	7,600	105%	9,500	12,400	13,300
Other Routes	43,400	44,500	65,000	1.9%	64,200	-1%	64,200	64,200	64,200
System Total	45,900	46,900	68,700	1.6%	71,800	5%	73,700	76,600	77,500
Cedar Avenue									
Routes in Corridor	4,900	4,300	7,600	2.4%	4,100	-46%	4,100	4,100	4,100
Fast Bus/BRT					6,400		8,600	11,800	12,800
Corridor Total	4,900	4,300	7,600	2.0%	10,500	38%	12,700	15,900	16,900
Other Routes	41,100	42,500	61,200	1.5%	59,500	-3%	59,500	59,500	59,500
System Total	46,000	46,800	68,800	1.6%	70,000	2%	72,200	75,400	76,400
Full System Implementation									
Routes in Corridor	18,600	16,800	25,800	1.8%	15,800	-39%	15,800	15,800	15,800
Fast Bus/BRT					22,600		30,400	41,500	45,200
Corridor Total	18,600	16,800	25,800	1.7%	38,400	49%	46,200	57,300	61,000
Other Routes	27,300	30,100	42,900	1.4%	36,100	-16%	36,100	36,100	36,100
System Total	45,900	46,900	68,700	1.6%	74,500	8%	82,300	93,400	97,100

Source: COFCG Travel Model, TCRP Report 118, Cambridge Systematics

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Key Findings Ridership

Overall, the Kings Canyon Road-Ventura Avenue-Blackstone Corridor has the highest ridership. This is explained by two factors. First, existing in-corridor local bus boardings are much higher than for the Shaw and Cedar Corridors; second, this Kings Canyon Road-Ventura Avenue-Blackstone Corridor is longer, thus providing more opportunities for travelers to use the BRT/Fast Bus service.

4.5 Proposed Corridor for Initial Implementation

The first phase BRT implementation is proposed along the Ventura Avenue/Kings Canyon Road corridor beginning at Fancher Creek and interlining north through downtown Fresno to Fresno City College or FAX's Manchester Center transit facility for connections with FAX routes 28, 30 (local), 31, 32, 41, and 45.

Chapter 5 will demonstrate an implementation plan for the segment on Ventura Avenue / King Canyon Rd between Fancher Creek development (Fowler Avenue) and State Route 41 / R Street. However, further study is required to determine the best alignment for service north of downtown Fresno where, Fresno City College is the next major destination north of downtown Fresno and the fastest alignment that serves the college may be a combination of Blackstone Avenue out of downtown Fresno, the along the south side of the BNSF tracks, then returning to Blackstone Avenue via the new underpass, just east of the City College.

Chapter 5 – Ventura Avenue/Kings Canyon Road BRT Implementation Plan

The potential for establishing BRT service along Ventura Avenue and Kings Canyon Road as an early implementation element of the overall Master Plan is described in this section. The analysis included field investigations to identify suitable locations for BRT stations and recommendations for corridor improvements representing a range of investment levels.

The Ventura Avenue and Kings Canyon Road corridor was identified for additional study because, in addition to being part of the most promising BRT corridor (see conclusion of Chapter 4), it also serves the site of the proposed Fancher Creek development, a major master-planned community. With Fancher Creek and downtown providing anchors for potential ridership at the ends of the Ventura Avenue/Kings Canyon Road corridor, the implementation of BRT would provide an increase in the level of service that is much needed for the communities between Fancher Creek and downtown.

5.1 Corridor Characteristics

The Ventura Avenue/Kings Canyon Road corridor was formerly a California Department of Transportation facility (former State Route 180). It begins on the southern edge of downtown Fresno and extends easterly to the newly developing suburban communities in the southeast quadrant of the metro area. After leaving the downtown area by passing beneath the SR 41 freeway, the route extends for just over two miles through an area of primarily older commercial development. This area is characterized by street-fronting businesses with many driveways and extensive dependence on on-street parking. Residential areas in this segment consist mostly of single-family neighborhoods located a block or more off the main corridor. Major traffic generators along this segment include the University Medical Center, County social services offices and the fairgrounds.

East of Chestnut Avenue, the corridor enters an area of newer development characterized by large shopping centers on both sides of the street, centered on South Winery Avenue. Medium-density apartment developments surround the shopping centers. This segment is approximately 0.6 miles long.

Beginning at South Adler Avenue, the alignment enters an area consisting of medium-density residential complexes interspersed with large tracts of undeveloped land. This segment extends 1.4 miles to a commercial node at Clovis Avenue. A dominant feature of this segment is the mature palm trees that line both sides of the right-of-way, which are considered aesthetically and historically important to the community and may reduce the feasibility of road widening. Major traffic generators along this segment include Sunnyside High School, located at Peach Avenue, and the IRS complex, located about a half-mile to the south. The extensive undeveloped parcels along this segment present good opportunities for higher-density, transit-oriented development.

The area east of Clovis Avenue consists of a mixture of land uses, including large-scale commercial development and newly-developing land, such as the Fancher Creek planned community. Since this area is near the outer limit of Fresno's existing urban footprint, it is proposed to be the terminus of the planned BRT route.

5.2 *Proposed Alignment and Station Locations*

As mentioned in Chapter 4, Ventura Avenue/Kings Canyon Road was one of four major arterials proposed for high frequency service or rapid transit service. It is also a corridor that currently experiences high transit ridership on FAX Route 28. The proposed Ventura Avenue/Kings Canyon BRT follows much of the same alignment as Route 28 beginning at the intersection of Van Ness Avenue and Ventura Avenue in downtown Fresno to the last corridor station at Peach Avenue, and continues east to either Clovis Avenue or Fowler Avenue, as described below—**Figures 5.1a-c** Ventura Avenue/Kings Canyon Road Corridor Alignment and Stations.

Downtown Fresno

The alignment of the Ventura Avenue/Kings Canyon Road BRT through downtown Fresno should be coordinated with other planned BRT routes and ideally connect with the Blackstone Avenue alignment. Final resolution of the BRT alignment through the downtown area would be determined as part of future planning studies. However the Downtown Transportation Infrastructure Study proposed Van Ness Avenue as the preferred transit corridor for downtown Fresno because of its centralized location within downtown. One possibility is to operate the Blackstone BRT on the one-way couplet of Stanislaus Street/Tuolumne Street to reach Van Ness Avenue, and stop at a station or stations in the downtown core. The route would then become the Ventura Avenue/Kings Canyon Road BRT and proceed southeasterly to Ventura Avenue. Turning left on Ventura Avenue, the BRT would depart from the downtown area by passing under the SR-41 freeway overpass.

Perhaps the most significant design issue facing this segment of the BRT is the crossing of the BNSF railway near the freeway overpass. Delays related to train movements can be lengthy and are inconsistent with the service goals of a BRT system especially those dealing with service reliability. A grade-separated crossing would be a costly element of a BRT project but, at a minimum, this should be considered and evaluated as part of the future design studies, especially for the medium and high-investment concepts.

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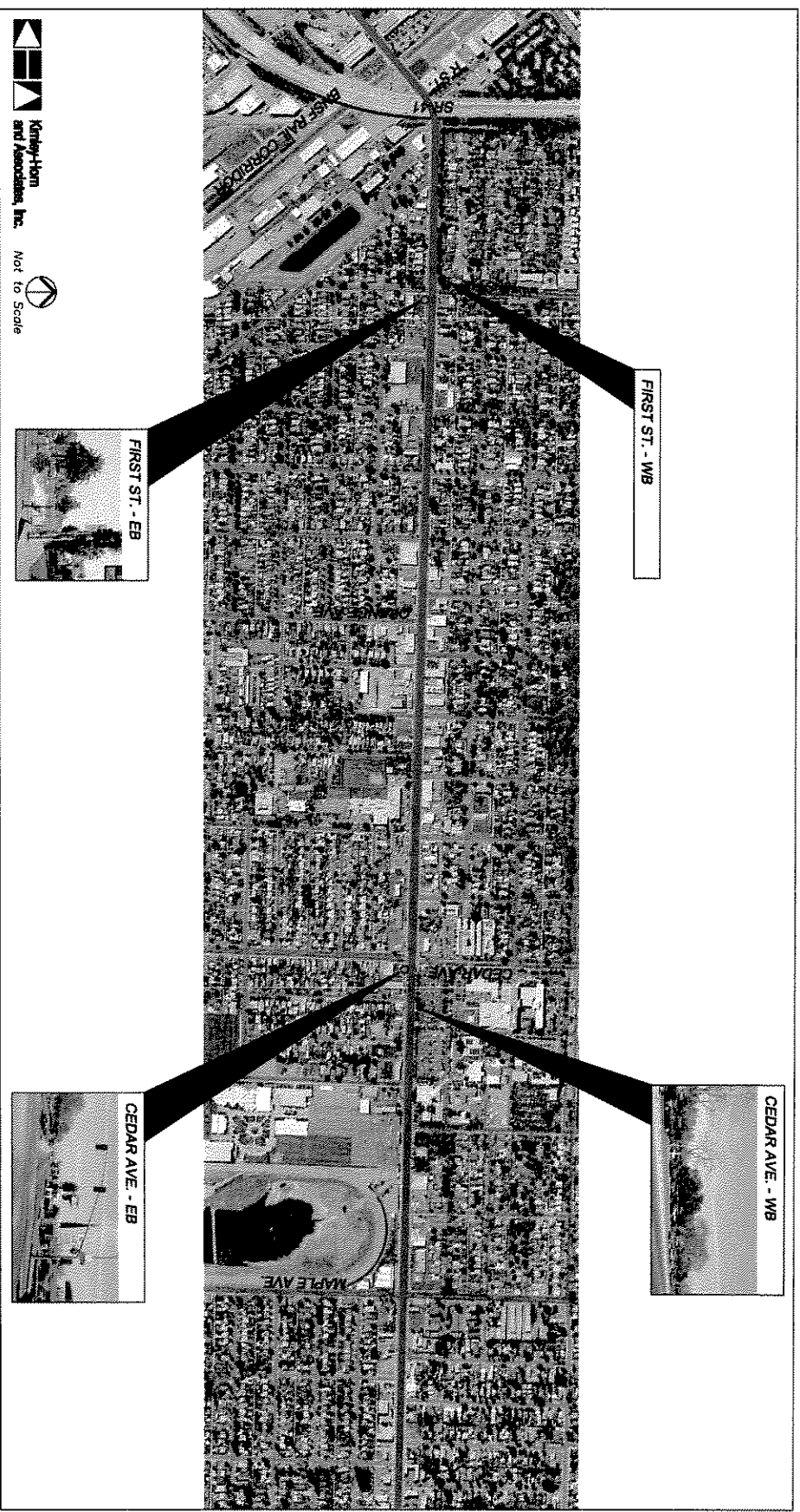


Figure 5. 1a: Ventura Avenue/Kings Canyon Road Corridor Alignment and Stations - 1st Street and Cedar Avenue

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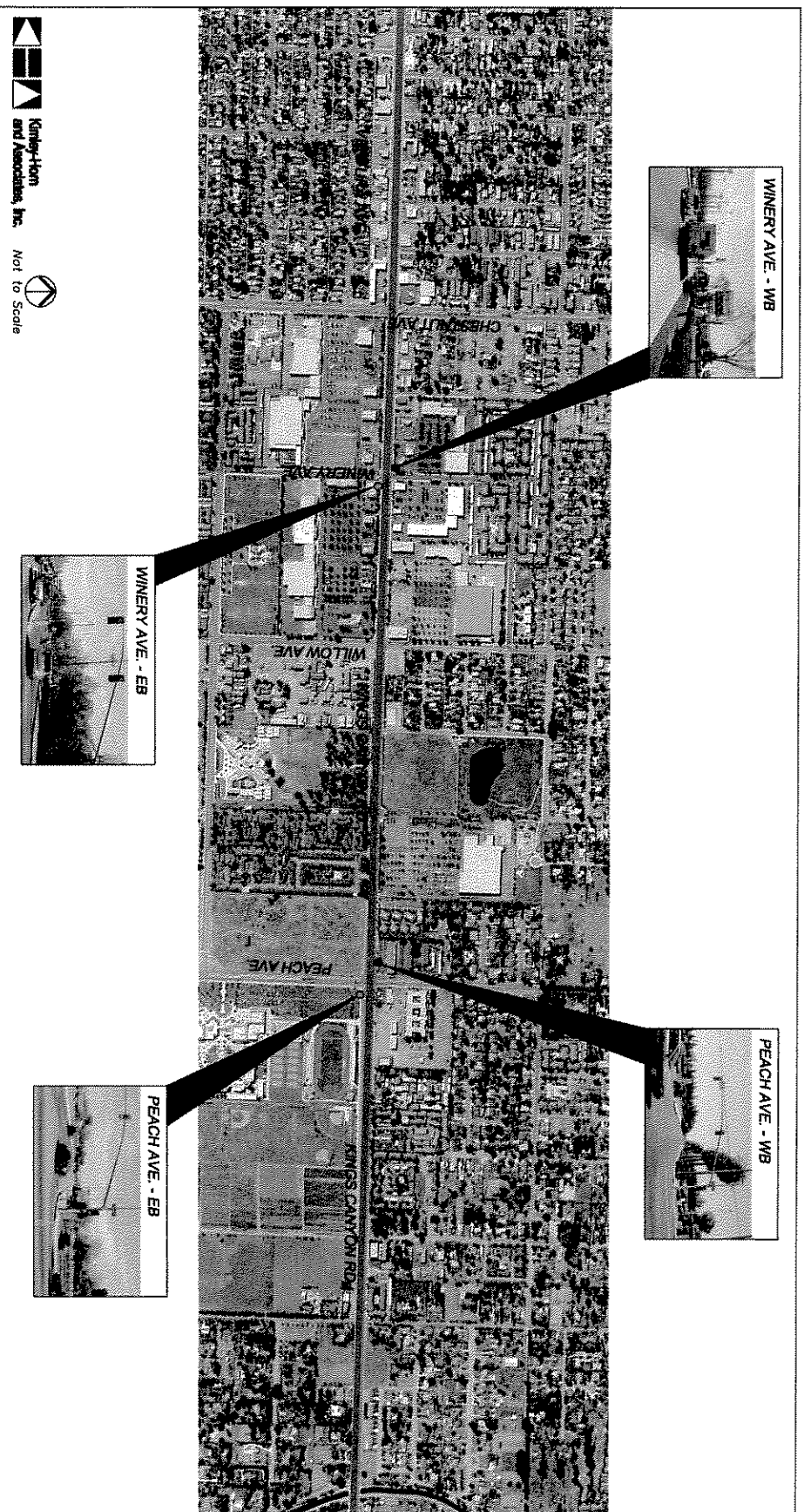


Figure 5.1b: Ventura Avenue/Kings Canyon Road Corridor Alignment and Stations - Peach Avenue and Winery Avenue

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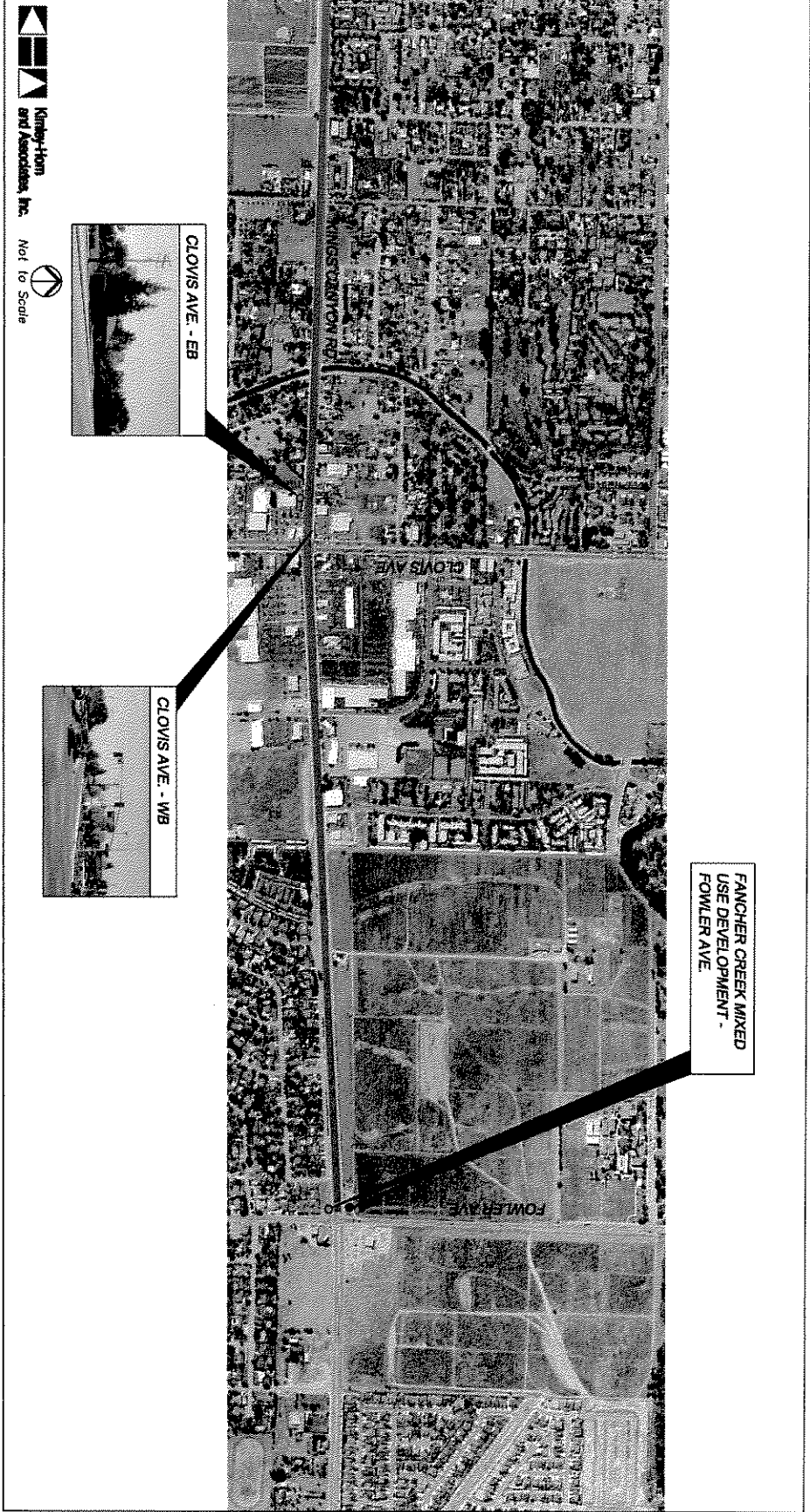


Figure 5.1c: Ventura Avenue/Kings Canyon Road Corridor Alignment and Stations -
Fancher Creek Development Loop and Clovis Avenue

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Ventura Avenue/Kings Canyon Road Corridor

East of SR-41, the BRT would proceed along Ventura Avenue. BRT stations are proposed at intervals of one-half mile to one mile, with the approximate locations being adjusted to gain maximum proximity to major traffic generators. In addition, stations typically should be located near the major cross streets on which transit lines are located, to facilitate transfers. In Fresno, the major streets are located on roughly a one-mile grid, and the major FAX bus lines follow these streets, so in most cases the logical station locations are adjacent to these one-mile arterial cross-streets.

1st Street and Ventura Avenue

This intersection provides a connection to Route 34 on 1st Street. The station is located near neighborhoods on the north and south. This is also the last station before entering downtown Fresno—see **Figures 5.2, 5.3, and 5.4**.

Cedar Avenue and Ventura Avenue

Cedar Avenue is currently a major bus stop on Route 28 and is likely to be a major destination within the proposed BRT system. The station is adjacent to the University Medical Center campus operated by the County of Fresno—see **Figures 5.5, 5.6, and 5.7**. The county is currently developing a master plan for the campus with an interest to integrate public transportation. This station would provide convenient access to a new campus that integrates effective pedestrian access to and from the BRT station. Also, the surrounding neighborhoods are transit dependent and would greatly benefit from additional service along the corridor.

The distance between the first three stations along the corridor is approximately a mile. This mile spacing means only half of this portion of the corridor would have access to a BRT station within a quarter mile. While not recommended for initial implementation, mid-point stations at half-mile intervals can be considered for future implementation when the demand warrants. The implementation of the “mid-point” stations would provide quarter mile access to any station along this portion of the corridor which currently contains the majority of the residential and commercial development.

Winery Avenue and Kings Canyon Road

A station at this intersection is a compromise between providing connecting service to Route 41 and providing service to a commercial center surrounded by higher density residential apartment and condos to the north. This site would serve a large FAX market of shopping trips while taking advantage of potential redevelopment opportunity of the area (parking lots) surrounding the proposed station—see **Figure 5.8**.

Peach Avenue and Kings Canyon Road

This location shows substantial promise for a successful BRT station. The station is located near a high school (serving one of FAX’s top markets – students) and adjacent to an empty lot, which provides a great opportunity for transit oriented development. An additional characteristic of the location is the width of right-of-way where transit-only lanes can be effective and inexpensive to implement—see **Figure 5.9**.

Clovis Avenue and Kings Canyon Road

Clovis Avenue is a station proposed to serve an area with little to no bus service currently. High density residential to the south on Clovis Avenue may provide some potential ridership; however, the main premise for a station is to provide connecting service to possible future north/south bus service on Clovis Avenue—see **Figure 5.10**.

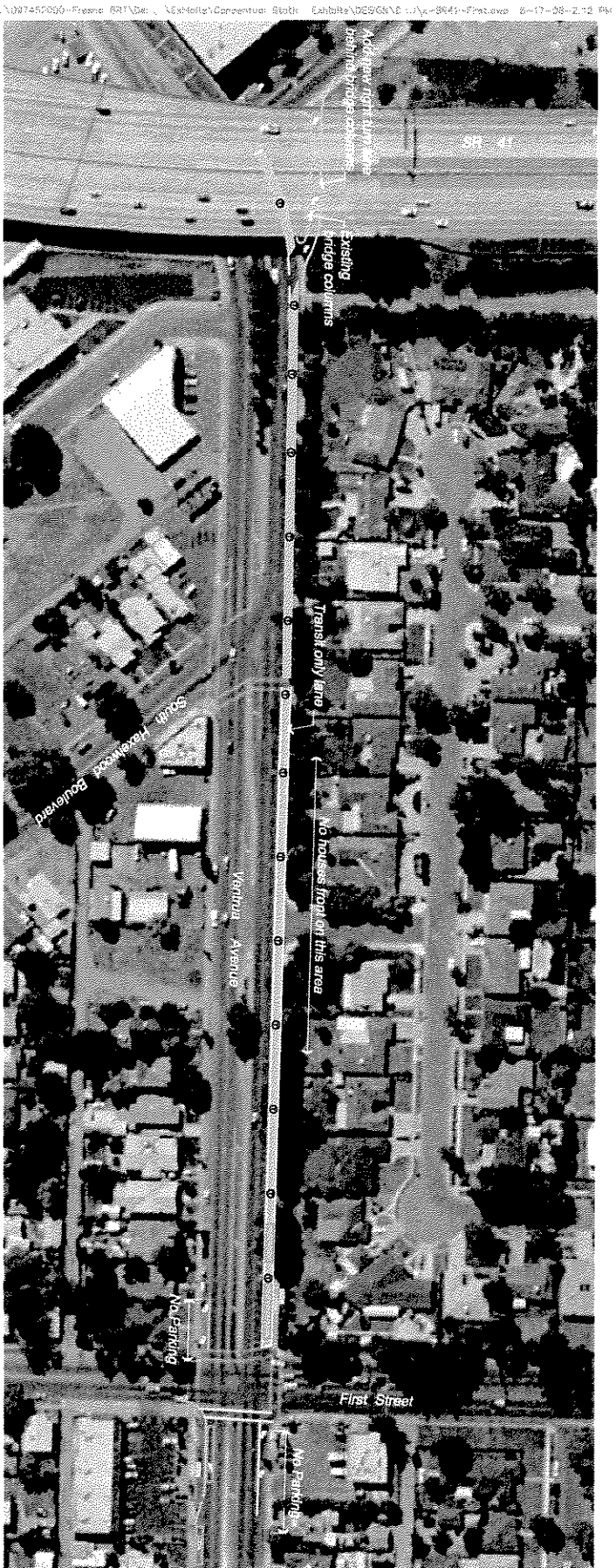


**Figure 5.2: Ventura Avenue/Kings Canyon Road Corridor -
First Street Station and Venutra Avenue Approaching Downtown Fresno**

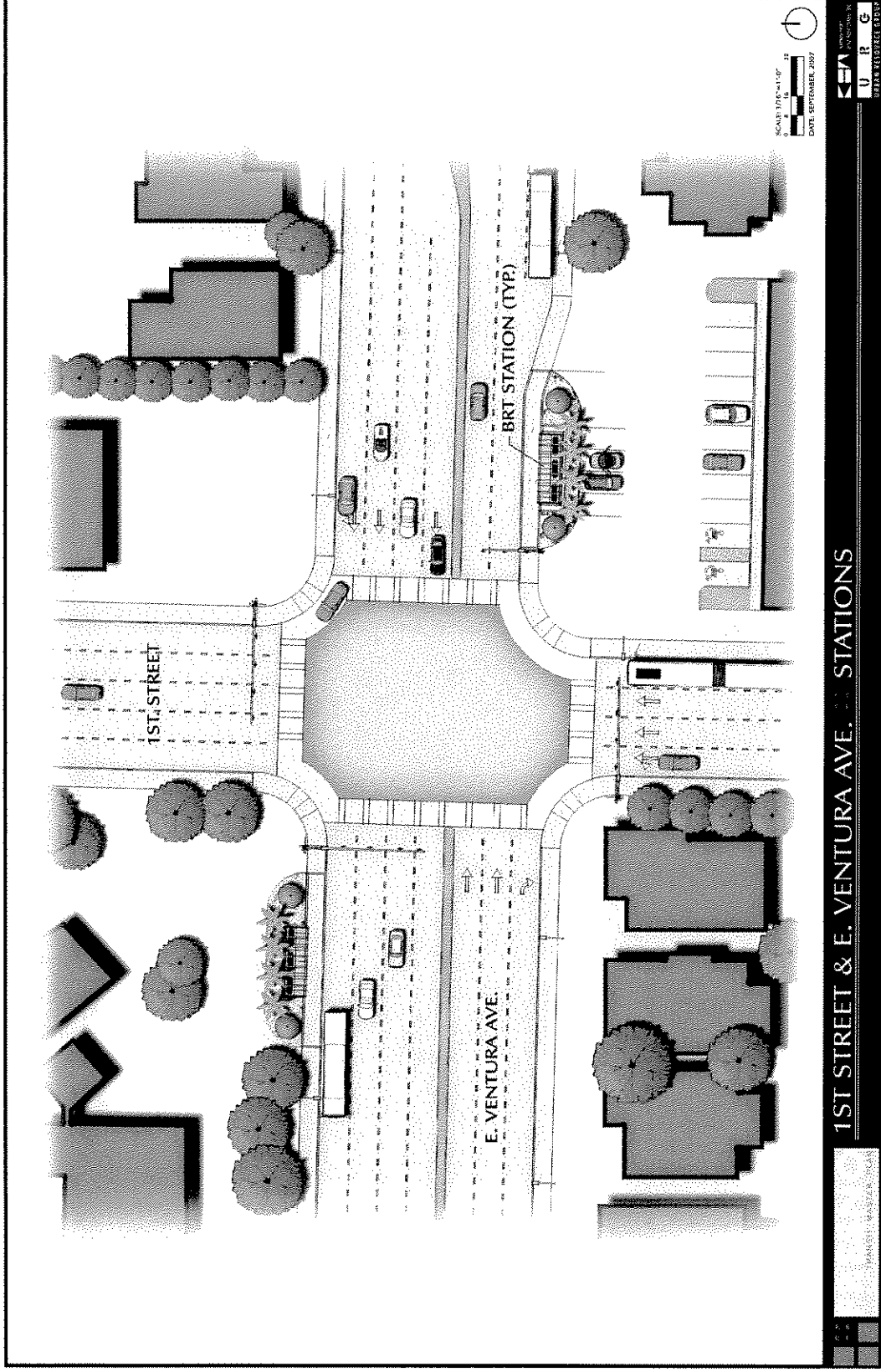


Figure 5.3: 1st Street and Ventura Avenue Station Concept – Plan View

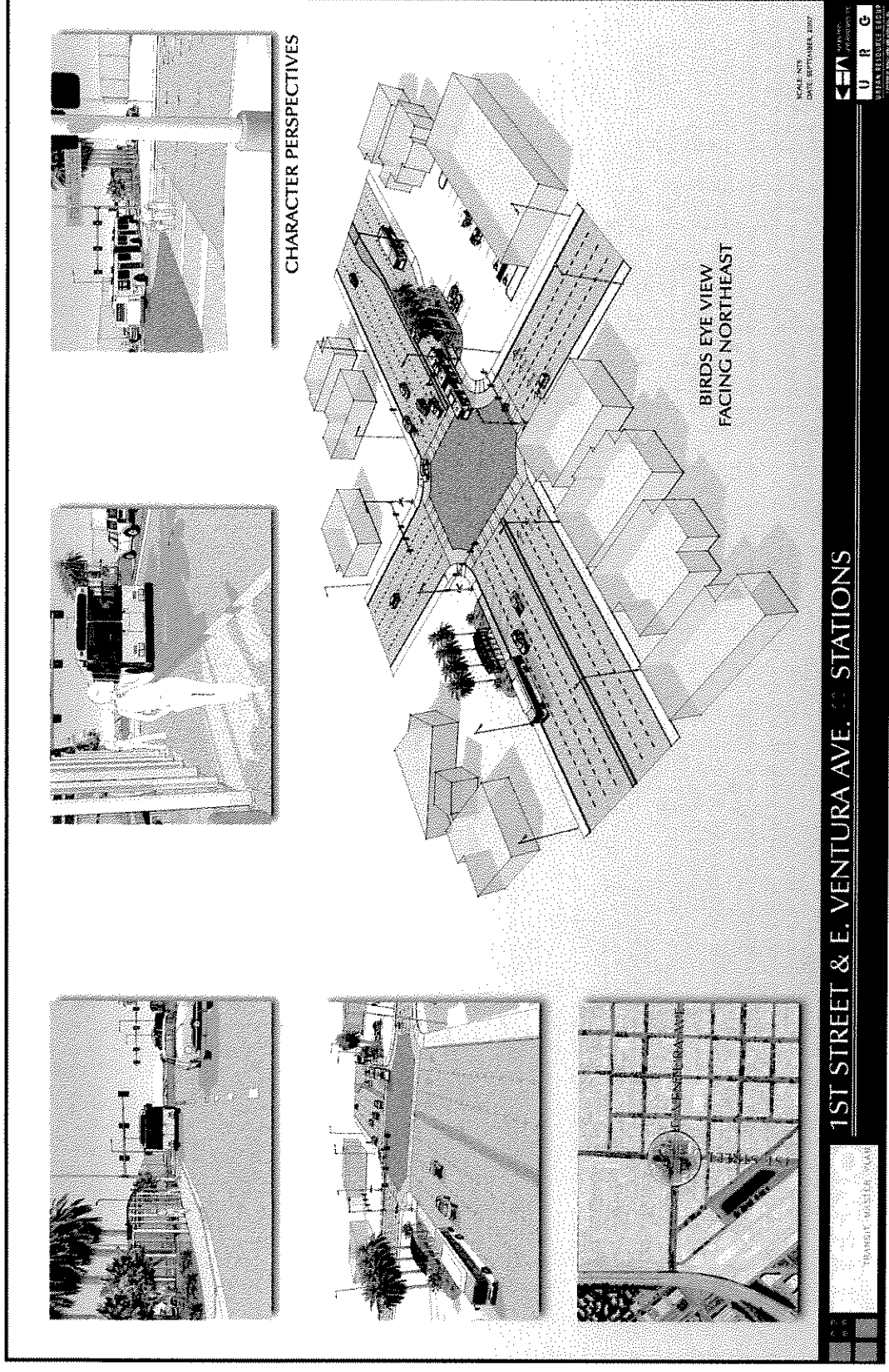


Figure 5.4: 1st Street and Ventura Avenue Station Concept – Birds Eye View

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Figure 5.5: Ventura Avenue/Kings Canyon Road Corridor - Cedar Avenue Station

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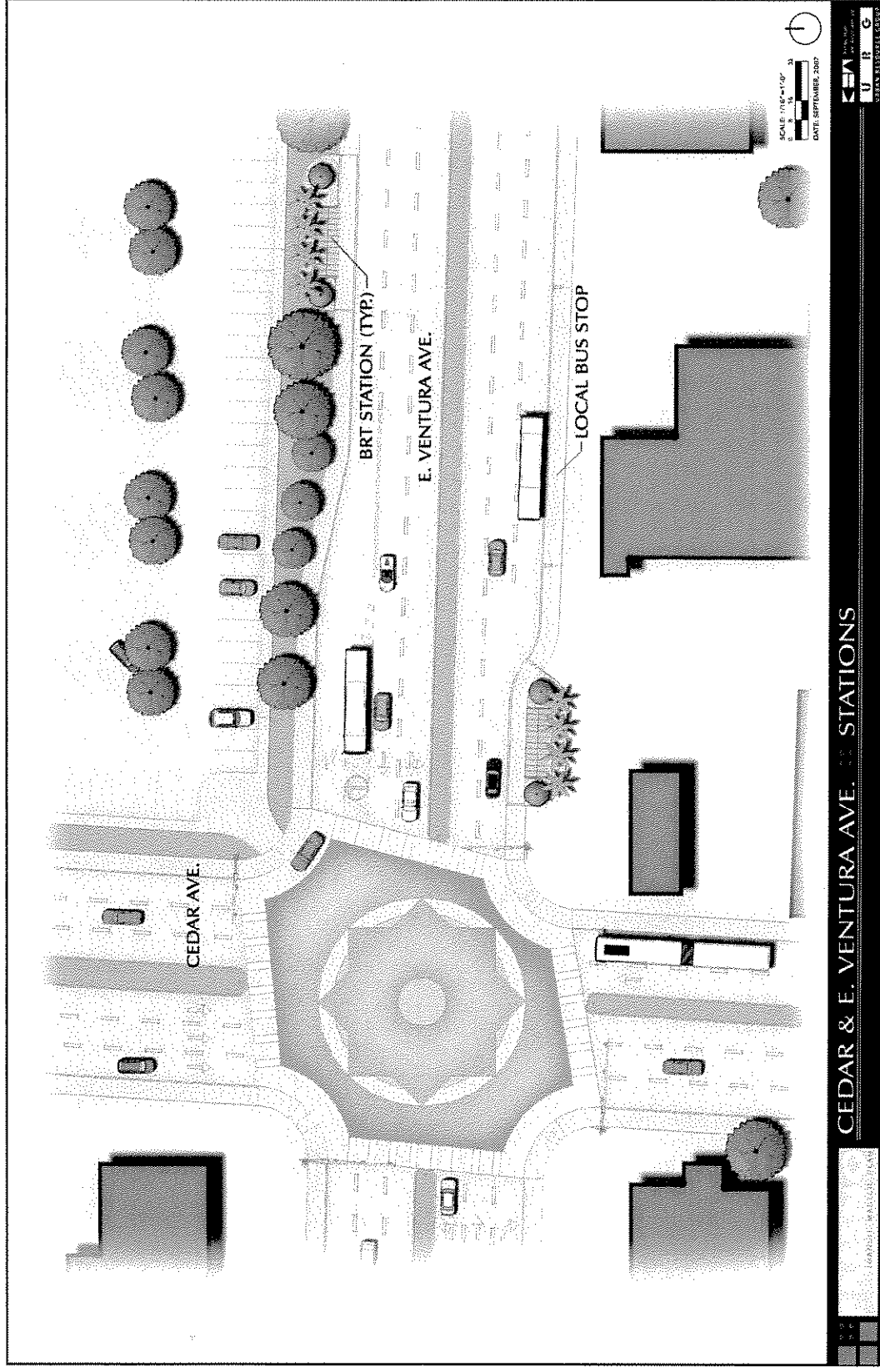


Figure 5.6: Cedar Avenue and Ventura Avenue/Kings Canyon Rd Station Concept – Plan View

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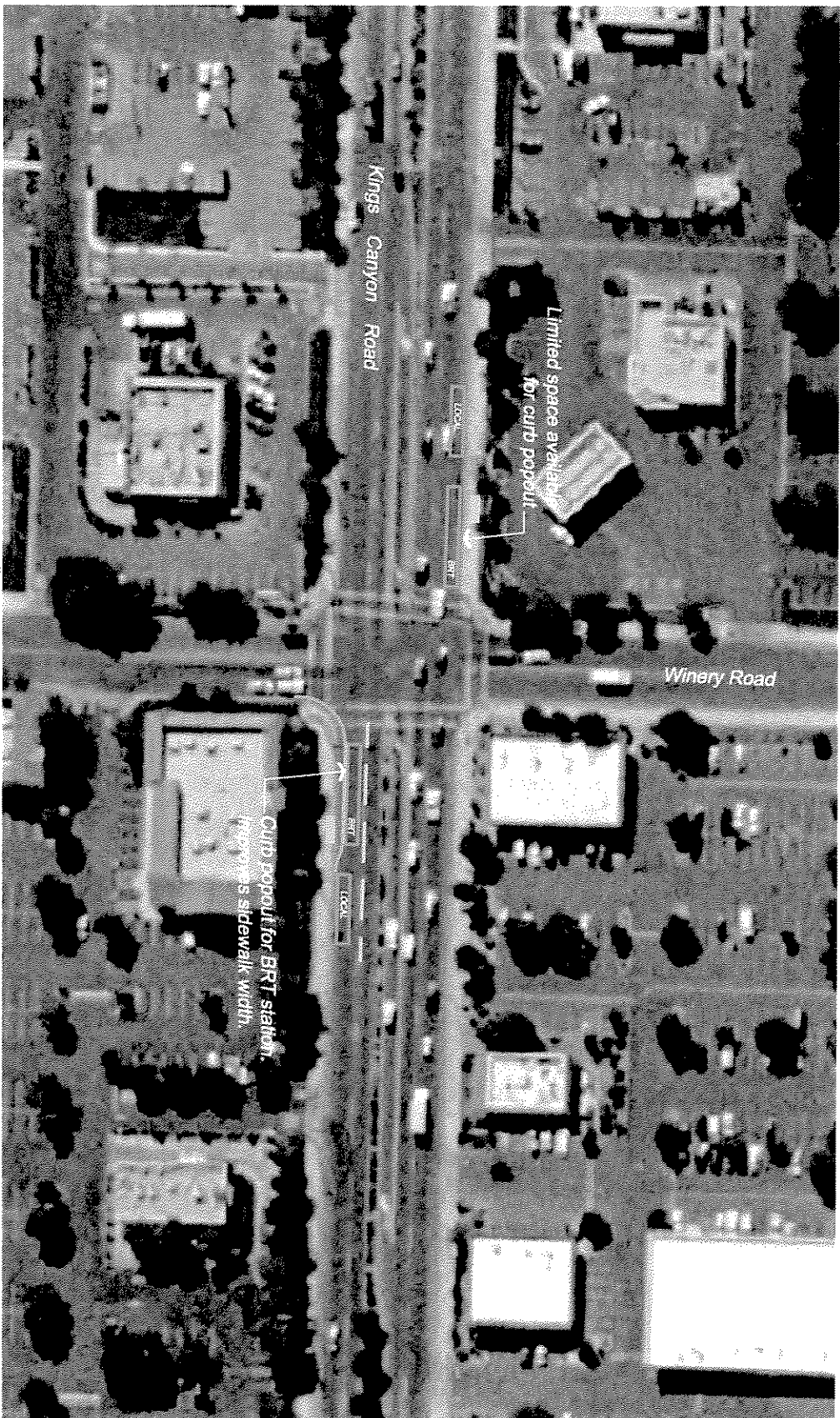


Figure 5.8: Ventura Avenue/Kings Canyon Road Corridor -
Winery Avenue Station



Kinney-Horn
and Associates, Inc. Scale: 1"=100'

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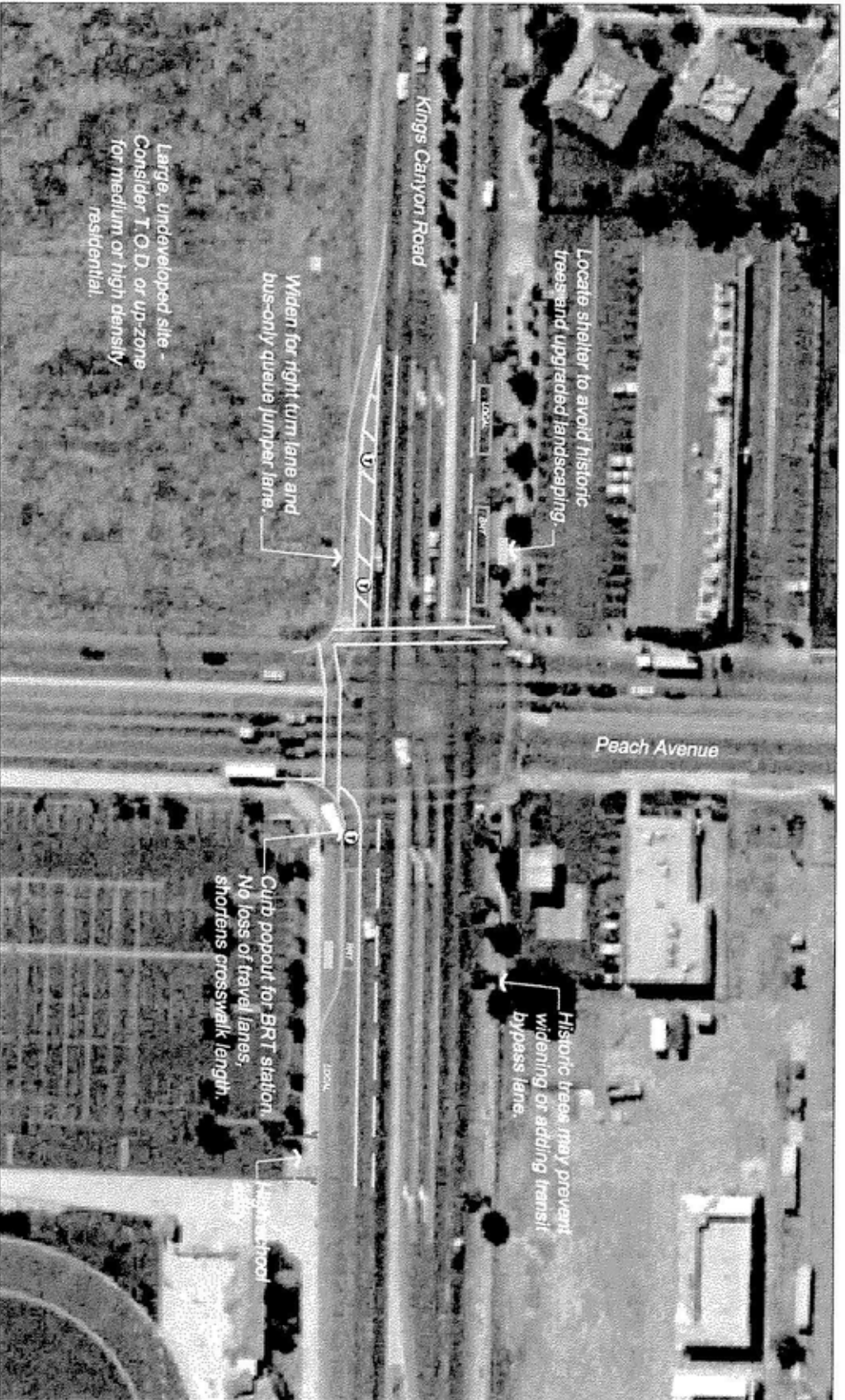


Figure 5.9: Ventura Avenue/Kings Canyon Road Corridor - Peach Avenue Station



Kintley-Horn
and Associates, Inc. Scale: 1"=100'



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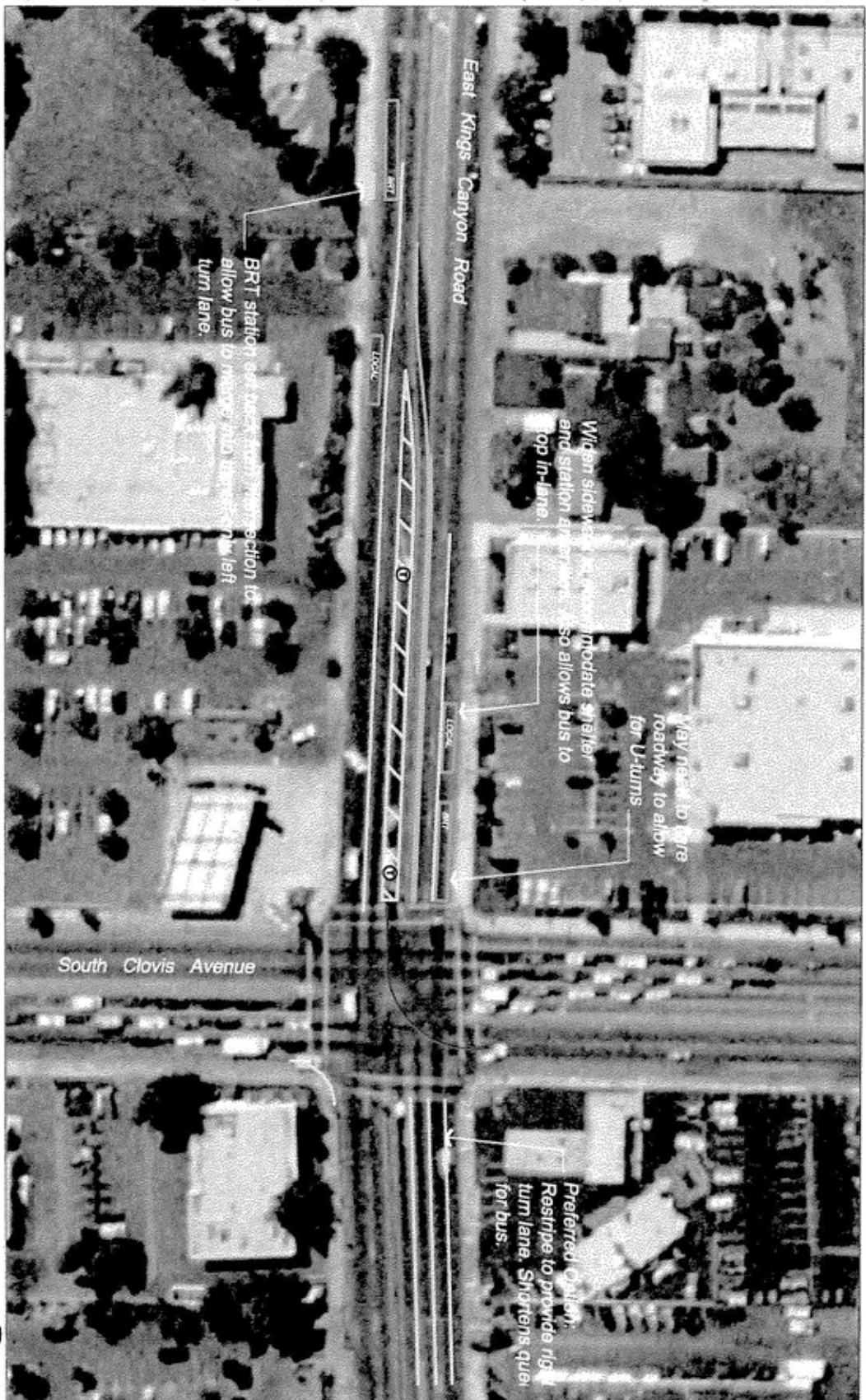


Figure 5.10: Ventura Avenue/Kings Canyon Road Corridor - Clovis Avenue Station



Kinkley-Horn
and Associates, Inc. Scale: 1"=100'

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Fancher Creek – East of Clovis Avenue

The master planned community of Fancher Creek occupies a large tract of land between Clovis Avenue and Fowler Avenue, and is expected to be a major generator of ridership for the Ventura Avenue/Kings Canyon Road BRT when fully developed. Two options have been identified for providing service to Fancher Creek. The first is to follow a direct alignment along Kings Canyon Road, with a terminal station near Fowler Avenue. A turn-around would need to be provided near the intersection of Fowler Avenue. An advantage of the Kings Canyon Road alignment would be the possibility of future extension to Highland Avenue (four miles east of Clovis Avenue and three miles east of Fowler Avenue), which would allow this BRT alignment to bisect the Southeast Growth Area. The Southeast Growth Area is a new master planned community for the City of Fresno that is part of the 2025 Fresno General Plan. The growth area encompasses 14 square miles and is anticipated to have 55,000 residents. It is bisected north-south by Wolf Avenue and east-west by Kings Canyon Road. The proposed alignment on Kings Canyon Road would allow for future (2020) extensions of the BRT and branching into the Southeast Growth Area.

This alignment, as shown in Figure 5.1c is the most direct and provides the shortest running time; however, in the short-term a drawback is that it would provide only limited service to Fancher Creek. The majority of the Fancher Creek residential units and all of its major shopping centers would be outside the quarter-mile convenient walking radius from any station site along Kings Canyon Road. This drawback can be resolved with effective shuttle or feeder service from the surrounding communities (including Fancher Creek) to connect to the BRT service.

The second option for BRT service to Fancher Creek would be to provide direct service by making a one-way loop through the center of the development. In this scenario, the BRT would turn left (north) onto Clovis Avenue and proceed north to Tulare Avenue, where it would turn east into Fancher Creek. The BRT would then proceed along Tulare Avenue to Fowler Avenue, where it would turn south to Kings Canyon Road, and then turn west to complete the loop and begin the return trip to downtown Fresno. This scenario would provide two stations, one near the commercial center and one along Fowler Avenue within the Town Center area. This alternative would provide much more convenient service to Fancher Creek and higher near-term ridership. This alternative would be less conducive to future direct extension into the Southeast Growth Area. It would not preclude branching service to the growth area to the east.

Regardless of the routing of the BRT to and from Fancher Creek, transit customers would need to use the pedestrian access links within Fancher Creek to and from the BRT Station. Pedestrian friendly design is imperative for BRT's success in attracting riders within the development. The best way to promote pedestrian mobility and access is by providing clearly defined pedestrian paths and uses. This includes locating main entrances to buildings along the sidewalk as opposed to having a parking lot between the street and the building. In Fresno, shade trees along sidewalks can be inviting for a more comfortable walk along the street. Other potential measures include shortening pedestrian crossings with curb popouts along anticipated high traffic pedestrian paths, providing a land use plan that encourages people to walk for short trips as opposed to using their cars, and providing an environment that promotes comfort and safety for pedestrians.

5.3 Conceptual Station Improvements

One of the required features for FTA-funded Small Starts and Very Small Starts projects is "substantial stations". There is some flexibility in the interpretation of this term. BRT stations can include shelters that are larger and more attractive than standard bus shelters. The shelters

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and other station amenities contribute to the “branding” of the project image and the public perception of the BRT as a high-quality form of transit. By being highly visible, the stations also contribute to public awareness of the BRT alignment.

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Features of BRT Stations/Stops

A variety of features can be incorporated into BRT stations. The following list should be considered as a “menu” from which items can be selected depending on the project’s budget or quality goals:

- “Substantial” station structure (mandatory project element, usually architecturally designed) typically having seats and space for wheelchair users
- Ticket vending machines. This feature has several benefits for the BRT system: pre-paid fares result in significantly faster boarding and reduced running times, customer convenience is enhanced by the ability to accept credit/debit cards or make change, and the presence of fare vending machines adds to the overall impression of a rail-like customer experience
- “Next Bus” announcement displays, based on data from an Automated Vehicle Location (AVL) system, advising passengers of the waiting time until the next bus will arrive
- Passenger information displays or kiosks, including transit information or maps of the surrounding community
- Ticket validation devices, if required by the fare collection system
- Landscaping and/or trees may be included, especially where shade is needed
- Increased curb height to allow for level boarding (floor of bus is approximately level with the platform area).
- Curb popouts the width of the parking lane, to move the curb line out to the edge of the right-hand driving lane or transit-only lane. This allows the bus to stop at the station without pulling over, and to move forward after boarding without having to merge into traffic. The construction of curb popouts also affords an opportunity to transition to a higher curb face if level boarding is being used. Curb popouts also provide extra space for the station facilities.
- Station signage, with lettering large enough to be legible from inside the vehicle
- Accessible boarding area that complies with the Americans with Disabilities Act guidelines
- A separate boarding area for local buses. Local buses should not stop at the BRT platform if possible because they usually lack provisions for expedited boarding and could delay the BRT vehicle.
- Pedestrian access enhancements in the surrounding area, such as improved crosswalks, enhanced sidewalks, or additional curb popouts beyond those used for the station

Where BRT vehicles stop at larger transit centers, they should still have a special boarding area with enhanced signage to reinforce the branding of the project.

Issues to be addressed in the design of BRT stations include:

- Drainage issues associated with the curb popouts, since these typically block the gutter
- Utility relocations, especially where underground utility lines may be in conflict with proposed shelter locations
- Visibility of businesses and their signage may be an issue where stations are located in front of existing businesses
- Pavement elevations and grading require careful attention especially where increased curb heights are being used adjacent to existing zero-setback storefronts sometimes found in business districts

Types of BRT Stations and Proposed Application within BRT Corridor

Even along a BRT corridor each station or stop has unique characteristics, from the type of passenger to the number of passengers using the facility. Again, building on the theme of flexibility with BRT components, stations can be defined as basic, moderate, and high level station improvements—the key is to build in the flexibility with the initial design to ensure that a basic station can eventually be upgraded to a high level station as demand dictates. Also, station design should provide both continuity along the BRT corridor and distinguishable features

reflecting the character of the surrounding community. The consistent recognizable style of the stations is a key element of system branding and public awareness of the alignment. However, many systems choose to also include some form of public art or other unique element at each stop to tie in to neighborhood themes.

The following “basic”, “moderate”, and “high” investment descriptions are point of reference in a wide range of investment possible at stations. Certain elements once, included at one station should be implemented across all stations, such as “next bus” display technology. The level of investment at stations should be consistent along a corridor with variations for higher demand stations where additional investment to accommodate that demand may be necessary—for example, downtown Fresno or Cedar Avenue near the University Medical Center campus.

Basic stations—provide a minimum level of amenities, including a substantial BRT shelter and BRT signage, plus essential station elements such as new paving, trash and recycling receptacles, way-finding signage, landscaping, and ticket vending machines (assuming off-board fare collection). Basic stations are recommended for stations integrated into existing sidewalks without a popout.

Moderate stations—provide a broad range of amenities and station elements, including a substantial BRT shelter and BRT signage, upgraded paving, trash and recycling receptacles, real-time traveler information system, way-finding signage, landscaping, additional seating and lighting outside of the shelter, and ticket vending machines. Moderate stations may include an additional shelter unit for larger passenger volumes. Moderate stations are recommended at locations where popouts are used and for stations located along segments of BRT-dedicated lanes or where passenger volumes exceed the capacity of basic stations.

High investment stations—provide the highest level of amenities and station elements specifically targeted to locations with the highest ridership and high visibility (such as downtown Fresno). Amenities and elements include BRT shelter (possibly two units), BRT signage, and a full range of elements in addition to those provided at moderate stations, including additional landscaping, special paving, an information kiosk, and decorative features. High investment stations are recommended for the downtown Fresno station and for stations along median running BRT segment. High investment stations should be able to accommodate over 15-20 people per vehicle arrival

5.4 Corridor Improvement Concepts

The Ventura Avenue/Kings Canyon Road BRT corridor improvement concepts facilitate convenient and passenger friendly transit services by improving transit facilities, such as BRT stations, and providing preferential treatment to transit. Travel time is key element to BRT service attracting patronage as well as helping FAX utilize their resources more efficiently. To achieve a reduction in travel time for BRT patrons along the corridor, several strategies can be employed, including:

- Traffic signal coordination
- Queue jumper lanes
- Transit signal priority or preemption
- Far-side bus stop locations (preferred) or near-side locations with countdown clocks
- Dedicated transit-only lanes
- Off-vehicle fare collection

- Level boarding and/or low floor BRT vehicles

The first five improvement categories help to reduce or even eliminate delays to transit movement associated with traffic congestion. In addition to improving the overall speed of the BRT vehicle, these measures also help eliminate variability in the travel time, resulting in more reliable service. The last two items reduce the required dwell time within stations. Savings of up to 30 seconds per station stop can be realized, resulting in an overall travel time reduction of several minutes along an entire BRT alignment.

An additional benefit of these corridor improvements results from the overall “branding” effect achieved by the combination of several measures. One obstacle to increasing “choice” ridership beyond the transit-dependent population is the fact that many potential riders are unfamiliar with the system and unaware of what services may exist that could meet their needs. Highly visible BRT facilities create a higher degree of public awareness as to where the bus routes are located and what destinations they serve. The branding of the system also contributes to a perception of higher-quality service that can be attractive to customers who currently assume the existing bus service is too slow or unreliable to meet their needs.

Traffic Signal Coordination

Traffic signal coordination is an important measure for reduction of transit travel times and improvement of travel time reliability. It also improves the overall flow of general traffic, resulting in high community acceptance and environmental benefits including air quality, noise, safety and traffic congestion. This measure has an excellent cost-benefit ratio and virtually no negative impacts on the community.

A system of traffic signal coordination typically consists of a physical connection between traffic signal controllers (conduits with wires or fiber optic cables) along the entire coordinated roadway segment. Traffic signal timing is then designed such that vehicles moving in the peak direction at or near the speed limit receive a nearly-continuous sequence of green lights. Ideally, the timing sequence is planned to also minimize delays in the off-peak direction to the extent possible.

Often one of the chief obstacles to creating coordinated signal corridors is the need to obtain cooperation from multiple jurisdictions. Where BRT lines cross city limits, a regional agreement or operating authority may be needed to take control of the signal timing and maintenance of the system. For corridors that intersect Caltrans facilities, additional coordination is required if the Caltrans signals are to be integrated into the regional system.

Queue Jumper Signals and Lanes

Queue jumper lanes are a corridor improvement element with potential to reduce running times along the corridor and improve schedule adherence. This improvement measure allows for BRT vehicles to bypass the traffic queue at the intersection and move up to the stop line. An advance signal lasting a few seconds allows buses in these lanes to move through the intersection ahead of the adjacent traffic lanes.

There are two common forms of queue jumper lanes: 1) a transit only lane between the through lanes and the right turn only lane; and 2) a shared right turn only lane with BRT vehicles exempted. The former provides BRT vehicles with an exclusive lane leading up to the stop line at the intersection. The presence of a BRT vehicle within the lane activates a transit only signal to proceed through the intersection ahead of other traffic. This type of queue jumper may require increasing the right-of-way at the intersection to accommodate the additional lane for the BRT vehicle. Since a separate lane is provided for the BRT vehicle, the system can use conventional

detector loops to alert the signal to the presence of a bus. The second form, or the shared queue jumper lane, provides a right turn signal phase to clear the queue in the lane when a BRT vehicle is detected, and allows BRT vehicles to use the right turn lane to avoid the traffic queue and obtain a transit-only signal to pass through the intersection. This alternative requires some form of signaling device such as an optical transmitter to alert the signal to the presence of a bus (see further discussion below under Transit Signal Priority). This second type of queue jumper is often less costly (due to reduced right-of-way requirements) but also somewhat less effective since the BRT vehicle still must wait behind vehicles making a right turn.

Queue jumper lanes are also a very effective marketing and branding tool due to their physical presence at the intersection—more so when BRT vehicles are seen using the lane to bypass the traffic congestion. This serves to reinforce public awareness of the BRT route location as well as enhance public perception of BRT as a rapid form of transportation.

Transit Signal Priority or Pre-emption

Transit Signal Priority (TSP) is a technique that reduces travel delays for transit vehicles due to red signals. The most common form of TSP, known as “green time extension,” consists of traffic signal modifications which allow the signal controller to recognize the presence of an approaching bus. If the signal is currently green but about to turn red, the controller adds a few seconds of extra green time to allow the bus just enough time to move through the intersection. There are a number of variations of this concept, including shortening the red time when a bus is already stopped at a signal. In headway based systems, another variation involves controllers capable of determining whether the approaching bus is running on time or late, and giving the TSP advantage only to late-running buses.

The highest level of transit priority would be full pre-emption, in which the signal automatically turns green for all approaching buses. In practice this is seldom used due to the severe impact on other traffic as well as issues with pedestrians who may be in the middle of a crossing.

Several forms of technology can be utilized in TSP systems to allow the controllers to detect approaching buses, but the most common type is optical strobe systems such as the Opticom system. Traffic signal systems along the corridor must have appropriate detector hardware and controller firmware to be able to recognize and respond to the approaching transit vehicle, and for older systems this usually requires an upgrade of the existing equipment. In addition, if similar optical systems are already in use in the area for emergency vehicle pre-emption, then all signals within line-of-sight of the transit line must be upgraded to allow them to distinguish transit vehicles. This system also requires all BRT vehicles to be outfitted with emitters.

Far-side Bus Stop Locations or Near-side Locations with Countdown Clocks

To maximize travel speeds, the preferred location for BRT stations is on the “far side” of intersections; in other words, allowing the bus to stop after passing through the intersection rather than before. This allows the BRT vehicle to take advantage of coordinated green signals and TSP as described above before making a stop. By comparison, at near-side stations a bus may stop to load passengers while the signal is green, only to have the signal turn red just as the bus is ready to move. An additional disadvantage of near-side stations is potential conflicts with right-turning vehicles which must turn directly in front of the stopped bus.

In spite of the preference for far-side stations, there are some locations at which local conditions dictate a near-side stop. Examples include locations where there is a major traffic generator on the near-side corner (such as the University Medical Center at Cedar Avenue and Ventura Avenue), or where right-of-way conditions or obstructions make it impractical to locate the

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station on the far side. In these cases, the use of a countdown clock is recommended. This is a digital display showing the number of seconds remaining in the red signal. This allows the driver to prepare for immediate departure and to move forward to the stop line. In many locations, this function can be served by countdown-style pedestrian walk signals.

Dedicated Transit-Only Lanes

Dedicated transit-only lanes provide the highest degree of priority to BRT vehicles, with a correspondingly higher cost. There are three major categories of transit-only lanes:

- Median-running transit lanes, see **Figure 5.11**
- Side-running transit lanes (along the right side of arterial streets), see **Figure 5.12**
- Grade-separated transit lanes

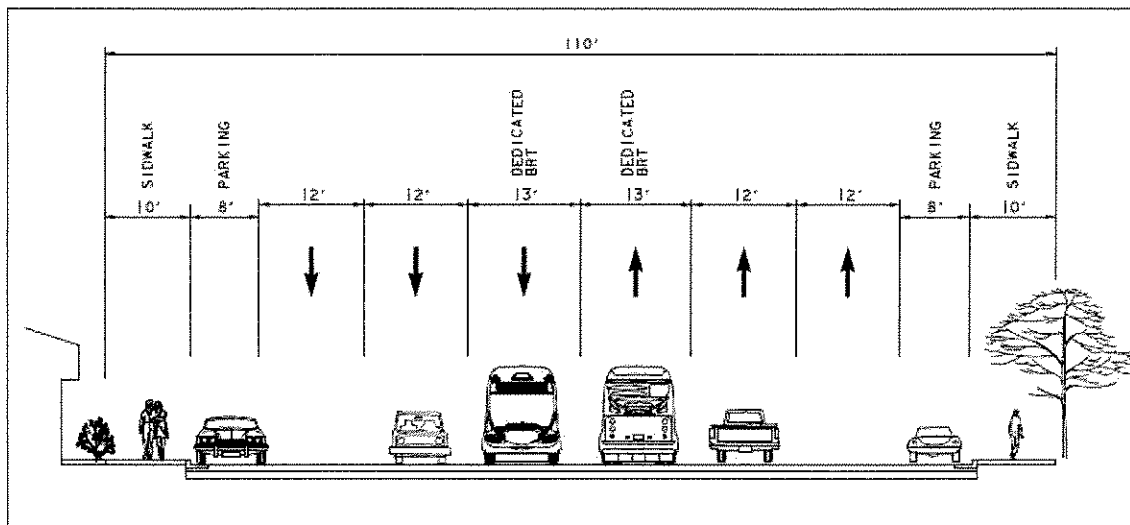


Figure 5.11: Median Running Transit Lanes Typical Section

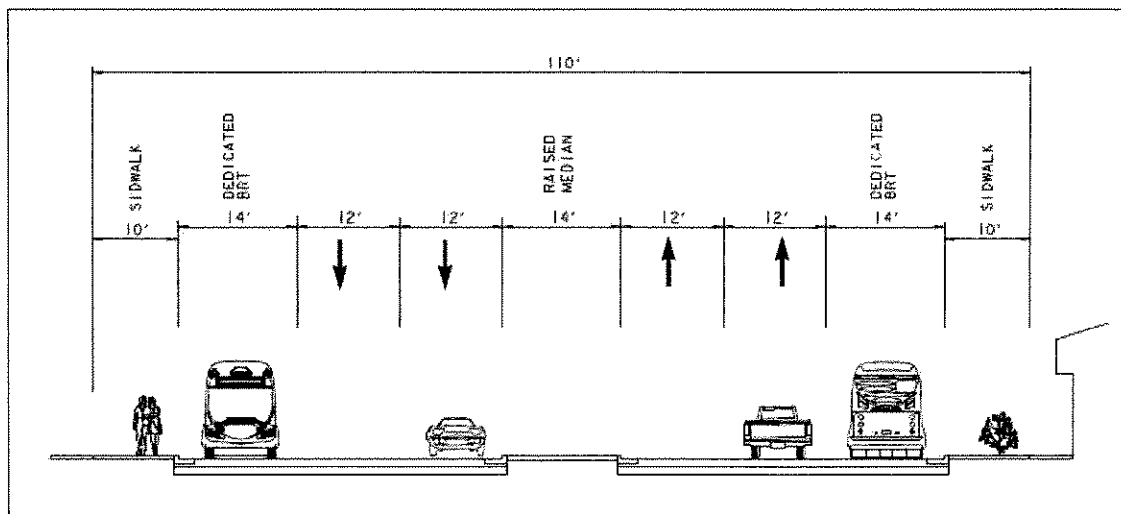


Figure 5.12: Side Running Transit Lanes Typical Section

Each of these concepts has advantages and disadvantages, and each segment must be assessed individually to select the most advantageous option. The advantages and disadvantages of median and side-running lanes are summarized in Table 5.1.

Table 5.1: Transit-Only Lane Advantages and Disadvantages

Advantages

Disadvantages

Side Running Transit Lanes

- | | |
|---|---|
| <ul style="list-style-type: none">▪ Easier to co-locate BRT stations with local bus stops, since local buses already use the right lane. Transfers are facilitated.▪ Allows use of standard vehicles with right-side boarding.▪ Stations are located outside the traveled way; patrons may feel safer waiting at the side of the road near pedestrians and businesses, rather than in the center of the road.▪ Lane is shared with local bus services. | <ul style="list-style-type: none">▪ On-street parking, if it remains, will partially conflict with bus movements.▪ BRT lane is interrupted by right-turning vehicles at intersections.▪ Requires two separate stations at each stop (one for each direction) and therefore greater infrastructure cost than “center” (or single) median stations. Infrastructure costs are similar or somewhat less than median transitway with side median (or two) platforms. |
|---|---|

Median Transit Lanes

- | | |
|---|---|
| <ul style="list-style-type: none">▪ More efficient use of space at stations, since buses can board from both sides of a single center platform.▪ Eliminates conflicts with right turns, parking maneuvers, and bicycles. Easier to implement completely dedicated transit lanes, as opposed to shared lanes with general traffic.▪ Single “center platform” station serves both directions of travel, station costs are lower for both initial construction and ongoing maintenance. However, left side boarding and alighting buses are required.▪ Double platform “side median” stations can be served with conventional right side boarding and alighting buses.▪ May be more acceptable to the business community, since stations are not located in front of businesses. | <ul style="list-style-type: none">▪ Requires contra-flow configuration with buses traveling on the left side of the centerline, unless specialized left-boarding vehicles are used.▪ Depending on available space, may require reduction or elimination of landscaped medians.▪ Requires all patrons to make a street crossing to reach the station or to connect from local buses.▪ Have higher construction and maintenance costs than a single “center platform” and similar or somewhat more than side running transit lanes and stations.▪ Typically, the existing median width is already being used for left-turn pockets. The median transit lane would either remove the left-turn lane or relocate it. Removal of the left-turn lane would cause backups and safety concerns in the through lane. Left turns across a transit lane can cause line-of-sight difficulties and safety issues. Some left-turn lanes may need to be closed, which would concentrate access at fewer intersections. |
|---|---|

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Grade separated transit guideways are by far the most costly type of transit-only lane, and are normally only employed in isolated locations where a significant travel time savings can be gained. Additional considerations, where stations are to be elevated or below grade, include pedestrian access, emergency egress, and security must be given special consideration since the stations lack the direct access and visibility associated with street-side stations.

Off-vehicle fare collection

In addition to physical improvements along the corridor, running time can also be improved through incorporation of systems to reduce vehicle dwell time at stations. An example of this is off-vehicle fare collection in which the on-vehicle farebox is eliminated and replaced with one or more measures for collecting pre-paid fares. The travel time savings result from the faster boarding that occurs by eliminating on-board fare payment at the entry door. The exact time savings vary depending on passenger volumes and the specific methods used, but savings on the order of 15 to 30 seconds per stop could be anticipated.

Several methods can be used to accomplish off-vehicle fare collection:

- Standard monthly passes are a form of off-vehicle fare collection. They require no new investment since the distribution network already exists.
- Ticket vending machines (TVMs) at the BRT stations allow patrons to purchase a ticket before boarding. An advantage of this system is that it allows the use of credit or debit cards, eliminating the barrier to ridership that results from the requirement for customers to have exact change. This can be highly attractive to “choice” riders. The cost of installing TVMs is significant (on the order of \$50,000 or more per machine). In addition, a communications system is required, including a central processing center and either a fiber-optic or wireless link to each station to transmit payment data. This system also requires additional operating costs due to the need to service the machines and collect cash. These costs can be partially offset by increased ridership and ticket sales. The availability of TVMs also adds to the image of the BRT system as a “rail-like” form of transit.
- Another method is the use of “smart cards”, which are proximity cards containing embedded computer chips for processing fare information. These cards can be sold at retail distribution locations, through mail order, or via TVMs. In a BRT application, the vehicle typically would have a validation device near the entry (or entries), allowing passengers to simply tap their card on the reader without stopping as they walk onto the vehicle. The decision to implement a smart card system is a significant investment with benefits and costs affecting the entire transit network; it would not be implemented solely for a single BRT line.

All of the above off-vehicle fare collection methods involve a decision by the agency regarding whether or not multiple door entry is desired. Using all available doors for entry provides the fastest boarding time by allowing passengers to disperse themselves to multiple entry points rather than forming a single queue at the front door. However, this usually requires roving inspectors to check for fare compliance, which adds to operating costs. The alternative is to require all passengers to enter through the front door, which allows the driver to check for fare compliance but with a penalty of somewhat longer boarding times.

Level Boarding and/or Low Floor Buses

The use of level boarding and/or low-floor buses can also reduce station boarding time by about 20 percent compared to standard high-floor vehicles, and in addition is a required project feature for any system wishing to utilize FTA Small Starts or Very Small Starts funding. Level boarding usually involves constructing new curbs at the station site that are somewhat higher than standard curbs (from eight to 14 inches is typical) so that the elevation of the boarding platform is nearly

level with the floor of the entry door on the vehicle. This facilitates entry by able-bodied passengers, but wheelchair users may still require a ramp to be extended to the platform. Use of a lift is usually not necessary in a level-boarding configuration since the elevation difference is small. Most contemporary buses that do not have stairs at their entries could be classified as “low-floor” buses.

Other features can be incorporated in vehicles or stations to further improve the walking surface at entry doors. These include magnetic, optical or mechanical guidance systems to maneuver the vehicle as close as possible to the curb. These measures add cost to the system, but the most sophisticated installations may achieve ADA-compatible bus access without the use of ramps.

5.5 BRT Vehicles

BRT vehicles can be an important element in increasing ridership, system performance, and mitigating environmental impacts. Propulsion systems impact revenue, service times, emissions, and operating and maintenance costs. Seating arrangements, floor height, and door configuration impact dwell time at stations, BRT travel time, and passenger comfort. Physical vehicle size; aisle width; and the number, width, and arrangement of doors influence BRT system capacity. Also, as mentioned in Chapter 3, BRT vehicles can be the primary marketing device in attracting the “choice” rider in Fresno.

Because BRT vehicles are “rubber-tire” technology, the BRT system has some flexibility as to the type of vehicles that are used throughout the system. For example, peak hour conditions may require articulated buses similar to the NABI 60' BRT Vehicle (see **Figure 5.13** – NABI 60' BRT Vehicle with FAX branding), which can carry more passengers than the standard 40' bus or a combination of articulated and standard buses. Off-peak service may be better served with a 40' bus when the demand is not as great. However, procurement of two separate fleets—for peak and off-peak service—is not recommended and service should be designed to maximize the use of the available bus fleet.



Figure 5.13: NABI 60' BRT Vehicle with FAX Branding

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Source: Provided by NABI USA

The Ventura Avenue/Kings Canyon Road Corridor offers an example as to how incremental increases in service frequency and vehicles can better serve a community. For example, the corridor is currently contributing a large portion of the 8,000 riders on Route 28, which operates with 40' buses on 15 minute peak headways. Upon implementation of BRT service within corridor, the demand can potentially be served with 40' BRT vehicles or 60' BRT vehicles at 10 to 15 minute frequency with a reduction in frequency to the local service to better correspond to the adjusted demand.

For the Ventura Avenue/Kings Canyon Road Corridor implementation, it is recommended that FAX design as much operating flexibility as possible upon initial implementation of a BRT system. Articulated BRT vehicle 15 minute frequencies for Route 28—at the time of implementation—is suggested. The 60' articulated BRT vehicles have shown their appeal to many Fresno residents. They are an icon on the road that would not be overlooked, and would provide FAX operating flexibility from the beginning of BRT operations.

5.6 Probable Operating and Capital Costs

Based on the above recommendations on corridor and station improvements, estimates of probable costs were developed for the Ventura Avenue/Kings Canyon Road Corridor.

5.6.1 Operating Cost Estimates

For weekday service it was assumed that the BRT service will follow the FTA funding guidelines of 10 minutes headways in the peak hours and 15 minutes in the off-peak. Weekend service is assumed to be every 15 minutes all day. This level of operating service provides a high level of service that may not be necessary at the commencement of BRT service but can be considered an operating goal in the short term (i.e. within three to five years). Frequencies and time periods are assumed as follows:

Weekdays

- Every 10 minutes from 6:30 AM to 9:30 AM and 4:00 PM to 6:30 PM
- Every 15 minutes from 9:30 AM to 4:00 PM and 6:30 PM to 10:30 PM

Weekends

- Every 15 minutes from 6:00 AM to 10:00 PM

Assuming an overall cycle time for a Fancher Creek to Downtown Fresno BRT line of 50 minutes³, the five peak buses are required. The BRT corridor would be served by approximately 150 bus trips (75 roundtrips) on weekdays and 130 bus trips (65 roundtrips) on weekends. This level of operating service translates to approximately 21,800 annual operating hours. Assuming a high estimate for fully allocated operating cost of \$90 per hour, the annual operating cost for the 7-mile, 7-station BRT corridor is expected to be approximately \$2,000,000—see Table 5.2.

³ Using a conservative estimate of 20 minutes of one-way travel for a 7-mile trip (average speed of approx. 20 mph over the corridor) with an addition of 10 minute recovery time at the end of the cycle.

Table 5.2: Operating Cost Estimate

Service	Approx. # of Roundtrips	Service Hours	Cost per Service Hour	Cost for Service Period
Weekday	80	15,800	90	\$1.4 million
Weekend (& Holiday)	65	6,000	90	\$0.6 million
TOTAL		21,800	90	\$2.0 million

5.6.2 Capital Costs Estimates

Capital costs have been broken into three levels of investment that are similar to the running way and station descriptions given in earlier sections of Chapter 5—with vehicles procurement as a separate capital cost since it remains constant across the three levels of investment. Using general cost estimates for BRT elements from the Federal Transit Administration and other Kimley-Horn BRT projects across California, the following are station and corridor improvement cost estimates for the three levels of investment and the anticipated capital cost for procuring BRT vehicles.

Corridor Improvement Estimates

Transit Signal Priority (Cost per signalized intersection) – Implementation of TSP can cost approximately \$25,000 per intersection, which includes the detection equipment and modifications to the traffic controllers.

Side Running Dedicated Lanes (Cost per corridor-mile) – Implementation of side running dedicated lanes has varying costs on different portions of the Ventura Avenue/Kings Canyon Road Corridor. In the segment of the corridor where the right-of-way is wider and includes on-street parking, side running dedicated lanes can be created by removing the parking and re-striping the road—i.e. no right-of-way increases for the BRT. This cost for striping a dedicated lane without colored asphalt is approximately \$300,000 per mile. The addition of a colored asphalt overlay would increase the total per mile cost of dedicated lanes to approximately \$500,000 per mile. The typical section for side running dedicated lanes is shown in **Figure 5.11**.

Median Running Dedicated Lanes (Cost per corridor-mile) – Implementation of median running dedicated lanes results in substantial increases in costs mostly due to reconstructing the road and the addition of stations within the roadway. The cost range for median running lanes—including the footprint for stations—can range between \$3 million per mile to \$10 million per mile not including increases in right-of-way. For Ventura Avenue east of Winery Avenue where the right-of-way is wider than portions to the east, assuming that median running dedicated lanes are the appropriate running ways, the right-of-way increase would be approximately 12' feet between stations and 22' feet at stations. This could cost between \$15 million and \$20 million per mile because the increase may require acquisition of the street fronting properties. The typical section for median running dedicated lanes is shown in **Figure 5.12**.

BRT Station Cost Estimates

Based on the station descriptions above, Tables 5.3 summarizes the approximate cost for a BRT station with typical elements of a BRT system (a station is defined to cover the BRT station facilities in both directions of operation). Other items were included in the cost estimate as follows:

- **Demolition** – This line item includes removing pavement/sidewalk, curb-and-gutter, existing striping or street markings, signage at station location, and landscaping in order

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to provide physical improvements to accommodate the BRT stations and their amenities. For example, the existing curb may be only 6" in height while a BRT station would need elevated curb in order to provide level boarding.

- Utilities and Drainage Modifications – This line item is intended to quantify the modifications to storm drain systems, utility pipes or structures, and electrical services. These costs are site specific and can vary greatly depending on the design of the BRT facilities and the existing conditions.
- Street Improvements – These improvements encompass curb and gutter, pavement, and landscaping (two trees per station, one on each side).
- Sidewalk / Pedestrian Improvements – BRT stations will likely require improvements to pedestrian facilities such as sidewalks, curb ramps, and cross-walks to provide a higher quality pedestrian environment for BRT patrons and the community surrounding the station.
- Traffic Control – The item accounts for impacts to traffic and pedestrians during construction.
- Communications and Electrical Service – Accounts for the provision of communication and electrical service to the station shelters for ticket vending machines, lighting, and the next bus signage.

Elements can be reduced or removed—and consequently the cost—based on the goals of the BRT system.

Table 5.3: BRT Station Cost Elements

BRT Station Cost Elements	Qty		Approx. Unit Cost	Element Cost
BRT shelters	2	EA	\$120,000	\$240,000
PCC pavement at BRT stop	1,200	SF	\$12	\$14,400
Station lighting (lump sum per station)	2	EA	\$8,000	\$16,000
Station paving	2,000	SF	\$13	\$26,000
Detectable Warning Strip	320	SF	\$30	\$9,600
Concrete pad for local bus stop (inc. AC removal)	2	EA	\$10,000	\$20,000
Smart card readers	2	EA	\$5,000	\$10,000
Ticket vending machines	2	EA	\$65,000	\$130,000
Bike Rack	2	EA	\$500	\$1,000
Trash Receptacles	2	EA	\$400	\$800
Next-bus signage and electronic equipment	2	EA	\$3,000	\$6,000
Photovoltaic system	2	LS	\$10,000	\$20,000
Communications cabinet	1	EA	\$10,000	\$10,000
Kiosk - Community Information	2	EA	\$35,000	\$70,000
Variable message signs	4	EA	\$4,500	\$18,000
Demolition	1	LS	\$40,000	\$40,000
Utilities & Drainage Modifications	1	LS	\$30,000 - \$100,000	\$30,000 - \$100,000
Street Improvements	1	LS	\$30,000	\$30,000
Traffic Signal Modifications	1	LS	\$100,000	\$100,000
Sidewalk / Pedestrian Improvements	1	LS	\$10,000- \$25,000	\$10,000- \$25,000
Traffic Control	1	LS	\$50,000	\$50,000
Communications and Electrical Service	1	LS	\$60,000	\$60,000

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Subtotal				~\$900,000- \$1,000,000
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Corridor improvements are elements proposed across the entire corridor such as a traffic signal interconnect, installation of Opticom hardware and software, or restriping/construction of transit-only lanes along portions of the corridor. The last item is not proposed as part of Ventura Avenue/Kings Canyon Road Corridor at this time.

Table 5.4: BRT Corridor Improvement Cost Elements

Corridor Improvement Cost Elements	Qty		Approx. Unit Cost	Element Cost
Traffic Signal Coordination	1	LS	\$120,000	\$240,000
Opticom Sensors and Controllers	23	EA	\$25,000	\$600,000
Subtotal				~\$900,000

BRT Vehicle Costs

Assuming the operating service levels will be as described in the previous sections, the peak hour vehicle requirement would be five BRT vehicles. An additional two buses for spares is recommended for a special fleet (e.g. unique vehicle with specialized branding) brings the total anticipated BRT fleet requirement to seven BRT vehicles. The following table shows the cost of acquiring either 40' or articulated 60' BRT vehicles.

Table 5.5: BRT Vehicle Costs

BRT Vehicle	Qty		Approx. Cost	Total Vehicle Cost
60' Articulated BRT Vehicles	7	EA	\$1,000,000	~\$7,000,000
40' BRT Vehicles	7	EA	\$500,000	~\$3,500,000

5.6.3 Probable Cost for Proposed Ventura Avenue /Kings Canyon Road Corridor

Based on the recommendations above for both station and corridor improvements, the following estimates are aggregated to determine the "order of magnitude" costs for initial implementation of BRT on Ventura Avenue/Kings Canyon Road corridor.

Table 5.6: Preliminary Costs for Proposed Stations

STATION	Probable Cost
Fancher Creek Commercial Center Station	\$ 900,000
Fancher Creek Town Center Station	\$ 900,000
Clovis Avenue Station	\$ 900,000
Peach Avenue Station	\$1,000,000
Winery Avenue Station	\$ 900,000
Cedar Avenue Station	\$1,000,000
1 st Street Station	\$ 900,000
Downtown Fresno Station	\$1,000,000
Probable Station Cost Estimate	~\$7,500,000

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Table 5.7: Preliminary Corridor Improvement Costs

CORRIDOR	Recommended Investment – Long Term 5+ years	Distance /Intersections	Probable Cost
Fancher Creek Interior	Dedicated Lane (One-way)	1 mile	\$1,000,000
Kings Canyon Road between Fowler Avenue and Winery Avenue	4 Queue Jumper Lanes @ Approx. \$100,000	4 intersections	\$ 400,000
Traffic Signal Upgrade for TSP	23 Intersections		\$ 600,000
Probable Corridor Cost Estimate			~\$2,000,000

Table 5.8: Preliminary Capital Cost Estimate

VENTURA / KINGS CANYON BRT PROJECT with Dedicated Lanes on Ventura Avenue between 1st St & SR-41	Probable Cost
Stations	\$7,500,000
Corridor Improvements	\$2,000,000
Central Control (AVL, Fare Collection and Next Bus)	\$2,000,000
<i>Subtotal Construction plus 25% Contingency</i>	<i>\$14,375,000</i>
Environmental Documentation and Design	\$2,875,000
Right of way acquisition inc. prof. fees (assumed value)	\$2,000,000
Final Design @ 12% of Construction inc. contingency	\$1,725,000
Plan Check Fees @ 2% of Construction inc. contingency	\$287,500
Construction Management @ 12% of Construction inc. contingency	\$1,725,000
Administration @ 10% of Construction, Contingency, Engr. & CM	\$2,070,000
Probable BRT Implementation Cost Estimate w/o Vehicles	~\$25,000,000
Probable BRT Implementation Cost Estimate w/ Vehicles	~\$32,000,000

5.8 Next Steps for BRT Implementation

FAX and the COFCG continue to work with the Technical Advisory Committee (TAC) and the local community to receive input on the project issues, develop guidelines for the BRT Master Plan and prepare an implementation plan for Ventura Avenue/Kings Canyon Road Corridor.

The following are next steps recommended to implement a BRT corridor within the next three to five years:

1. *Update Regional Transportation Plan:* Begin process to update the Regional Transportation Plan (RTP) for COFCG to include the Ventura Avenue/Kings Canyon Road, Blackstone Avenue, Cedar Avenue, and Shaw Avenue corridors for BRT implementation over the next 3 to 10 years. These corridors have demonstrated substantial ridership and are the corridors with the largest potential for success in both the short- and long-term. Additional corridors defined in Chapter 4 can be added by COFCG and FAX to the RTP after the implementation and evaluation of the first corridor implementation.

2. *Initial Contact with FTA:* Section 6.3 below describes the federal funding programs that may be available to provide capital development funds for one or more BRT lines. In order to retain eligibility and improve the region's prospects for such funding, it is desirable to begin discussions with FTA staff early in the project development process. FTA staff members can often provide helpful guidance on the most recent FTA policies and guidelines which can help local agencies avoid delays or unnecessary issues in the subsequent grant application process.
3. *Perform Alternatives Analysis and Initial Environmental Assessment:* Assuming that FTA funding is desired, it is essential that the early phases of implementation be carried out in accordance with FTA policy. Several volumes of guidance have been issued and recently updated by FTA, providing current information about these policies. Because these documents are revised frequently, it is advisable to maintain regular communications with FTA staff members to ensure the most current approach is being followed. In general, however, it is important to note that the alternative analysis process must be carried out in strict conformance with FTA guidelines, which are coordinated with NEPA requirements. A key point is that the development of project alternatives must not proceed prematurely to a level of completion that could be seen as prejudicing the comparison of project alternatives under NEPA. However, initial environmental assessments should be performed early in the process since the initial application for FTA funding must contain information about the project's impacts and an assessment of the appropriate environmental approval document. Also, depending on the type of FTA funding, the ridership estimation as part of the alternatives analysis may require significant refinements to the COFCG transportation demand model.
4. *Public Outreach:* A project that can demonstrate a strong level of public support will have a higher probability of achieving FTA funding. Therefore, some level of public involvement in the planning process can be helpful. A public workshop to introduce the completed BRT Master Plan would be an example of an appropriate step. Another necessary step is to obtain evidence of official approval of the decision to move forward with the selected BRT line as the first stage of system implementation. This could be in the form of an ordinance enacted by the Board of COFCG approving the Master Plan and identifying a specific corridor for initial implementation.
5. *Develop Funding Plan:* At the conceptual development stage, an initial operating plan should be prepared. The plan should identify capital and operating costs, service levels, and any system adjustments or cost saving opportunities that would arise from project development. The application for FTA funding will need to include complete cost breakdowns using FTA's Standard Cost Categories as well as sufficient evidence that the agency has adequately accounted for project costs and has sufficient resources to construct and operate the system. Three years of audited financial statements will be required to accompany the application.
6. *Prepare Application for Small Starts or Very Small Starts Funding:* The application consists of a set of documents providing required information to FTA to begin the process of seeking grant funding. The application process also allows the project to be "rated" (i.e., given a priority ranking by FTA) and entered into the "pipeline" of projects awaiting FTA approval to enter Project Development (PD). FTA considers "preliminary engineering" to be a component of Project Development, and therefore it is important to limit design activities to the very conceptual level prior to obtaining permission to enter

PD. After receiving this permission, subsequent PD and design activities may be partially cost-reimbursable.

7. *Environmental Documents and Design:* The appropriate environmental process varies depending on the extent of impacts. Transit projects in California would in most cases require both NEPA and CEQA documentation, assuming that federal funding is used. Some BRT projects have been allowed to use the less-rigorous forms of environmental documentation under NEPA/CEQA, such as Environmental Assessment/Mitigated Negative Declaration. Some projects have been granted Categorical Exclusion (CatEx) status and a basic level of investment within the corridor may be able to obtain a CatEx. Preliminary engineering and final design should proceed only after approval has been granted by FTA.
8. *Branding and Marketing:* In general, these efforts occur later in the development process. During the Project Development process, public relations activities and public involvement can be used to build public support, enthusiasm, and overall awareness of the system.

Chapter 6 – Funding Mechanisms for Implementing BRT

BRT and other transit enhancements generally involve increased investment and therefore funding plans are essential for their successful implementation. The distinction between capital and operating costs is very important. Not only are funding sources often focused on one or the other, but operating costs are annually reoccurring costs whereas capital costs are often one time costs.

The broad mission for transit in Fresno is to increase mobility, without increased dependence on the private auto mode. Three actions are needed to accomplish this purpose:

1. Increased frequency of transit services that will be needed to make service sufficiently convenient to attract choice riders will cost more money to provide and therefore additional local funds need to be identified. It is unlikely that more state and federal monies will cover anything more than proportional population increases.
2. New development needs to be encouraged to locate along existing major transit corridors, including in the downtown area. This will help to maximize the number of local trips that can be easily served by transit, with little to no increase in transit costs. Adding transit fees to developments along identified principal transit corridor will discourage rather than encourage this form of smart growth.
3. Subsidies for automobile use need to be reduced or eliminated. Requirements for developers to provide off street parking result in very large subsidies in the form of free parking. Parking is not free to provide and therefore zoning ordinances that mandate free parking lead to auto use subsidies.

Funding expanded or higher quality transit services therefore needs to provide a revenue stream for operating subsidies and capital costs, but respect the overall mobility mission that looks for coordination between land use development and transit services. Developers should not be penalized (taxed) for locating in principal transit corridors or within the core area of FAX service. At the same time additional monies need to be gathered to fund desired transit improvements. ***So the issue becomes how to raise funds for transit improvements without discouraging developers from locating along "smart growth corridors".***

The approval process for the Fancher Creek Development included a requirement to fund this present BRT Master Plan Study and specifically to:

“address Urban Growth Management Transit ("UGMT") Districts, an ordinance establishing "UGM Transit Districts," or similar form of district, one of which would encompass the southeast portion of Fresno, including the Fancher Creek development. The purpose of the UGM Transit Districts shall be to collect fees to pay for the costs of transit facilities within each UGM Transit District. No portion of the fees collected shall be used for transit facilities outside of the UGM Transit District generating the fees; however, proportional shares from all UGM Transit Districts may be used to fund any capital aspect of the BRT system that has a city-wide benefit. Fees shall be imposed on all new development in each UGM District, including but not limited to the Fancher Creek development. Payment by developers, including but not limited to Fancher Creek,

shall not commence unless and until the UGM Transit Districts and fees are approved by the City Council.”

Chapter 6 begins with a discussion of funding needs and is followed by a description of funding sources (local, state and federal) and concludes with recommendations.

6.1 FUNDING NEEDS

Capital costs for FAX and other transit agencies typically include cost of obtaining and maintain the fleet and passenger facilities. FAX’s capital improvement program for FY06 through FY10 is estimated to cost \$45.6 million and focuses on the following projects:

- Replacement, expansion, and retrofit of fleet (40’ buses),
- Replacement of Handy Ride and non-revenue vehicles, and
- Passenger amenities and facility upgrades,

Thus, the average capital costs over the next five years will be about \$9.1 million, of which the local match requirement (for federal funds) will be about 25% or \$2.3 million annually.

Based on the 2005-2010 SRTP estimates for operating costs, FAX’s primary costs in FY07 will be generated by employee services (62%) and operations, maintenance, and training (16%) associated with its fixed route operations. In 2004, Handy Ride operations accounted for 11.5% of the District’s operating costs, a percentage that has been on the rise since it became part of the Transit Division’s farebox calculation in 1980.

In FY07, revenues to fund these operating costs are anticipated to be generated primarily through passenger fares, federal funding, and state funding sources. Figure 6.1 shows an anticipated breakdown of these sources for FY07. For FY 2007/08 annual operating costs are estimated to total \$33.7 million. Fares are anticipated to cover \$11.0 million of this total, leaving a subsidy of \$22.7 million to be covered by the public. The federal government is being looked to for \$6.6 million, the state government for \$13.7 million. Measure C would provide about \$1.4 million. No monies are being looked for from the general fund or private sector interests. Increases in operating subsidies above current levels would need to come from local public and private sources.

Broadly, the total publicly subsidized annual costs for providing transit services in Fresno is about \$31.8 million of which nearly \$9.1 million (25%) is capital cost and \$22.7 million (75%) is operating subsidies. A “rule of thumb” therefore is that for every dollar of annual operating subsidy another 40% should be allowed to cover capital cost. Of this capital cost, some will be covered by federal and state funds suggesting that local funds for capital are needed to cover a surcharge of 10% of the annual operating subsidy for added service.

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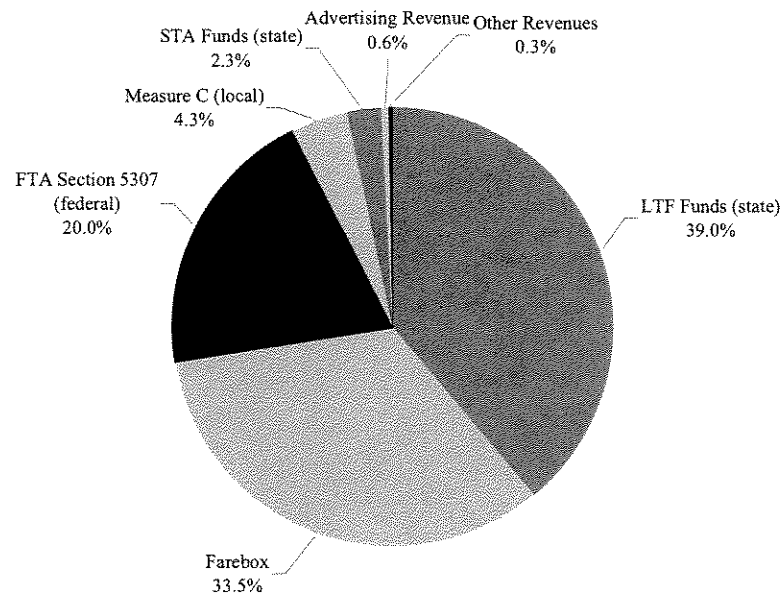


Figure 6.1: FAX's Operating Revenue Breakdown (FAX 2005-10 SRTP - Estimated FY07)

Local transit funding needs are primarily oriented to operating subsidies, rather than capital dollars. Future needs associated with increased investment in transit services will likely be linked both to service area wide improvements and also to project/corridor specific improvements (like BRT in the Kings Canyon corridor).

Service Area-wide Improvements

Most federal and state funding for transit will increase proportionally with population and sales tax increases. Thus, the future funding gap somewhat can be defined by the difference between the current per capita spending for transit in 2008 dollars versus the future per capita spending for transit associated with improved transit services. Additional investment in transit services will be needed to attract "choice riders" and increase transit's capture of the local travel market. With an annual operating subsidy of \$22.7 million and a local annual capital cost of \$2.3 million and a population of about 428,000 persons within the FAX coverage area, the current annual transit cost per capita is \$50 (excluding federal and state capital subsidies).

As described in Chapter 1, the FAX coverage standard is for 90% of population is within one half mile of 60 minute bus service and also provide complementary para-transit services to this population. Any population or other development that is not within one half-mile of a transit route will add transit operating and capital costs. The more fringe areas of the current service area also tend to require higher subsidies than core parts of FAX's service area. Addition of population and employment within FAX's core service area, rarely results in increased operating or capital costs and sometimes even provides more farebox revenue. Lastly, as bus routes need to be lengthen beyond a 30 minute bus running time from downtown (about 5 miles), bus subsidy costs tend to increase disproportionately. These increase subsidy costs for fringe area service (greater than five miles from downtown) relate to the increased requirement for faster services that are needed to attract "choice riders". ***Bottom line is that costs associated with development in the core service area and corridors tends not to increase operating and capital cost, while development beyond current service areas, substantially increase all costs.***

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Project/Corridor Improvements

Some major investment projects and transit investment elements specific to individual development projects have yet to be defined costs. The proposed Kings Canyon BRT project for example is estimated to involve capital costs of about \$35 to \$37 million and annually operating costs of \$2 million. Fares are anticipated to cover about \$800,000 of the annual operating costs, leaving an annual \$1.2 million operating subsidy need. If the average life cycle for the capital investments is 15 years, the average annual capital costs for the BRT system would be \$2.4 million. Much of this capital cost would be federally funded, with perhaps \$1 million funded locally. These simplistic estimates suggests that the total local annual costs for the BRT would be approximately \$2.2 million which would be about equally split between one time capital costs and annually reoccurring operating costs. Thus, unlike roadway projects that are mostly one time capital expenses, upgraded transit services also have a significant need to cover annually reoccurring costs. This is a major consideration in designing a local funding strategy for improved transit services. If a one time assessment is levied, this assessment should provide for some specified span of annual transit operating costs.

An argument can be made that the costs for large projects should be linked to the area where the service benefits will accrue. Similarly, cost for new bus stops/shelters probably can be linked to new developments that will directly benefit from the bus stop facility. This latter type of transit improvement could be simply part of the conditions for project approval. The former type of large transit investment is more complex. Are the beneficiaries of the faster and more reliable BRT service all of those located along the transit investment corridor or only those located at the far end? For example on the proposed Kings Canyon BRT project, patrons boarding at Cedar Avenue will experience some added service and reliability, but very little travel time savings. Patrons boarding at Clovis Avenue will experience both faster running times and improved reliability. Also how are benefits to the downtown to be considered? A strong argument can be made that the entire region benefits from a high investment transit project and therefore the entire region should help to fund it.

6.2 Local Funding Options

A number of local funding options exist to generate revenues for transit. A number of these funding sources compete with other forms of transportation for their dollars so often times it is up to policy makers to support actions for transit to get their fair share of the pie. Six different local financing sources are listed below and summarized in Table 6.1.

Sales Tax Measures

Taxing is one of the most common financing mechanisms used by municipalities to build and maintain public infrastructure. This is typically done through a municipal, regional, or county sales tax measure. Many counties across the country including Fresno, San Francisco, San Diego, and Santa Clara in California use a portion of their sales tax revenues to fund local transit capital costs. Measure C in Fresno County and Measure A in Marin County are examples where sales tax dollars are also used for funding the planning, operating, marketing, maintenance of the local fixed route bus services.

Measure C is a half cent sales tax increase that is used to fund transportation improvements in Fresno County, including capital operating expenditures for transit. Nearly 14% of the total \$1.7 billion generated over the next 20 years will be allocated to FAX to improve bus service. In FY07, revenues from Measure C are anticipated to account for 4.3% of FAX's total operating budget. At the next renewal of the transportation sales tax consideration might be given to

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increasing its share of funds commensurate with the county's target transit mode capture objectives.

Tax Increment Financing

Tax increment financing (TIF) is a tool that uses future gains in taxes to finance the necessary improvements needed to create those tax gains. This is often achieved when public projects (schools, roads) are built which subsequently increases the value of surrounding real estate. This increase in property value creates more taxable property which creates more tax revenues.

In California, TIF must be done within a redevelopment district. Fresno current has 19 redevelopment project areas where this funding strategy could be used. These areas include a significant portion of the Blackstone corridor running north from Highway 99, the Highway 99/UPR corridor, the Central Business District in Downtown, and along Kings Canyon (east of Downtown).

Although TIF is more commonly used for public works projects such as roads, parking, sidewalks, and sewers, its application has been used for transit. Major capital improvement projects including significant portions of the Dearborn Subway and Randolph/Washington Station in Chicago and elements of the Central City Streetcar in Portland have used this mechanism for generating financing.

Benefit Districts

Benefit Districts have been established throughout the state of California as a tool to generate revenues for improving downtowns or specific business districts. Benefit Districts differ from Business Improvement Districts in that Benefit Districts do not tax the property owners, rather they increase use fees to generate revenues. The best examples of Benefit Districts are Parking Benefit Districts that place additional charges on parking to generate revenues to be used to fund improvements in the District. Many cities in California have Parking Benefit Districts including Pasadena, San Luis Obispo, and Redwood City. The City of Ventura has recently adopted a Commercial Parking Benefit District that will use dedicated parking revenues from its downtown district to fund improvements in the District including transit infrastructure.

Transit Impact Fees

A transit impact fee program is designed based on the same principles as traffic impact fees. Both are developed to provide funding for incremental costs of providing transportation to new development. San Francisco has a transit impact fee program that was established in May of 1981. This fee applies only to new development located in the greater downtown area.

Delineated in Chapter 38 of the San Francisco Administrative Code, the transit impact fee was intended to recover the capital and operating costs of increased peak-period transit service associated with new office construction in downtown San Francisco. The law says:

The demand for public transit service from downtown area office uses imposes a unique burden on the Municipal Railway, qualitatively different than the burden imposed by other uses of property in San Francisco. The need for that level of service provided by the Municipal Railway during peak-periods can be attributed in substantial part to office uses of property in the downtown area.

The Transit Impact Development Fee attempts to recover the cost of carrying additional employees into downtown via public transit, capturing fees on office development on a square foot basis at the time the development is occupied. The fee is intended to capture "all costs

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incurred by the Municipal Railway in meeting peak-period public transit service demands created by office uses in each new development subject to the fee, including the expansion of service capacity through the purchase of new rolling stock, the installation of new lines, the addition of existing lines and the long term operation, maintenance, repair and replacement of those expanded facilities.”

Impact fees, sales tax measures, and TIF are good funding sources for transit-related capital projects but often times the operating costs of new service is the true challenge to finance for the agency. Two types of taxing measures including a County Service Areas and a Transit Concurrency System have been used by jurisdictions and transit agencies to provide a continuous stream of funds that can be used to cover the incremental operational costs of funding new service.

County Service Area

A County Service Area is typically established to provide funding for basic services (water, sewer, police, fire protection, etc.) to an unincorporated area. Often times adequate levels of basic services are difficult to provide to areas that geographically diverse. Through the establishment of a County Service Area, residents who live in these rural areas and want a higher level of these services can choose to pay (through taxation) to get these services.

County Service Areas are established through an initial petition of registered voters or by adoption of a resolution at the county level. They have also been established as a condition of approval for new developments in unincorporated areas. The majority of residents or land owner in these areas must then vote in favor of the taxation for its approval.

The use of a County Service Area for transit funding was recently established in Contra Costa County as a condition of approval on the Intervening/Alamo Creek residential development project. The project is expected to add over 1,000 single family and 220 multi-family units to 609 acres just east of Danville and San Ramon. As a condition of approval, the County required the establishment of “County Service Area T-1 (Public Transit)” requiring each homeowner to pay a fee that will enable the County to finance extended public transit services to the new development.

The fee is structured as an annual homeowner fee that is adjusted based on the inflation index. These funds will be used to implement a transit service plan that is laid out in a phased approach. The first phase will include either vanpool or maxi-taxi service, the second phase will provide a shuttle bus service operated by a private contractor, and the third and final phase will integrate the development into the County Connection service network.

Establishment of these County Services Areas requires support from land owners and residents who must vote to tax themselves for these additional transit services. As observed in the Alamo Creek case, requiring these as a condition of approval on a new development, prior to the establishment of a large homeowner population, can be a good strategy toward a successful implementation.

Transit Oriented Concurrency System (Broward County, FL)

A transit oriented concurrency fee system was recently established in Broward County, Florida to create a revenue stream for increased transit operations in the County. Since the County is nearing a build-out condition, the Board of Supervisors made a policy decision to require new development to contribute to a fund used to support transit rather than toward the development of new roadway infrastructure.

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The Transit Oriented Concurrency System assesses a fee to each new development project in the County based on the project's location within the County and the peak hour trip generation of the project. Each of the ten Concurrency Districts each has their own fixed cost (per peak hour trip) that is based on the current transit level of service for that area. In general, the more transit service already provided to an area, the lower the cost for new development in that area, and vice versa. The system was developed following a Countywide five-year Transit Development Plan. Figures 6.2 and 6.3 below show the various concurrency fees by land use and district and their corresponding locations on the map.

EXAMPLES OF CONCURRENCY FEES BY LAND USE AND DISTRICT

Column #	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10
Land Use	# of Trips	Trip Length Factor	NORTH EAST DISTRICT	NORTH CENTRAL DISTRICT	SOUTH CENTRAL DISTRICT	CENTRAL DISTRICT	EASTERN CORE DISTRICT	SOUTH EAST DISTRICT	SAW GRASS DISTRICT	PORT AIRPORT DISTRICT
Cost per trip --->			\$975	\$986	\$1,334	\$1,430	\$1,641	\$1,535	\$1,579	\$1,219
50 Single Family Units	50.5	0.88	\$43,329 (See example below)	\$43,818	\$59,283	\$63,549	\$72,926	\$68,215	\$70,171	\$54,172
50 Garden Apts.	30.5	0.88	\$26,169	\$26,464	\$35,805	\$38,381	\$44,044	\$41,199	\$42,380	\$32,718
50,000 sq ft industrial	38.5	1.00	\$37,538	\$37,961	\$51,359	\$55,055	\$63,179	\$59,098	\$60,792	\$46,932
50,000 sq ft Office	111.52	0.77	\$83,723	\$84,668	\$114,551	\$122,794	\$140,913	\$131,810	\$135,589	\$104,676
50,000 sq ft Retail	397.4	0.65	\$251,852	\$254,694	\$344,586	\$369,383	\$423,887	\$396,506	\$407,871	\$314,880

Please note: Staff will be recommending substantial credits be made available for projects designed to encourage transit usage.

Notes: (1) All trips are p.m. peak hour trips.

(2) Trip generation rates used are those adopted by Broward County Commission for TRIPS model (see web link).

Example: Calculate the transit concurrency fee for a 50 Single Family unit project located in the North East District.

50 Single Family units multiplied by trip generation rate for single family (1.01 T/PH) = **50.5 Trips/Peak Hour** (column #1)

50.5 Trips/Peak Hour multiplied by .88 (trip length factor - column #2) = 44.44 Trips/Peak Hour

44.44 Trips/Peak Hour multiplied by the cost per trip per District (North East District - column #3) **\$975 = \$43,329**

Figure 6.2: Fee Calculation Matrix by Land Use and District

The program is also designed to give concessions or credits to those projects that are designed to encourage transit use. The credits can translate into 10% to 50% discounts depending upon the specific site characteristics. Affordable housing and government uses that promote the health and safety needs of the general public are given waivers from these fees.

To date the system has been deemed a success by the County in terms of generating revenue for transit. However, since the program was designed to only cover the initial five-year capital costs and three-year operating costs of the project, costs beyond this initial start-up period are shifting to the responsibility of the County who must look to other sources of revenue to continue the expanded services. The program is currently being evaluated to determine if fees need to be adjusted to address long term transit needs.

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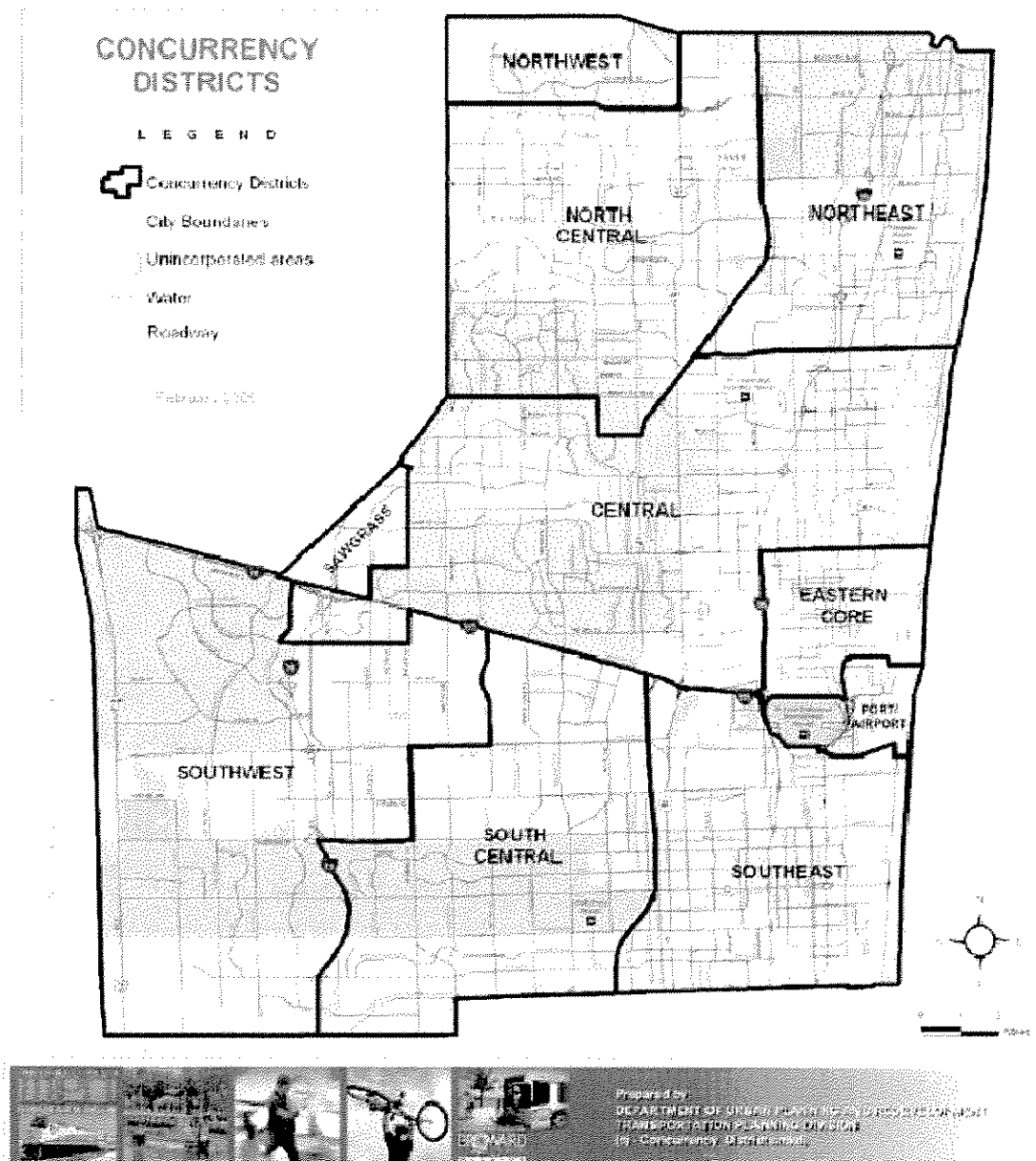


Figure 6.3: Concurrency District Boundaries

The City of Fresno's recently enacted traffic impact program is defined in a similar manner to the Transit Concurrency System. The traffic fee system is based on vehicle miles traveled rather than acres and distinguishes between development in infill and new growth areas as shown in Figure 6.4. Like the Transit Concurrency System, the new traffic impact fee recognizes that development in areas where infrastructure is already in place should be charged less than areas where new infrastructure is needed. This is reflected in the Concurrency System's levels of constant charges it placed on each district based on its location within the County. Since the

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boundaries of the traffic impact fee's Infill Zone closely aligns with FAX's service area, a parallel developer impact fee program used to finance transit could be explored by the City.

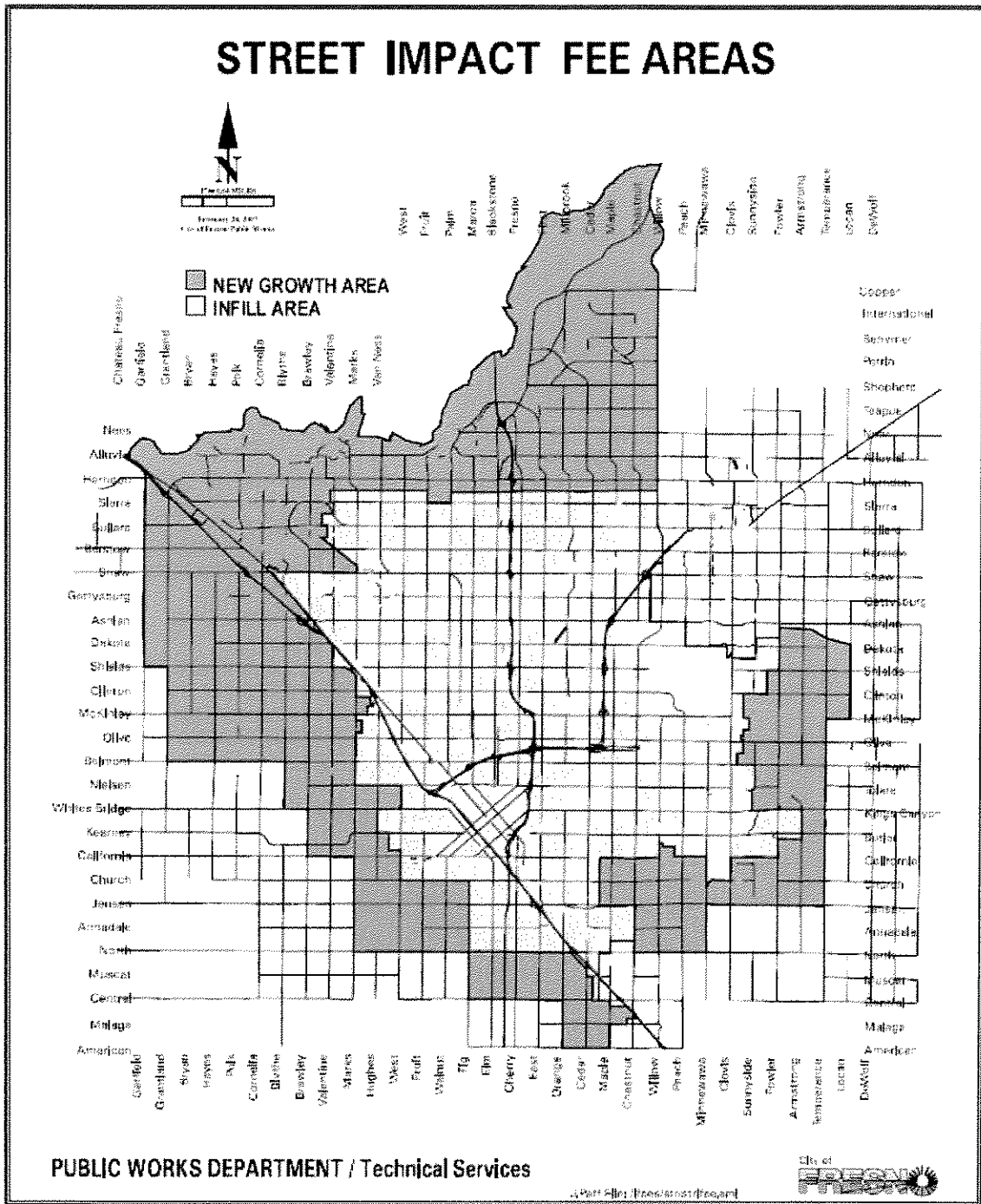


Figure 6.6: Street Impact Fee Area

Source: Fresno Major Street Impact Fee Program Nexus Study, 2007

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Table 6.2: Comparison of Various Local Funding Sources

Name	Type of Charge	Assessment	Determination of Charge	Who Is Charged	Areas Funded	Applicable Setting	Example
Sales Tax Measures	Ongoing charge	Sales tax	Percentage of total fund (total amount depends on the economy)	Consumers	Capital and Operations	County's with traffic congestion issues	Fresno's Measure C
Tax Increment Financing	Ongoing charge	Property tax	Property value	Local Governments / Property Owners	Capital	Redevelopment areas	Portions of Portland's Central City Streetcar
Transit Impact Fee	One-time charge	Size (Various measures including per sq. ft, per dwelling unit, etc.)	Estimated lifetime cost of providing transit to a new development	Developers	Capital and Operations	High transit use areas	San Francisco's Transit Impact Fee
Transit Concurrency Fee	One-time charge	Trips & location (trips generated times fixed dollar amount based on location)	Cost to introduce and/or provide service to new areas	Developers	Capital and Operations	All land uses Urban settings, well established roadway network	Broward County, FL's transit oriented concurrency system
County Service Area	Annual charge	Size of new development	Annual cost to provide transit to a new area	Homeowners	Capital and Operations	Residential Rural setting, limited transit services	Contra Costa County's T-1 (Public Transit)
Benefit Assessment District	Ongoing charge	Use (per hour)	Fixed Amount	Users	Capital and Operations	Commercial Urban setting, attractive areas	Parking Benefits District – City of Ventura

6.3 State Funding Programs

FAX currently receives funds from the Local Transportation Fund (LTF) and the State Transit Assistance Fund (STA), both are generated from the State's Transportation Development Act (TDA). In FY06, 1.4 billion dollars was collected from the LTF which is generated from a statewide quarter-cent sales tax. This money is apportioned to each County in California based on population. In Fresno County, the Council of Fresno County Governments (COFCG) distributes these funds to each jurisdiction and also determines the quantity of distribution on population. Revenues from the LTF will vary based on the economy and to continue receiving these funds, FAX must maintain a 20% recovery from its farebox. The five year operating budget outlined in the 2005-2010 FAX Short Range Transit Plan estimates the LTF to contribute nearly \$12.8 million or 39% of the District's total operating budget in FY07.

STA funds for transit come from the Transportation Planning and Development portion of the account which is generated from the statewide sales tax on motor vehicle fuel (gasoline) and use fuel (diesel). Statewide allocation to the Fresno COG is 50% based on its proportion of population compared to the rest of the state and 50% based on the proportion of FAX's previous year's revenues compared to the statewide total of transit operator revenues. Statewide STA expenditures were nearly 200 million in 2005-06 or 29% of all state transit expenditures for that year. This fluctuating and uncertain source of funds requires operators to meet an efficiency standard in order to qualify for these funds. This efficiency standard is based on operating costs per hour beginning in FY92. Since the inception of this funding source, FAX has received anywhere from \$16,000 to \$1.4 million per year from STA funds. In FY07, FAX is estimated to receive \$946,000 toward its operating budget, accounting for only 2.8% of its total estimated operating budget.

From time to time voters have approved transportation bond measures that can be used to fund public transit projects. Proposition 1B is an example. It was approved in November 2006 and it includes \$4 million statewide for transit improvements. These Proposition 1B funds can be used for BRT projects and transit center projects.

6.4 Federal Funding Programs

Funding sources available at the federal level are achieved through the Federal Transit Administration's (FTA) capital investment program. Section 5309 Capital Investment Grant program provides capital funding for transit related projects. To date, these funding sources have been divided into three classifications; New Starts, Small Starts, and Very Small Starts. These classification levels are based primarily on the size of the project and the amount of funds available for request from the FTA.

The BRT project recommended for Fresno will likely qualify for funding under either the Small Starts or Very Small Smarts program. The cost of the project will determine which of these two funding sources should be explored. Small Starts is limited to projects with a total cost of \$250 million and Very Small Starts is limited to projects with a total cost of \$50 million and a per mile cost less than \$3 million (excluding vehicles). Both programs also require that the total cost of the project accounts for no more than 5% of the agency's operating budget.

The portion of the total project cost that is available from federal funds varies but will not exceed 80%. During the application process the FTA assigns a rating to each project to determine if the project should ultimately be recommended for funding. If the local match of funds is 20%, the project will receive a medium rating. If the local match is boosted to half the total project cost, the project will receive a high rating and have increased chances of being recommended for funding.

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The FTA also requires agencies applying for federal funds to be able to demonstrate a local financial commitment including:

- A reasonable plan to secure funding for the local share of the capital costs or sufficient available funds for the local share (all non-New Starts funding must be committed before receiving a Project Construction Agreement)
- The additional operating and maintenance cost of the project are less than 5% of the agency's operating budget
- The agency is in reasonably good financial condition

FTA has recently made an attempt to streamline the financial evaluation process. Under this new process, FTA requires the project sponsor to submit the following pieces of information to prove the above mentioned requirements:

- The Small Starts Project Finance Worksheet, available for download from their website
- A detailed plan to secure funding for the local share of project costs which includes the sources, amount, and steps needed to secure funding commitments
- A detailed operating and maintenance cost estimate
- The current agency budget documenting that the project's operating and maintenance costs would constitute no greater than 5% of the system wide operating and maintenance costs; and
- Three years of audited financial statements documenting the financial health of the transit agency

Sponsoring agencies who are unable to provide the relevant information mentioned above are subject to complete and submit a financial plan consistent with FTA's June 2000 Guidance for Transit Financial Plans, but only covering the period up to and including the opening year.

6.5 Recommendations

It is clear that if Fresno is to substantially improve its transit services to attract "choice riders" that increased local funding will be needed. It is also clear that a fundamental means of increasing the usage of public transit is to shape the travel market around a few principal transit corridors through land use and development policies. The most effective means to accomplish the latter is to tilt the development financial table to favor development locations and designs that are in principal transit corridors, including in downtown. This tilting argues against financial penalties for developing along principal transit corridors and instead using financial penalties to fully allocate multimodal transportation costs to developments that are located outside of the principal transit corridors. Complicating this desirable funding strategy is that a nexus or connection must exist between fees and benefits.

The best means to favor transit oriented development with financial incentives/disincentives and provide the required nexus between benefits and fees would be to broaden the nexus discussion. Developments in transit corridors should be expected to have increased transit usage and correspondingly reduced private car travel. As such they should pay lower traffic impact fees than developments that are located outside of the principal transit corridors. Offsetting these reduced traffic fees revenue losses, should be higher traffic fees for other developments (fees were defined based on averages and if some developments generate fewer vehicle trips the others will generate above the average vehicle trips). Bottom-line a multimodal transportation fee is recommended,

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rather than a transit focused impact fee. The appropriate revenues, however, need to be clearly directed to transit in accordance with the nexus framework.

How Much Funding is Needed (and when)?

This question is linked to how much service needs to be provided to achieve the regions goals, objectives and targets for mobility, clean air, livability, economic vitality including congestion management. The question therefore needs to be addressed within the broad context of local general plans, and long range blueprint visions for the FAX service area. One of several possible approaches would be to translate these broad goals into transit market capture targets as suggested in the Downtown Transportation Infrastructure Study. The second phase of the Fresno County's Public Transportation Infrastructure Study, which is soon to commence, would be an ideal vehicle to comprehensively and multi-modally define the amount of future transit services that are needed and the required local funding that is needed to support these levels of enhanced transit services. This multimodal approach is similar to the traffic planning approach that defined the street improvement costs based on desired quality of service. The annual per capita transit operating costs in the Sacramento RT service area is about twice that in the FAX service area. Thus there are examples in other communities of stronger local funding for transit. It is clear that maximum use of federal and state funds should be considered in defining the local funding needs. This comprehensive planning process would provide the "legal nexus" that is needed to assess developers with impact fees.

The issue of cash stream should also be addressed in this effort. Transit needs a reliable flow of funds, particularly to cover operating subsidies, some projects require upfront funding.

Fair Share Funding

Some current residents and businesses will also benefit from improved transit services in the form of more frequent service. It therefore is reasonable to expect that these beneficiaries should help fund the increased services. New transit coverage, however, is clearly oriented to serve new developments and costs associated with expanded coverage should be borne solely by developers. This suggests that expanded service coverage should be funded by developers and that improved headway service should be funded both by developers and existing residents and businesses in some yet to be defined shared fashion. Increased funding from current residents and businesses probably will need to wait for future renewal of Fresno County's sales tax or other manifesting local funding opportunities as they arise in the future. The City of Fresno's current Traffic Impact Fee program defines an urban infill area (generally consistent with FAX's service area) and a new growth area. These boundaries could also be used for the proposed broader multimodal transportation impact fee program.

Framework for Developer Impact Fees

The amount (number and length) of automobile trips that are generated by a development is generally defined by the development size and type, its location in the region, the mix of land uses in the surrounding area, proximity to transit and design features related to pedestrians and bicycles. Thus, in defining a multimodal transportation impact fee that covers all the transportation systems consistent with broad community goals on air quality, livability, mobility and economic vitality these development features should all be considered.

Development Type and Size

The City of Fresno's current traffic impact fee program defines six types of land uses:

- Residential (low-medium) for six dwelling units or less per acre

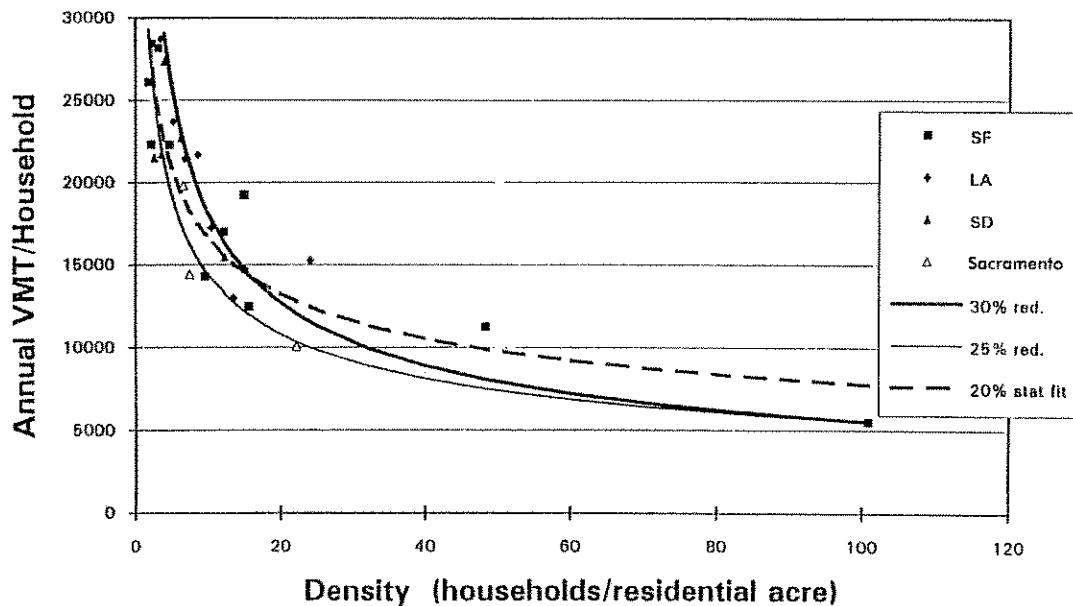
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- Residential (medium/high-high) for 6 to 28 dwelling units per acre
- Commercial retail
- Commercial office
- Light industrial
- Heavy industrial

Schools and institutional uses are not included in the impact fee program. Aside for the infill and new growth areas, No recognition is given to proximity to transit (most communities also ignore transit in the simplified traffic impact fee calculation). High density residential is assessed about twice the fee per net acre as the low-medium residential developments. Research has shown that higher density housing tends to produce much lower annual vehicles miles of travel than lower density housing (see Figure 6.5). Vehicle miles traveled is in many ways a better indicator of street capacity use than trips generated. From Figure 6.5, two dwelling units per acre generate about 30,000 annual miles of vehicle travel annually compared to about 18,000 miles for ten units per acre and 13,000 miles for 20 units per acre. Part of this is due to higher transit use and more pedestrian travel. In general, higher density residential developments should be assessed less per dwelling unit if transit is considered in the multimodal cost equation. The current traffic fee rate schedule slight favors high density residential uses.

Figure 6.5 – Relationship of Residential Density to Automobile Use



Development Location

As noted previously, developments that occur within the downtown area and along major transit corridors generally do not increase transit operating costs. Thus the developer impact fees should specifically recognize this factor. It is also true that developments located within a quarter mile of a bus route more highly patronize transit than those that are located one quarter to one half mile away (FAX's coverage criteria). This is particularly true of commercial developments more so than residential developments. Some vehicle trip rate discount information related to these issues is defined in the *Urbemis* model that was developed by Caltrans for air quality analysis purposes.

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- Infill/New Growth Area - Development location based multimodal fees should start with the infill/new growth boundaries that have been defined for the traffic impact fee program.
- Principal Transit Corridors and Downtown - Developments that are located downtown or along the strongest transit corridors should be recognized for reduced multimodal impact fees. The principal transit corridors that are currently shown in the City of Fresno's General Plan should be narrowed to no more than six corridors where high investment transit would be the most promising ----- Ventura, Blackstone, Cedar, Shaw etc.
- One Quarter Mile Coverage – The half mile population coverage standard that is used by FAX's, is good for assessing service coverage. Experience has shown that higher ridership is achieved from residential uses that are located within one-quarter mile of a transit route. This is even more true for commercial uses. Thus new developments within one quarter mile of a transit route should be credited with higher transit ridership and reduced multimodal transportation fees. Conversely, developments that are located more than one quarter mile from a transit route should pay more than the average impact fee rate.

Parking

Off street parking ordinances tend to encourage free parking and higher automobile access profiles for developments. This is particularly true for commercial projects, but it also applies to high schools. Since high parking supply developments will be more automobile oriented than other developments, it would be reasonable for them to be assessed higher impact fees.

Diversity/Mixed Use

Development projects that are in mixed use areas tend to have higher transit and pedestrian use and lower automobile use. A number of studies have attempted to quantify the reduction in automobile use and increased use of transit. The *Urbemis* model has some general information on this topic.

Design

Similarly development project design that includes features that make walking, bicycling and transit use more convenient tend to result in lower automobile usage and higher transit usage. Developments with cul de sacs and large suburban type blocks conversely result in higher automobile usage and impacts on the transportation network and environment. The *Urbemis* model has information on trip reduction aspects of project design.

Summary

The funding program for multimodal transportation improvements associated with new development travel demands needs to be set to generate sufficient funds to cover projected capital and operating costs for transit as well as for roadway projects. Developments within the infill area, near transit corridors and with designs that favor transit, pedestrian and bicycle usage should be assessed a substantially lower rate than other developments. Conversely projects that are located outside of the infill area and that are not designed for transit, pedestrians and bicycle access should be assessed higher impact fees.

Phase 2 of the Public Transit Infrastructure Study should define the amount of money that is required for public transit to meet its desired future role in the county's mobility system. A geographically and multi-modally enhanced version of the City of Fresno's Traffic Impact fee program should be defined for growth revenues along with community wide revenue base for current residents. The purpose would be to provide the required revenue stream without penalizing growth along principal transit corridors or downtown.

APPENDIX A – BUS RAPID TRANSIT: Elements Performance Benefits

BRT brochure provided by the Federal Transit Administration (see next page)

MAJOR ELEMENTS OF BRT

Wide choice of running ways

BRT systems can operate on all types of running ways—mixed flow arterials, mixed flow freeways, dedicated arterial lanes, at-grade transitways, fully grade-separated surface transitways, managed lanes, and in tunnels.

Enhanced stations

Aesthetically-designed stations make BRT systems attractive while providing passenger amenities such as shelters, benches, lighting, ticket vending machines, security features, and next vehicle arrival information.

Innovative vehicles

Stylized and specialized buses can operate along BRT corridors, with emphasis on comfort, aesthetic enhancements, easy access, passenger circulation, and environmentally-friendly propulsion. Purchase costs for higher-end BRT vehicles can range from \$370,000 to \$1.6 million, depending on the size and propulsion technology.

Improved fare collection

Electronic fare cards, off-board fare collection, or proof-of-payment options allow for shorter dwell times and shorter overall travel times.

State-of-the-art technologies

BRT incorporates ITS (intelligent transportation system) applications such as transit signal priority, advanced communication systems, automated scheduling and dispatch systems, and real-time traveler information at stations and on vehicles for faster and more convenient trips.

Improved service

BRT systems generally include rapid transit features such as all-day service spans, greater spacing between stations, and more frequent service than local bus service. The flexibility and lower-cost of BRT allow it to provide greater network coverage.

Modern branding and marketing

Distinctive logos, colors, styling and technologies for vehicles and facilities help develop a system identity. BRT services can be marketed as a new bus route or a new tier of service or as part of a multi-modal rapid transit network.

SYSTEM PERFORMANCE

Significantly decreased travel time

Exclusive transitways have been shown to operate at an average of 17 to 30 miles per hour. This can achieve an overall travel time savings as high as 55% compared to regular bus services and compares well with rail transit.

- The Silver Line Washington Street has experienced reductions in mean running times as high as 25%, especially in the midday and PM peak periods.
- Las Vegas experienced 37% (northbound) and 43% (southbound) reductions in running times compared to pre-MAX bus services.
- With the implementation of BRT, travel time in the BRT corridor in Pittsburgh decreased 55%.
- In Los Angeles, the MetroRapid achieved travel savings as high as 40%, equally attributed to fewer stops, transit signal priority, and low floor vehicles.

Increased reliability

BRT's use of exclusive transitways, level boarding, improved fare collection, and automated vehicle location technologies allow for greater reliability.

Improved accessibility

Vehicle, station, ITS, and fare collection design options can greatly improve the accessibility of a BRT system to mobility-impaired and other riders.

Increased safety and security

With modern technologies and facilities, customers report BRT systems to be safer than other local bus service.

- In Boston, passengers rating the safety as "above average" increased 19% after the Silver Line began operating.
- In Las Vegas, 69% of riders rated MAX vehicles as "excellent" and 54% rated safety at MAX stations as "excellent."

Increased capacity

Because of larger vehicles and greater frequency, BRT systems can offer capacities comparable to other rapid transit modes. Seated capacity on BRT vehicles can range from 40 to 85 passengers, while the maximum number of passengers that can be carried per hour per direction can range from 10,000 on arterials to 30,000 on exclusive rights of way. In Bogotá, Colombia, the TransMilenio system has experienced a capacity of 41,000 passengers per hour per direction in some segments.

BENEFITS OF BRT

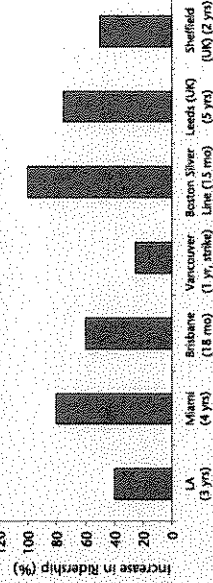
Increased ridership

The integration of system elements has demonstrated that BRT can attract choice riders and greatly increase corridor ridership. Ridership gains of 20% to 96% in BRT corridors have been noted in practice (see chart below).

- Boston's Silver Line Phase I experienced a 96% increase in weekday corridor ridership, with 1/4 of new riders previously using other modes.
- On Pittsburgh's West Busway, 1/4 of riders used an automobile previously.
- San Pablo's Rapid Bus accounted for a 43% increase in corridor ridership.

Net Corridor Ridership Gains with BRT

(Source: TCRP Project A-23, 2003)



City (time data collected after BRT implemented)

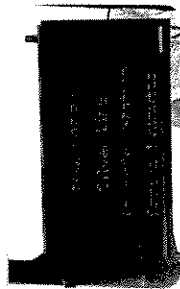
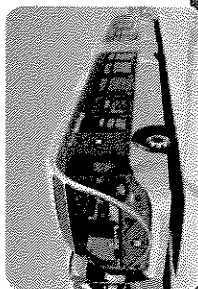
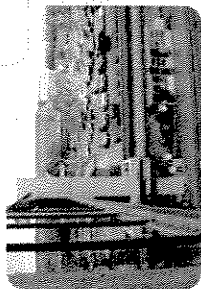
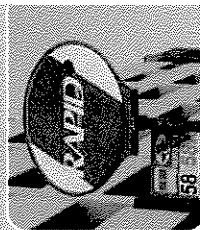
Improved capital cost effectiveness

BRT systems can use less costly or existing infrastructure and reduce fleet requirements with better vehicle utilization. Overall, capital costs are less than other rapid transit modes such as light rail (LRT) or heavy rail (HRT).

	Mode	Length (Miles)	Capital Cost (millions of US\$ per mile (2003\$))
Las Vegas MAX	BRT (surface)	7.5	\$2.70
Las Vegas Blvd., North	BRT (surface)	2.3	\$11.90
Boston Silver Line Phase I - Washington St	BRT (surface)	14.0	\$23.07
Los Angeles Orange Line	(exclusive ROW)	25.6	\$13.30
Bogotá TransMilenio (Phase 1)	BRT (exclusive ROW)	25.6	\$24.80
Bogotá TransMilenio (Phase 2)	BRT (exclusive ROW)	15.0	\$26.50
Salt Lake North South Corridor	LRT (surface)	11.6	\$32.80
Minneapolis Hiawatha Corridor	LRT (surface, 1.5 mile tunnel)	16.5	\$337.60
Los Angeles (LACMTA) Red Line	HRT (underground)	112.0	\$145.50
Washington (WMATA) Entire Metrorail System	HRT		

WHAT IS BUS RAPID TRANSIT?

Bus Rapid Transit (BRT) is an innovative, high-capacity, lower-cost public transit solution that can achieve the performance and benefits of more expensive rail modes. This integrated system uses buses or specialized vehicles on roadways or dedicated lanes to quickly and efficiently transport passengers to their destinations, while offering the flexibility to meet a variety of local conditions. BRT system elements can easily be customized to community needs and incorporate state-of-the-art, low-cost technologies that attract more passengers and ultimately help reduce overall traffic congestion.



Improved environmental quality

By capturing choice riders and using advanced vehicles with cleaner propulsion systems and emissions controls, BRT may improve air quality and noise level and reduce overall congestion.

Improved operating cost efficiency

Performance indicators such as passengers per revenue hour, subsidy per passenger mile, and subsidy per passenger can improve when BRT service is introduced to a corridor.

- Metro Rapid in Los Angeles reported high vehicle utilization, reduced subsidy per passenger mile (\$0.15 to \$0.18), and increased passengers per revenue mile (51 to 59.7).
- The Washington Street corridor in Boston experienced a 15% increase in riders per passenger hour with the implementation of the Silver Line.

Transit-supportive land development

Investments in BRT infrastructure and related streetscape improvements can result in significant positive development effects much like other high-quality transit modes.

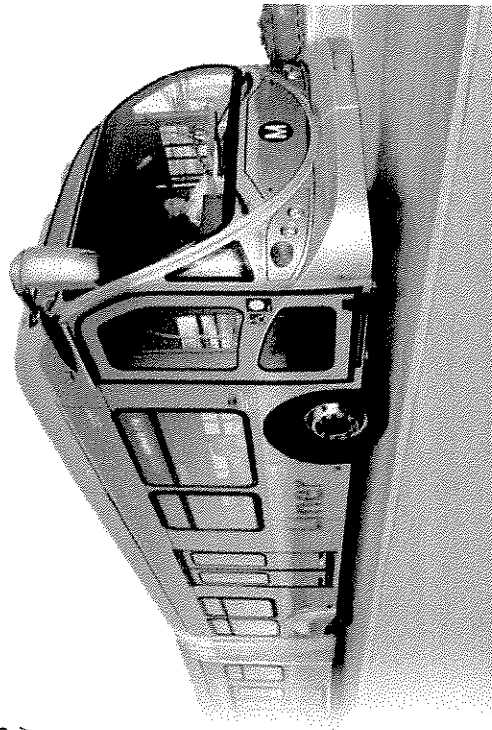
BRT Land Development Benefits

City	Benefits
Pittsburgh	\$300M in development around stations
Ottawa	\$700M in development around stations
Boston	\$650M in development occurred along the Washington Street corridor
Brisbane	+20% gain in residential values near stations, initiation of several joint development projects

The data in this brochure were compiled by the National Bus Rapid Transit Institute (NBRTI) using evaluation reports and from the Federal Transit Administration's publication "Characteristics of Bus Rapid Transit for Decision-Making." These and other resources are available at www.nbrti.org.

Cover photo: Metro Orange Line, courtesy of Los Angeles County Metropolitan Transportation Authority

Bus Rapid Transit Elements Performance Benefits



NBI National Bus Rapid Transit Institute

U.S. Department of Transportation
Federal Transit Administration

U.S. Department of Transportation
Federal Transit Administration

APPENDIX B – Ridership Estimation Methodology and Ridership Increases Associated With Specific Amenities

This appendix demonstrates the methodology for estimating the ridership forecasts for the corridors identified in Section 4.4 and the percentage increase in ridership attributed to various elements of the Fast Bus Alternative and the three levels of BRT investments (“basic”, “medium”, and “high”).

Ridership Estimation Methodology

A ridership adjustment methodology was devised for each of the Fast Bus Alternatives and then applied to the BRT Investment Alternatives. First, the existing route structure was analyzed to determine the extent to which all routes fall within each BRT corridor. A judgment-based approach was used. For example, for the Kings Canyon Road-Ventura Avenue-Blackstone corridor, six routes were identified where each operates between 33 percent and 75 percent within that corridor. Fewer routes operate in the Shaw and Cedar corridors; however, those corridors are also smaller and do not serve downtown Fresno (the hub of FAX’s system).

It was then assumed that local bus ridership within and outside the BRT corridor under study was equal to the percent of the route within the corridor. For example, if Route 99 was determined to be physically 50 percent within a BRT corridor, then it was assumed that 50 percent of the riders on Route 99 were also within the BRT corridor. This assumes an even distribution of ridership across the stops along the corridor. This assumption can be refined in future analysis with updated origin-destination matrix from automatic vehicle location data collected by FAX. Corridor and non-corridor ridership was then summed for the Base Year and 2030 No-Project Alternatives.

An adjustment was made for the 2030 Fast Bus Alternative. Local bus ridership was similarly calculated with some exceptions. Total in- and out-of-corridor ridership growth was obtained from the model outputs. In the Kings Canyon Road-Ventura Avenue-Blackstone Corridor, local bus ridership changes were determined to be +18% within the corridor, and -three percent out-of-corridor. These summary percentage changes were multiplied against the same line items in the 2030 No-Project alternative to determine total in- and out-of-corridor ridership changes.

Similarly, the individual within-corridor routes were adjusted based on model percentage change between the No-Project and Fast Bus Alternatives. These percentage changes for each route were multiplied against the Adjusted No-Project route-level boardings to determine the final local bus boardings under the Fast Bus Alternative.

With these calculations, total within-corridor local bus ridership and complete within-corridor ridership were both known. The difference between these two values was assumed to be the fast bus route.

This methodology produced fairly conservative results. The raw model predicted 12,561 Kings Canyon Road-Ventura Avenue-Blackstone fast bus riders, and with the model adjustments, fast bus ridership was reduced to 9,396, a reduction of over 25 percent--compared to Route 28 current 7,800 daily riders, this is only a 20 percent increase over 23 year period (an annual ridership growth of 0.8%).

For the three BRT investment alternatives, the TCRP Report 11: BRT Practitioner’s Guide was consulted for estimated ridership changes. One key change is noted, relative to the methodology for determining fast bus ridership. Under the Fast Bus Alternative, total within-corridor ridership changes were calculated. For the BRT alternatives, ridership changes are attributed only to fast bus

BUS RAPID TRANSIT MASTER PLAN
Council of Fresno County Governments (COFCG)

or BRT route. Ridership on all other routes – both those inside and outside the corridor – is assumed to remain constant across the remaining alternatives.

The TCRP report found that additional increases of ridership can be gained based on specific amenities selected as part of the BRT program description. These incremental gains are additive, such that systems incorporating a combination of amenities can anticipate ridership increases equal to the sum of the gains for each individual amenity. In addition, a “bonus” of extra ridership was found to occur in systems that achieve very high levels of perceived quality by incorporating most of the major features. Ridership gains are itemized for each specific amenity category, and are summarized at the bottom of the table.

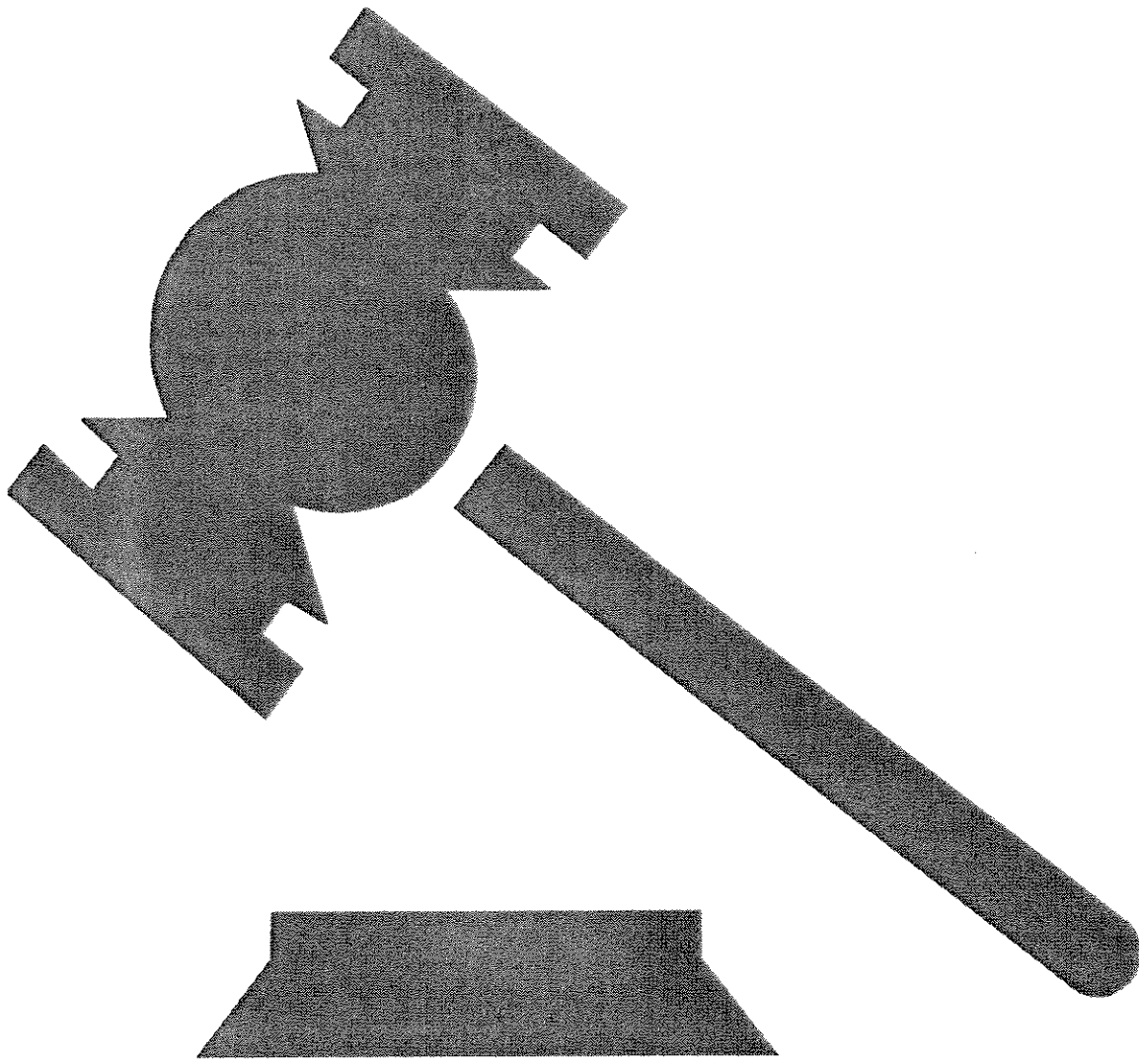
Table A-1: Ridership Increases by BRT Attributes and Amenities

	Max.	Fast Bus	Basic BRT	Moderate BRT	High BRT
Increased Service (from model - not BRT handbook)		10%	10%	10%	10%
Running Ways (not additive)	20%				
Grade Sep. busways (special ROW)	20%				
At-grade busways (special)	15%				15%
Median arterial busways	10%			10%	
All-day bus lanes (specially delineated)	5%				
Rush-hour bus lanes	0%				
Mixed traffic	0%				
Stations (additive)	15%				
Generic shelter	0%				
Unique/ attractively designed shelter	2%				2%
Illumination	2%			2%	2%
Telephones/security phones	3%			3%	3%
Climate controlled waiting area	3%				
Passenger amenities	3%			3%	3%
Passenger services	2%				2%
Vehicles (additive)	15%				
Conventional vehicles	0%				
Uniquely designed vehicles (external)	5%		5%	5%	5%
Air conditioning	0%				
Wide multi-door configuration	5%		5%	5%	5%
Level boarding (low-floor or high platform)	5%		5%	5%	5%
Service patterns (additive)	15%				
All-day service	4%	4%	4%	4%	4%
High-frequency (10 minutes or less)	4%				
Clear, simple service pattern	4%	4%	4%	4%	4%
Off-vehicle fare collection	3%		3%	3%	3%
ITS applications (selective additive)	10%				
Passenger information at stops	7%		7%	7%	7%
Passenger information on vehicles	3%		3%	3%	3%
BRT Branding (additive)	10				

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	Max.	Fast Bus	Basic BRT	Moderate BRT	High BRT
Vehicles & Stations	7%		4%	7%	7%
Brochures/schedules	3%		3%	3%	3%
Summary					
Running Ways	20%	0%	0%	10%	15%
Service Patterns	15%	8%	11%	11%	11%
Stations	15%	0%	0%	8%	12%
Vehicles	15%	0%	15%	15%	15%
ITS applications	10%	0%	10%	10%	10%
Branding	10%	0%	6.5%	10%	10%
Sub-total	85%	8%	43%	64%	73%
BRT component synergy <i>(when subtotal is 60 or more)</i>	15%	0%	0%	15%	15%
Increased Frequencies <i>(not in BRT handbook)</i>	—	10%	10%	10%	10%
Total	100%	18%	53%	89%	98%
Change from Lesser Alternative			35%	37%	9%

Source: TCRP Report 118, FCOCG Travel Model, Cambridge Systematics

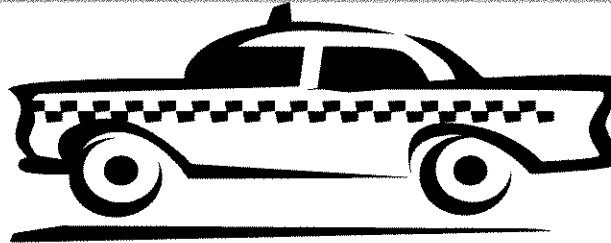


***TRANSPORTATION
ACTION/DISCUSSION ITEMS
AGENDA ITEM III. F.***

Senior Taxi Scrip Program

Save 75% on Taxi Rides

Starting July 1, 2008



What Is The Senior Taxi Scrip Program?

It is a Measure C funded program that provides alternative, reliable and affordable transportation to Fresno County residents who are 70 years of age and older. Eligible seniors receive a 75% discount on taxi fares by purchasing taxi scrip. *Fresno COG reserves the right to limit scrip sales based on availability.*

How Does It Work:

Participants simply obtain and submit an eligibility application. Once approved, participants can purchase a \$20 value booklet of taxi scrip (like coupons) from select locations for only \$5. **This is a 75% discount!** Up to (5) booklets of taxi scrip can be purchased each calendar month. Scrip can then be used like cash to pay for taxi cab fares only. Taxi Scrip can be used at any time, 24 hours a day, and 7 days a week when needed.

What Are The Rules?

- You must be a resident of Fresno County.
- You must be at least 70 years old (proof of eligibility is required by providing a copy of a California driver's license, California DMV issued Identification Card or Medicare Card.
- You must first complete and submit an eligibility application before purchasing taxi scrip for the first time. You can pick up an application and purchase Taxi Scrip at several approved Fresno and Clovis Taxi Scrip Distribution Service Centers (listed below). Fresno COG will send the application and fill taxi scrip orders via US mail only if requested. Applications are also available online at www.fresnocog.org.

How Can I Get More Information?

For full program details, please visit us on the web at www.fresnocog.org or call our office during normal business hours.

Where Can I Apply & Purchase Taxi Scrip?

FRESNO

Fresno Area Express (FAX)
3590 North Blackstone

Fresno Area Express (FAX)
2016 Tulare Street

CLOVIS

Clovis City Hall
1033 Fifth Street

Clovis Senior Center
850 Fourth Street

**Fresno COG will only accept mail orders and applications.*

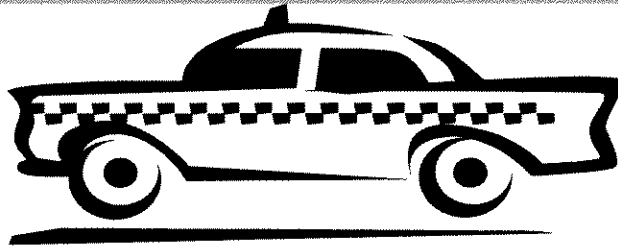


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E-mail: mgarza@fresnocog.org



Programa de Vales de Taxi Para Personas Ancianas Ahorre 75% en Cada Viaje de Taxi

Empezando 1o de julio 2008



¿Qué es el Programa de Vales de Taxi Para Ancianos?

Es un programa fundado por la Medida C que provee transportación alternativa, confiable, y bajo en costo a los residentes del Condado de Fresno que tienen 70 años o más. Personas elegibles recibirán un descuento de 75% hacia las tarifas de taxi solamente comprando un librete de vales. Fresno COG reserva el derecho de limitar la venta de vales dependiendo en disponibilidad.

¿Cómo Funciona el Programa?

Participantes simplemente obtienen y llenan una solicitud de elegibilidad. Ya que sea aprobada, podrá comprar un librete de \$20 vales (cupones) por solamente \$5.00 en localidades selectas solamente. **¡Esto es un gran descuento de 75%!** Solamente se podrá comprar (5) libretes de vales para servicio de taxi por mes. Los vales se podrán usar como dinero en efectivo para pagar la tarifa de taxi solamente y podrán ser usados a cualquier hora, 24 horas al día los 7 días de la semana como sea necesario.

¿Cuales Son Las Reglas?

- Debe ser residente del Condado de Fresno.
- Debe tener 70 años de edad o más (se requiere comprobante de elegibilidad por ejemplo licencia de conducir del departamento de vehículos de California, Identificación del DMV o tarjeta de Seguro Medicare.
- Debe primero completar el formulario de elegibilidad antes de comprar vales de taxi por primera vez. Puede recoger el formulario y comprar vales de taxi en varias localidades de servicio aprobadas en Fresno y Clovis (vea la lista abajo de localidades aprobadas). Si desea, Fresno COG puede mandarle el formulario y venderle los vales de taxi por correo solamente. El formulario también está disponible por Internet en www.fresnocog.org.

¿Cómo Puedo Conseguir Más Información?

Para mas detalles, visite www.fresnocog.org o favor de llamar a nuestra oficina durante las horas normales de oficina.

¿Donde Puedo Aplicar y Comprar Vales de Taxi?

FRESNO

Fresno Area Express (FAX)
3590 North Blackstone

Fresno Area Express (FAX)
2016 Tulare Street

CLOVIS

Clovis City Hall
1033 Fifth Street

Clovis Senior Center
850 Fourth Street

**Fresno COG solamente aceptara ordenes y aplicaciones por correo.*



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