Public Transportation

Infrastructure Study

Fresno Council of Governments

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EXECUTIVE SUMMARY

Fresno PTIS

Executive Summary

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Background

Following the planning process established during the San Joaquin Blueprint Study, Fresno's Public Transportation Infrastructure Study (PTIS) began in earnest at the end of 2008 in an effort to identify strategies for transportation investments and land use policies that would result in measurable reductions in vehicle miles travelled (VMT) and improve mobility choices for greater Fresno County residents. Improving transportation choices for Fresno County and City residents means taking transit, bicycling and walking more attractive than driving alone for every trip. And, less reliance on the automobile translates to air quality improvements, setting achievable benchmarks for reducing greenhouse gases.

With Fresno County's population expected to grow from the current 954,000 people to 1.5 million people by 2035, the topics of growth management, transit and land development policies are timely for Fresno for proactive planning that may stem the tide of Fresno County's past trends:

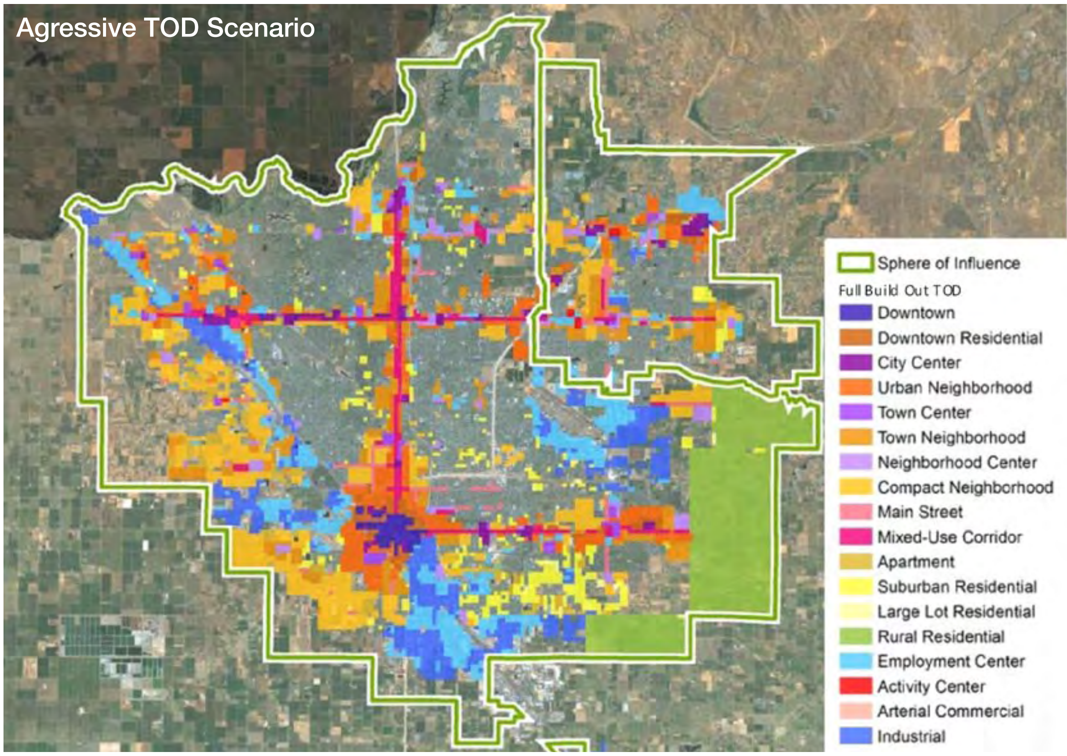
- Very little traffic congestion makes driving an automobile very attractive for those who can afford them.
- Low density development is occurring on Fresno's urban fringe where transit services don't exist now and will likely not exist in the future, ensuring automobile dependency.
- Development encroachment on farmland is an ongoing concern due to the high demand for agricultural products from this region.
- The San Joaquin Valley is the 5th most polluted airshed in the US.
- 82% of FAX riders take the bus because they either don't drive or cannot afford a car. This rate is about double the transit dependency rate found in other cities of a similar size. Due to a number of factors the demand for Transit Oriented Development is lower in Fresno than other US cities of similar size, making it a challenge to build, finance and market these projects.

The Study Process

The PTIS Study followed a four-step process over two years:

1. **Research on Existing and Future Conditions –** travel patterns, travel demand, current land use development trends, and a needs analysis. We determined where people are traveling to and from, and by which modes of transportation. We identified the current transit providers in the region, the significant trip generators and transit travel demand by market sector:
   a. Commuters by necessity
   b. Commuters by choice
   c. Intra-City vs Inter-County Commute Patterns
   d. Discretionary Riders (includes recreational, shopping and entertainment destinations)
   e. Institutional Riders (includes seniors, college students and the disabled)

Today, the largest mode share in the San Joaquin Valley outside of driving alone to work (75%) is carpooling (20% to 29%). Transit represents between 3% and 6% of regional commute trips by county. Although there doesn't appear to be sufficient travel demand to support commuter express buses now, it is estimated that by the year 2030 there will be enough travel demand along highway 99 to warrant an investment in express commuter buses to Sacramento and the northern Bay Area.[2]



[1] *Based on a 2009 FAX rider survey.*
[2] *Summary of Transit Market Findings, Strategic Economics, July 1 2009.*
[3] *Ibid.*
[4] *The Southeast Growth Area is an area of 9,000 square acres located at the eastern edge of the current Fresno metro area, planned for 41,000 households, 36,000 jobs and a population of 119,000.*

The Cities of Fresno and Clovis are not major destinations for any given rural city or place. While nearly 80 percent of nonfarm jobs are located in Fresno and Clovis, Fresno County's rural cities and places are not generally "bedroom communities" to Fresno/Clovis. Generally, no more than one-third of the workforce in any given rural city commutes to Fresno or Clovis, making express bus or commuter rail service economically nonviable.[3]

2. **Land Use Alternatives Analysis –** Lists of projects and estimated costs for transportation improvements already programmed in Fresno

were analyzed for the short term (5 year plan or "No Build Scenario") and the long term (20 year plan or "TSM Scenario") to see what improvements the current trends in growth and investment would bring for Fresno's future. Modeling results confirmed that Fresno's current and planned transit investments would result in declining transit usage in the future if significant changes were not made to redirect a significant portion of new growth to designated transit corridors where high service levels could be provided and maintained in a cost-effective way.

Next, we wanted to determine the transportation impacts (the changes in transit use, walking and bicycling) of three different land use scenarios of increasing density and mix in the year 2035:

a. The "Build" or "COG Trend" scenario – describes the current low-density fringe growth development pattern with separated zoning for housing and jobs continued into the future.

b. The "Constrained" Scenario – assumes that TOD housing demand remains constrained as it is today, and assumes that the South East Growth Area (SEGA) is built, absorbing a significant amount of the new growth. Bus Rapid Transit (BRT)[4] service on Ventura/Kings Canyon to downtown is extended out another 2 ½ miles to meet the new growth in SEGA.

c. The "Full Build-Out TOD" or "Aggressive Growth" Scenario – assumes that new development patterns emerge due to new employers being attracted to the Fresno area, likely because the high speed rail station has been built, and TOD housing demand is no longer constrained, and SEGA is not built or develops much more slowly.

The PTIS Study used sophisticated land use modeling techniques to "paint" future land use patterns into existing Traffic Analysis Zones (TAZ's) in the proposed high capacity transit corridors. The trips that were generated by the land uses were then fed into the COG Regional Travel model.

The Full Build-Out TOD Scenario was shown to be the most efficient at reducing vehicle miles traveled, increasing transit and walk/bike trips, and reducing greenhouse gas emissions. However, achieving this level of urban

> What we discovered was that as density and mix of land uses grew (bringing more housing, jobs and shopping in close proximity to each other) the more people tended to take transit, walk or bicycle in the transit corridors.

density and mix of uses would not be supported with Fresno's existing employment base and demographics. A catalyst would be needed to spur job growth, and in particular white collar jobs that attract young urban professionals who would want to live in a TOD product. The other population segment that should be courted to come to Fresno are the seniors of today and the baby-boomers of tomorrow who would also enjoy living in a TOD-style development with lots of destinations in walking distance, a warm climate, and a quality regional medical facility located nearby.

Comparing Land Use Scenarios

	COG Trends	Constrained TOD	Aggressive TOD
% of new growth moved to transit corridors	38%	42%	52%
Density in 1 mile of transit corridors	10.6 du/ac	12.3 du/ac	14.9 du/ac
Transit Mode Share of all trips for region	.93%	1.22%	1.45%
Transit Mode Share for all trips within 1 mile of corridors	1.7%	2.3%	2.5%
Transit Share to work in BRT Corridors	5.65%	7.64%	8.51%
GHG Reductions	0.4%	6%	8%

1. **Alternative Transportation Investments –** a significant part of the PTIS Study is the assessment of transportation technologies and determining which choices would be right for Fresno. Separate studies were conducted on the following technology options for Fresno:

   a. A BRT Feasibility Study and Federal Transit Administration (FTA) Very Small Starts (VSS) application for funding for BRT on Blackstone Avenue and Ventura/Kings Canyon.

   b. A Streetcar Feasibility Study for Downtown Fresno, which was coordinated with and integrated into the Fulton Corridor Specific Plan being prepared by the City of Fresno.

   c. A test case application of Personal Rapid Transit (PRT) operating at the CSU Fresno campus.

   d. An assessment of an expanded BRT system for the future to include a third BRT corridor operating on Shaw Avenue serving CSU Fresno and connecting to Clovis.

   e. An assessment of the feasibility of upgrading BRT on Blackstone and Ventura/Kings Canyon to Light Rail Transit (LRT) by the year 2025.

2. **Study Conclusions and Recommendations –** based on what we learned from the previous steps the PTIS Study makes recommendations for investments, the timing of those investments, and funding sources augmenting Measure C sales tax revenue to pay for them. In addition, the PTIS study makes policy recommendations that will be important to be adopted by City and County elected officials and planning administrators in order to shape future growth in such a way that it supports the transit investments.

   Transit Investment Recommendations:

   a. Continue to pursue funding to build BRT on Blackstone and Ventura/Kings Canyon.

   b. Consider adding a third BRT corridor on Shaw Avenue from a future Park & Ride lot on Highway 99, connecting to CSU Fresno and east to Clovis.

   c. If forecast population and job densities have been reached in the transit corridors and downtown by the year 2025, look at upgrading BRT on Blackstone and Ventura/Kings Canyon to LRT with a fixed guideway and new LRT stations.

   d. If or when high speed rail becomes a reality – the project is under construction and new development projects are coming to the downtown area - apply for federal funding for federal funding for the streetcar project as a complement to the planned development projects.

   e. Although Personal Rapid Transit (PRT) is not economically viable in Fresno at the present time, place types have been identified that may work for PRT technology in the future, including:
      - Major activity center(s)
      - Very large institutional or corporate campuses
      - A downtown with widespread venues
      - Remote parking for major employers and regular events
      - Connecting major travel modes (e.g. rail to rail)

   f. Continue the existing demand-responsive service currently provided in the smaller towns until the demand for transit warrants fixed route service.

   g. An expansion of the vanpool program is recommended for other employment destinations due to the success of the existing farm worker vanpools.

   h. Expansion of the Valley Rides carpool matching database and promotion campaign is recommended to serve the demand for carpools.

   i. At some future date when intra-County commuting to the downtown has grown to the point that express bus service is warranted, begin express commuter service along Highway 99 from Kingsburg, Selma, and Fowler and construct park and ride lots to serve them.

Draft Policy Recommendations:

Policy recommendations were made by the consulting team on the PTIS study for implementation by the City of Fresno, Fresno County, and the cities and towns of greater Fresno County to meet the study objectives. The recommendations fall under six broad categories:

1. Increase the number of people and businesses in Downtown Fresno and in close proximity to designated high-capacity Transit Corridors, with a priority on making downtown more attractive to pedestrians.
2. Plan for and build TOD housing developments for a mix of middle and lower incomes, and families.
3. Grow the transit, bicycle and pedestrian mode shares by making it more attractive to use alternate modes.
4. Decrease the drive alone mode share and reduce vehicle miles travelled (VMT) with Travel Demand Management (TDM) programs and policies.
5. Attract residents to Fresno who would be willing to live in market priced TOD-style development, including young urban professionals, seniors, and future high speed rail commuters.
5. Increase the number of residents in Fresno who would be willing to live in market priced TOD-style development, including young urban professionals, seniors, and future high speed rail commuters.
6. Cross jurisdictional and departmental boundaries with processes to link local and regional transportation and land use planning decisions.
7. Restrict the growth of new development on the urban fringes and into farmlands with incentives, disincentives, and growth boundaries.

Next Steps

A two day conference is being planned at the Fresno Art Museum on March 2nd and 3rd of 2011 to present “Tools and Strategies to Achieve Smart Growth in Fresno”. The conference will culminate in a roundtable discussion on “What Will Work for Fresno?” to refine the draft policy objectives. The study is scheduled to be finalized by May 2011

Introduction to the PTIS

- Goals, Objectives, and Evaluation Criteria
- Assessment of Existing Conditions
- Transit Technology and Service Alternatives

1.0 Introduction to the PTIS

1.1 Purpose and Need for the PTIS

Purpose

The purpose of the Public Transportation Infrastructure Study (PTIS) is to identify strategies for land use and transportation investments that will result in measurable reductions in vehicle miles traveled and provide increased mobility for Fresno County residents.

Fresno County is one of eight counties in the San Joaquin Valley Unified Air Pollution Control District (Valley Air District), which currently does not meet several of the air quality standards set forth in the Federal Clean Air Act or the California Clean Air Act. The Valley Air District is a designated non-attainment area for ozone ("serious") and particulates (both PM10 ["serious"] and PM2.5) and is a maintenance area for carbon monoxide. The Valley Air District similarly fails to meet California standards for these pollutants. As a result, the County must satisfy Federal requirements calling for consideration of transportation control measures to reduce emissions and demonstrate conformity with the State Implementation Plan for Air Quality. It follows that whatever transportation projects are considered and ultimately implemented must not deteriorate existing problems and must support efforts to bring the County into air quality attainment. Given auto and truck travel is a major source of critical emissions, the County must consider implementing more-efficient (e.g. increased occupancy, reduced travel times, lower costs), high-capacity modes of transportation that provide competitive options to the auto. Such transportation modes must also address the need to provide suitable alternative travel options to parts of the population who have limited mobility, and parts of the County currently inadequately served by public transportation.

Need for the PTIS Study

Fresno County's population, estimated at 954,000 people, is projected to grow to 1.5 million people by 2050. The Fresno-Clovis Metro region has the most freeway lane miles per capita and local major street lane miles per capita of all the major Cities in California with more lane miles planned and programmed into the long range transportation investment plan. Fresno County and City need new policies, goals and funding priorities that support a new direction in transportation and land use planning, along with education and public awareness of the issues and trade-offs that must occur with the shift away from automobile-dominated transportation planning.

More people will walk, bike and use transit if Fresno considers all modes of travel as they build their future transportation system. People will live closer to the core of the metro region if Fresno builds a transportation system that is designed around all modes of transportation and provides attractive places for people to live in close proximity to transit. Transportation issues exemplify the type of challenge that many cities in California face. The recent passage of SB375 calls all metropolitan planning areas in the state for a commitment to sustainable solutions. Building a transportation system solely with the automobile in mind based on a level of service "C or D" for the peak 15 minute demand is one of the most expensive transportation systems to build and maintain. Fresno City and County need a new approach or thought process for determining what is needed to attain an alternative future that provides transportation alternatives to the car for a majority of the population. Fresno's metro region is a top five leader in the nation with the least amount of commute congestion and travel time and travel speeds of all major metropolitan regions. In fact, the Fresno COG Travel Demand model suggests that in the next 20-30 years the travel speeds of our region will only decrease by one or two miles per hour, whereas in the same timeframe, the Sacramento metro region's travel speeds will nearly be cut in half.

Fresno County currently does not meet air quality standards, including ozone and particulates. As a result, the County must satisfy Federal requirements calling for consideration of transportation control measures to reduce emissions and demonstrate conformity with the State Implementation Plan for Air Quality. It follows that whatever transportation projects are considered and ultimately implemented must not deteriorate the existing air quality and must support efforts to bring the County into air quality attainment.

Given that auto and truck travel account for about one-third of greenhouse gas emissions, the County must consider implementing more-efficient, high-capacity modes of transportation that provide attractive options to the auto. Such transportation modes must provide suitable alternative travel options to parts of the population who have limited mobility, with a focus on higher density and mixed use corridors where large numbers of households and businesses can be well served by transit investments. Currently the majority of Fresno's transit riders use the system out of necessity, rather than choice. To maximize transit ridership and reduce congestion in the future, it will be important to continue to serve and attract ridership among households that need transit, as well as those who might choose to take transit though they can afford to drive.

Fresno County needs to plan, design and implement public transportation services and supportive land use types and development patterns that will support alternatives to single-occupant vehicles, improve mobility for all users, and seek to reduce traffic congestion, urban sprawl, and air quality impacts.

Study Background

The Public Transportation Infrastructure Study (PTIS) was originally conceived in two parts or phases to spur a dialogue between Fresno County and local cities about the possible futures of the region and the steps needed to be taken to shape that growth in a conscious way. Phase I of the study was published in May, 2006 under contract to the Fresno County Council of Governments (FCOG). The Phase I study was a broad overview of the growth-related challenges faced by Fresno County in the next 50 years, comparing Fresno to the cities of Portland, Sacramento, and San Diego to illustrate possible futures. The study identified the need to develop corridor-based strategies for land use and transportation investments and to look at transportation system planning strategies.

The December 2008 Phase II of the PTIS study takes a much more detailed approach in developing regional sustainability goals and policy recommendations for Fresno County. Through a systematic analysis of identified future high-density travel corridors, the PTIS Phase II study makes specific recommendations to achieve various levels of transit, bicycle and pedestrian mode share increases identified in three growth scenarios with related transit investments and zoned land use densities to the year 2035.

Land use densities and residential/employment mix alternatives were developed for three potential high capacity transit corridors:

1) Blackstone Avenue from downtown Fresno to the River Park Transit Center
2) Ventura/Kings Canyon from downtown Fresno to the edge of development (Clovis Avenue)
3) Shaw Avenue from Highway 99 to CSU Fresno, then along Highway 168 to a high density employment destination planned for north Clovis.

A fourth potential corridor between Fresno and Kingsburg along Highway 99 was also assessed for potential light rail or commuter rail, but subsequently dropped from further analysis due to the lack of planned residential and employment densities by the cities along the corridor. The theoretical densities in the corridors were modeled at three incremental levels to predict the changes in travel behavior and mode choice resulting from the high number of residents and employment centers in close walking or transit distance proximities of each other. Transportation modeling for the project was performed, using the Fresno COG 2035 Travel Demand Model. Based on the model results of trips by mode for the three scenarios, recommendations are made for transit investments and service frequencies with associated costs. Air quality improvements for the three scenarios are modeled by the Fresno COG and will be applied to the COG air quality committee tasked with meeting greenhouse gas emission reductions under SB375.

Finally, a list of policy recommendations is put forth by the consulting team for implementation by the City of Fresno and Fresno County in order to realize the future scenarios as described and modeled. Phase II of the PTIS Study began in December, 2008, with final deliverables on the project due by the end of May, 2011.

1.2 PTIS Study Outline

The Fresno PTIS Study follows this basic outline and approach:

1) Introduction to the PTIS Study
   - Goals, Objectives, and Performance Measures
   - Assessment of Existing Conditions
   - Transit Technology and Service Alternatives
2) Alternatives Analysis
   - Transit Technology Alternatives
   - No Build, TSM and Build Scenarios
     - Land Use Scenario Modeling and Analysis
     - Transportation Modeling Outcomes
     - Application of Performance Measures
     - Transit Ridership and Operations Plan
     - O&M Cost Analysis
3) The Locally Preferred Alternative
   - Multimodal Transportation System Plan
   - Sustainability Benchmarks
   - Infrastructure Financing Plan
   - Policy Recommendations

4) Appendices
   - Public Outreach
     - Public Opinion Surveys and Stakeholder Interviews
     - Newsletters, Boards, E-Blasts and Website
     - Events, Workshops and Presentations

   - Feasibility Study for a Downtown Fresno Streetcar
   - Bus Rapid Transit Very Small Starts Application
   - Personal Rapid Transit Test Application at CSU Fresno

1.3 Goals, Objectives, and Performance Measures

Study Goals – From the Fresno Blueprint Process

Starting with the rationale for the Fresno PTIS framework and the Fresno Blueprint, a set of five goals were identified for this study. One additional goal "To improve air quality" was added subsequent to passage of SB375 and AB32 requiring all MPO's to submit a plan to reduce greenhouse gas emissions to pre-1990 levels. For each goal, multiple objectives were identified. From the Fresno Blueprint process, the following goals were applied to this study:

1) Increase personal mobility by providing functional access to work, education, health care, recreation, and other essential services for all County residents.

2) Implement viable public transportation projects that will increase and integrate other modes of transportation including bicycle/pedestrian and multiuse trails and increase access to transit and principal activity centers.

3) Propose economical, efficient, and convenient alternatives to private automobiles.

4) Enhance public transportation connectivity to existing or planned (transportation) services and facilities.

5) Maintain and enhance public transportation over a 50-year planning horizon.

6) Improve air quality in the region.

The goals and objectives contributed to the development of potential performance measures or evaluation criteria. The purpose of performance measures is to measure the success of each strategy explored in order to determine the best approach, or preferred alternative, for the region. Under new regulations by several Federal agencies, this approach is used to identify "Benchmarks" for achieving sustainability for a planning area. Sustainability is discussed in terms of environmental sustainability, with an overall goal of reducing vehicle miles travelled and increasing the number of trips taken by transit, on foot and by bicycle in order to reduce greenhouse gas emissions, improve air quality, and reducing our impact on the built environment.

Study Objectives – From the Study Team

- Evaluate current and realistic future potential usage of public transportation based on current build-out of general plans in Fresno County communities.
- Define, evaluate and identify the most economical, convenient, effective, and efficient public transportation services to address the forecast demands.

- Promote transit-oriented development, transit-supportive corridor and neighborhood design, and multi-modal network and street design.
- Encourage local jurisdictions to implement the goals, objectives and policies contained in the Regional Transportation Plan relating to bicycle and pedestrian facilities.
- Support County Health Department efforts to promote walking and cycling as healthy transportation and recreational alternatives.
- Integrate bicycle facilities such as bicycle racks on and in transit vehicles and at transit stations.
- Encourage public agencies to adopt pedestrian-friendly development and transportation network guidelines and standards within public transportation corridors.
- Promote intermodal facilities including integration of park and ride, rideshare, bicycle, rail and transit centers.
- Promote the coordination of service, scheduling, pricing, universal fare collection and infrastructure.
- Support and integrate new services with High-Speed Rail and the downtown Fresno rail station.
- Expand public transportation to new growth areas and areas without such service where need exists and can be reasonably met.
- Provide transportation alternatives that provide convenient, fast, efficient, and reliable access to essential functions and services, emphasizing special needs communities.
- Expand and promote Transportation Demand Management (TDM) programs and strategies that provide incentives to developers to integrate multimodal access elements into projects.
- Encourage private sector participation in shuttles and connections to public transportation.
- Develop regional traveler information systems.
- Identify and evaluate practical and cost-effective public transportation connections.
- Promote preservation of major transportation corridors for multiple technologies (rail, bus, HOV).
- Encourage rail consolidation.
- Identify and support public/private partnership opportunities that provide funding for operations, maintenance and capital expansion of public transportation and help sustain regional economic vitality.
- Align the Regional Transportation Plan to fund the PTIS recommendations as critical elements of the capital improvement plan for the region.
- Promote transit-oriented development, and encourage Fresno County jurisdictions to adopt transit-supportive land use designations, pedestrian-friendly development and transportation network guidelines and standards within public transportation corridors.
- Maintain and grow the fare box revenue percentage through careful ongoing service planning to match fiscal realities.
- Enhance the vehicle fleet to minimize the greenhouse gas emissions and minimize net energy usage of the public transportation system.
- Help expedite the development of advanced transit systems such as personal rapid transit, and other fully automated transit networks.
- Determine phasing of public transportation for short term (10 yrs), mid-term (20 yrs), and long term (50 yrs) growth based on current general plan build-out.
- Estimate costs to implement plans and possible funding sources

Performance Measures – For Application to the Scenarios

The following performance measures were identified to be used as benchmarks to evaluate the performance of the three land use scenarios:

Travel Data

- Average weekday total transit trips
- Transit mode share
- Growth in ridership
- Total walk/bike trips
- Walk and Bike mode share

Demographics/Land Use

- Number of residents and dwelling units/acre within BRT corridors and downtown
- Total jobs and employment per acre within BRT corridors and downtown
- Percent of housing in mixed use developments
- Percent of jobs in mixed use development

User Benefits

- Person-hours of delay (vehicle and transit) per person
- Cost per mile of travel (compare driving versus transit)
- Travel times or speeds between selected origins and destinations (compare driving versus transit) in the TOD corridors

System Performance

- Vehicle Miles Traveled (VMT) system-wide or per person
- VMT in congestion, percent of travel in congestion

Operations & Maintenance – BRT vs LRT

- Capital costs
- Annualized total capital cost
- Total annual cost per rider
- Total annual cost per new rider
- Operating cost per transit passenger mile

Emissions (to be prepared by COG)

- Change in greenhouse gas emissions by scenario

2.0 Existing Conditions in Fresno County

The Existing Conditions section describes existing transit service providers, existing travel markets and travel patterns and existing land use and development patterns in Fresno County. These conditions establish the background for the analysis of transportation needs analysis and the alternatives analysis.

2.1 Existing Transit Service Providers

There are a total of seven agencies or companies providing transit services in Fresno County, and dozens of transit providers, both public and private. Transit service operators in the greater Fresno area include Fresno Area Transit (FAX), Clovis Transit System, Amtrak, Greyhound, Kings County Area Transit (KART), and Fresno County Regional Transit Authority (FCRTA). In addition, a significant and growing program run by KART/AITS subsidizes vanpools and carpools to select work destinations.

Fresno Area Express (FAX): FAX is the largest provider of transit services in the region, with 18 million annual boardings and an operating budget of approximately $43 million per year. An efficient operation for its size, FAX service consists of 17 fixed routes in the City of Fresno with three major hubs: the downtown transit mall, the Manchester transit station along Blackstone Avenue north of downtown, and a transfer point at the River Park shopping center in north Fresno. A fourth transfer center, the “Transit Village”, includes 129 units of affordable housing for seniors, is planned in the Ventura/Kings Canyon Road Corridor.

Under Measure C local tax initiative, senior fares are 60 cents, and the standard adult fare is just $1.25, considerably below market compared to other cities this size. Children under age 6 also ride for free, and the disabled pay just 60 cents. There is no express bus service for commuters, and no park and ride lots. Regular service stops at 10:00 pm (for high-demand routes) and 7:30 pm (on lower demand routes) on weekdays and 7:00 pm on weekends. These service characteristics limit the viability of transit for many workers, students and low-income people who need public transportation outside of current operating hours.

There are no express buses in the FAX system for commuters, and all buses operate as local service, with frequent stops.

Clovis Transit System: Two transit lines serve the Clovis area. Stageline operates along fixed routes with regularly scheduled stops. Round Up is a demand-response service for senior (age 65+) and disabled residents who call in advance to schedule trips. The Stageline service operates weekdays from approximately 6:15 am to 6:15 pm. FAX route 28 operates in Clovis on Shaw Avenue weekdays from 6:30 am to 7:30 pm and weekends from 8:11 am to 3:15 pm. The fare for the general public from age 6 to 64 is $1.25 per one-way trip. Seniors 65 and over and children under age 6 ride for free. Seniors and disabled ride for $.50 with proof of disability. Clovis Transit does not accept the Fresno Area Express regular monthly metro pass and all transit trips between Clovis and Fresno require a forced transfer between to the two systems and delays that make transit unattractive to most users.

Amtrak: makes four daily roundtrips between Bakersfield and Oakland daily. A one-way ticket from Bakersfield to downtown Fresno costs about $19.00.

Greyhound: Operates inter-city bus service, with a dozen daily departures from Fresno for Bakersfield and seven departures from Merced to Fresno. Service to communities not located on the Highway 99 corridor is more limited, but still available. The fare from Fresno to Bakersfield is over $20.00.

Kings County Area Rural Transit (KART): Serves Fresno, Selma, Layton, Hanford, and Visalia. Provides two round trips each weekday to Layton (in Fresno County) and one weekday trip to hospitals in the City of Fresno. The KART Hanford to Fresno Hospitals operates at 1.6 passengers per hour, a very low productivity rate.

Fresno County Rural Transit Agency (FCRTA): Provides rural transit service in Fresno County through a Joint Powers Agency consisting of 13 incorporated cities and Fresno County. Operations are contracted out to 18 separate providers, both public and private. Under recently approved Measure "C" sales tax funding Fresno COG has initiated its own vanpool program (that was previously provided by FRCTA). Transit providers under FCRTA include the cities of Auberry, Coalinga, Firebaugh, Fowler, Huron, Herman, Kingsburg, Laton, Mendota, Orange Cove, Parlier, Reedley, Sanger, San Joaquin, Selma, South Sierra, Southeast, and Westside.

The individual city systems typically have a fixed-route component and a Dial-A-Ride component. The fixed-route systems link each city with the City of Fresno with one bus in the morning and one bus in the afternoon. The Dial-A-Ride Program is free to riders, providing transportation services within the city limits of Coalinga and operates five (5) days a week Monday thru Friday from 8:30 a.m. thru 4:15 p.m. with the exception of holidays to persons with disabilities and to senior citizens 65 years of age or older. The Dial-A-Ride Program is designed to take passengers to and from local social events, community services and personal local appointments.

Regional Agency Formation Study: In May of 2007 the Council of Fresno County Governments contracted with Nelson Nygaard to study the possibility of consolidating FAX, Clovis Transit and FCRTA (the three transit agencies operating in Fresno County) into one agency for the purpose of improving coordination of services. In spite of obvious benefits to users of the transit system, consolidation has not been embraced by the agencies themselves.

A second study on transit consolidation is currently under way to assess the opportunities and challenges of consolidated services to connect Fresno, Clovis and the rural transit system operators.

Existing Demand for Carpools and Vanpools

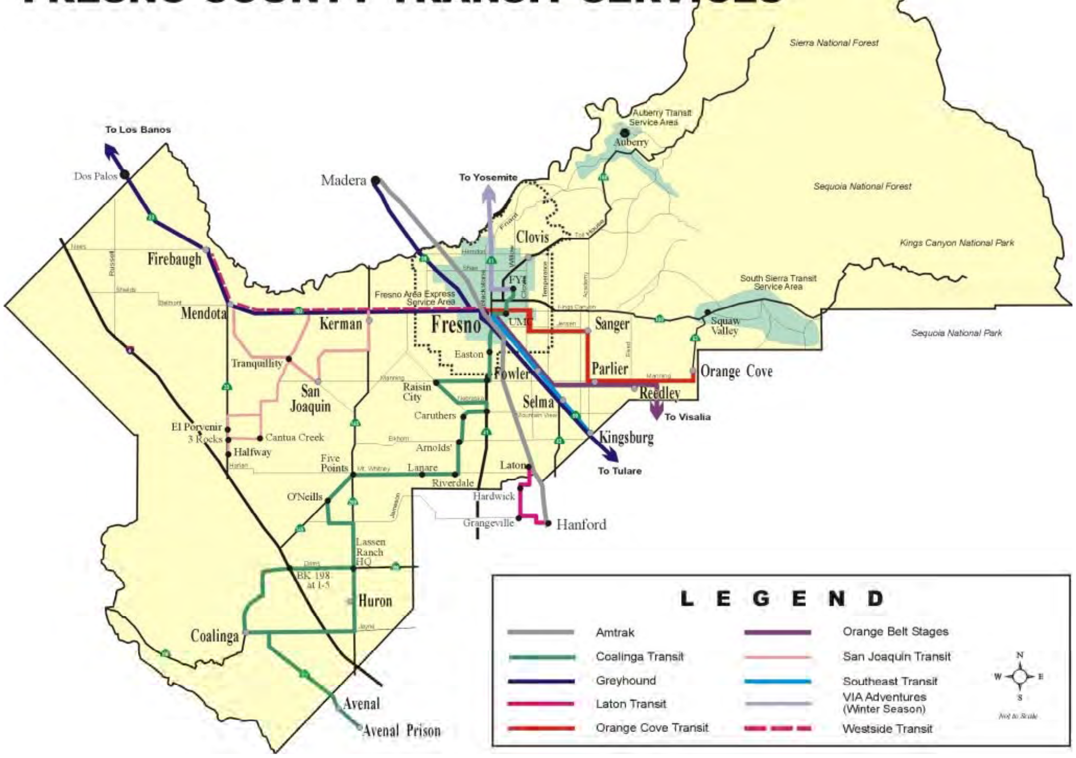
Table 1: 2003 Survey Target Mode Shares

Mode	Work		Non–Work		Total	
Drive Alone	351,445	82.0%	1,108,956	34.2%	1,460,401	39.8%
Shared Ride 2	40,135	9.4%	850,318	26.2%	890,452	24.3%
Shared Ride 3+	20,353	4.7%	991,317	30.6%	1,011,670	27.6%
Transit Walk Access	8,709	2.0%	21,580	0.7%	30,289	0.8%
Transit Drive Access	88	0.0%	218	0.0%	306	0.0%
Bicycle	2,056	0.5%	16,447	0.5%	18,503	0.5%
Walk	6,017	1.4%	253,503	7.8%	259,520	7.1%
	428,803	100.0%	3,242,339	100.0%	3,671,142	100.0%
	12%		88%			

These results from the COG's 2003 travel survey are the foundation of the mode split assumptions used in the Fresno COG travel model. The high percentages of trips taken with shared rides, particularly for non-work trips indicates a significant demand for carpools and vanpools in Fresno, far exceeding the transit mode share.

Figure 1:

FRESNO COUNTY TRANSIT SERVICES



KART/AITS Vanpool Program: Operated by Kings County Area Public Transit Agency (KCAPTA), and Agricultural Industries Transportation Service (AITS), a joint powers agency made up of Kings County and the cities of Hanford, Lemoore, and Avenal. The agency also has agreements with the Counties of Madera, Fresno, Tulare and Kern. With a $3.2 million budget for general workers and $3.6 million for farm workers in 2008, the service has approximately 350 vehicles, most of which are 15-passenger vans, carrying more than 900,000 trips per year. Just over 100 vehicles serve agricultural workers. The agency leases and maintains the vehicles, but they are operated by commuters. The State of California subsidizes workers $65 a month for the cost of vanpools. Another subsidy program for farm worker vanpools covers half the cost of the program and charges workers a fixed fee of $25.00 per month.

In 2001, KCAPTA initiated its vanpool program with several vanpools transporting State workers to prison facilities in Corcoran and Avenal. The vanpool program expanded in 2002 with the successful funding of the AITS project. This project focused on farm workers and was undertaken in cooperation with Tulare County. KCAPTA now provides between 300 and 350 vanpools. In the San Joaquin Valley, vans travel between multiple counties, including Fresno, Kern, Kings, Madera, and Tulare. Vans also operate in Monterey and Ventura Counties and will soon be initiated in Sacramento County. The number of farm worker vanpools varies between 80 and 140 vans throughout the agricultural season. Riders are comprised primarily of State and federal workers, teachers, college students, and casino workers.

The long-term viability of the vanpool program is insured through the shared use of vans between traditional (i.e., prison) vanpools and AITS vanpools and through the potential use of SB716 funds. Vans are initially acquired through a five-year lease/purchase or purchased using AITS grant funds. Traditional vanpools lease/purchase vans while farm worker vanpools use grant-funded vans. Vanpool expenses are billed monthly to the traditional vanpools. Farm worker vanpools pay weekly based on the number of miles driven. Rates are adjusted as necessary to cover costs. All passenger subsidies are used to reduce participant costs and do not generate additional revenue for KCAPTA.

What started as a local experiment to see if vanpools could be used by farm workers to travel to and from work, has grown into a successful regional vanpool operation that benefits residents in several counties. Ridership has grown to include all forms of work trips connecting riders of adjoining cities and counties. The only requirement for becoming a vanpool driver is that he/she must be traveling to or from a member county, have a Class C license, Class B medical exam, clean driving record, and the ability to make payments on time. Who rides, and where and how far they travel is up to the vanpool group.

The vanpool operation continues to grow and is now seen as a key part of the San Joaquin Valley's effort to reduce single-occupancy vehicles and traffic congestion, and to meet future air quality emission reduction requirements. The current vanpool program does not require outside funding for its operation, and it is not anticipated that any member agency would be obligated to provide funding to the new agency. This would not prevent an agency, however, from providing support if it so chooses. An example of this is the Council of Fresno County Governments' Measure C support of vanpools originating in Fresno County, or the Tulare County Association of Governments' annual contribution to promote ridesharing. In addition, KCAPTA staff has secured San Joaquin Valley Air Pollution Control District grants, Congestion Mitigation and Air Quality grants, and Job Access and Reverse Commute grants.

2.2 Existing Fresno Travel Markets

For the purpose of this study, transit travel markets are defined by their unique characteristics:

1) Transit Commuters by Necessity
2) Transit Commuters by Choice
3) Discretionary Riders (includes recreational trips, visiting friends, etc.)
4) Institutional Riders (trips to doctors, schools or social service appointments)

A discussion of transit riders or the transit market is typically described in these four groups with distinct travel needs: commuters by necessity, commuters by choice, institutional riders and discretionary riders. Commuters are discussed in terms of travel distance; intra-city commuters and inter-county Commuters.

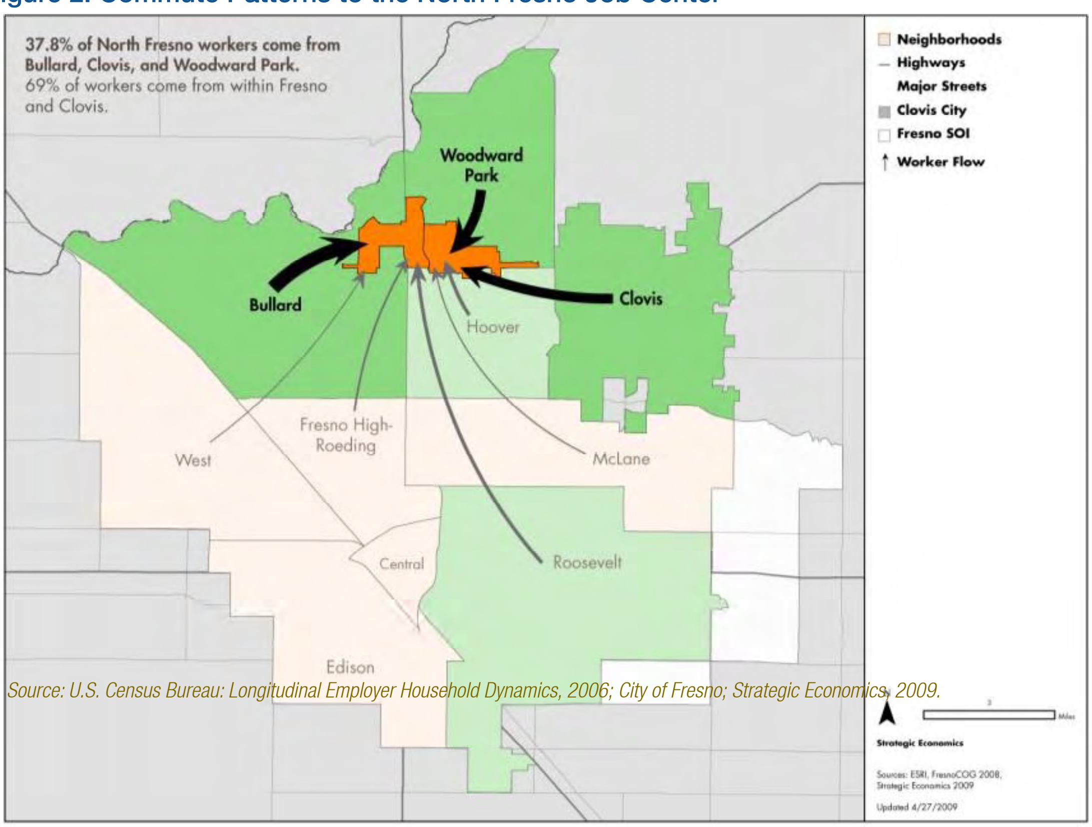
1) **Transit Commuters by Necessity** (also called captive riders) are defined as individuals who cannot afford a car (families or individuals living below the poverty line) or households with two primary wage earners who own only one car. These people take transit because they have no choice. As of the 2000 Census, the median income for a household in the city of Fresno was $32,236, and the median income for a family was $35,892. Males had a median income of $32,279 versus $26,551 for females. The per capita income for the city was $15,010. About 20.5% of families and 26.2% of the population were below the poverty line. In addition, 36.5% of the population that is under age 18 and another 10.7% of those aged 65 or over. Fresno's total captive transit market represents 73.4% of the population. This is a considered a very large captive transit market.

   The United States Census Bureau issued a report entitled the American Community Survey in 2007, which found that six San Joaquin Valley counties had the highest percentage of residents living below the federal poverty line in 2006. The report also revealed that the same six counties were among the 52 counties with the highest poverty rate in the United States. Commuters by necessity are fairly well served at a low cost with the regional vanpool and carpool programs, and a very low cost local bus system (FAX). Some minor improvements to existing programs could make these options very attractive for a minor additional investment.

2) **Commuters by Choice** can afford a car and typically own at least one, but for economic or environmental reasons, they choose to take transit anyway. Riders by choice are typically commuters who make a decent wage and have a lower tolerance for delays and slow travel times by local bus, and will take an express bus if available. Commuters by choice are not as well served in Fresno. Without express bus service or dedicated bus lanes on the streets or on the highways, transit riders are stuck in the same congested traffic as car drivers are, and buses typically take twice as long as a similar trip by car, simply because of the number of stops a bus must make, and the difficulty of re-entering the traffic stream during congested peak travel times. There is likely a large unmet travel demand for high-quality express transit service in Fresno.

   In most larger urban areas a specialized high-quality transit service is offered to attract riders who would choose to take transit, in spite of having a car at their disposal. Riders by choice demand top-quality transit service that competes favorably with the car, both in door to door travel time and perceived operating cost. This travel demand market is not met in Fresno. All of FAX and Clovis bus routes are local in nature and do not offer competitive service to the automobile. This quality of service has been attempted by FAX service planners in the past, but with poor ridership results, so service was scrapped. Without much congestion in Fresno, bus service has a hard time competing with the automobile in terms of travel time comparisons and convenience.

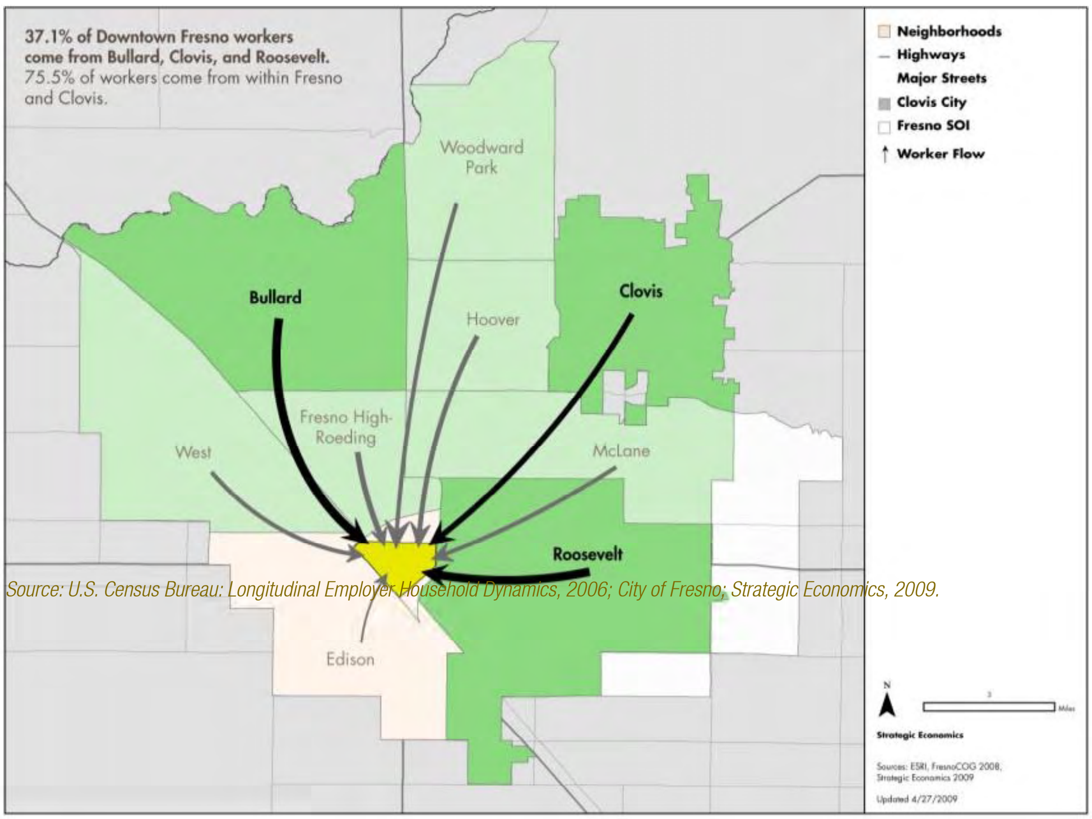
Figure 2: Commute Patterns to the North Fresno Job Center



Source: U.S. Census Bureau: Longitudinal Employer Household Dynamics, 2006; City of Fresno; Strategic Economics, 2009.

3) **Fresno's Intra–City Commuter Market** is defined as home to work based trips that occur within the developed Fresno metropolitan area, which includes the City of Clovis. Two top employment destinations were identified: one in Clovis along Herndon Avenue and the other in downtown Fresno. Analysis by the project team shows that 37.8% of north Fresno workers travel from nearby Bullard, Woodward Park and Clovis areas, as illustrated in Figures 10 and 11 below. These trip patterns identify the key commute corridors that would be well-served by high quality transit that could compete well with the automobile in order to capture riders by choice.

Figure 3: Commute Patterns to the Downtown Fresno Job Center

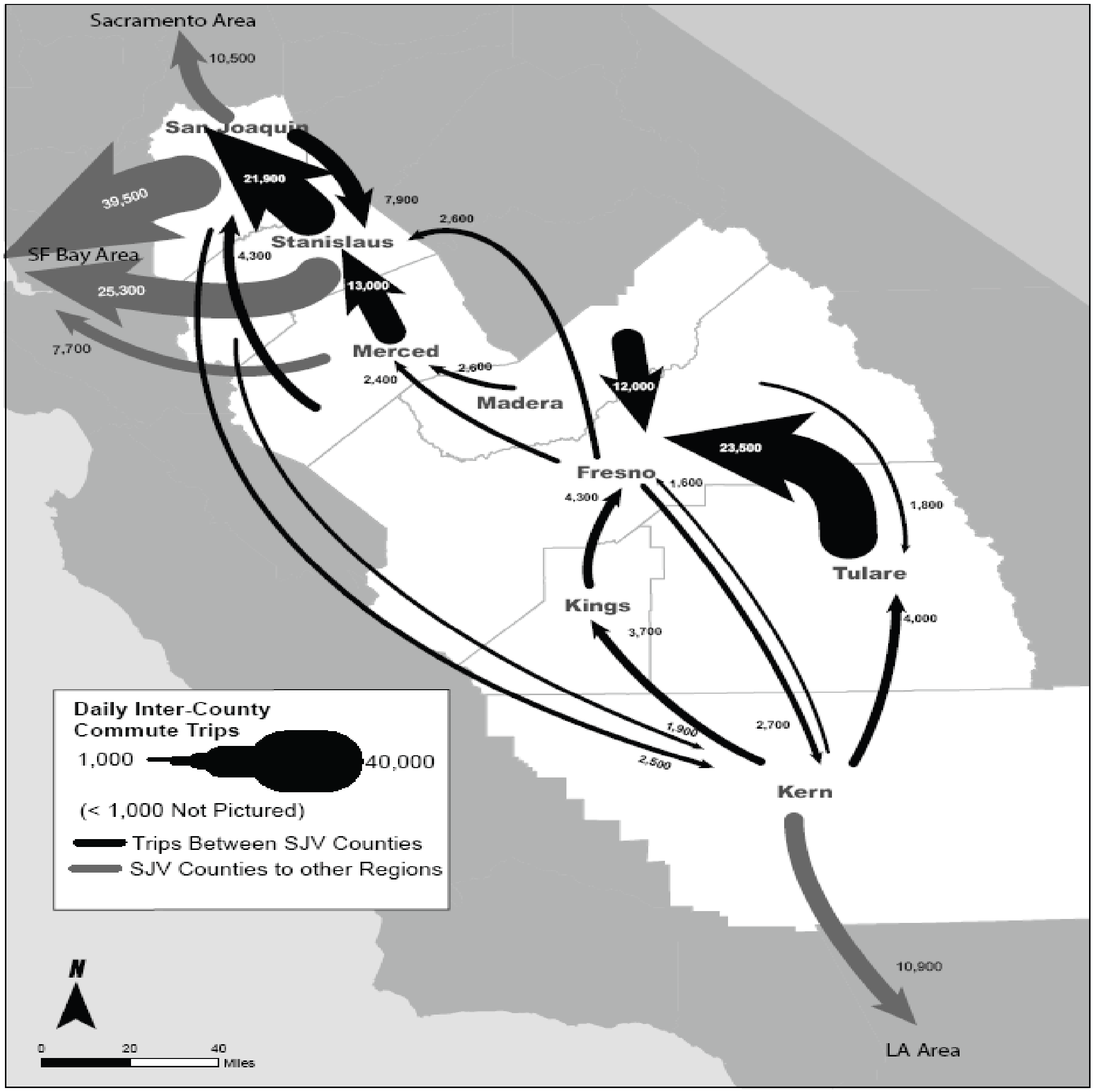


Source: U.S. Census Bureau: Longitudinal Employer Household Dynamics, 2006; City of Fresno; Strategic Economics, 2009.

The Inter-County Commute Market. Recent transportation studies in the area have identified a significant and growing commute travel pattern into Fresno along Highway 99. The May 2009 Study "San Joaquin Valley Express Transit Study" estimates that about 5,000 commute trips leave Fresno County each day for Stanislaus County (1,500), Merced County (1,300), Tulare County (1,115) and Kern County (1,200).

However, Fresno County, as the major employment center for the region, attracts far more commuters than it exports. Approximately 23,0000 more commuters travel from Madera County (6,500), Kings County (2,800) and Tulare County (14,000).

Figure 4: Projected Inter-County Commute Trips 2030



Nelson|Nygaard consulting associates

Data Source: Cambridge Systematics Statewide Model
GIS Source: ESRI, CASIL

Forecasts for 2030 see dramatic increases in inter-county commuting. It is projected that the largest inter-county markets are Tulare to Fresno (24,000 daily trips) and Madera to Fresno (12,000 daily trips). The number of workers coming to Fresno County from surrounding counties is expected to grow to nearly 40,000 by 2030. Daily commute trips to Fresno along Highway 99 are expected to double from the current 2,400 trips per day from non-urban Madera County by 2030.[1]

[1] *Cambridge Systematics Statewide Model. GIS Source: ESRI, CASIL*

3) **Discretionary Riders** take transit to shopping, recreational and entertainment destinations. Sometimes discretionary riders are either too old or too young to drive. They typically travel at off-peak times during the day and do not mind the extra travel time the bus takes but choose to take the bus because of the lower cost. Discretionary riders are commonly seniors during the daytime hours and teenagers after school hours, going to the local mall or after school jobs.

   Fresno County contains many recreational destinations of significance, including Yosemite National Park, and a dozen others. Transportation is one of the major issues facing many of the national parks. The growing numbers of visitors to the national parks is increasing congestion on the roads leading to and inside the parks. Automobile congestion brings air quality issues and several of the nation's parks have visibility and health issues now associated with the influx of visitors. This is particularly evident in Yosemite National Park, which has as many as four million visitors each year.

   The Yosemite Area Regional Transportation System (YARTS) is a regional joint powers authority formed by Mariposa, Merced, and Mono Counties to implement transit service to Yosemite from surrounding communities. The YARTS experience has been a positive one that Fresno COG is looking to replicate to other recreational destinations. Since it began operating in May of 2000 YARTS, now in its 10th year, has provided an alternative to driving to over 515,000 riders traveling in the Yosemite Region.

Other recreational destinations that could benefit from improved transit service include:

- Kings Canyon National Park
- Sequoia National Park
- John Muir Wilderness Area
- Millerton Lake Recreational Area
- San Joaquin River
- Kings River
- Shaver River
- Huntington Lake and the Kaiser Wilderness Area
- Pine Flat Reservoir
- Mendota Wildlife Reservoir

Recreational destinations in the Fresno metro area include the Fresno Convention Center, California State University sporting events, Chukchansi Park (Grizzlies Baseball Stadium), Fresno City Zoo, Island Water Park, Roeding and Woodward Regional Parks, Kearney Park and Lost Lake Park along the San Joaquin River.

4) **Institutional Riders** take transit for visits to doctors, for classes at schools and colleges, or to get to social service appointments. Institutional riders typically must meet an appointment schedule and are significantly inconvenienced if they are delayed or if bus service is cancelled. Institutional riders are typically willing to pay more for more reliable and faster service. They are frequently transit dependent.

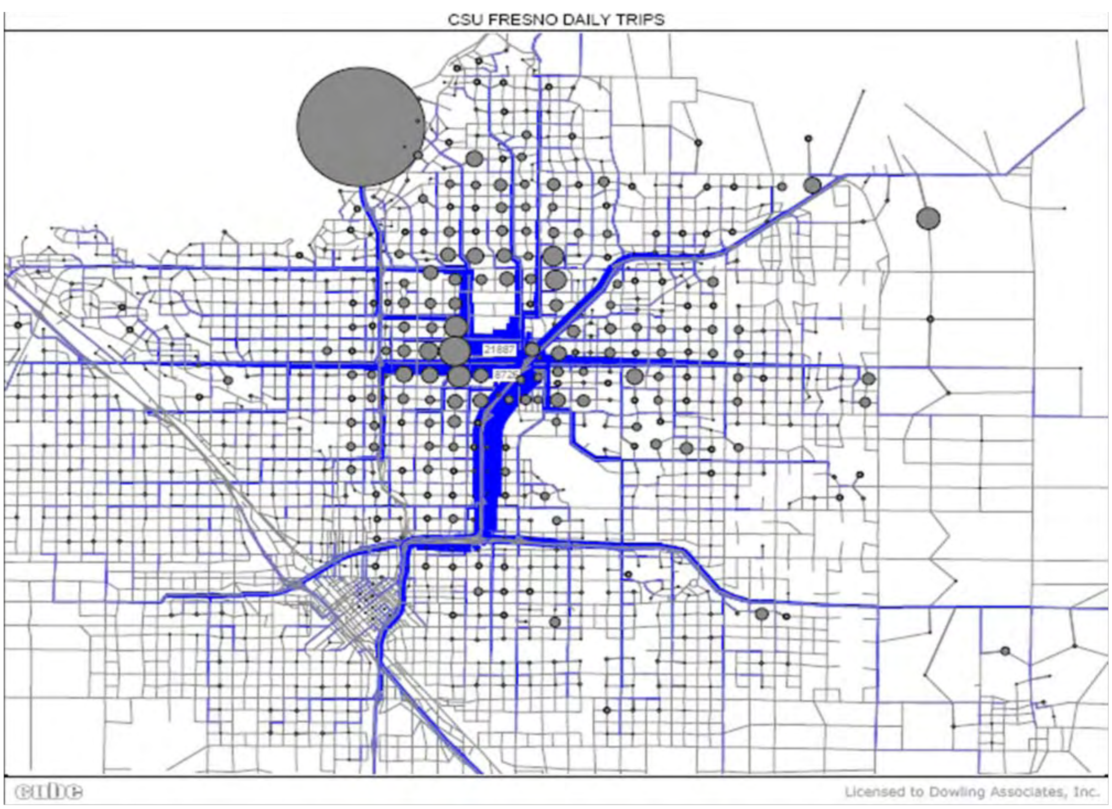
   FCRTA provides local service to institutional riders in many smaller communities in Fresno County, with some variation in service hours and type between communities. Most provide local response service on weekdays. Kingsburg and Selma also offer demand response Saturday service. Demand response service in the greater Fresno area is available to all residents in outlying communities to get to doctor's appointments, grocery shopping, or other basic needs. Use of the system has no user requirements, like proof of a disability, proof of age and/or an ID card. Patrons wanting a ride simply make a call to the call center when they want to go with no advanced notice requirement.

CSU Fresno

The California State University campus at Fresno represents a unique set of travel patterns and a highly concentrated transit-dependent population of institutional riders. With about 20,000 students currently enrolled and another 10,000 students expected to be added at this campus in the future, parking, congestion and campus circulation are ongoing issues. The January 2008 Campus Master Plan calls for the addition of five more parking structures scattered throughout the campus to handle the expected demand for student parking on campus. A need for a transit center on the campus and bicycle parking has also been identified.

There are four transit routes currently serving the CSU Fresno campus. Clovis Transit Route #10 circulates through the city of Clovis and then makes a loop along Barstow through the campus to Shaw Avenue. FAX Route #9 links the campus to lower income residential areas on the west side of Highway 99 along Shaw Avenue. FAX Route 28 links the campus with downtown Fresno and the Manchester Transit Center, stopping on the south end of campus on Shaw Avenue. And, FAX Route 38 links the campus with the River Park Transit Center and downtown Fresno with stops on the west side of the campus along Cedar Avenue.

Figure 5: CSU Fresno Daily Trip Origins

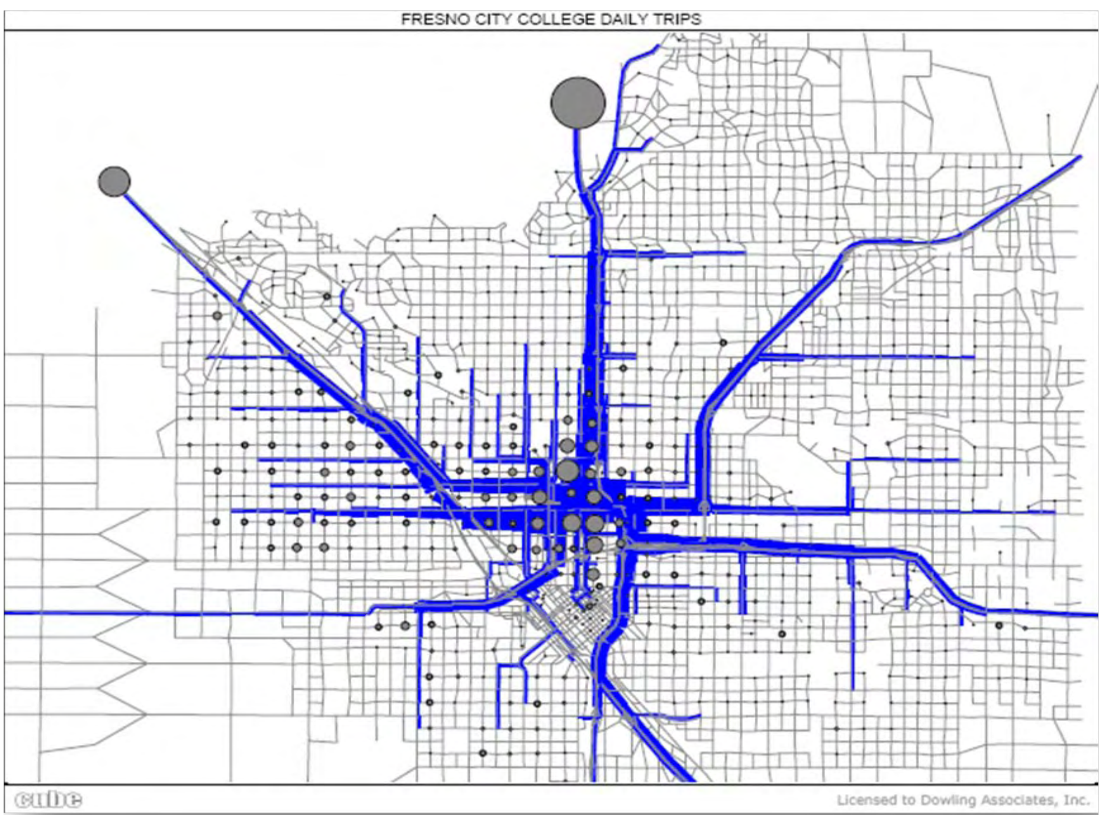


A travel demand model run for trips destined to the CSU campus shows heavy concentrations of student housing around the campus within about a 3-mile radius, and a large number of students commuting to the campus from points north along Highway 41. Figure 2 above identifies areas of need for transit service where none currently exists. Recommendations for improving transit service to the CSU Campus include: 1) implement a circulator shuttle in the 3-mile area around the campus, linking to destinations in the center of the campus; 2) survey students who commute in to the campus from points north to determine if there are common trip origins for grouping student pickups for either a vanpool program or commuter express-type bus service for these trips; and 3) Adoption of a Travel Demand Management (TDM) program on campus to provide incentives to take transit, including assessing an impact fee for parking which will offset program costs. A bicycle circulation study around the campus area is also recommended to improve student's comfort with riding bikes to school.

Fresno's Community College Campuses

Fresno City College, or FCC, is a community college in Fresno, California. The main campus is situated in the heart of Fresno, near the Tower District. Four other campuses in the community college system include Reedley College, Willow International Center, Madera Center and Oakhurst Center. FCC is part of the California Community Colleges system within the State Center Community College District (SCCCD). Student enrollment for the combined campus locations was 21,624 in 2007-2008 (13,379 full-time equivalent) plus about 326 teachers.

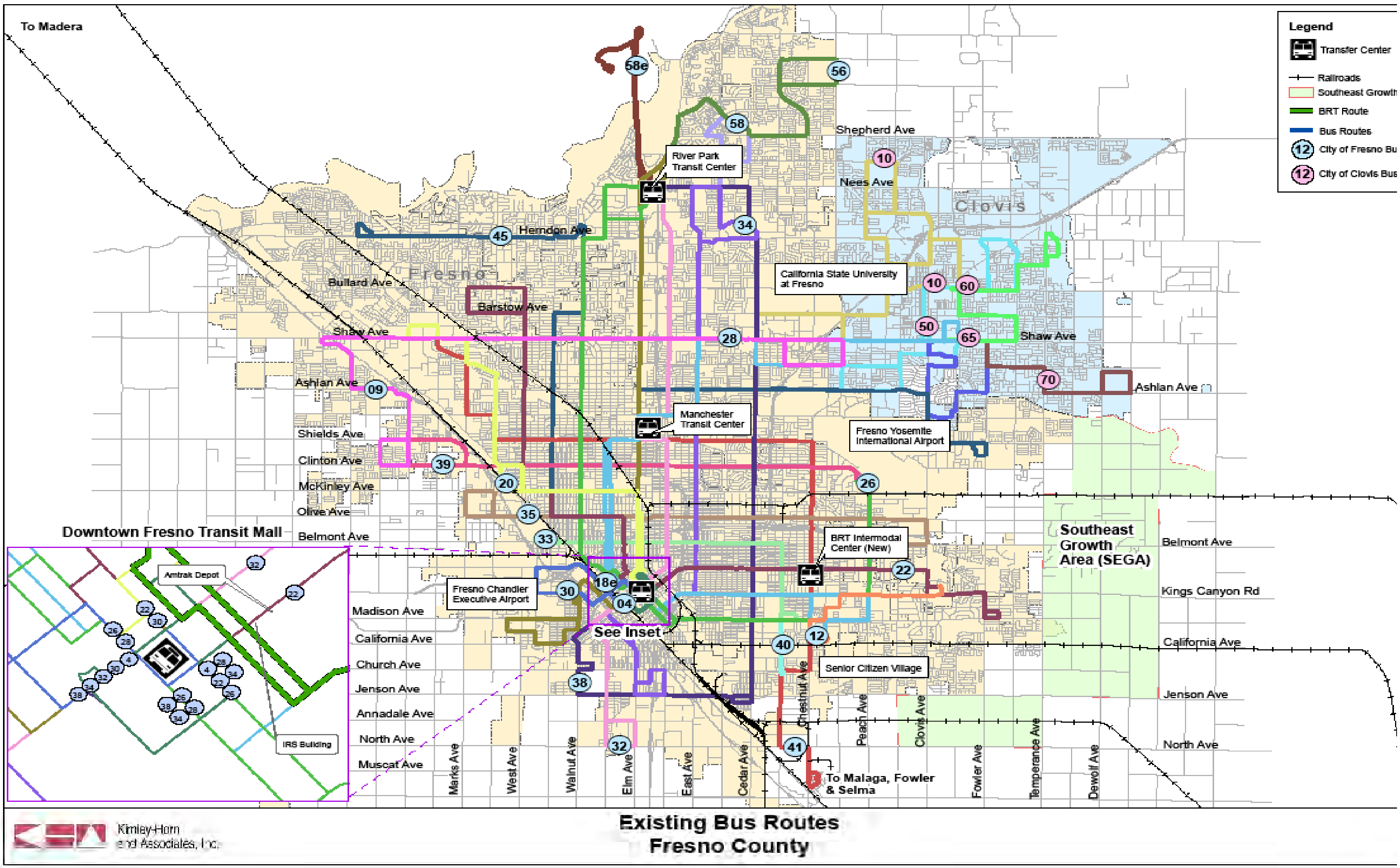
Figure 6: Fresno City College Daily Trip Origins



Travel patterns to the City College Campus location are illustrated in Figure 6 above. The City College Campus trip origins more dispersed than the CSU Fresno trips, with students coming to the campus from points north along Highway 41, Highway 99, from Clovis and other points east and south. Some students do live near the campus and would benefit from local transit service. This area is well served by transit with five FAX bus lines within a block of the campus: Routes #30, #39, #20, #45 and #26. However, there are no direct bus routes from the City of Clovis for students who live in Clovis and attend Fresno City College.*

**Route 28 provides direct service to Fresno City College from Kings Canyon/Venture, Downtown Fresno, Van Ness and Fulton, Shields and Blackstone/Dakota/1st Street to Shaw. Clovis residents would take Clovis Route 10 and transfer to Route 28 at CSU Fresno.*

Figure 7: FAX and Clovis Existing Transit Routes



Kimley-Horn and Associates, Inc.

3.0 Existing Transit Supportive Development

An assessment of development densities in residentially zoned land in Fresno County revealed that rural Fresno County does not yet exhibit development patterns that will support high volume modes of travel. Also lacking is the concentration of activity centers that could support lower volume, advanced technology circulator systems. Employment densities are probably more important than residential densities when considering high volume BRT and rail modes. It appears that, at minimum, central business districts with 15,000 to 20,000 jobs per square mile (found in San Jose and Phoenix, respectively) are necessary for light rail to be considered[2]. Fresno City and County currently fall short of these thresholds.

The City of Fresno currently has about 43,000 employees and 19,000 households in the Central Business District. By comparison, the City of Portland has 145,000 employees and 27,000 households in their central business district. Currently Fresno County carries 2.17% all trips to work on transit while Portland carries 20% of its work trips on transit.

Changes can be brought about to provide for development patterns that will support certain higher capacity transit modes in metropolitan Fresno. In fact, in some corridors within the city of Fresno, demand appears high enough to support Bus Rapid Transit (BRT) service at 10-minute peak hour frequencies. FAX has applied for federal funding support to implement the first major BRT service and capital improvements in the next two to three years along Blackstone Avenue heading north from downtown and Ventura/Kings Canyon, heading east from downtown Fresno. The most promising BRT corridors generate transit demand from a combination of high transit dependency (due largely to low auto availability), concentrations of commercial and retail uses along the proposed BRT arterial, and also concentrations of employment in downtown Fresno, which would be served by proposed BRT routes.

3.1 Existing Transit Technologies in Fresno

Standard buses and demand responsive vans and minibuses are currently the dominant transit technologies in Fresno because they are most effective in meeting both the type and level of demand. Currently, bus transit is the primary transit technology in use in metropolitan Fresno County. The common bus type operated on fixed-route service is an approximately 35- to 40-foot, compressed natural gas (CNG) or clean diesel powered vehicle. This vehicle is often referred to as a standard transit bus. To provide paratransit services (for seniors and the disabled) in the Fresno-Clovis metropolitan area and both paratransit and demand responsive services in smaller communities elsewhere, smaller vans and minibuses powered by gasoline, diesel or CNG are used. About the only other transit technologies commonly operating within Fresno County are over-the-road transit coaches (diesel) and passenger rail trains (diesel-electric) for long-distance intercity or interstate travel.

[2] *Other central business district job densities are: San Diego-33, 179 and Sacramento-30, 364.*

Alternative Analysis

- **Transit Technology Alternatives**
  – Feasibility Assessment of Rail Service to Kingsburg
- **No Build, TSM and Build Scenarios**
  – Land Use Scenario Modeling and Analysis
  – Transportation Modeling Outcomes

4.0 Alternatives Analysis

4.1 Summary of Transit Technology Alternatives

This section reviews the various transit technologies and service alternatives that might have future application in Fresno County. The focus is on local/regional transit opportunities and not long-distance mass transportation services like high speed rail. This is to keep the analysis in line with the scope of the Public Transportation Infrastructure Study (PTIS), Phase 2. Also, although the review presents a long list of technologies found throughout the U.S., it targets the more limited number of technologies that appear most suitable given the development patterns of metropolitan Fresno and, to a lesser extent, of smaller Fresno County communities.

Table 2 summarizes the characteristics of thirteen transit technologies in the US. Of these, twelve are fairly common in major US cities, and one, PRT, is still considered experimental technology in the US and Europe. From left to right in the table, the technologies are listed generally in terms of vehicle and also line capacity, although line (or route) capacity can be highly variable and depends on service frequencies. Certain technologies, which can operate at very high frequencies, will offer greater line capacities than other technologies that actually have higher per vehicle capacities.

Selection of an appropriate transit technology for an urban area is dependent on a range of factors including, most importantly, predicted ridership from serving high-demand destinations in dense areas. The more densely developed or attractive an area is, the greater the justification to invest in a transit technology that carries a large number of people at high frequencies and fairly high speeds that compete with personal car travel times and attractiveness. Large numbers of riders result in higher cost efficiencies of the transit operation, which helps to qualify the project for federal funding in a highly competitive nationwide process.

At one end of the passenger rail spectrum are streetcars, which usually operate on existing city streets, sharing the right-of-way with autos and trucks, and are limited to one- or two-car trains. Individual vehicle capacities can exceed well over 100 passengers, but train frequencies tend to be limited due to the challenges of operating in mixed-flow traffic environments with multiple traffic lights. In the middle ground are light rail and commuter rail systems. Light rail vehicles can carry over 150 passengers on trainsets of typically two to three vehicles, for total capacities of 300 to 500 passengers.

Commuter rail vehicles include passenger cars seating 100 or more (standees on commuter rail trains are assumed to be avoided or kept to a minimum), linked together in trains of five to eight or more cars for a total train capacity similar to heavy rail. Line capacity per hour is usually less due to lower train frequencies. Diesel multiple units (DMUs) are an alternative to conventional commuter rail and even light rail technologies. Each vehicle or married-pair vehicle (essentially two cars permanently hinged in the middle) is self-propelled, but two to four DMU cars can be linked together per train. They are best deployed where large commuter rail trains are not needed due to limited demand and where electrification for propelling light rail trains is not practical and present too high a capital cost.

***Table 2:** Transit Technologies and Service Alternatives*

Basic Characteristics / Transit Types	Definition:	Service Type:	Station Type:	Distance between Stations:	Service Frequency:	Alignment:	Right–Of–Way Width:	Minimum Turning Radius:	Vehicle Length:	Typical Operating Speed:
Heavy Rail 	"Heavy Rail is high-speed, passenger rail cars operating singly or in trains of two or more cars on fixed rails in separate rights-of-way from which all other vehicular and foot traffic are excluded" (APTA)	Urban/Regional	Raised high-floor level platform. Location: Center or Side	1 to 3 miles apart (except in CBD)	5 to 10 minutes during peak	Separate right of way	25 to 33 feet (Double Track)	330+ feet	40 to 70 feet per car	30 to 80 mph
Commuter Rail 	"Commuter Rail is long-haul rail passenger service operating between metropolitan and suburban areas, whether within or across the geographical boundaries of a state, usually characterized by reduced fare for multiple rides, and commutation tickets for regular, recurring riders." (APTA) Commuter Rail can operate along existing freight tracks with freight trains if cars meet FTA safety standards (i.e., are FRA compliant).	Interurban/Regional	Raised high/low floor level or low-level step up platform. Location: Center or Side.	2 to 5 miles apart	20 to 30 minutes	Uses existing tracks (at grade or grade separated crossings)	> 37 feet (Double Track)	140 to 460 feet	90 to 105 feet per passenger car	30 to 79 mph
Light Rail 	"An electric railway with a 'light volume' traffic capacity compared to heavy rail. Light rail may use shared or exclusive rights-of-way, high or low platform loading and multi-car trains or single cars" (APTA). Light rail is an intermediate rail transit between high speed rail and streetcars.	Urban/Regional	Sidewalk sign, raised high/low floor level or low-level step up platform. Location: Center or Side.	1/2 mile to 1 mile	5 to 30 minutes during peak	Either center or side of street in separate or shared right of way with other traffic; exclusive right of way also sometimes provided	25 to 33 feet (Double Track), 11 to 13 feet (Single Track)	50 to 150 feet	50 to 95 feet per car	20 to 60 mph
Diesel Multiple Unit (DMU) 	A passenger vehicle similar to a commuter rail but with lower capacity used for providing passenger service on short or medium distances. DMUs are self propelled vehicles typically powered by diesel. DMUs can operate as a single unit or multiple units based on the demand. Limited options exist in U.S. for FRA-compliant vehicles, limited DMU applications in active freight corridors.	Urban/Regional	Raised high/low floor level or low-level step up platform. Location: Center or Side.	2 to 5 miles apart	Varies. Typically 15 to 30 minutes	Can use existing freight tracks (at grade or grade separated crossings) if meeting FRA requirements; separate guideway is a more expensive alternative.	25 to 37 feet (Double Track)	> 250 feet for single car and > 300 feet for multi cars	85 feet to 135 feet	25 to 40 mph
Modern Streetcar 	Streetcars are rail transit vehicles designed for local traffic movement and are powered by electricity from overhead catenary wire.	Urban Circulator	Sidewalk sign, raised low-floor level platform or low level stepup platform	approximately every 1/4 mile	8 to 15 minutes during peak	On street with traffic	19 to 24 feet (Double Track), 11 - 13 feet (Single Track)	40 to 80 feet	35 to 60 feet	6 to 12 mph
Heritage Streetcar 	Same definition for Modern Streetcar applies, except replicas of 20th century trolley are used and typically are nonarticulated.	Urban Circulator	Sidewalk sign, low level step-up platform	approximately every 1/4 mile	8 to 15 minutes	On street with traffic	19 to 24 feet (Double Track), 11 - 13 feet (Single Track)	40 to 50 feet	35 to 50 feet	6 to 12 mph
Bus Rapid Transit 	Bus Rapid Transit is an integrated system of facilities, equipment, services, and amenities that improve the speed, reliability, and identity of bus transit.	Urban and Regional	Sidewalk sign, raised low-floor level platform or curb level step-up platform	approximately every 1/2 to 1 mile	10 minute (peak) and 15 minutes (off peak)	On street with traffic, dedicatedlanes	12 feet (single lane), 25 feet (double lane)	40 to 70 feet	40 to 60 feet	Varies, 15 to 20 mph on mixed flow lanes and up to roadway speed limit on dedicated lanes

Table 2: *Transit Technologies and Service Alternatives*

Basic Characteristics / Transit Types	Definition:	Service Type:	Station Type:	Distance between Stations:	Service Frequency:	Alignment:	Right–Of–Way Width:	Minimum Turning Radius:	Vehicle Length:	Typical Operating Speed:
Express Bus 	A bus service which is intended to run faster than the local bus. It is an intermediate service between the local bus and the bus rapid transit.	Urban and Regional	Sidewalk post sign or shelter, curb-level stop	Approximately every 1/2 mile	10 to 30 minutes	On street with traffic	10 to 12 feet (preferred 12 feet)	40 to 70 feet	40 to 60 feet (latter for articulated vehicle)	Varies, 15 to 20 mph in mixed flow lanes; up to roadway speed limit on freeways/expressways
Local Bus 	A bus service which is intended for passenger pick up and discharge at designated stops along road corridors.	Urban and Regional	Sidewalk sign post or shelter, curb-level stop	Varies from couple of blocks to every 1/4 mile	5 to 60 minutes	On street with traffic	10 to 12 feet (preferred 12 feet)	40 to 70 feet	30 to 60 feet (latter for articulated vehicle)	Varies 9 to 15 mph in mixedflow lanes but depends on the speed of the traffic
Automated Guideway Transit (AGT), Monorail, and People Mover 	A fixed guideway transit mode where electrically propelled, rubber-tired vehicles straddle atop or suspend from a single guideway beam, rail, or tube. These vehicles ride along grade separated guideway. Typically operates automatically and without operators as a shuttle service at tourist attractions and airports.	Urban - Theme parks, Airports	Station, high-level platform for level boarding	Approximately 1/2 mile to 1 mile	Typically 5 to 15 minutes	Grade separated, dedicated right-of-way	Typically 25 ft (over city streets); 6'x8' support pillars	75 to 150 feet	Varies, could be combined to form trains	25 to 45 mph
Demand Responsive (Para Transit, Taxi's etc.) 	Demand responsive transit (includes paratransit, dial-a-ride, taxi's, etc.) is comprised of passenger cars, vans or small buses operating in response to calls from passengers or their agents to the transit operator, who then dispatches a vehicle to pick up and transport passengers to their destinations. (APTA) While many agencies offer demand responsive service, most limit the service to persons with disabilities, their attendants and companions, and older Americans (with the exception of taxis).	Urban, Local and Regional	Flexible routes; typically curb stops and no set stations	Varies	Varies	On street with traffic	10 to 12 feet (preferred 12 feet)	Varies, approximately 25 feet	Varies, generally less than 30 feet	Varies, depends on the speed of traffic.
Carpool/Vanpool 	"""Carpool/Vanpool service operates primarily from rural and outer suburban areas into urban area central business districts or suburban employment centers. Most carpools/vanpools serve large urban areas, though a few states have statewide programs."" (APTA)	Urban and Regional	Sidewalk sign and/or park-andride lots	Varies, with major destination a major activity center	Varies (on demand)	On street with traffic	10 to 12 feet	Varies, passenger vehicles approximately 21 feet	Approximately 15 to 30 feet	Varies, depends on the speed of the traffic.
Personal Rapid Transit 	A concept that offers ondemand, non-stop transportation using small, independent self-propelled, electric vehicles on a network of specially-built guideways. Two different vehicle sizes and operational objectives exist. Smaller vehicles are designed to carry a single travel party and larger vehicles are sized to transport larger groups, all to the same destination.	Urban / Suburban	Station, platform level with vehicle floor; station is off-line from the main guideway.	Approximately 1/4 to 1 mile	Demand responsive and therefore no regular schedule; vehicle waits in station until passengers board and select destination	Separate right-of-way; typically grade separated	10 to 12 feet for single guideway; 20 to 25 feet for double	Varies, as low as 30 feet	Varies, approximately 9 to 25 feet	15 to 35 mph

Table 2: *Transit Technologies and Service Alternatives*

Basic Characteristics / Transit Types	Maximum Grade:	Seating Capacity Per Car:	Route Length:	Capital Cost per Vehicle:	"Capital Cost per Mile: (Excluding Vehicles)"	Power Source:	Vehicle Life Expectancy:	Example Cities:	Residential Density Thresholds (Pushkarev and Zupan, 1982)*
Heavy Rail 	4 to 6 percent	60 to 80 seated, 120 to 150 with standees	10 to 30 miles	$2 to $5 million	$50 to $250 million (excluding right of way)	Electric	25 to 30 years	New York (MTA), Chicago (CTA), Washington (Metro), Atlanta (MARTA), San Francisco (BART), Boston (MBTA)	12 dwelling units/acre (100 - 150 sq. mile corridor); Service Level = 5 minute peak headways
Commuter Rail 	3 to 4 percent	80 to 170 seated	20 to 100 miles	$1 to $3 million	$5 to $25 million (excluding right of way)	Diesel, Diesel-Electric, or electric with overhead catenary	25 to 30 years	Dallas-Fort Worth (TRE), New Jersey (NJT), New York (Long Island RR), San Jose - San Francisco (Caltrain), Chicago (MetraRail), Los Angeles (Metrolink), Nashville (RTA), Albuquerque (NMRR), Northern Virginia (VRE)	1 - 2 dwelling units/acre (along existing tracks) and requires high density employment centers, such as large central business district, to be viable; Service Level = 6 - 80 trains/day
Light Rail 	5-7 percent	32 to 100 seated, 150 to 200 with standees	8 to 25 miles	$2 to $5 million	$30 to $70 million (excluding right of way)	Electric with overhead catenary wire	25 to 30 years	Denver, Dallas, Minneapolis, Houston, Salt Lake City. Charlotte, Phoenix, Los Angeles, San Diego	9 dwelling units/acre (25 - 100 sq. mile corridor); Service Level = 5 to 15 minute peak headways
Diesel Multiple Unit (DMU) 	< 3 percent	Typically 80 seated	10 to 35 miles	$5 (single unit) to $9 million (articulated or A-B units)	$5 to $45 million (excluding right of way)	Diesel, Diesel-electric	NA	New Jersey (River Line), Portland (Westside Express Service), San Diego (NCTD Sprinter Line); Austin Leander Line (2009 revenue opening)	1 - 2 dwelling units/acre (along existing tracks), Service Level = 6 - 80 trains/day
Modern Streetcar 	9 percent	Typically 30 seated, 115 with standees	1 to 8 miles	$2 to $3.5 million	$20 to $40 million (excluding right of way)	Electric with overhead catenary wire	25 to 30 years	Portland, Seattle, Tacoma	20+ dwelling units/acre and high density office/ commercial uses such as in central city; Service Level = 10-12 minute peak and off-peak headways
Heritage Streetcar 	9 percent	Varies, 30 to 45 seated, 70 to 100 with standees	1 to 7 miles	Varies ($100,000 to $1 million)	$5 to $20 million (excluding right of way)	Electric with overhead catenary wire	Varies but typically 25 years or more	San Francisco, New Orleans, Memphis, Little Rock, Kenosha, Galveston	Same as for Modern Streetcar but often built for excursion/ tourist service
Bus Rapid Transit 	10 to 13 percent	Varies. Typically 45 seated for regular 40 foot bus, 60 forarticulated buses	2 to 40 miles	$500,000 to $800,000 (articulated vehicle)	$4 to $25 million (excluding right of way)	Diesel, Alternative Fuel (CNG), Electric Trolley, Diesel-Electric Hybrid	12 years	Boston, Pittsburgh, Los Angeles, New York, Cleveland, Eugene, Houston	15 dwelling units/acre; Service Level = 10 minute headways

Kimley-Horn and Associates, Inc.

Table 2: *Transit Technologies and Service Alternatives*

Basic Characteristics / Transit Types	Maximum Grade:	Seating Capacity Per Car:	Route Length:	Capital Cost per Vehicle:	"Capital Cost per Mile: (Excluding Vehicles)"	Power Source:	Vehicle Life Expectancy:	Example Cities:	Residential Density Thresholds (Pushkarev and Zupan, 1982)*
Express Bus 	10 to 13 percent	Varies. Typically 45 seated for regular 40 foot bus, 60 forarticulated buses	Varies, but typically 5 to 20 miles	$350,000 to $500,000	Minimal cost for bus stops and passenger amenities unless in busway ($5 to $10 million per mile)	Diesel, Alternative Fuel (CNG), Diesel-electric Hybrid	12 years	Any city with a bus system	7 dwelling units/acre, Service Level = 40 buses/ day (Note: Service Level is for Intermediate service bus; it is assumed that intermediate service bus is equivalent to a Express Bus)
Local Bus 	10 to 13 percent	Varies. Typically 45 seated for regular 40 foot bus, 60 for articulated buses	Varies, but typically 2-10 miles	$300,000 to $500,000	Minimal cost for bus stops and passenger amenities	Diesel, Alternative Fuel (CNG), Diesel-electric Hybrid	12 years	Any city with a bus system	4 dwelling units/acre, Service Level = 20 buses/ day (Note: Service Level is for minimum service bus, it is assumed that minimum service bus is equivalent to a Local Bus)
Automated Guideway Transit (AGT), Monorail, and People Mover 	6 to 10 percent (rubber tired traction for upper limit)	10 to 40 per vehicle (80 with standees; 240-person maximum with 6-car Monorail	Varies (1 to 4 miles)	$2 to $6 million	$50 to $100 million	Electric	10 to 20 years	Lake Buena Vista Florida (Walt Disney World), Downtown Miami (MetroMover), Las Vegas Casino District, Jacksonville (JTA Skyway), and Seattle CBD. Various U.S. and international cites have airport people movers.	Suitable as circulator in amusement parks and in highdensity commercial areas; public transit service would be supported by light rail density thresholds.
Demand Responsive (Para Transit, Taxi's etc.) 	10 to 13 percent	5 to 18 (paratransit van),	Varies (no fixed routes)	Approximately $60,000	Minimal if operating on city streets	Gasoline, Diesel, CNG	Varies, depends on vehicle type and manufacturer	Any urban area	Suitable for low residential densities or any urban and surrounding rural areas when limited to service for mobility impaired
Carpool/Vanpool 	Varies, depends on vehicle type and manufacturer	5 (car/small van) to 18 (extended van or minibus)	Varies (5 to 30 miles)	"Carpool-none; vanpool costs are often subsidized"	Minimal if converting existing traffic lane to high occupancy vehicle; $10 to $30 million per mile if new facility	Gasoline, Diesel, Electricgasoline (Hybrids)	Varies, depends on vehicle type and manufacturer	Many areas and employers offer carpool/vanpool services and incentives.	Requires high employment densities, typically large central business districts, to be effective
Personal Rapid Transit 	5 to 10 percent	3 to 4 for small and 12-15 for large vehicles excluding standees	Varies (2 to 10 miles for first generation systems)	$50,000 to $300,000 for first generation systems (no recent examples in U.S.)	Estimated $10 to $20 million per mile but no recent systems in U.S.	Electric or Cable	10 to 15 years (estimate for first generation systems)	London Heathrow International Airport (in testing), Morgantown, WVA	Possibly suitable in moderate and high density mixed residential and employment areas

Passenger Rail Application Thresholds

Passenger rail service includes heavy rail, commuter rail, light rail (LRT), diesel multiple units (DMUs) and modern and heritage streetcars. With the possible exception of streetcars and single vehicle DMUs, passenger rail is best applied where transit demand is very high. This typically means service connects to highly concentrated employment centers with high residential densities also required to generate ridership and improve rail's effectiveness (ridership capture) and efficiency (cost per vehicle mile or hour of service). Heavy rail is very capital intensive and its cost only justified in certain U.S. cities. Commuter rail can be successful where residential densities are low if convenient large-lot park and ride access to train stations is provided. But on the attraction end of the transit service, meaning the employment destination, large central business districts are required to generate large number of users.

Small DMU trains have found applications in lower density commute corridors. If able to use existing freight or similar lines, capital costs are low. The critical issue is usually operating rights and priority over freight rail traffic, which if frequent, can disadvantage passenger train movements. Streetcars are finding new applications in urban activity centers where construction is not overly disruptive to existing uses or very costly. Costs cans be reduced by running track in existing streets, following the street contour, and building stations as sidewalk or sidewalk-extension stops with limited amenities. Streetcars are best justified where residential and commercial activity is mixed and intense. Some systems have been applied in lower density areas (Little Rock, Galveston, and Tacoma) although they would not be considered major transit lines.

Bus Systems

Three types of bus services are profiled in Table 2. The newest application is bus rapid transit (BRT), which attempts to replicate many of the aspects of light rail service at a fraction of the capital costs. BRT has a broad definition. At the high end, it includes dedicated bus lanes (usually in existing public right-of-way); passenger stations with amenities such as real time information, canopies, seating, and safety and security measures, among other features; and high capacity, high frequency service. Vehicles and the service in general are branded to distinguish them from regular buses and conventional fixed-route service. Many BRT lines have articulated buses with a seated capacity of 50 to 60 and total capacity of 90 passengers. Vehicles receive transit signal priority to move more quickly through intersections.

Express bus service can appear similar to BRT services but are now considered an intermediate service between BRT and local service. Limited stops and peak hour service to and from work are the defining characteristics. Express buses may share traffic lanes or operate in the high occupancy vehicle lane on freeways and expressways. Local buses operate in a multitude of environments. They are usually defined by frequent stops and slow average speeds from stopping often and running along arterials in mixed-flow traffic.

BRT and express services are similar to light rail in requiring higher densities or, for freeway express operations, at least the attraction end of transit trips located in a large central business district. Because of their much lower capital costs, they can operate in lower density corridors than light rail operates in. Because buses can operate at very high frequencies, especially if not restricted to mixed-flow lanes, line capacities typically exceed those for streetcars and often approach those for light rail systems. Bus frequencies can be readily tailored to match demand, and range considerably, from five minutes or less on local and BRT lines in central cities to hourly service in low density, low demand suburban and small community applications.

Automated Guideway Transit: People Movers (Monorail) and Personal Rapid Transit (PRT)

Although proposed for conventional transit applications, including moderately high demand corridors, these types of automated systems have failed to gain a foothold. Peoplemovers are becoming more common in airports throughout the U.S. and abroad and as local circulator/excursion services (e.g., Las Vegas, Disneyland/Disneyworld) but not as line haul services to substitute for express bus, BRT or light rail services. PRT systems are still extremely limited, with almost no recent track record of construction and operation, but they are proposed at airports and in unique situations (several locations in the Middle East, such as Masdar City in Abu Dhabi). The current construction cost estimates for PRT hovering around $50million per mile keeps this technology application from serious consideration where less expensive options can meet the same needs for much less money (like BRT at $3.0 million per mile or streetcars at $15 million per mile).

People movers can carry moderate line volumes while PRT is designed more for convenience and local access. PRT vehicle capacities are two to possibly five individuals and applications are limited to constant-demand conditions without peak surges. There is no reliable track record of either technology that would suggest their performance is superior to other more conventional transit modes. Until proven otherwise, it would appear they are best considered for serving special transit needs.

Demand Responsive Transit

Paratransit and demand responsive services are widespread and rely on vans and minibuses. These vehicles operate along existing public roadways and typically do not follow a fixed route. Paratransit is mainly a subsidized service for seniors and the disabled who cannot use fixed-route transit. Demand responsive services work when fixed-route service cannot attract sufficient uses to be cost-effective.

As noted, paratransit vans and minibuses operate in most urban areas as a complementary service to standard transit buses on fixed-route service. Demand responsive vans and minibuses provide service in small urbanized and even rural areas and are probably no longer justified when residential densities average four or more units per acre in larger communities.

Carpool/Vanpool Transit

Although included Table 2, some may view such service as a personalized mode of transit more akin to the auto than to public transit. However, carpools and especially vanpools serve an important function, and fill an important niche, in many large urban transit environments. Carpools and vanpools may operate in HOV lanes or in mixed traffic lanes. Generally, a significant portion of the trip is made in these facilities as that is how they achieve a travel time advantage compared to regular auto trips; carpools and vanpools avoid the congestion of mixed-flow lanes and may be afforded relief from tolls and other transportation system user charges.

Carpools and vanpools usually only become attractive where freeway congestion is high and travel is concentrated in certain corridors proceeding to and from major employment areas. In fact, like commuter rail, large central business districts where parking is limited and/or costly are a precondition to making carpools and vanpools viable.

System Comparisons

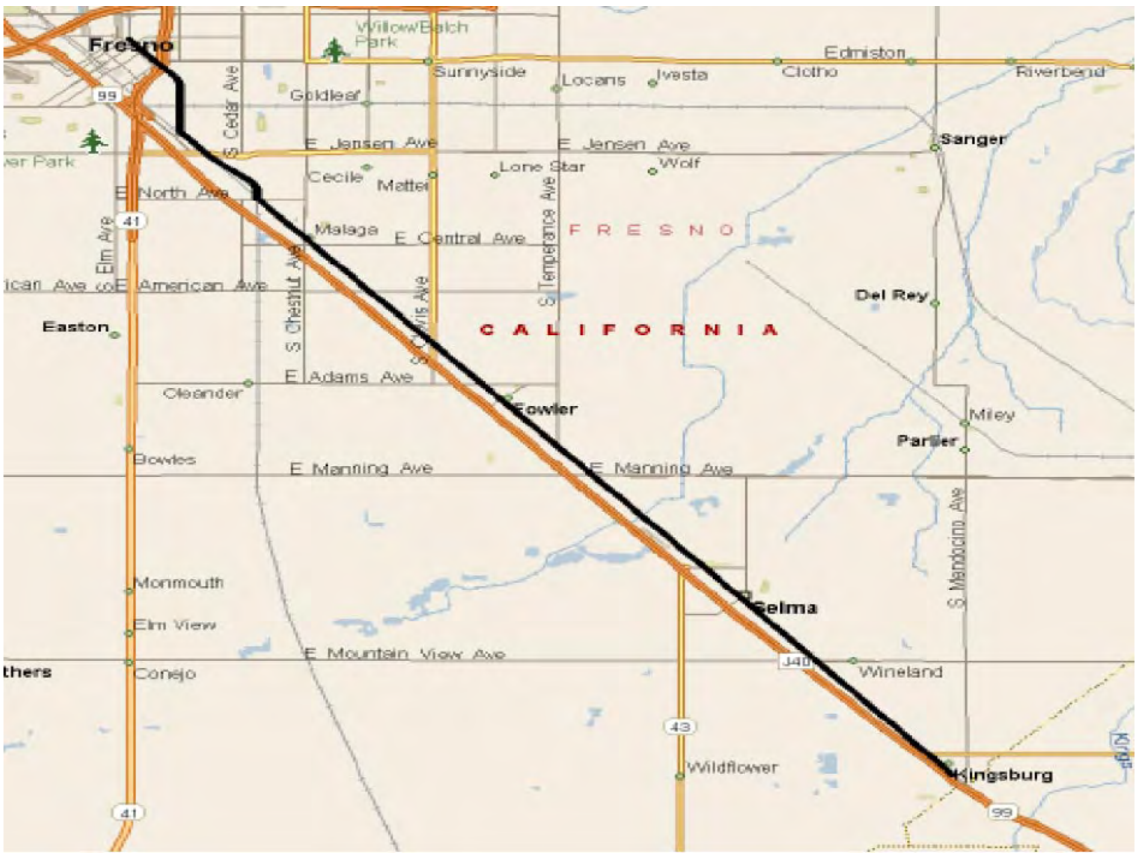
The highest volume systems are typically rail systems, with heavy rail, as represented by San Francisco's BART and Los Angeles' Red Line, among the fastest and having the most carrying capacity. Such lines are typically grade-separated in exclusive right-of-way and can carry 10,000 passengers or more per hour each direction.

As Fresno County and the state grow and demand for transit increases, other technologies could become attractive for the area. One exciting new opportunity is high speed rail for long-distance intercity travel. Fresno is a candidate for a station served by ultramodern steel-wheel-on-steel-rail trains running at speeds upwards of 250 miles per hour. Planning is underway for this system, with construction several years off, but voters have already approved the first major funding allocation. For local travel, a proposal to implement bus rapid transit (BRT) on Blackstone and Ventura/Kings Canyon, the top two travel corridors in the city, has been approved by the Council of Governments and a Very Small Starts application has been submitted to the Federal Transit Administration (See Chapters 9 and 10 and Appendix A for more detail on the planned BRT project).

4.2 Feasibility Assessment of Rail Service – Fresno to Kingsburg

An analysis of the Fresno to Kingsburg/Highway 99 corridor was conducted under the PTIS study to determine the feasibility of a light rail or commuter rail system operating along this alignment that parallels Highway 99, also referred to as "the Golden State Corridor".

Figure 8: The Golden State Transportation Corridor



Source: Kimley-Horn and Associates, Inc., 2000 Census database

An analysis of population densities in comparable cities with light rail systems of similar lengths was conducted to see how this corridor compared with existing systems that had recently been funded (using 2000 Census population data).

Table 3: Existing Light Rail Systems Comparison

City	Transit Authority Monitoring Rail System	System Length (mi)	Total # of Existing Stations	Population Density (per acre)	Household Density (per acre)
Buffalo, NY	NFTA-METRO	6.4	16	11	4.7
Dallas, TX	DART	45.0	48	6.2	2.4
Minneapolis-St. Paul,	Metro Transit	12.0	17	6.9	2.9
Sacramento, CA	Regional Transit	29.7	55	6.3	2.7
Salt Lake City, UT	UTA	19.0	24	5.2	2.3
St. Louis, MO	Metro	17.0	37	4.8	2
Averages		21.5	32.8	6.7	2.8
Fresno, CA	N/A	22.9	N/A	3.5	0.7

Source: 2000 US Census and FTA Transit System Database 2010

The comparative analysis shows the cities with existing light rail service in operation have an average system length of 21.5 miles, similar to the Fresno to Kingsburg corridor at 22.9 miles. Population densities in existing rail corridors range from 4.8 to 11 people per acre. The number of households in the one-mile wide existing rail corridors range from 2.0 to 4.7 per acre. The proposed Fresno to Kingsburg light rail line has a population density of 3.5 persons per acre and a household density of 0.7 households per acre. The proposed rail line has 30% less population density and 65% fewer households than existing light rail lines operating across the U.S.

The conclusion of this comparative analysis is that rail service between Fresno and Kingsburg would not be feasible with current low density residential growth patterns. The existing population density of the Fresno to Kingsburg corridor is compared with rail transit corridors in Buffalo, Dallas, Minneapolis/St. Paul, Sacramento, Salt Lake City and St. Louis. The Fresno to Kingsburg corridor is compared to other cities with an average of 8 persons per acre and 3.25 households per acre. Fresno has 15% of the population density and 12% of the household density of these other existing systems.

Passenger rail service in the Fresno to Kingsburg corridor would not be feasible at this time. However, with changes in planned land use densities in this corridor concentrated around the rail line, transit could capture a large share of the forecast 24,000 daily trips in this corridor, which could make a light rail investment feasible in the longer term. Light rail would be a better fit than commuter rail in this corridor for the foreseeable future, assuming development density patterns are established in the near term to support this future investment.

Interim steps toward that goal would include adoption of a transit-oriented land use policy and new zoning regulations to require significantly higher residential land use densities in identified future transit corridors. In the interim, it is recommended that the Fresno COG consider the construction of Park and Ride lots in each city along the corridor (Malaga, Fowler, Selma and Kingsburg) and provide express bus service into downtown Fresno, with a timed transfer to the Bus Rapid Transit system downtown for destinations north and east of downtown.

4.3 Transit Priority Corridor Recommendations

Based on an evaluation of job centers and commute patterns, the following corridors were recommended by Strategic Economics for transit infrastructure investments. Note that these recommendations are only made based on limited information, and do not factor in investment feasibility, traffic, or other factors that the remainder of the PTIS Phase II study will consider.

Tier A Transit Connects Top Job Centers, Improves Southern Access to Growing Northern Job Centers

Although new regional job centers have sprouted up in northern Fresno and Clovis, Downtown Fresno is still a job center of regional significance, and continues to draw a significant share of commuters from all of Fresno and Clovis's neighborhoods. The study team recommends extending the planned Kings Canyon BRT line north along Blackstone. Doing so will link the City's two top job centers (North Fresno and Downtown) and create a jobs-rich transit network. To enhance low income residents' access to jobs, the study team recommends a single continued transit corridor from Kings Canyon to Blackstone, eliminating any transfer that might otherwise be needed in Downtown Fresno.

Tier B Transit Links in Secondary Office–Based Job Centers and Improves Northern Resident's Access to Major North Fresno Destinations

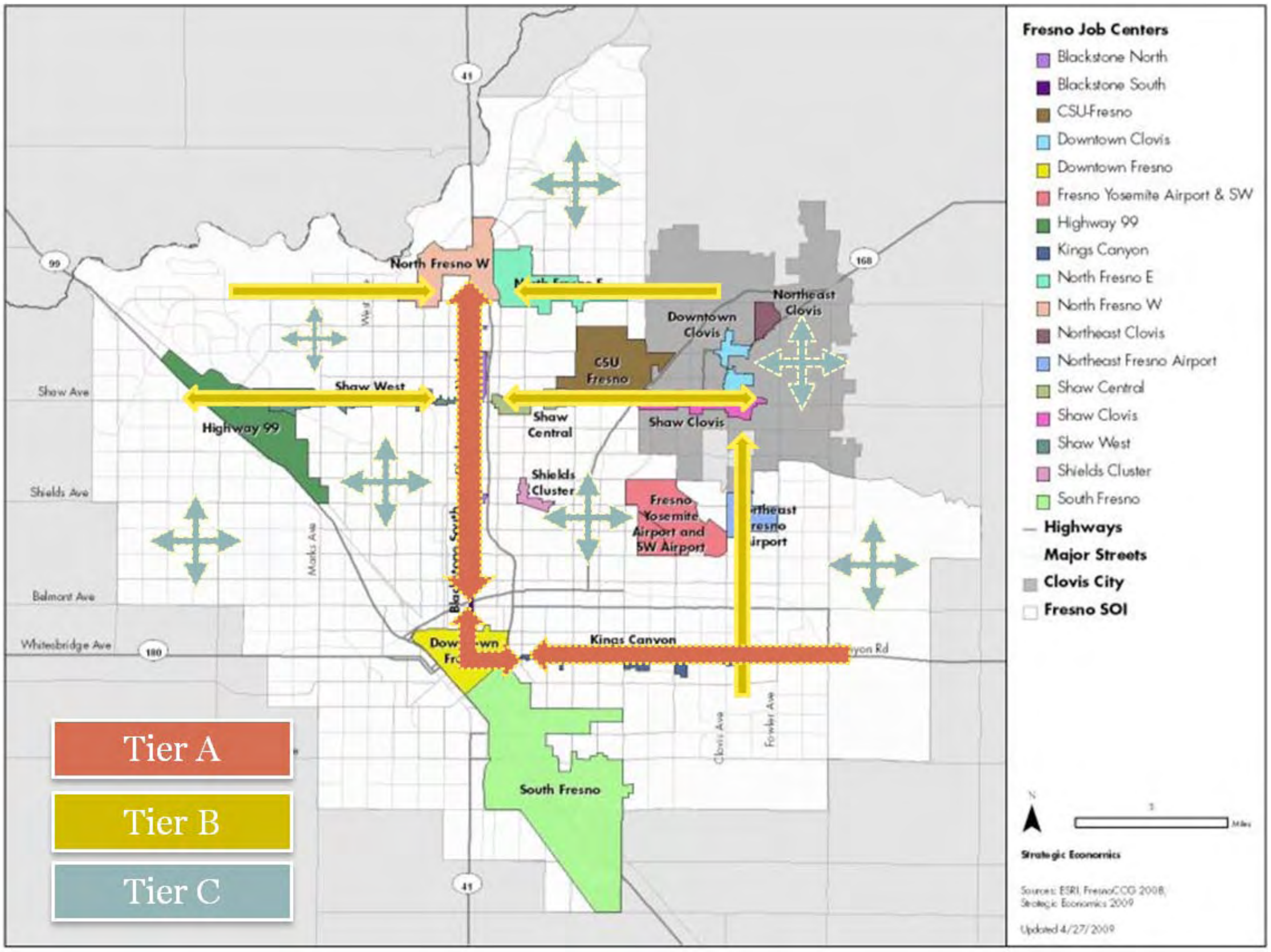
Second only to Blackstone, the Shaw corridor maintains a strong economic presence in the City, and accommodates many of Fresno County's office based jobs. Every effort should be made to link to the office nodes aligning Shaw, and to connect the Fresno State campus into the regional transit network. An additional north-south corridor will help link residents to job centers in Clovis and surrounding the airport.

Tier C Transit Offers a Circulator System to Bring Residents to Major Transit Corridors

Fresno maintains a fairly segregated land use pattern. Although jobs are concentrated along major corridors, there is a significant lack of housing along these routes. While there is ample opportunity to accommodate residential and mixed-use development along certain portions of Fresno's corridors, the transit system will be incomplete without a circulator system that can link Fresno's existing residential neighborhoods into the regional transit corridors.

The top two transit corridors identified for a Bus Rapid Transit investment—Blackstone and Ventura/Kings Canyon—became an FTA Very Small Starts application for funding in the Fall of 2010.

Figure 9: Recommended Transit Priorities



Source: Strategic Economics, 2009.

As shown in Figure 9, forecast travel patterns clearly identify a high volume north-south corridor along Blackstone Avenue into downtown Fresno, and a medium volume corridor along Herndon Avenue in the east-west direction at the north end of the city. The Herndon corridor at the north end of the city between Clovis and Fresno has a high volume of employment trips but no transit service exists across Herndon due to the lack of an inter-local agreement between the two cities to provide transit service across jurisdictional boundaries.* Significant employment trip generators include CSU Fresno State along Shaw Avenue, the IRS complex downtown and North Clovis area.

*However, Fresno and Clovis have an interlocal agreement to operate service on Shaw Avenue. If future demand and funding should materialize, cooperative service could be added on Herndon.

5.0 No Build, TSM and Build Alternatives

Fresno's Existing Travel Patterns

Baseline indicators for the year 2010 from the COG Travel Model are provided in Table 4. Of significance for Fresno is the very small amount of congestion (only 2% of travel) for such a large urban area, which keeps personal automobile use attractive compared with taking transit. The average travel speed of personal autos, at 43.87 miles per hour is significantly better than the average transit travel speed of the local bus service at 16.63 miles per hour. Transit cannot compete with the automobile in terms of travel time attractiveness.

The journey to work in Fresno County is predominantly by the automobile (95.86%) with only 2.17% taking transit to work. Note the high percentage of non-work bicycle and pedestrian trips, suggesting a large number of people prefer to walk or bike over taking transit for discretionary and institutional trips in the neighborhoods.

Table 4: Baseline Performance Indicators

Performance Measure	Mode/Measure	2010
Vehicle-Miles of Travel	Vehicles	22,925,352
Vehicle-Miles of Travel in Congestion	Vehicles	465,776
Percent VMT in Congestion	Vehicles	2.03%
Person-Miles of Travel	Vehicles	36,000,416
Person-Miles of Travel	Transit	108,340
Vehicle-Hours of Travel	Vehicles	521,092
Person-Hours of Travel	Vehicles	820,572
Person-Hours of Travel	Transit	6,516
Vehicle-Hours of Delay	Vehicles	13,597
Person-Hours of Delay	Vehicles	21,455
Person-Hours of Delay	Transit	81
Average Speed	Vehicles	43.87
Average Speed	Transit	16.63
Total Trips	**Persons Daily**	**4,658,403**
% Work Auto Trips	Percent Daily	95.86%
% Work Transit Trips	Percent Daily	2.17%
% Work Walk/Bike Trips	Percent Daily	1.97%
% Non-Work Auto Trips	Percent Daily	91.05%
% Non-Work Transit Trips	Percent Daily	0.67%
% Non-Work Walk/Bike Trips	Percent Daily	8.28%
% Total Auto Trips	Percent Daily	91.58%
% Total Transit Trips	Percent Daily	0.84%
% Total Walk/Bike Trips	Percent Daily	7.58%

Source: Dowing Assiciates, Inc., Fresno COG Travel Model

These number of transit dependent people in Fresno County indicate an unmet market demand for more formalized carpooling and an expansion of the vanpooling program to match commuters with similar origins and destinations, particularly to outlying areas not well served by fixed route transit. The large number of cyclists and pedestrians points to a need for a formalized bicycle route system with connecting bike lanes and completion of sidewalk networks linking neighborhoods to shopping centers, schools and recreational destinations.

5.1 The No Build Alternative

The No-Build alternative provides the baseline for comparing the environmental impacts of the alternatives, and the cost-effectiveness of the TSM alternative on a largely unimproved transportation system. This alternative is defined to include those transportation facilities and services that are likely to exist in the forecast year. All elements of the No-Build alternative must be part of each of the other alternatives except where an alternative replaces services or facilities inside the corridor.

To provide a basis of comparison the No-Build alternative must include the following features:

- The maintenance of existing facilities and services in the study corridor and region;
- The completion and maintenance of committed projects in the study corridor that have successfully completed their environmental review; and
- The continuation of existing transportation policies.

The No-Build Alternative incorporates "planned" improvements that are included in the fiscally constrained long-range (5-year) Transportation Improvement Plan for projects that are expected to be implemented. The No-Build alternative maintains the current transit operating strategy with a growth in service commensurate with forecast population and employment growth. New bus routes may be added and existing bus routes extended, but the underlying strategy should remain the same.

The Proposed No-Build List of Projects

The following list of projects includes projects found on the 2009 TIP update in the constrained network plus recommended minor improvements in routing and headways consistent with current operating practice. Funding sources, budgeted amounts and programmed year of construction from the 2009 TIP are provided below. The total cost of the No Build transit scenario is estimated at $46.8 million which does not include operating costs associated with driver wages, benefits, gas, and maintenance.

Assumptions:

1) The No-Build Alternative assumes the first two top priority BRT lines (submitted as a single project for Very Small Starts funding) will be built as part of the trend scenario in the forecasted transit system for 2035, based on the current RTP ($35 million budgeted in 2014).

2) It is also assumed that "Owl Service" is introduced to begin offering extended service hours until midnight on 6 or 8 key routes, adding about 5% to total operating hours and cost. The forecasting model will not detect this change, however.

3) A fare increase is assumed to have happened by 2035. Fares on FAX are currently below market and have not been raised for nearly a decade. The model calculates an average of the current adult fare ($1.00) with the ADA fare (75 cents) and the senior fare (no cost per Measure "C") to be about 67 cents. The model will calculate a sensitivity test for a doubling of the average fare (to about $1.34). Dowling will compare the change in ridership against other transit agencies who have undergone a fare change in the past 2 years to test validity of the results from the model.

4) It is assumed that recent discussion about merging the separate transit operations into a single agency serving the region has happened, either through a legislative mandate creating the new agency, or through structured inter-local agreements.

5) Assumes FAX Route 12 and Route 56 have been eliminated.

The following list of approved transit-related projects and a suggested list of improvements to the existing transit service are mapped on "Figure 1: The No-Build Scenario". In addition to the list of projects in the constrained (4-year) Regional Transportation Plan, The No-Build Alternative also proposes to expand local bus service, consistent with the growth in service over the past three reporting years to the FTA. Fresno's population has averaged 1.5% growth per year over the past four years, while growth annual vehicle revenue miles have averaged 1.1% per year over the same timeframe[1].

Table 5: Commute Patterns to the North Fresno Job Center

FRESNO AREA EXPRESS BRT List of Stations September,2010			Bus Classification *(Major, Minor, Basic)*	Distance from Previous Station *(miles)*
1	Friant Road	at Audubon Dr (End of Line)	Minor	-
2	Blackstone Avenue	at N. of El Paso (NB & SB)	Minor	1.16
3		at Herndon Ave (NB & SB)	Minor	0.61
4		at Sierra Ave (NB & SB)	Minor	0.50
5		at Bullard Ave (NB & SB)	Basic	0.50
6		at Barstow Ave (NB & SB)	Minor	0.50
7		at Shaw Avenue (NB & SB)	Major	0.49
8		at Gettysburg Ave (NB & SB)	Basic	0.51
9		at Ashlan Ave (NB & SB)	Minor	0.49
10		at Griffith Way (NB & SB)	Minor	0.25
11		at Manchester Center	Major	0.48
12		at Clinton Avenue (NB & SB)	Minor	0.51
13		at McKinley Avenue (NB & SB)	Minor	0.25
14		at Olive Avenue (NB & SB)	Minor	0.53
15		at Belmont Avenue (SB) at Abby Street (NB)	Minor	0.51
16	Stanislaus St	at P Street (NB & SB)	Minor	0.52
17	M St P St	at Mariposa St (SB) at Fresno St (NB)	Basic Major	0.43
18	Ventura St	at P St (EB & WB)	Minor	0.62
19		at 1st Street (EB & WB)	Minor	0.43
20		at 5th/6th St (EB & WB)	Basic	0.41
21	Kings Canyon Road	at Cedar Avenue (EB & WB)	Major	0.59
22		at Maple Avenue (EB & WB)	Minor	0.50
23		at Chestnut Avenue (EB & WB)	Major	0.51
24		at Helm/Transit Village/Wal-Mart (EB & WB)	Major	0.54
25		at Peach Avenue (EB & WB)	Minor	0.19
26		at Clovis Avenue (EB & WB)	Minor	1.02
			Total Distance to Clovis Ave (mi)	13.79
			Average Spacing (mi)	0.55
			Total project	**41.4 miles**

Source: NTD Database years 2005 to 2007 for Fresno FAX System fixed route service.

1. BRT is implemented on Blackstone Avenue and Ventura Boulevard/Kings Canyon

The proposed alignment follows N. Blackstone Avenue in the northern portion of the corridor, O and P Streets through Downtown Fresno and Ventura Avenue-Kings Canyon Road in the eastern portion of the corridor. The alignment begins just north of the RiverPark Shopping Center on Friant Road at Audubon Drive and continues south on Blackstone Avenue to Hedges Avenue. Then the alignment follows the one-way couplet through Downtown Fresno (southbound on Blackstone Avenue to O Street, northbound on P Street and Abby Street). The total distance is approximately 41.4 miles. Blackstone Avenue is currently served by FAX Route 30, connecting downtown Fresno with Fresno City College, the Manchester Transit Center, Heald College and the River Park Transit Center.

The alignment and the BRT service continues east as a single route on Ventura Avenue which turns into Kings Canyon Road east of Cedar Avenue and terminates at Fowler Avenue, a distance of approximately 5.4 miles. The Kings Canyon Road-Ventura Avenue corridor connects a major growth area of southeast Fresno (up to 55,000 new residents provided for in the 2025 General Plan) to downtown Fresno. The route is currently served by FAX Route 28, and connects downtown Fresno with the Social Services offices, Eastgate Shopping Center, Sunnyside High School, and Fresno Pacific University.

Table 6: No Build Alternative Headways

Proposed No Build		Weekday			Weekends		
(decrease headways per constrained RTP, VSS project)		**Peak**	**Midday**	**Evening**	**Peak**	**Midday**	**Evening**
9	Shaw Ave. Crosstown	15	15	30	20	20	30
28	CSUF / Manchester Center / W. Fresno	20	30	30	20	20	30
BRT on Ventura Avenue/Kings Canyon		10	15	15	10	15	15
30	Pinedale / N. Blackstone / West Fresno	20	30	30	20	20	30
BRT on Blackstone		10	15	15	10	15	15
32	N. Fresno / Manchester Center / W. Fresno	15	15	30	20	20	30
34	NE Fresno / North First / West Fresno	15	15	15	20	20	30
38	North Cedar / Jensen / Hinton Center	15	15	15	20	20	30
41	North-South service that intersects with BRT	15	15	15	15	15	15
new	Downtown Circulator	30	30	30	30	30	30

Notes: 1) Routes 28 and 30 operate as "supplemental" bus service operating in BRT corridors until Build Alternative converts this to extended BRT.
2) "Night Owl" service is introduced on 6 or 8 key routes extending existing services until midnight.

A total of 26 station locations have been approved by the City of Fresno COG for the BRT as identified in Table 3, below. The total project cost estimate to implement BRT on both corridors is estimated at $48.2 million at 2012 construction costs, or about $3.0 million per mile. The Very Small Starts application for the project was being submitted to the FTA in September of 2010.

1) Prioritize traffic signals for bus routes #9 (Shaw Avenue), to decrease the number of buses needed to maintain existing frequencies, and thereby reduce emissions. CMAQ Program: $1,565,700 for 10/11. This project can be modeled.

2) Commute Green Fresno County: A travel demand management commuter program for Fresno County employees designed to provide subsidies and incentives for program participants. CMAQ: $306,900 for 10/11 and $283,400 for 11/12. (It was determined that this amount of subsidy is too small to be reflected in the model outcomes. It is also not mapped).

3) Continue 15 minute frequencies of service intervals on high demand routes #34 and #38. Fresno Street, 1st Street, and Cedar. Increase frequencies on Route #32 to 15 minutes. CMAQ: $6,736,400 08/09 and $1,036,500 in 09/10.

4) Park & Ride Lot construction to accommodate 58 stalls for long distance commuter vanpools and carpools near SR99. CMAQ: $29,500 10/11 and $618,100 in 11/12. The exact location of this Park & Ride lot is unknown. For modeling purposes, we assume a location to be determined along Highway 99 in Madera, suggest Almond or Pecan Avenue intersections.(outside of mapped area)

5) Construct transit stop facilities along Sierra Street east of Rafer Johnson Street (also known as Greenwood Street) in Kingsburg west of 99. CMAQ: $9,700 in 10/11 and $98,800 in 11/12. (Not modeled or mapped).

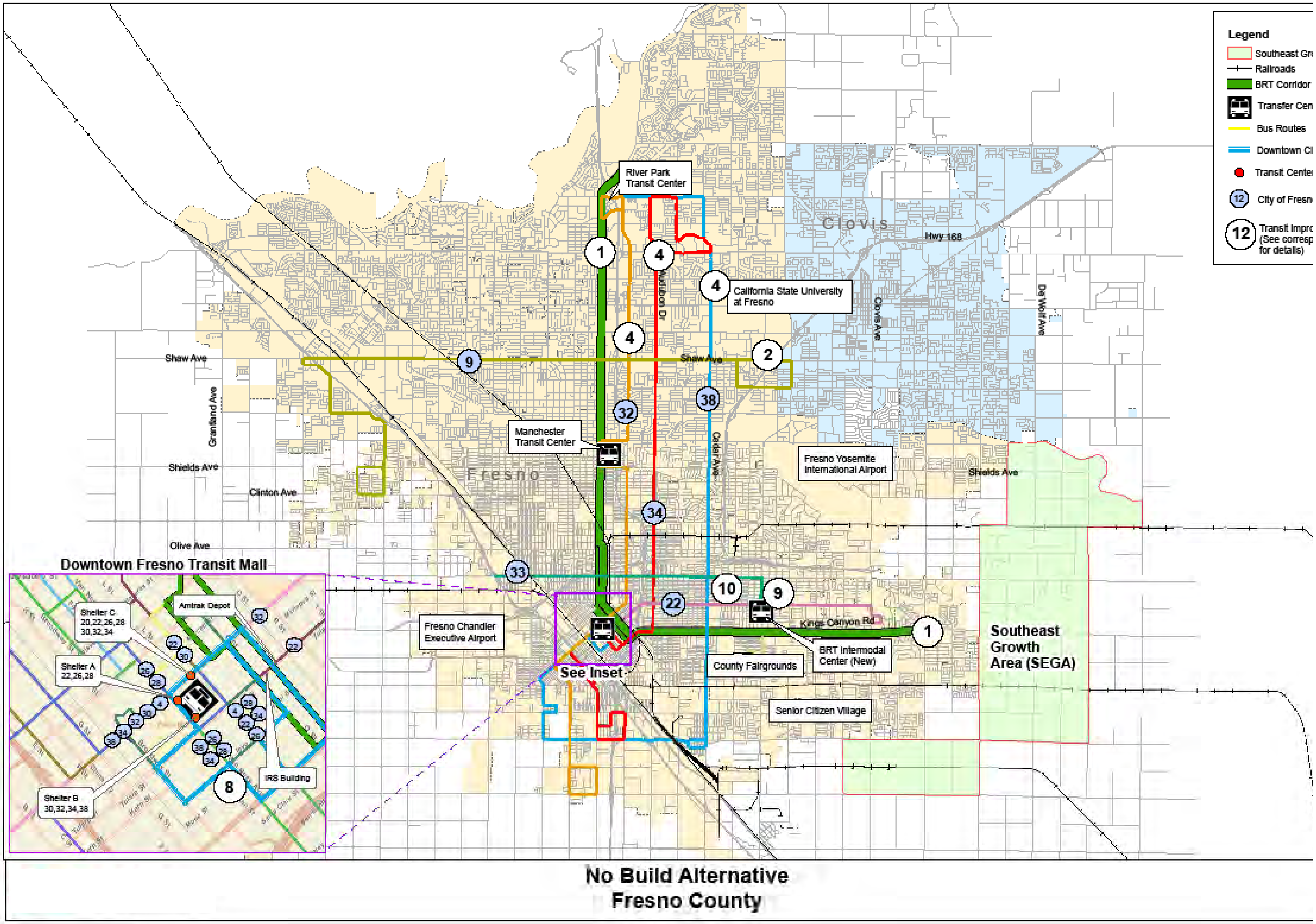
6) Passenger shelters/structures, benches, trash receptacles and lighting; On-street signs; Bus stop repairs, and miscellaneous amenities to benefit transit passengers. FTA Section 5307 Program $600,000 ($200,000 in 2008, $200,000 in 2009 and $200,000 in 2010). (Not modeled or mapped).

7) Downtown circulator program: provide shuttle service throughout downtown Fresno during peak commute hours. Purchase of 4 shuttle vehicles. FTA Reference Projects: $1,200,000 in 08/09. (See the proposed route planned for downtown in the map callout box). Suggest increasing frequency of D/T shuttle to 15 minutes mid-day weekdays and possibly on weekends to support proposed build-out of downtown retail, restaurants and high density housing. Current downtown circulator Route 4 offers two peak hour buses and has an average daily ridership of 412 (replaced by new downtown circulator route)

8) Intermodal facility program: Develop and construct intermodal facility to be located at Kings Canyon and Chestnut in the TOD Village in the Southeast area of Fresno. CMAQ: $1,000,000. Should be in operation in 2012. Will serve as a hub for FAX transit routes 28, 41, 33, and 22 (Route 12 has been eliminated).

Total cost estimate for the No Build Scenario: $46.8 million. Does not include transit operations and maintenance costs per FTA guidelines.

Figure 10: The No Build Map



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5.2 The Proposed TSM Alternative

The TSM Alternative is comprised of low-cost improvements over the No-Build Alternative, as identified in the 25 year Transportation Improvement Plan. The TSM project list is comprised of projects found in the 2007 unconstrained plan (in the 25-year scenario) plus recommendations by the consultant team to add or improve existing transit service. The TSM Alternative projects and service expansion is shown in Figure 9: The TSM Alternative Map.

These projects are not yet budgeted, so they should be viewed as future possible projects. TSM projects typically include:

- Upgrades to current and planned service
- Transit priority measures
- Operations improvements on key transit corridors
- Vehicle upgrades
- HOV Facilities
- Intermodal improvements

The TSM Alternative assumes that all the improvements identified in the "No Build Alternative" have been implemented. All recommended changes or improvements are cumulative and build from one alternative to the next. The total cost of the TSM Alternative is estimated at $258million, including all the improvements listed in the No Build Scenario (again not including operations and maintenance costs). This price tag assumes a built-in cost of replacing the existing fleet of FAX buses estimated at $150 million.

Compared with a fixed guideway investment, transportation system management alternatives are relatively low cost approaches to addressing transportation problems in the corridor. The TSM alternatives provide an appropriate baseline against which all of the major investment alternatives are evaluated. The most cost-effective TSM alternative generally serves as the baseline against which the proposed guideway alternative is compared during the New Starts rating and evaluation process that begins when the project applies to enter preliminary engineering continuing through final design.

The TSM alternative represents the best that can be done for mobility without constructing a new transit guideway. Generally, the TSM alternative emphasizes upgrades in transit service through operational and small physical improvements, plus selected highway upgrades through intersection improvements, minor roadway widening, and other focused traffic engineering actions. A TSM alternative normally includes such features as bus route restructuring, shortened bus headways, expanded use of articulated buses, reserved bus lanes, contra-flow lanes for buses and HOVs on freeways, special bus ramps on freeways, expanded park/ride facilities, express and limited-stop service, signalization improvements, and timed-transfer operations. Outside the study corridor, the TSM should have the same transit network as the no-build alternative. While the scale of these improvements is generally modest, TSM alternatives may cost tens of millions of dollars when guideway alternatives range up to several hundreds of millions or billions of dollars.

TSM Alternative Recommendations

Westside Transit Service Expansion: $2,734,239.

1) Serve growth west of SR99 by extending Route 9 westbound on Shaw Avenue to North Grantland Avenue and east by extending service to De Wolf for a transfer to new service on De Wolf connecting to SEGA (see project #19). Includes a timed transfer at the SavMart transfer center. Increase frequencies from 30 to 15 minutes in TSM. On the east side, tie Route 9 to the Sierra Vista Mall transit center @Shaw and Clovis for a timed transfer. Allow transfers to BRT where it crosses Blackstone.

2) Add a new route on Herndon with transfer points to Clovis bus route 10 that goes west to Grantland and turns south to Shaw. In the middle, connect up to the River Park Transfer Center (up Ingram, right on Nees, then back down to Herndon on Fresno Street). At the east end, go up Highway 168 to Clovis and do a loop, heading left on E. Shepherd Avenue, left on N. Temperance, back to Highway 168.

3) Continue Route 34 to connect to the River Park Transit Center. Eliminate the portion of Route 34 south of D/T transfer center and use time on north extension to River Park. Extends the top end of the route on Nees to connect to the River Park Transfer Center with a timed transfer. The southern end of the route terminates at the downtown transfer center.

4) Separate Routes 30, 32, 34 and 38 at the point where they go south and west of the downtown transit center. Re-route Route 38 to turn west on Ventura Avenue and terminate at the Downtown Transit Mall. Redesign and consolidate these 4 routes into one or two new route(s) that travels between D/T transfer center and the SW area. (See the revised route map for this area) Operate on 15 minute peak/30 minute off peak schedule (transit dependent neighborhood). Routes 30 and 32 remain unchanged.

5) Leave the North/South service on Route 45 from Manchester Transfer Center to Herndon as is. Extend the part of Route 45 that runs east-west on Ashlan all the way westbound to North Grantland Avenue. On the eastbound side, connect all the way to De Wolf Avenue. At Clovis Avenue take a one block detour to connect to the Sierra Vista Mall Transit Center.

6) Route 41 on Shields is realigned to go farther west to Grantland Avenue, then north to connect with expanded route 45 on Ashlan. Destinations north of Shields are now served by other routes. The service meets the Manchester Transit Center on Blackstone and goes east to Chestnut, where it heads south to connect to the new Intermodal BRT Center on Kings Canyon. Route 41 continues to the Senior Citizen Village and Malaga, Fowler and Selma to the south.

7) Extend Route 39 on Clinton Avenue west to Grantland Avenue. This route begins at the downtown transit center, comes up Blackstone, then heads west on Olive Avenue. This route then heads east on Olive to connect to the airport and allows transfers to BRT at the Blackstone crossing. Route 35 on Olive Avenue is extended westbound to Grantland Avenue and goes north to connect with Clinton Avenue to form a loop. This route extends to Clovis Avenue on the east side and loops on Belmont and Peach, then back to Olive. This route forms a continuous loop back into the downtown transfer center on Blackstone.

8) Terminate and separate Route 22 at the downtown transfer center so 22a only goes North/South or and 22b only goes East/West. Increase the frequency from 30 minutes to 15 minutes on the North/South portion. The East-West service on Route 22b on Tulare Street gets combined with route 28b on Ventura Avenue to form a loop that ends at the downtown transfer center. On the east end, route 22b goes south on Clovis to Kings Canyon then extends eastward to De Wolf Avenue ending at the transit center in SEGA.

   (We also separate Route 28 at the downtown transfer center so 28a only goes North/South and 28b only goes East/West).

Eastside Transit Service Expansion: $2,734,239.

1) Create a new route that runs north-south on Clovis Avenue from E. Shepherd Avenue at the northern end in Clovis and south to Kings Canyon Road, then goes west on Kings Canyon about one mile to connect to the Wal-Mart and new TOD intermodal facility/BRT station (5125 Kings Canyon Blvd.) . (May require an inter-local agreement between Fresno and Clovis to run this).

2) Provide new north-south service on the east side connecting employment centers in east Clovis and on Ashland Avenue with the SEGA development running along DeWolf Avenue connecting to a planned future SEGA transit center. The employment centers are served by continuing the route north-south along Temperance Avenue and then east-west along Shepherd terminating near the intersection of De Wolf and Shepherd. This route allows a transfer to other Clovis bus routes at Temperance and Shaw.

Inter-County Transit Service: $3,038,044.

1) Add Express Bus service from remote Park & Ride Lots on SR99 (Madera to the north, Malaga, Fowler, Selma, and Kingsburg to the south) Assumes 20 minute headways during peak AM and PM times only, starting at 6:20am to 9:20am, then returning 3:20pm to 6:20pm

   Express Route#1: Starts in Madera @ Hwy 99, heads south to downtown Fresno transit center with one stop at W. Herndon.

   Express Route #2: Starts in Kingsburg @ Hwy 99 and heads north to downtown transit center with one stop in Selma.

   Express Route #3: Starts in Fowler@ Hwy 99 and heads north to downtown transit center with one stop in Malaga. (this one starts and ends 20 minutes earlier and later because it is so far out)

   Express Route #4: Creates an origin point at the intersection of Hwy 41 and Hwy 145 for a park and ride lot to serve the planned Rio Mesa Development east of Madera. Provides service down to Fresno's transit center downtown, with a stop at the River Park transit center at the north end of Blackstone, where people could transfer to BRT or Clovis destinations.

Transit Transfer Centers (4) $250,000 each

1) Create a timed transfer between FAX routes and Clovis Transit at the Savmart Transfer Center. (The model can reflect shorter transfer times)

2) Enhance the current transfer situation for Clovis to FAX bus routes at the Sierra Vista Mall – corner of Clovis Avenue and Gettysburg Avenue.

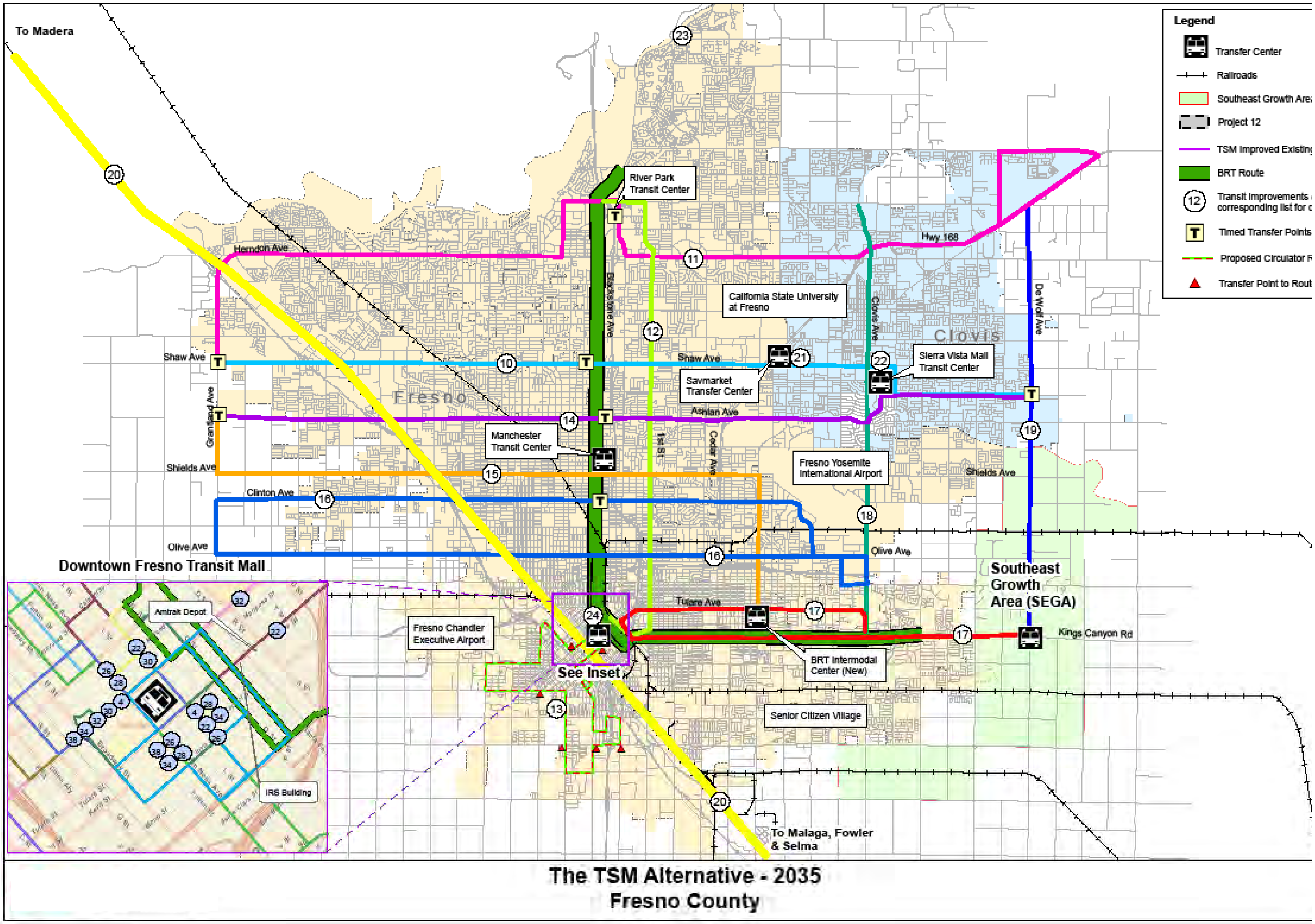
3) A new Park & Ride Facility at Friant Road and East Copper Avenue near Madera County line: $750,000.

4) Transit Mall: Redesign and consolidation of Downtown Fresno transfer facilities to include enhanced amenities including commercial development (references Downtown Circulation Study, not modeled)

- Increased bus fleet (400 to 500 buses) $150,000,000. (see proposed headways for new routes in Table 3). This is modeled.
- Expansion of on-street transit information sign system: $1.5 million. (not modeled or mapped)
- Stop and Station Improvements: (no budget amount) (not modeled or mapped)
- Bus Signal Preemption System: $500,000. Locations unknown. (Not modeled or mapped.)

Total cost estimate for No Build plus TSM: = $440 million does not include transit operations and maintenance costs. It does assume that the $150 million cost for replacing the FAX transit system buses has occurred twice in these 25 years.

Figure 11: The TSM Alternative Map



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5.3 No Build and TSM Modeling Results

The results of the No-Build and TSM scenario forecasts using the FCOG approved travel model identifies key trends to further develop the future transit build packages and to refine the performance indicators.

The following two scenarios were evaluated:

1) The No Build Scenario reflecting FCOG's forecasted transit system based on the current adopted Regional Transportation Plan (RTP). This scenario includes projects found on the 2009 TIP update in the constrained network plus recommended minor improvements in routing and headways consistent with current operating practice.

2) The TSM Scenario comprised of low-cost improvements over the No-Build Alternative, including proposed upgrades to current and planned service, transit priority measures, operations improvements on key transit corridors, vehicle upgrades, HOV facilities, and Intermodal improvements as identified in the Fresno COG Long Range Transportation Plan (LRTP).

Ridership Summary by Route

The model run comparing transit ridership in No Build vs. TSM alternatives by route shows the overall system ridership is projected to grow from approximately 45,000 transit trips in 2010 to 60,000 riders under 2035 No-Build and 80,000 transit trips under 2035 TSM*. Forecasted trip tables by route are included in the appendix of this report.

Upon closer review of the ridership projections for each individual route, the following trends are noted:

2010 to 2035 No Build

- Majority of increased FAX ridership is due to the new Blackstone – Kings Canyon BRT service.
- Of the remaining FAX routes, 1/3 of routes will experience growth in ridership, 1/3 will decrease, and 1/3 will remain stagnant.
- All Clovis transit routes experience ridership increases.
- The FCRTA Coalinga to Fresno line experiences a ten-fold ridership increase (20 to 240 riders).
-

2035 No Build to 2035 TSM

- 7 existing FAX routes experience growth between No Build and TSM with a similar number of routes projected to remain stagnant
- 4 existing FAX routes will see decreased ridership
- The four new FAX routes have ridership ranging between 1,500 and 4,000 riders each
- All Clovis transit routes, except Route 60, will have decreased ridership due to the growing affluence of the area and a non-connecting transit system.
- FCRTA ridership will remain stagnant except for the four new express routes.

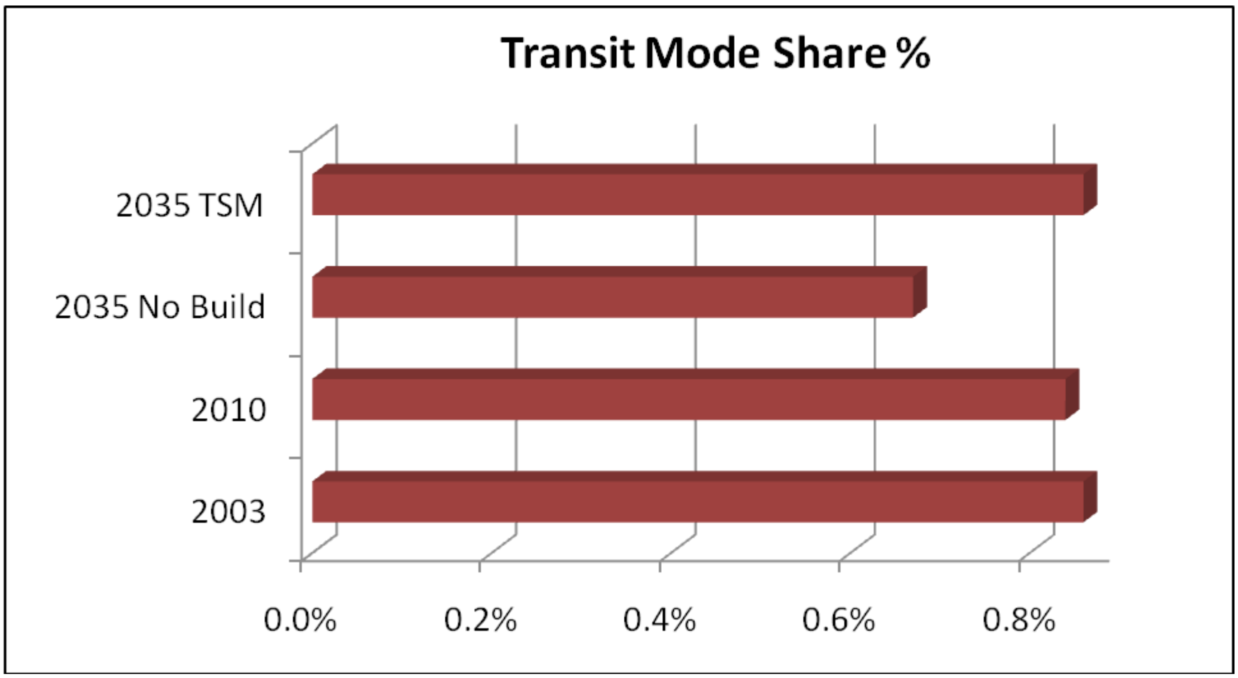
No Build and TSM Performance Indicators

Performance indicators were generated from the COG transportation model for the 2010, 2035 No Build, and 2035 TSM scenarios. The table of performance indicators can be found in the appendix of this report, and are summarized in the graphics below. Upon closer review of the ridership projections for each individual route, the following trends are noted:

2010 to 2035 No Build

- Substantial growth in Vehicle Miles of Travel (VMT), Person Miles of Travel, Vehicle Hours of Travel and Delay.
- Similar substantial increases for Total Auto (work and non-work) trips and Total Walk/Bike Trips.
- Transit mode share continues to decline as a percentage of total trips taken in spite of $440 million dollars of planned investment in transit infrastructure and services, largely as a result of the low-density planned expansion of growth to the urban fringe.

Figure 12: No Build to TSM Change in Transit Mode Share

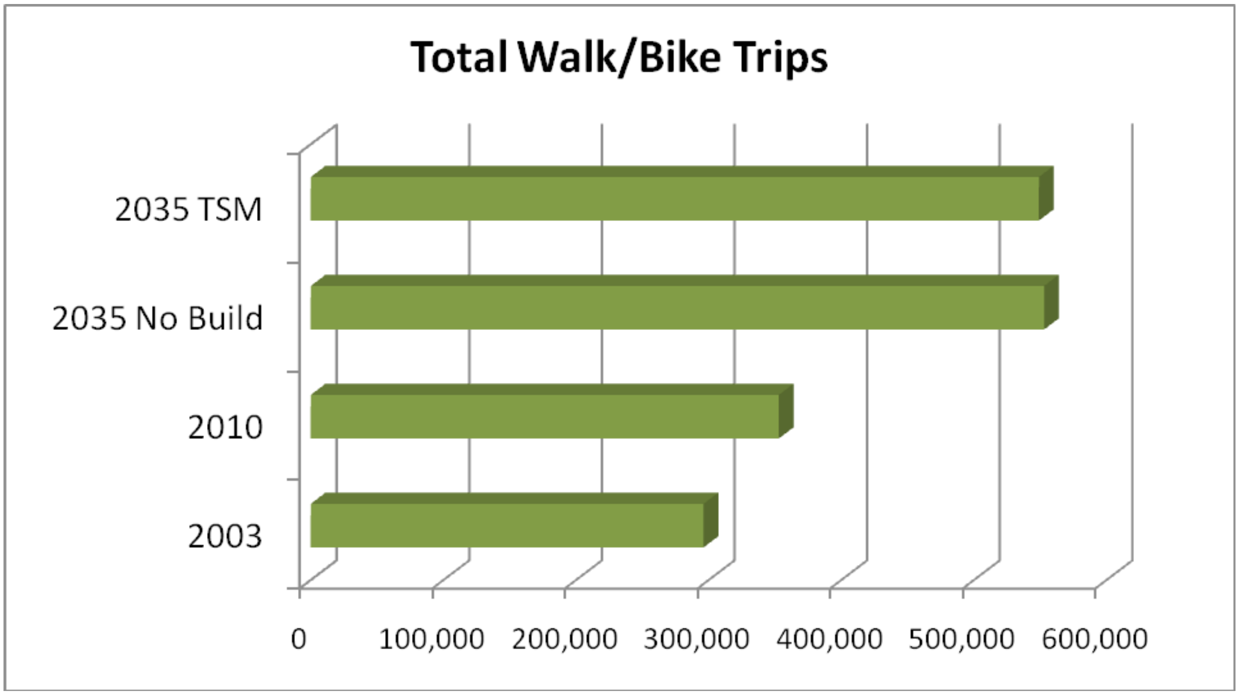


Source: Kimley-Horn and Associates, Inc.
Note: There was a change of less than 1% in total auto trips after investing $440 million in transit improvements.

2035 No Build to 2035 TSM

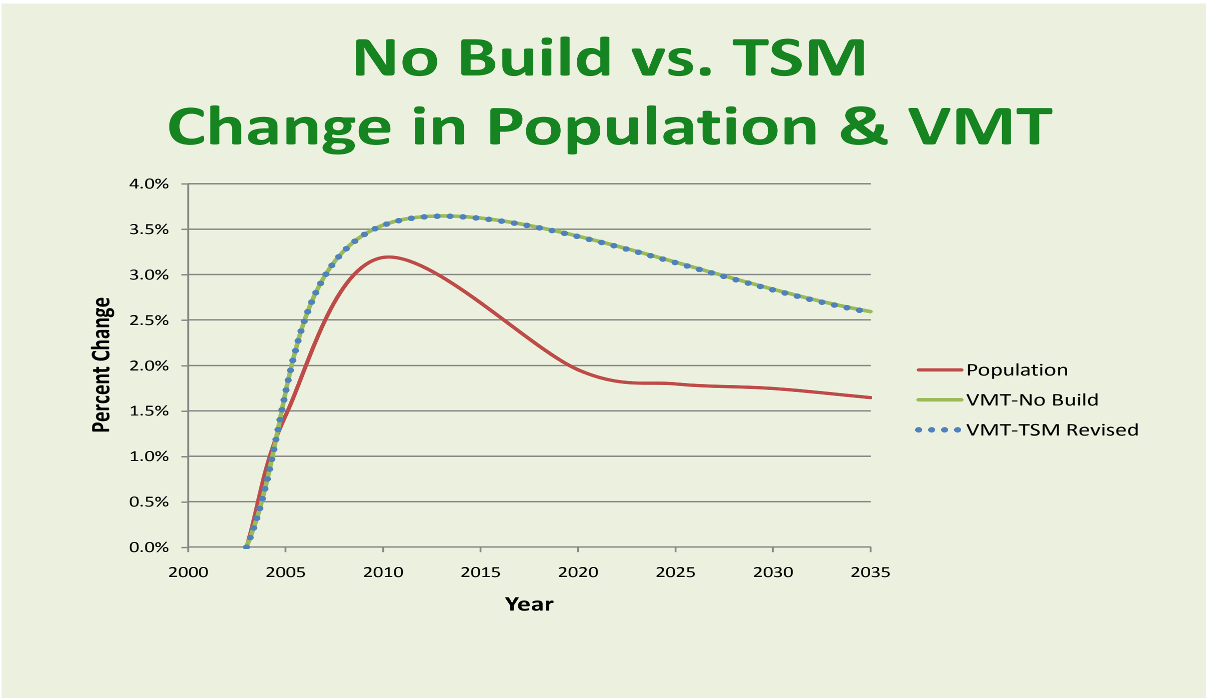
- Slight decreases in non-transit performance indicators and Total Auto Trips.
- Slight decrease in walk/bike trips and the mode share of walk/bike trips also declines.
- Over 25% increase in total transit trips, but transit market share continues to decline due to low density suburban growth in the outlying areas where transit services cannot be effectively expanded.

Figure 13: No Build to TSM Change in Walk and Bike Trips



Source: Kimley-Horn and Associates, Inc.
Note: There is a less than 1% change in total walk and bike trips between he No Build and TSM Alternatives.

Figure 14: No Build vs TSM Change in Population and VMT



Source: Kimley–Horn and Associates, Inc.

Comparing the No Build to the TSM Scenario, we find that VMT doubles from 18 million miles in 2003 to 37 million miles in 2035. VMT Grows at the same rate as the population under the current land use scenario. However, shown as a percent change by year over time, VMT grows at a faster rate than the population.

No Build to TSM Conclusions

The following concluding remarks are drawn from the results of the ridership projections and from the performance indicators:

- A majority of the new ridership growth is attributed to the Blackstone-Kings Canyon BRT service under 2035 No Build scenario
- VMT is not projected to substantially decrease under 2035 TSM suggesting that transit is not an attractive option to driving.
- Additional investments in transit improvement/packages beyond TSM Alternative would likely yield minimal increases in ridership or mode split (assuming no changes in FCOG 2035 land use)
- TSM Alternative improvements are needed to maintain existing 2003 mode split
- Although transit trips are increasing between the study scenarios, this suggests the growth is due to extensions of existing routes or new routes
- The number of transit riders to rural Fresno communities is very small thus resulting in a high cost/rider ratio.
- The increase of just over 500 riders on the FCRTA rural transit service between 2010 and 2035 indicates the growth in demand is linked to overall slow growth in the rural areas and can likely be handled with the existing number of vehicles and service levels.

5.4 The Land Use/Transportation Scenarios

The three landuse scenarios were merged with the COG travel model to estimate how well the transit network would perform under the different landuse densities. Each future land use scenario explores the impacts of higher density assumptions on transit use and bicycle/pedestrian trips. The initial scenario is evaluated under the current COG trend land use scenario, assuming Fresno continues to grow into the future as it did in the past. This growth pattern is characterized by lower density suburban growth that encroaches into the "area of influence" or the urban growth boundary. Subsequently, the build alternatives will be evaluated under higher density, transit-focused alternative land use scenarios identified as "COG Trend" (or the virtual future), "Constrained TOD" and the most aggressive "Full Build-Out TOD".

Chapter 6 describes the transportation indicators from three landuse/density scenarios in illustrates the high capacity transit network that forms the basis of the high capacity TOD greater detail. The three scenarios are designed to answer the question:

> "What effect does development density and mix of housing and employment have on people's travel behavior in specific transit corridors and downtown?"

Scenario Building Process

The scenario building process begins with the creation of prototype buildings. The buildings are modeled using existing and projected data for the Fresno area. Inputs include; unit size, land costs, building uses, parking ratio, rent and sales prices and construction costs. The outputs are the return on investments. A collection of buildings are assembled to create a development type or "place". A "place" is created by a variety of buildings, a percentage of streets and the amenities that make up places people live, work and play. Scenario builder is used to paint the development types on a map to design several possible future land use scenarios to test the implications of different decisions or policies. The outputs of the "painted" map are evaluated in a spreadsheet. Evaluation criteria include: density and mix of uses, transportation mode choice, and housing mix and affordability.

5.5 Transit Network for the Three Alternatives

All three future land use alternatives assume the same future transit network has been built, as described below and illustrated in Figure16 " Future High Capacity Transit Corridors". The initial "Build" transit network builds upon the projects and improvements already identified in the TSM and the No Build Alternatives and contains the following transit improvements:

1) BRT is implemented on Shaw Avenue with a new Transit Center/Park & Ride Lot at the intersection with Highway 99 North at the west end. This system extends up Hwy 168 on the east end terminating near downtown Clovis. A transfer center is located at CSU Fresno.

2) An extension of BRT on Kings Canyon Road to the planned Southeast Growth Area (SEGA) transit center in the Constrained TOD Scenario, but it stops at Clovis Avenue in the Full Build Out Scenario (because SEGA is assumed not to exist).

3) It is assumed that high speed rail is approved and operating by the year 2035. The planned High Speed Rail station is located west of H Street along the Union Pacific Railroad corridor. (See Figure 11 below)

4) BRT on Blackstone and Kings Canyon is extended downtown to interface with the planned High Speed Rail station.

5) A streetcar system comprised of two alignments is added downtown replacing the former circulator trolley downtown. Figure _ below illustrates the preferred streetcar alignments for downtown. Preferred streetcar routes are: 1) Fulton or Van Ness through downtown, connecting to the Tower District and Fresno City College See details of the streetcar analysis in the separate Feasibility Study for the Downtown Fresno Streetcar in the appendix of this document; and 2) Fresno Street from Chinatown to San Joaquin High School, with connections to high speed rail and the regional hospital.

6) By the year 2025 or 2030 it is assumed that sufficient population and job density have been achieved in the high capacity transit corridors to justify upgrading transit service on Ventura/Kinds Canyon and Blackstone Avenue from BRT to LRT.

**The 45,000, 60,000, and 80,000 numbers represent the number of trips using transit each day to get from an origin to a destination. Many of these trips use more than one transit vehicle (due to transfers) so the ridership (total boardings) number is always higher than the person trip number.*

Figure 15: Future High Capacity Transit Corridor Recommendations

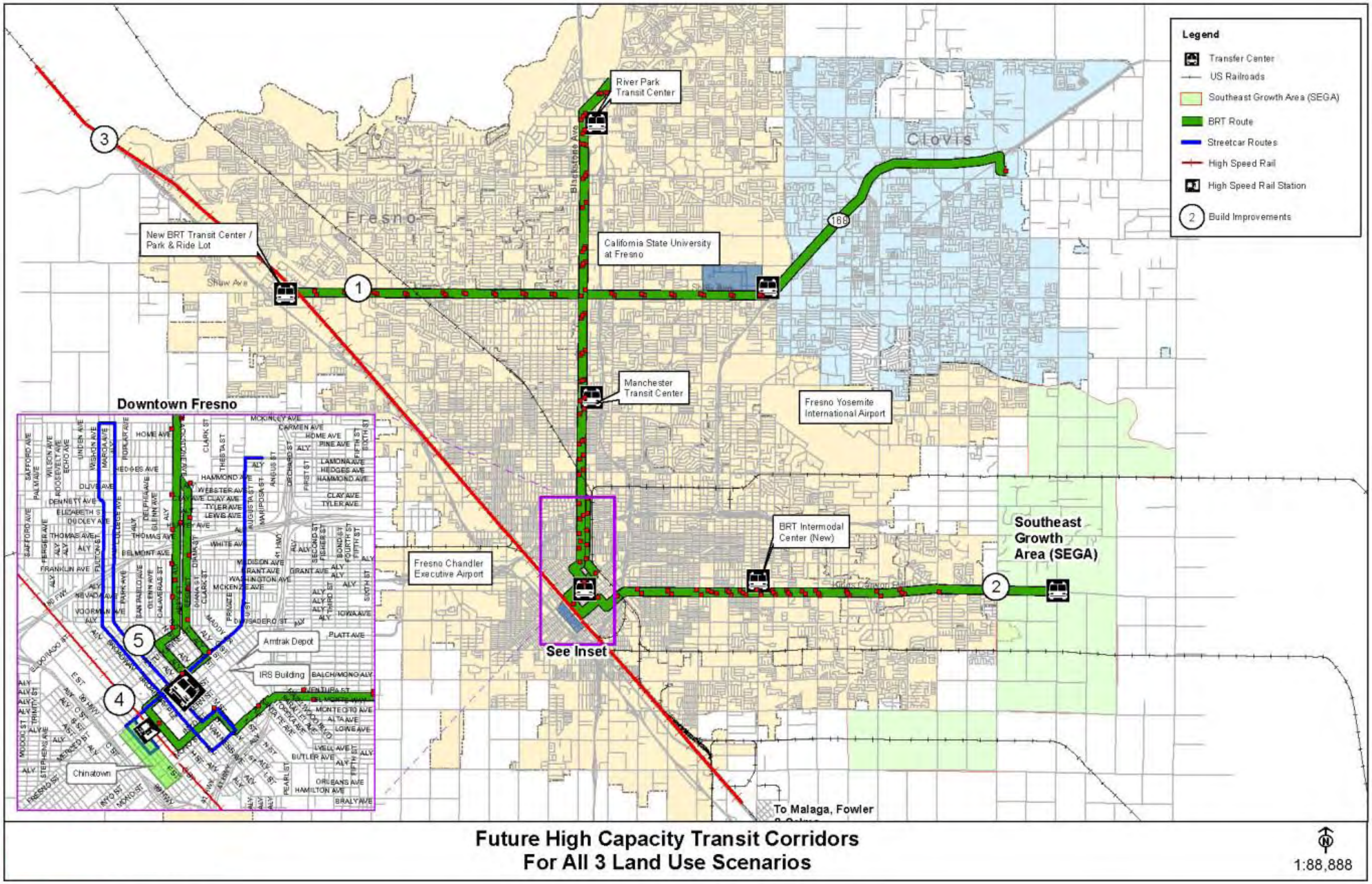


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Figure 16: Proposed Downtown Fresno Streetcar Alignments

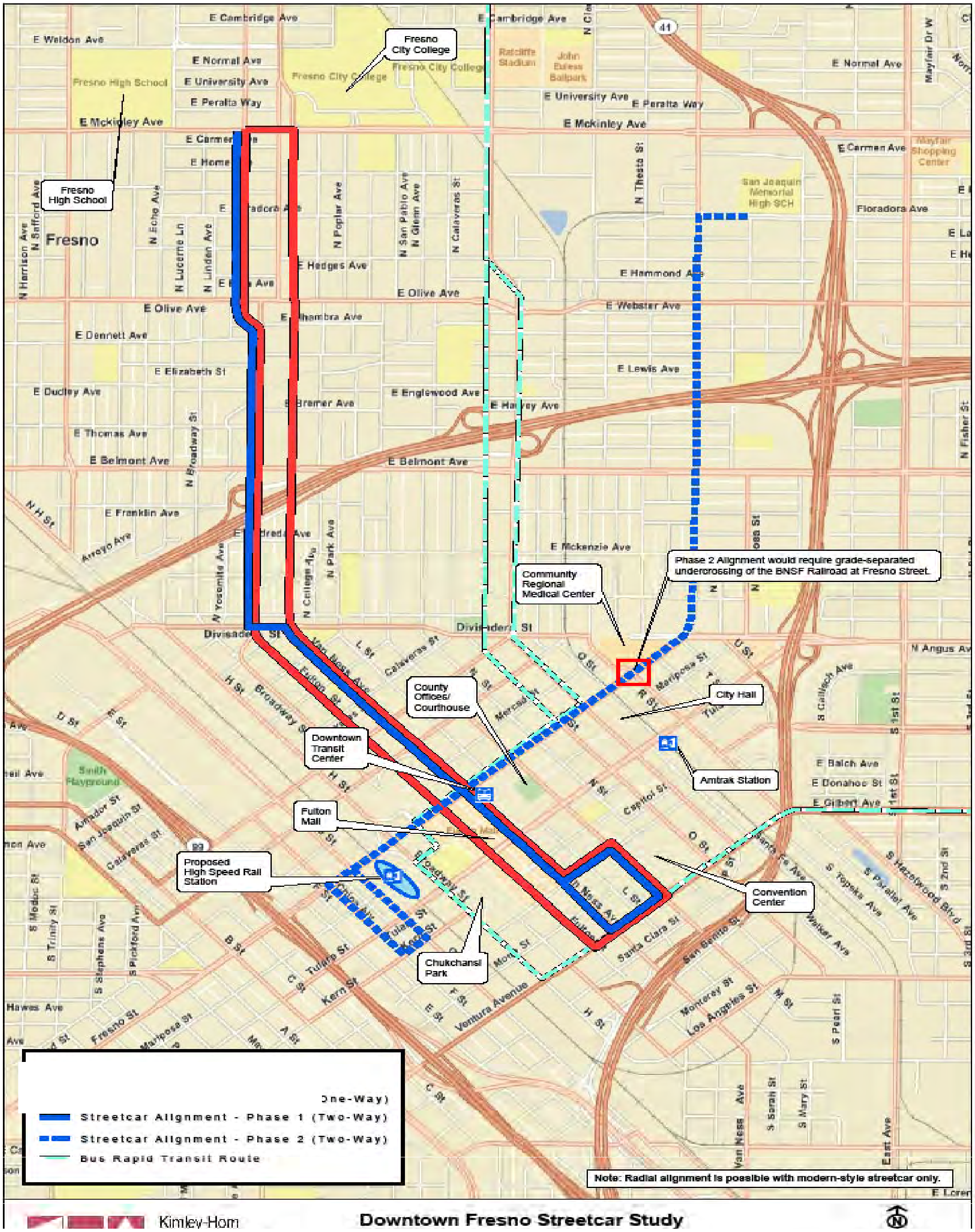
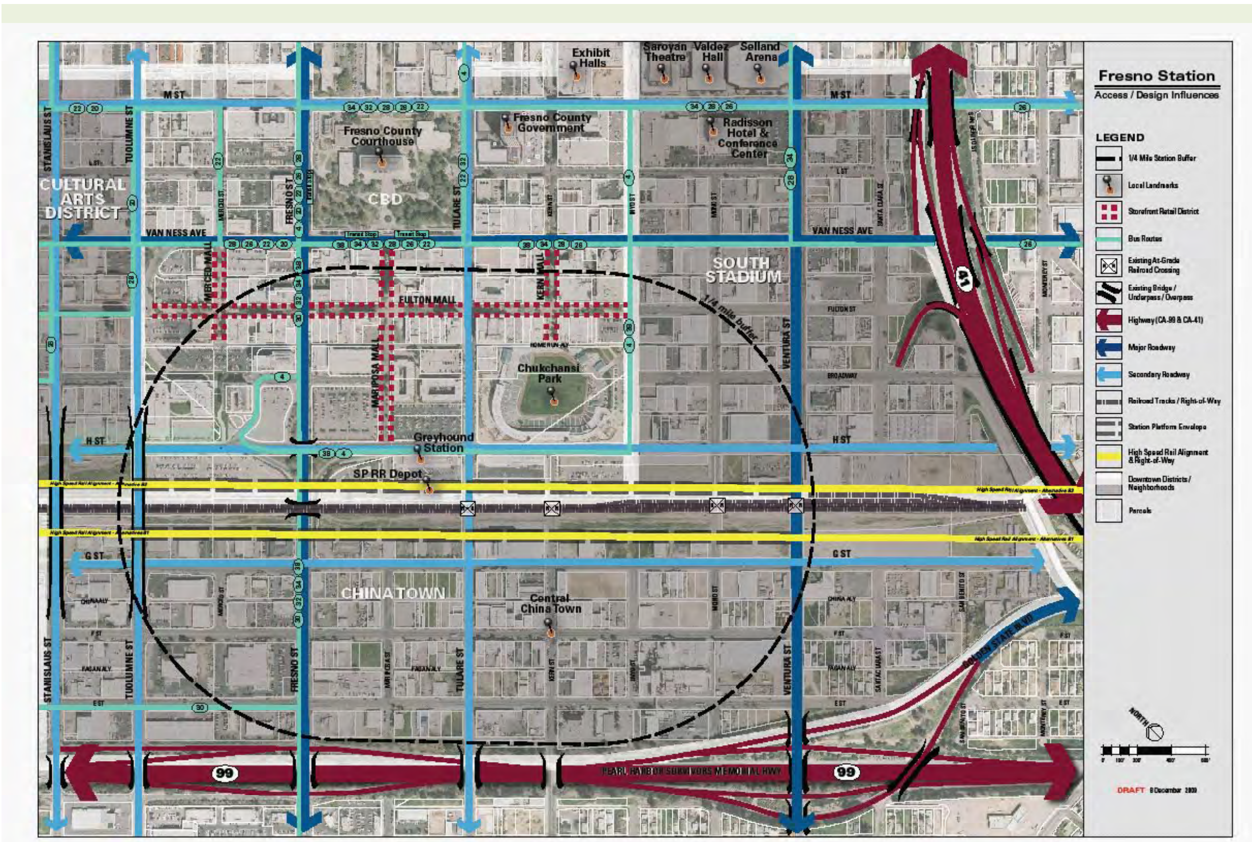


Figure 17: Location of the planned High Speed Rail Station



Map Source: California High Speed Rail Authority

Proposition 1A, approved by California voters in November of 2008 is a bond measure to help fund a 200mph high speed rail line that will connect Los Angeles and San Francisco through the Central Valley with a station in Fresno. Proponents of the project expect new, high density developments will be built adjacent to the stations, which will be a catalyst for development in downtown Fresno. The train system is expected to be completed in 2030.

6.0 Land Use Alternatives Analysis

Developing alternatives for Fresno's Transit Investments begins with an analysis of the land use densities and destinations that shape regional travel patterns. Existing high demand travel corridors are forecast to become very high demand travel corridors in the future. With the right kind of land use planning these future travel corridors could be developed as transit-supportive corridors, supported by well planned environments where walking or riding a bicycle become preferred options for more trips.

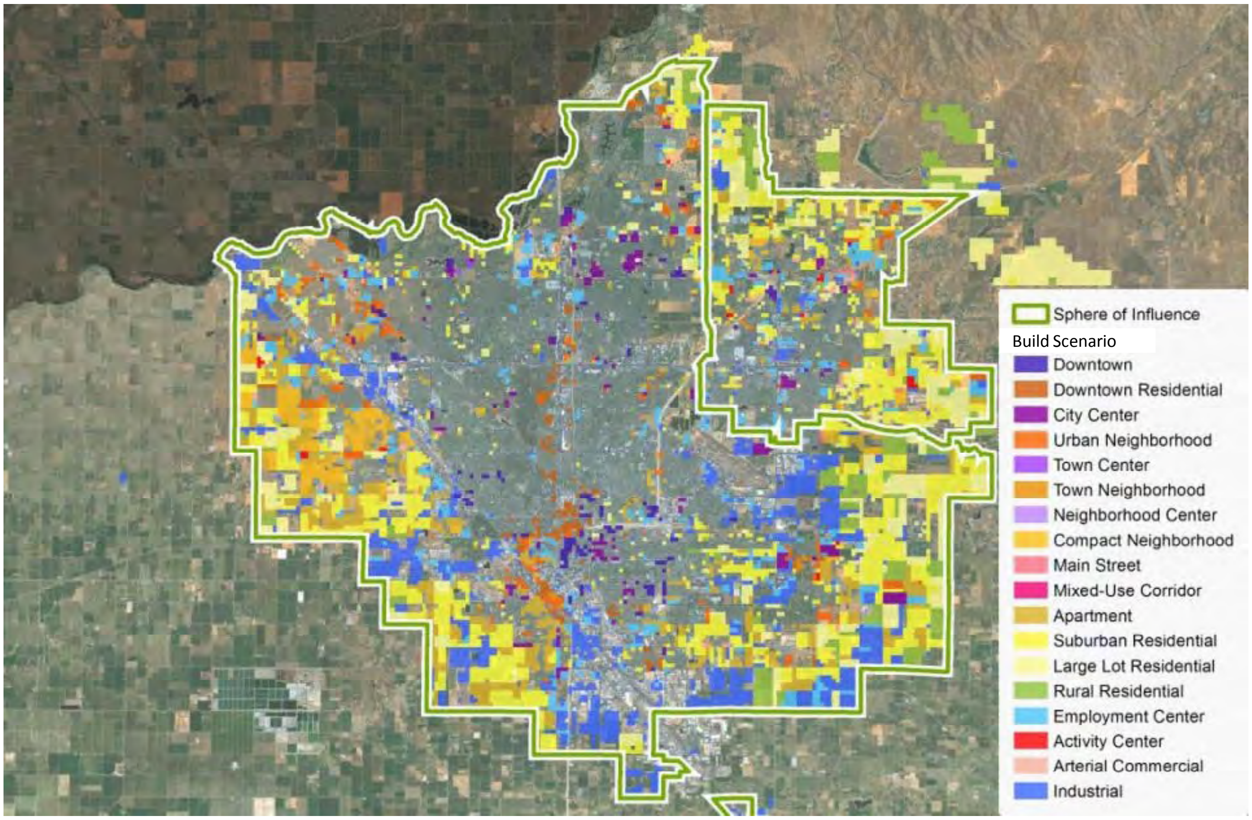
Analysis of existing and forecast land use densities reveals that significant changes in zoning and development densities will need to occur in order to concentrate development in specific corridors to support future high-capacity transit investments. Depending on the amount of development density and mix that can be attracted to the transit corridors, both bus rapid transit and light rail transit may be feasible in twenty years.

The Fresno Council of Governments recently updated their travel model to predict changes in travel patterns and behavior as a function of land use plans in future years. In travel demand modeling, future growth patterns become an extrapolation of current growth patterns. Growth predictions are a useful tool in planning future transportation investments and services. The figure below illustrates the COG's growth forcast for 2030. New residential growth as shown by the yellow coloring is anticipated south and west of Highway 99 in Fresno. Clovis and the north east areas are also expected to continue their strong growth patterns. A cluster of new development in the South East Growth Area (SEGA) also appears in the model by the year 2035. These new growth areas currently have no transit service and the ever-increasing expansion of low-density development on the urban fringes makes providing transit service to these areas increasingly inefficient and unsustainable.

6.1 The Build Land Use Scenario - 2035

The first Build Scenario (also called COG Trend Forecast) assumes that Fresno continues to grow in the future as it has in the past (according to the adopted COG land use plan), out to the year 2035. The Build Scenario assumes 38% of new population growth is absorbed into the three BRT corridors and downtown. Residential, low density single family homes are built out on the urban fringes consuming valuable farmland and requiring the outward expansion of roads, utilities, schools and municipal services to support this growth. There is some mixed use development but no clustering of this kind of growth, and some redevelopment of downtown, but not at significant changes in existing density.

Figure 18: Build Scenario 2035 Land Use



Source: Fregonese and Associates

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Growth Assumptions for the Build Scenario

- 38% of new growth is located in the BRT corridors and downtown
- 9% of new housing units are in mixed-use buildings
- 23% of jobs are in mixed-use building
- Mixed-use buildings in the scenario include:
  - 5-story, 4 story and 3 story retail/residential
  - 4 story retail/office
  - 10 story mixed use office
  - Main street commercial

COG Forecast Model Population for the Build Scenario: 236,869 in the ½ mile walk zone around the BRT corridors and 600,974 people in the 1 ½ mile bicycle shed around the BRT corridors. Development density for the is increased to 9.22 du/ac in the 1 mile wide corridor on either side of the transit line. The Growth Scenario absorbs 38% of the new growth coming to Fresno County by the year 2035.

The modeled results for the Build Scenario shows the Countywide automobile mode share for all trips is 91.36%, with a 0.93% transit mode share and a 7.71% combined mode share for bicycle and walk trips. In the approximate one mile wide TOD corridors for the 3 BRT alignments, the mode splits remain virtually unchanged from No Build to the Build Scenario: the automobile mode share is 89.6%, the transit mode share is 1.7%, bicycle trips are 0.82% and walk trips are at 7.89%

6.2 The Constrained TOD Scenario

The population totals are held constant in each of the future growth scenarios to illustrate how changes in population density can influence mode choice and travel behavior in identified high-growth corridors that can be well-served by transit. New growth in housing and jobs is moved to the transit corridors to illustrate the effectiveness of the TOD growth strategy on trip reduction and the shift to transit, walking and bicycling in the ½ mile "walk shed" and the 1 mile "bike shed" around the transit corridor..

The Constrained TOD Scenario was modeled two ways, one showing trips by mode with a shared BRT lane and the other with a dedicated lane for BRT (or future light rail). The shift in transit, bike and ped mode shares in the exclusive BRT lanes scenario made the difference of only +0.05%, and was not statistically significant. The percentages given for this scenario use the figures for BRT in dedicated rights of way.

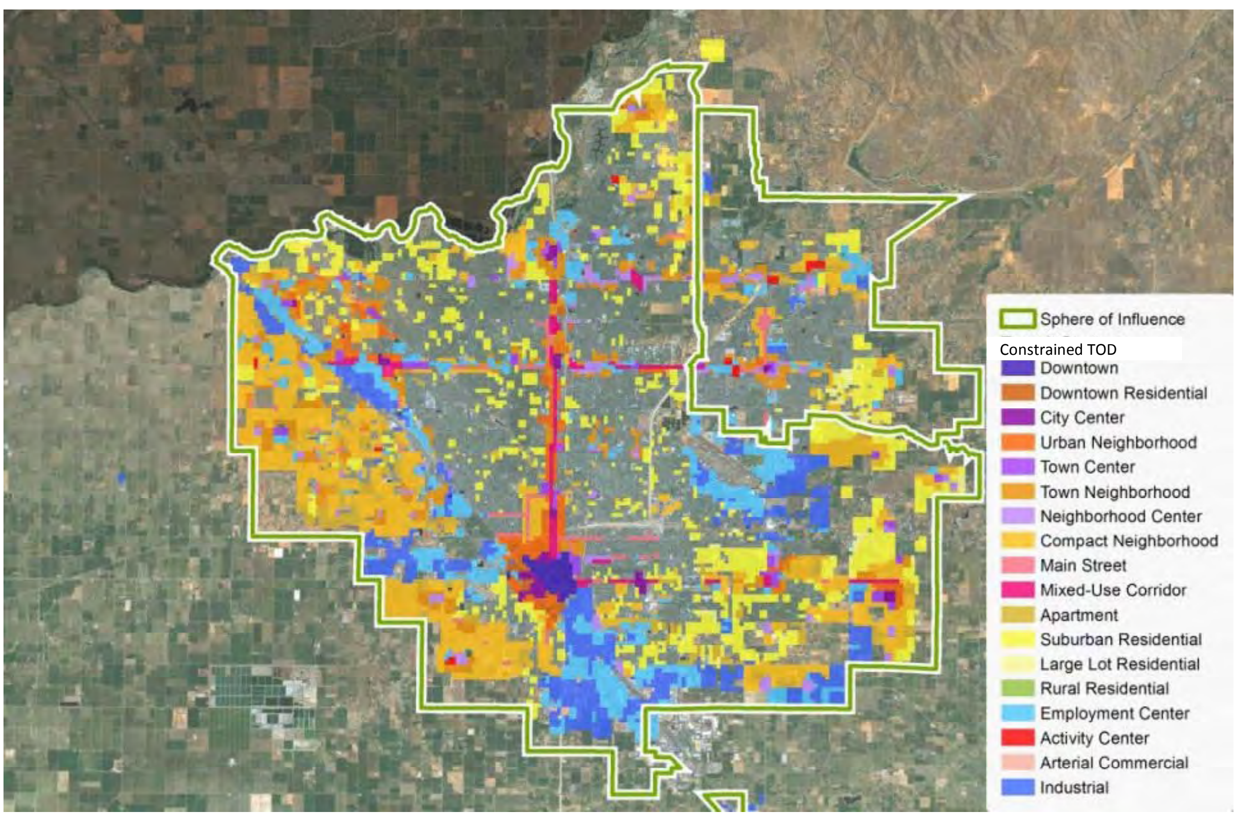
The Constrained TOD Scenario is based on the same transit network developed for the Build Scenario (with BRT on Blackstone, Ventura/Kings Canyon and Shaw Avenue going up Highway 168 to Clovis). The Constrained TOD Scenario assumes 42% of the new population growth is absorbed into the three BRT corridors and downtown. Population densities and employment in mixed use buildings are moved to the BRT corridors in the land use model to illustrate a conservative approach to transit oriented development in Fresno.

Table 7: Comparing Land Use Scenarios

	COG Trends	Constrained TOD	Aggressive TOD
% of new growth	38%	42%	52%
Density in 1 mile	9.2 du/ac	12.32 du/ac	14.85 du/ac
Transit Mode Share of all trips for region	.93%	1.22%	1.45%
Transit Mode Share for all trips 1 mile corridors	1.7%	2.3%	2.5%
Transit Share to work on BRT Corridors	5.65%	7.64%	8.51%
GHG Reductions*	0–2%	6%	8%

Source: Fresno COG staff

Figure 19: The Constrained TOD Land Use Scenario- 2035



Source: Fregonese and Associates

Growth Assumptions for the Constrained TOD Scenario

The constraints assumed by the Constrained TOD Scenario are 1) that the market demand for TOD housing in the future is limited by the same income and household makeup constraints that exist in Fresno now and 2) that the Southeast Growth Initiative (SEGA) is built on the urban fringe.

- 42% of the new population growth will move to the BRT corridors and downtown
- 18% of new housing units are in mixed-use buildings
- 37% of jobs are in mixed-use buildings
- Mixed-use buildings in the scenario include:
  - 5-story, 4 story and 3 story retail/residential
  - 4 story retail/office
  - 10 story mixed use office
  - Main street commercial

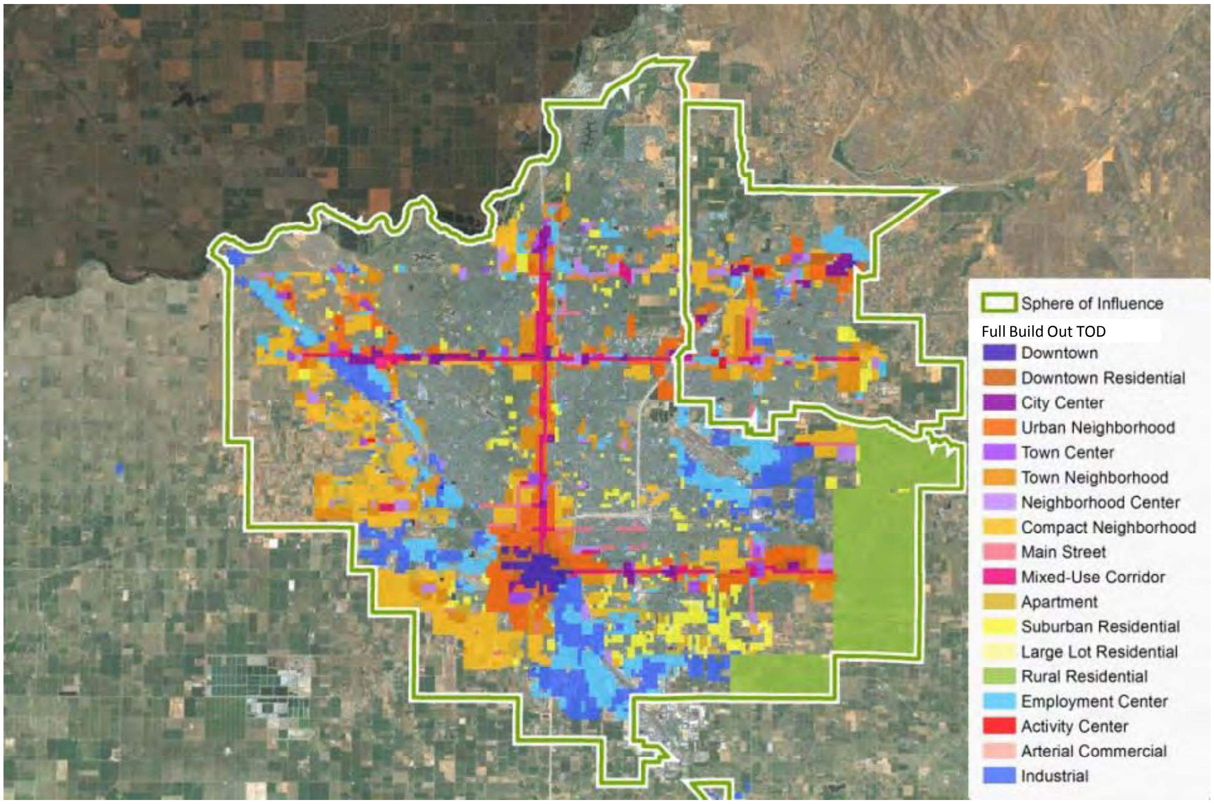
Constrained TOD Population: 317,203 people in the ½ mile walk shed of the BRT corridors and 689,508 people within the 1 ½ mile bicycle shed of the BRT corridors. Constrained TOD density is increased to 10.58 du/ac in the 1 mile wide area either side of the transit corridors. The Constrained TOD Scenario absorbs 43% of the population growth coming to Fresno County by the year 2035.

Comparing the No Build to the Constrained TOD Scenario, the transit mode share for all trips in the BRT corridors increases from 1.21% in to 2.3%. The bike trips decrease slightly from 0.86% to .81% as some bike trips are shifted to transit and the walk trips increase from 8% to 8.88%. The automobile mode split has decreased only 2% - from 89.93% to 88.0%.

6.3 The Full Build-Out TOD Scenario

In the Full Build Out TOD Scenario, the restrictions placed on growth and density in the Constrained TOD Scenario are removed. The BRT Corridors and downtown are built up with as much growth in dwelling units and employment as possible, absorbing 52% of the new population growth into the three BRT corridors and downtown. Our planning experts felt that going beyond this level of development in terms of total growth and density levels could not be supported. In this scenario, SEGA no longer exists and all of SEGA's forecast residential and employment development is moved to the three BRT corridors and a planned employment center in north Clovis at Highway 168. The Bus Rapid Transit line on Kings Canyon now stops at Clovis Avenue, 2.5 miles short of the planned transit terminus in the middle of SEGA at the intersection with North Locan.

Figure 20: The Full Build-Out TOD Land Use Scenario- 2035



Source: Fregonese and Associates

Growth Assumptions for the Full Build-Out TOD Scenario

- 52% of new growth moves to the BRT Corridors and downtown
- 27% of new housing units are in mixed-use buildings
- 43% of jobs are in mixed-use buildings
- Mixed-use buildings in the scenario include:
  - 5-story, 4 story and 3 story retail/residential
  - 4 story retail/office
  - 10 story mixed use office
  - Main street commercial

Full Build-Out TOD Population: 398,414 people within the ½ mile walk shed of the BRT corridors and 782,009 people within the 1 ½ mile walk shed of the transit corridors. Density is 14.85 du/ac in the 1 mile wide corridors.

Comparing the No Build to the Full Build-Out TOD Scenario, the transit mode share for all trips in the BRT corridors increases from 1.21% in to 2.48%. The bike trips decrease slightly from 0.86% to .84% and the walk trips increase from 8% to 9.73%. The automobile mode split has decreased from 89.93% to 86.95%.

6.4 Comparing the Scenarios

Table 8: Comparing Densities in the BRT Corridors

Existing	Density	in BRT	Corridors	Total	Housing	and Jobs
	.25 Mile	.5 Mile	1.5 Mile	.25 Mile	.5 Mile	1.5 Mile
Housing Units per Residential Zoned Acre	9.48	8.20	7.41			
Housing Units per Acre	2.25	2.38	2.15	22,726	47,806	132,161
Employment per Acre	6.25	5.41	2.83	63,138	108,678	174,131
Build Scenario				Total Count		
	.25 Mile	.5 Mile	1.5 Mile	.25 Mile	.5 Mile	1.5 Mile
Housing Units per Residential Zoned Acre	13.81	11.77	10.59			
Housing Units per Acre	3.28	3.42	3.07	33,117	68,654	188,919
Employment per Acre	8.16	7.25	4.20	82,509	145,597	258,262
Constrained TOD Scenario				Total Count		
	.25 Mile	.5 Mile	1.5 Mile	.25 Mile	.5 Mile	1.5 Mile
Housing Units per Residential Zoned Acre	21.60	15.81	12.32			
Housing Units per Acre	5.12	4.59	3.57	51,801	92,190	219,748
Employment per Acre	11.97	9.29	4.70	120,973	186,489	289,528
Full Buildout TOD Scenario				Total Count		
	.25 Mile	.5 Mile	1.5 Mile	.25 Mile	.5 Mile	1.5 Mile
Housing Units per Residential Zoned Acre	36.16	23.52	14.85			
Housing Units per Acre	8.58	6.83	4.30	86,708	137,196	264,908
Employment per Acre	14.97	11.03	5.32	151,336	221,487	327,390

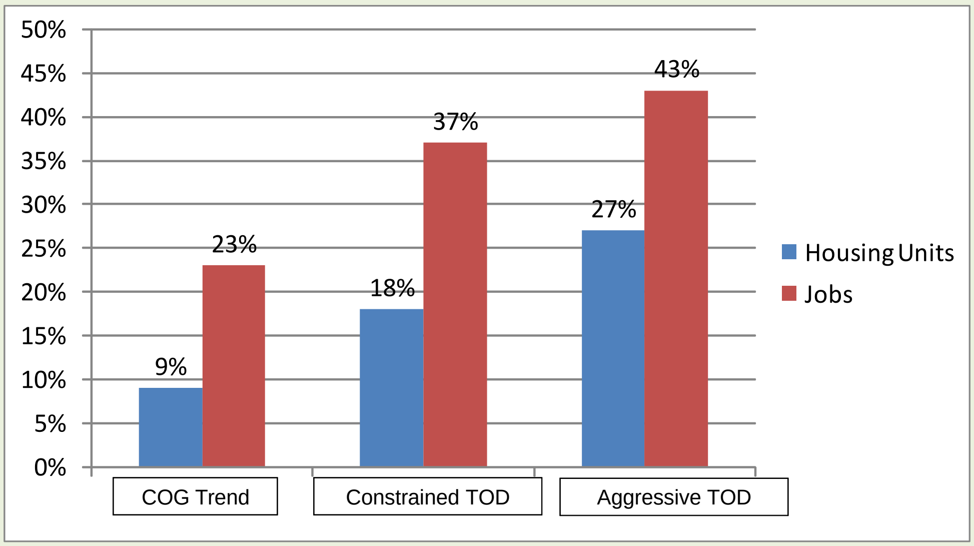
Source: Fregonese and Associates

Population density in the BRT corridors and downtown increases significantly as the scenarios build from the existing growth patterns of the virtual future (or Build Scenario) to the kinds of densities that would support a high-capacity transit investment. The growth scenarios increase housing units per acre from 68,654 units in the Build Scenario to a high of 137,196 in ½ mile walk shed in the Full Build-Out TOD Scenario. To keep things in perspective it is important to note that these population numbers represent only 1.7% to 2.3% of Fresno County's population total expected in the year 2035. Accordingly, it will be important to judge the impact of this small shift in development density relative to the development patterns that exist in most of Fresno County and have existed over the past 100 years.

When we evaluate the BRT corridors as new growth areas with a potential to make a difference in a defined area the differences in population and employment are quite dramatic compared with the baseline population in the corridors of 178,940 people. Of the 527,403 new residents that are expected to come to Fresno County, the Build Scenario would house 38% of them; the Constrained TOD Scenario would house 43%; and the Full Build-Out TOD Scenario would house 52% of the new residents. Residential densities triple from the current 8.2 du/ac to 23.52 du/ac in the ½ mile walk shed zone.

Increasing the Density and Mix of Uses

Figure 21: Percentage of housing units and jobs in mixed-use buildings



Source: Fregonese and Associates

Across the three scenarios, housing is increased from 9% of the mix to 27% of the mix, while jobs are increased from 23% to 43% of the development mix. Increasing the mix of land uses in higher density development has a significant impact on mode choice in a corridor. With origins and destinations in close proximity, many more trips can be made by walking, bicycling, and taking transit. As a result of increasing density and mix of uses in the BRT corridors, comparing the No Build to the Full Build Out TOD Scenario, the transit mode share increases 105%, walk trips increase 21.63% and bicycle trips actually decline by 2.3% as transit attractiveness replaces trips that used to be taken by bicycle in the transit corridors.

7.0 Forecast Demand for TOD-Style Development

A focused market analysis for Transit Oriented Development -style housing in Fresno identified a market demand deficit for TOD projects due to Fresno's unique demographics. Compared to the State of California and the United States as a whole, Fresno has a much higher share of family households with children. Fresno County households tend to earn lower median incomes on average, and are less likely to live alone. These demographic characteristics do not generate a significant share of conventional demand for TOD.

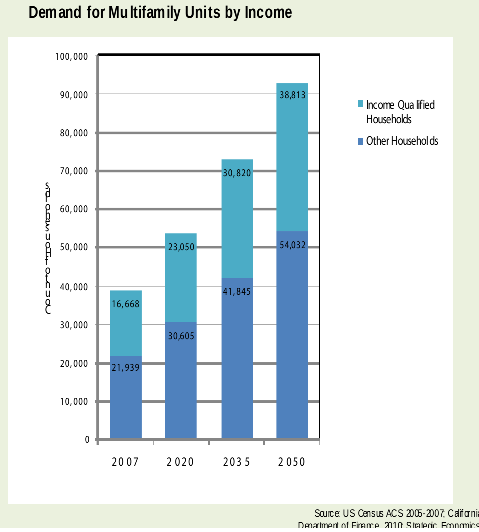
It is estimated the demand for TOD-type housing in Fresno County is only 14% of the total demand for new housing, compared to 25% share reported at the national level. This represents about 73,000 of the total 520,000 households forecast by 2035. Of that total, it is estimated that only 40% of those TOD households (29,200 households in 2035 and

39,000 households in 2050) will be able to afford new built, market-based units. The remaining 54,000 units in 2050 will need to be rehabilitation of existing housing, warehouse conversions and subsidized housing for lower income families.

While the Fresno market has an abundance of affordable single family products but not many choices for mixed use or multifamily housing. As new employers enter the market and wages increase, the new housing products will become more desirable, improving the profitability to developers. Even in regions with a larger concentration of young professionals – such as San Francisco – developers will tend to build only to the highest end of the market when possible.

Figure 22: Market-rate multi-family housing likely to be targeted to higher income households

Only 40% of TOD households (30,000 in 2035) can afford newly built, market-rate higher density units.



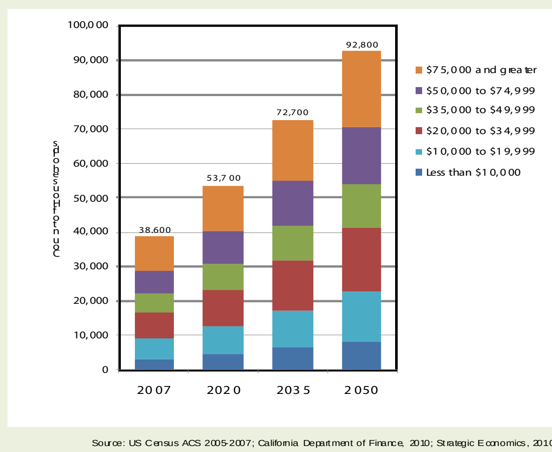
Source: Strategic Economics

With this very limited demand for TOD-style housing in the Fresno market, the cities of Clovis and Fresno first focus on enhancing their existing job centers, and concentrating any future market momentum for TOD and transit-supportive jobs in these existing areas which are more central to the existing and proposed regional transit network (i.e. in downtown Fresno, Clovis and the planned BRT corridors on Blackstone and Kings Canyon/Ventura, and then on Shaw Avenue to CSU Fresno in the future).

7.1 TOD Building Types to Support Transit

Figure 23: TOD Demand by Income

60% of TOD demand (43,000 units in 2035) is from households with low and very low incomes.



Source: Strategic Economics

In order to support a robust transit system, new building and development types will be required. Mixed use buildings become commonplace along transit corridors. Downtown development types are made up of some residential towers, mixed use high rise condos and a number of mixed use four- story buildings. Three and four story mixed use residential and office and retail buildings will characterize the corridors. The development types described in the scenarios are both types that are seen on the ground presently in Fresno and new types that will become more common in a transit supportive future.

Rates of redevelopment range from zero percent for large lot residential types to 50 percent for downtown. Downtown and urban development types are generally higher profit projects and these areas have more demand for change; therefore have a greater chance of redevelopment. Stable large lot residential areas on the other hand are unlikely to redevelop.

Figures 24: Examples of Lower Density Housing and Offices

	
Creating inviting places for the pedestrian	*New small scale mixed–use development*
	
Townhomes are suitable for Fresno	*Densities are in the 15–30 units per acre range*

Photos courtesy of Fregonese and Associates

Adjacent to the transit corridors will be supporting compact neighborhoods. Infill single family homes, townhomes and duplexes, cottage homes and some apartments will make up these neighborhoods. The market in Fresno will need to be different in the future to support these building types. For instance, Strategic Economics research shows that multifamily are the most costly per unit. For these transit supportive units to be affordable they will either need to be subsidized or the market will need to shift in large part to support higher paying jobs.

The development types that are familiar to Fresno today but that will not support transit in the future are; suburban residential, large lot residential, rural residential, activity center, and arterial commercial. The recommended development types that will support transit and introduce some new land uses to Fresno are; **downtown, downtown residential, city center, urban neighborhood, town center, town neighborhood, neighborhood center, compact neighborhood, main street, and mixed use corridor.** The transit supportive scenario uses these new development types, often redeveloping areas that are currently not transit supportive. These development types meet the recognized minimum density of 12 units per acre needed to support bus rapid transit. The development types have a mix of buildings in them that not only encourages transit use but also alternative transportation modes such as walking and biking to reduce the reliance on automobile travel, and as a result greenhouse gas emissions.

Figure 25: Examples of Medium Density Housing and Offices

Medium density mixed use.

Retail on the ground floor, condos above.

Photos courtesy of Fregonese and Associates

7.2 Fresno's Future Land Use Vision

The land use future vision anticipates that there will be both changes in resident's behavior and changes in land use. A significant portion of projected growth for the county will shift from new undeveloped areas inward to already developed areas. Much of that growth will concentrate in a one mile buffer on either side of transit corridors. The half mile closest to the corridor will consist of denser buildings, including mixed use. In the half mile further from the corridor an increasingly compact neighborhood will evolve. All the neighborhoods in between transit corridors will also experience changes, as vacant and underutilized lots redevelop into higher more intense uses. New buildings will be required to provide less parking, resulting in a drastic reduction of surface parking lots in Fresno. Buildings will front transit corridors and pedestrians will not have to traverse a parking lot between the sidewalk and the building entrance. As inner Fresno City neighborhoods and transit corridors transform they will be increasingly more desirable places to locate. Amenities will be a short walk, bike ride or transit ride away. The transit supportive scenario will accommodate all of the forecasted growth for the region, however, the housing choices will be different and more diverse and the growth will be more concentrated.

Figure 26: Examples of Higher Density Housing and Offices for a Downtown

High-rise office building

High density mixed use.

Photos courtesy of Fregonese and Associates

PTIS Policy, System and Investment Recommendations

- **Planning Policy Recommendations**
  - *– Transit System and Investment Recommendations*
  - *– Transit Operations and Maintenance Plan*
  - *– Infrastructure Financing Plan*

8.0 PLANNING POLICY RECOMMENDATIONS

Draft Policy Recommendations Summary

Policy recommendations were made by the consulting team on the PTIS Study for implementation by the City of Fresno, Fresno County, and the cities and towns of greater Fresno County to meet the study objectives. The recommendations fall under six broad categories:

1. Increase the number of people and businesses in Downtown Fresno and in close proximity to designated high-capacity Transit Corridors, with a priority on making downtown more attractive to pedestrians.
2. Plan for and build TOD housing developments for a mix of middle and lower incomes, and families.
3. Grow the transit, bicycle and pedestrian mode shares by making it more attractive to use alternate modes.
4. Decrease the drive alone mode share and reduce vehicle miles travelled (VMT) with Travel Demand Management (TDM) programs and policies.
5. Attract residents to Fresno who would be willing to live in market priced TOD-style development, including young urban professionals, seniors, and future high speed rail commuters.
6. Cross jurisdictional and departmental boundaries with processes to link local and regional transportation and land use planning decisions.
7. Restrict the growth of new development on the urban fringes and into farmlands with incentives, disincentives, and growth boundaries.

Policy Recommendations in Detail

The following Draft Policy Recommendations were widely distributed for comments at meetings with City, County and Council of Government elected officials and staff during the week of October 25, 2010 and revised with comments from the City of Fresno staff on December 16th, 2010.

> Policy changes that direct how and where development is allowed to occur will be critical to the success of future transit investments and meeting air quality requirements.

1. Increase the number of people and businesses in Downtown Fresno and in close proximity to designated high–capacity Transit Corridors.

Specific strategies and recommendations…

…for the City of Fresno to implement:
Overview. Focus as much growth downtown as possible, particularly employment uses. Maximizing growth downtown optimizes the use, viability and efficiency of public transportation, pedestrian and bicycle use, and shortens the average trip lengths made by car. Successful residential development will rely on the sense of security felt by prospective residents, as well as provision of fundamental services residents need. Therefore, development and growth strategies need to be augmented by a Clean & Safe program (as proposed through the new Downtown PBID) and incentives to attract and retain grocery and support retail.

The approval processes for downtown development and redevelopment should be simplified and expedited, and fees and improvement costs should show a clear nexus. The concept of using incentives such as fee waivers to attract development has been proposed by the City of Fresno Public Works and Downtown and Community Revitalization Departments. A high priority for the City of Fresno should be the renovation of downtown infrastructure such as water, sewer, and storm drain systems. This requires an infrastructure Master Plan (that is now being developed in conjunction with the Fulton Corridor Specific Plan and a shared funding mechanism that maximizes public sources of funds to keep development costs low. Finally, a policy is needed to address vacant historic buildings that are in such a state of disrepair that they cannot be feasibly renovated. The PTIS recommends the following strategies to support the goal above.

A. Make downtown Fresno the top priority for investment and redevelopment, allowing for the highest densities in this area. (A new form-based code is proposed to accompany the Fulton Corridor Specific Plan). Target public investments in "place making" and infrastructure in Downtown Fresno to incent private development.

B. The first "tier" of priority investment in high capacity Transit Corridors is the Blackstone and Ventura/Kings Canyon corridors for which FAX is anticipating Federal funds. The second tier corridors include Shaw Avenue and the extension of the Shaw Avenue corridor along Highway 168 to Clovis. The third tier of corridors with potential for 15 minute bus service to downtown should also be considered for medium density development, (i.e., Cedar, Palm, First, and Fresno Streets) particularly TOD at key nodes and where transit routes intersect.

C. Explore public/private partnerships to facilitate projects that could act as catalysts for Downtown and Transit Corridor revitalization. But any investment in development projects should be concentrated within the Fulton Corridor Plan area to contribute to "critical mass" in the downtown area.

D. Monitor where development occurs in relation to target corridors and create performance indicators to track the growth in housing units, commercial/retail, etc. within walking distance of the priority transit corridors and downtown. This "market information" can be used, if necessary, to shift or refine development related policy.

E. (Cities of Fresno and Clovis) Create a Transit Overlay District and associated Form Based Code with density requirements, mix of building types and development guidelines that will support the transit investment in Downtown and Transit Corridors.

    1. Develop and adopt Form-Based Codes to illustrate and specify the density and quality of development required in transit corridors and downtown. (The Fulton Corridor Specific Plan that is currently in progress with the City of Fresno proposes to create new form-based codes for downtown Fresno).

2. Specify building heights ranging from 3 to 6 stories maximum, with a pedestrian oriented residential and mixed use, at high densities (e.g.,70 to 80 du/ac) within ½ mile of the Transit Corridors. Allow taller heights at specified centers (high-density nodes at transit intersections). Gradually decrease density requirements beyond one-half mile from Transit Corridors.

3. Prohibit or restrict auto-oriented uses such as big box retail, strip commercial and low intensity distributed office parks fronting and within ¼-mile of high capacity Transit Corridors and in the Downtown area (through the TOD overlay district policies or a new form-based code) –and encourage the conversion of existing auto-oriented development in these corridors to residential and residential mixed use projects.

4. Adopt reduced off street parking requirements for projects built in the Downtown and high capacity Transit Corridors – this should reduce construction costs, provide better pedestrian environments and perhaps increase building FARs. (The form-based code being developed for the Fulton Corridor Specific Plan proposes to accomplish this).

F. Prepare a Master Plan and establish a funding mechanism to rebuild the infrastructure (water, sewer, storm drain) in the designated high capacity Transit Corridors and Downtown to add the capacity needed to accommodate higher density development (with Downtown as the highest priority). (The Fulton Corridor Specific Plan is making recommendations to achieve this, but for the downtown area only).

G. Streamline and expedite the approvals process for higher density mixed use development projects and major employment uses Downtown. (Recommendations are being made through the Fulton Corridor Specific Plan to reduce the time and cost of development approvals).

H. Encourage additional growth as possible within ¼ mile of other current FAX bus routes – particularly Cedar (to support 15 to 20 minute headway service) and perhaps also First, Fresno and Palm bus lines.

…for Fresno County, COG and Fax to implement:

I. (FAX) Adopt a transit service expansion policy that FAX will not subsidize or expand transit service to new areas without minimum transit supportive densities (8 du/ac for local bus, up to 12 to18 du/ac for BRT/LRT).

J. (COG) Study the feasibility of reprogramming available flexible transportation funds to make infrastructure and place-making investments that promote TOD and infill development.

K. Only locate low density residential in areas not already served by transit with no expectation that transit services will be extended to these areas in the future. Require that developers communicate this fact to the potential property buyers.

L. Do not allow location of new employment centers outside of the Downtown or high capacity Transit Corridors.

2. Plan for and build TOD housing developments for a mix of middle and lower incomes, and families.

Specific strategies and recommendations…

…for the City of Fresno to implement:

A. Create a development code that will allow more flexibility in how residential density is designed or redeveloped. For example, allow for the creation of common living and dining areas for communal or group-style family housing to accommodate extended families; allow for in-law units (or accessory units) to be added on to existing homes to increase density in place; allow for home-based businesses in TOD areas, etc. (Note: The new form-based code is purported to create this kind of flexibility in the downtown neighborhoods area).

B. Reduce the parking requirements for new and modified residential developments to allow for a higher percentage of units to be set aside for people who would choose to live car-light in new TOD developments. (Note: this is also being addressed through the Fulton Corridor Specific Plan and the form based code).

C. Reduce the parking requirements for commercial development in the TOD corridors and Downtown and provide eco-passes (transit passes) to employees. (Parking requirements are being reduced through the Fulton Corridor Specific Plan and the form based code).

D. Build medium density housing for a mix of income groups along the second tier of bus corridors as infill development. (Proposed through the Downtown Neighborhoods Community Plan and accompanying form-based code).

E. Work with the Housing Authority to subsidize a percentage of new development for lower income residents along all transit corridors, mixed among market rate units.

F. Explore the use of the Low Income Housing Tax Credit program to develop mixed-income housing Downtown and along Transit Corridors.

G. Set up a series of instructional workshops for developers to teach them (and learn from them) about how to use the new form based code and how to fund, market and build flexible TOD products for the Fresno market.

3. Grow the transit, bicycle and pedestrian mode shares by making it more attractive to use alternate modes.

Specific strategies and recommendations…

...for the City of Fresno to implement:

A. Develop and adopt Complete Streets Design Guidelines and designate priority streets in the General Plan circulation element for transit, bicycle and pedestrian improvements.

B. Use CDBG funds for bike/ped projects in Transit Corridors.

C. Set up a series of instructional workshops for developers to teach them (and learn from them) about creating bicycle and pedestrian connectivity for their projects.

D. Prioritize projects in the CIP, and Measure “C” to match the identified priority corridors and Downtown.

F. Traffic signals should be timed for people as well as cars. Allocation Green time allocation and max cycle lengths should reflect transit routings and pedestrian flows.

...for Fresno County, COG and Fax to implement:

G. Create a new source of funds for bicycle and pedestrian projects similar to Safe Routes To Transit (SR2T) http://transformca.org/sr2t/history

H. Create a Travel Demand Management program office in Fresno staffed with Trip Reduction Coordinators who actively promote and market carpooling, vanpooling, bicycling and walking to work.

I. Consider requiring employers with 50 or more employees to survey and measure their employees' mode of travel for commuting annually and establish targets to reduce the single occupant vehicle mode.

J. Prioritize projects in the RTP and Measure "C" to match the identified priority Transit Corridors and Downtown.

4. Decrease the drive alone mode share and reduce VMT with Travel Demand Management (TDM) programs and policies.

Specific strategies and recommendations…

…for the City of Fresno to implement:

A. Through the new form based code for the Fulton Corridor Specific Plan, amend the development code to replace the current parking minimums with new maximums and to encourage shared parking.

B. Invite owners of privately owned parking lots Downtown to talk about collective parking pricing approaches instead of undercutting each other. Parking collective meetings could also discuss items of common interest like priority spaces for carpoolers, signage, and crime prevention.

C. After a review of the supply and demand for parking downtown, eliminate excess capacity by pulling up asphalt and installing landscaped pathways, planter boxes, community gardens, and trees or by developing the land. This will also help reduce the heat island effect of so much asphalt and improve the pedestrian friendliness of Downtown.

D. Consider implementing a public awareness campaign to educate the public of the impacts and consequences of driving for every trip and to promote ridesharing, transit, bicycling and walking.

5. Increase the number of residents in Fresno who would be willing to live in market priced TOD–style development, including young urban professionals, seniors, and future high speed rail commuters.

Specific strategies and recommendations…

…for the City of Fresno to implement include:

A. Increase the number of people who are responsible for marketing the City of Fresno as a desirable place to live and to relocate or start a business in.

B. Partner with the Chamber of Commerce and the PBID Partners of Downtown Fresno to create an effective marketing campaign for Downtown Fresno.

C. Work with the community colleges and CSU Fresno to retain graduates and place them in local businesses. Develop incubator businesses to grow the kind of employment desired in Fresno. (Keep young people from leaving Fresno.)

D. Clean up the decay, homeless encampments and crime areas downtown. Safe streets will be as important as complete streets in attracting seniors to the Downtown.

6. Cross jurisdictional and departmental boundaries with processes to link transportation and land use planning decisions together.

Specific strategies and recommendations…

…for the City of Fresno, Fresno County, COG and Fax to implement together include:

A. Create an inter-jurisdictional "compact" to support and implement the Blueprint principles and achieve SB 375 targets.

B. COG should consider creating flexible sources of funding (similar to TLC funding in the San Francisco Bay Area) to incentivize TOD development projects in the City of Fresno. Also see description of the Pedestrian Connectivity Program in Portland, Oregon, in the section on interagency coordination.

C. COG should consider creating a performance monitoring system (like the new Federal Sustainability Benchmarks concept) to track development performance over time on key indicators (from the COG travel model). For example, measure the number of new (housing units, residents, square feet of development by type) permitted or built in the priority Transit Corridors and Downtown.

D. Measure VMT per capita and compare the Transit Corridors against the outlying areas to illustrate the impact of living on the fringes. Large developments like SEGA should be monitored as they build out to ensure that they do not exceed smart growth VMT levels.

Discussion on Interagency Coordination
Developing and implementing strategies to award transportation funds for projects consistent with Fresno's Blueprint and Public Transportation Infrastructure Study recommendations.

Benefits of coordination

It is important not just to plan for smarter growth, but to take the steps to implement it. The coordination would forge a stronger connection between regional transportation planning and local land use planning and decision-making.

Land use influences travel behavior and can be a powerful tool to improve the efficiency and effectiveness of the regional transportation system. If it is convenient for people to travel to common destinations by public transit, walking, or biking, the County can reap air quality and congestion-relief benefits at the local and regional scale.

Many aspects of the relationship between land use and transportation are well understood. We know, for example, about the effect that population and employment density have on travel behavior, and what happens to land use when a transportation investment is made.

The use of transportation funds

A coordination program would use transportation funds to provide financial incentives to encourage transit supportive development near transit centers and/or capital grants to local jurisdictions for small-scale transportation improvements.

Proposals would be submitted by public agencies, and evaluated for how well they promote the Blueprint and PTIS Principles, and the level of project maturity and commitment to actual physical construction.

Other regions in California are using transportation funds to link land use and transportation

Programs are underway in the Bay Area, Sacramento and San Diego that use federal and state transportation funds as well as sales tax measure proceeds for the purpose of linking land use and transportation. (Fresno is currently using CDBG and Prop 84 funds for planning work).

In California, the San Francisco Bay Area- Metropolitan Transportation Commission's (MTC) Transportation for Livable Communities (TLC) has used this approach since 1996. Other noteworthy programs outside of California include:

- Atlanta, Georgia - Atlanta Regional Commission (ARC)'s Livable Centers Initiative (LCI); and
- Chicago, Illinois - Regional Transportation Authority (RTA)'s Regional Technical Assistance Program (RTAP).

While it is still an emerging field, there are three types of approaches from around the United States where transportation investments decisions have been linked to land use.

The most basic approaches are those where transportation dollars are being invested in land use planning to realize long-term changes in land use that are supportive of the desired transportation system.

Generally, programs provide a set of incentives and financial support to communities wishing to integrate transportation and land use planning for the purposes of place-making and reducing automobile trips. In these programs, public agencies have invested in funding for local land use planning to help create a framework where transportation improvements and land use plans are better integrated.

Use of the funds

The program would fund both planning activities and construction of improvements consistent with those planning activities. It would place an emphasis on involving the public in decision-making and taking steps to create places that have the physical attributes that supports walking trips, compact development and civic vitality.

Capital grants will direct transportation dollars to support smaller-scale capital projects that can help promote transportation choices as well as support land use changes in the form of infill housing and transit-oriented development.

Examples of programs that use this targeted approach

The Federal Transit Administration's (FTA) New Starts Land Use Criteria is the most notable example at the national level of linking transportation investment decisions to land use conditions, plans and policies.

Land use is one of three factors FTA uses in rating projects. The other two factors are the User Benefit calculation (essentially travel time savings for new and future riders divided by capital cost) and the strength of the local financial commitment. For a project to advance, it needs at least a combined rating of "medium."

The federal government estimates there are over $48 billion in New Starts projects in the "funnel" competing for $22 billion in funding with another 120+ projects considering pursuing New Starts funding. At current funding levels, it has been estimated that it would take 50 years to fund all the projects in the New Starts pipeline.

Federal policy gives special consideration to land use in funding decisions for New Starts. In today's environment, where over a hundred projects are chasing a limited amount of federal dollars, the implications of a "low-medium" rating on FTA's land use criteria can be significant.

Other examples of a targeted approach of linking transportation investment decisions to land use

An emerging example of linking transportation investment decisions to land use is the San Francisco Bay Area Rapid Transit District (BART) "Policy Framework for System Expansion." The policy was adopted by the BART Board in 1999 and is unique among transit agencies in the United States.

Perhaps the most significant element of the System Expansion Policy is how it has begun to change the dynamics of the conversation between BART and local jurisdictions. The policy has been an effective tool in helping local governments to see the transportation implications of their land use actions and how they are an important partner in the success of a new transit project.

The BART policy provides a clearly defined two stage "project advancement process" for how projects are screened and can advance through the process. At the first stage, BART staff relies on an initial planning assessment of a transit expansion project and evaluates the proposed project against their criteria and decides whether to recommend a project to the BART Board for advancement to the next stage.

Once the project advances to stage two, BART staff will work in partnership with local jurisdictions to develop a Memorandum of Understanding (MOU) laying out coordinated timelines for the environmental review of the proposed project and the "Ridership Development Plan" process.

The Ridership Development Plan process appears to constitute the essential element of the system expansion project advancement process. At this stage BART would enter into a partnership with local jurisdictions to achieve transit ridership thresholds by balancing TOD with community desires.

In the MOU, BART would be seeking local jurisdictional commitments to adopt transit-friendly General Plans and/or Specific Plans with sufficient levels of density to make the project cost-effective.

More direct approaches being used to link land use and transportation

The most direct approaches are those where an anticipatory decision was made to condition a specific transportation investment on binding commitments to change land use in a manner supportive of the transportation investment.

This approach ties the allocation of funding for specific transportation infrastructure to the delivery of projects that are expected to provide substantial ridership to the new system and/or financial support for the cost of delivering the transit infrastructure.

The Valley Transportation Authority in Santa Clara County is a good example of this approach. In 2002 the Santa Clara Valley Transportation Authority (VTA) adopted the Community Design and Transportation (CDT) Program as its primary program to integrate transportation and land use. The CDT program set out to aid the implementation of transit-supportive development that would broaden and strengthen the range of viable transportation choices in the region while making the most efficient use of transportation and other resources in the county.

VTA collaborated with its member agencies, the cities and county of Santa Clara, to develop the goals, and later asked each municipality to formally adopt the principles and best practices identified in the CDT program into planning, public works, and redevelopment projects, and in project development, review, and approval processes. VTA drafted a model resolution for cities establishing a minimum level of commitment to the CDT program and its principles.

While thus far the agency has not enforced the arrangement, the program and the best practices manual that was designed to support it has helped to make the requirements for access, pedestrian-friendly urban design, and transit-supportive land use programming explicitly clear to developers and to the cities that partner with developers. During its use several cities have amended their zoning codes and regulations.

Another Example

Portland's regional government, Metro, operates an innovative TOD Implementation Program using federal transportation funds that was designed to help stimulate the construction of "transit villages".

The TOD Program operates through a series of cooperative agreements between Metro and local jurisdictions, and utilizes Development Agreements with private developers. Metro has funding by which they purchase and entitle land, and then using these agreements they sell the property to the private sector.

Another Metro program is the CMAQ TOD Program run by the Portland Development Commission. The program was funded with $3.5 million in CMAQ funds to acquire land, and design and construct transit amenities as part of TODs. A total of nine projects have received this funding.

Transportation system benefits from Metro's program

Metro's TOD Program pushes the development envelope by using public-private partnership techniques to secure more TOD-like projects than would otherwise be developed on a given site. For example, on a site where the market would likely produce three-story apartments with surface parking and no retail, the TOD Program would push for five-stories with podium parking and ground floor retail that may have four to five times more dwelling units and induce significantly more transit ridership. Property is acquired, re-parceled and planned, then sold with conditions to private developers for constructing TOD and/or dedicated to local governments for streets, plazas, and other public facilities where appropriate. In many cases, the land value is reduced to cover the high development costs required to construct a specific TOD project. In such cases, a "highest and best transit use" appraisal is used to establish the sale price.

According past Metro employee Marc Guichard, "real estate development economics often make the dense mixed-use TODs sought in local plans infeasible in much of the region. A development rule of thumb is buildings should be constructed over parking, and uses should be stacked when land is more expensive than a parking structure. In the Portland region, this rarely occurs if market dynamics are generating land values less than $50 to $60 per square foot. In fact, parcels near most of the transit stations in the region, outside downtown Portland, generate land values of only $6 to $10 per square foot.

7. **Restrict the growth of new development on the urban fringes and into farmlands with incentives, disincentives, and growth boundaries.**

Specific strategies and recommendations….

…for Fresno County and COG to implement include:

Require development to fully fund the cost of expanding infrastructure to serve development in the outer ring of the sphere of influence of any incorporated city. This can either be achieved by requiring new development to fund construction and operations of the infrastructure and services necessary (e.g., streets and transportation, water, sewer, sewer treatment, schools, fire stations, police etc.) or through implement a multi-faceted infrastructure impact fee to be imposed on any new development. A benefit assessment district could be used to fully assign costs to fringe developments.

8.1 Discussion on Urban Growth Boundaries

Urban Growth Boundaries (UGBs) can act an instrument to help preserve farm and forest uses in rural areas and promote efficient job and housing growth in urban areas. The intended effect is to limit urban sprawl for the purpose of:

- Reducing costs of public infrastructure
- Preserving rural lands (farm, forest and scenic)
- Coupled with general plans, concentrating job and housing density toward central areas, nodes and corridors to enhance urban places

Urban growth boundaries help signal that growth is expected within existing cities, where amenities such as transit, parks, schools, and utilities already exist. As a result, more public and private investment is focused into existing nodes and corridor for infill development. This investment can help improve and build on the County's downtowns, corridors, and main streets. These urban places offer unique opportunities. For some residents, the townhouses and condos mean more options for buying a home. Other residents move to these areas to be closer to urban amenities.

Urban places are able to provide more options for people's daily lives, be they housing, transportation of even access to cultural amenities and the arts. Development in these areas often also allows residents to drive less and walk more, leading to cleaner air and healthier lives.

UGBs, by various names are used in numerous places around the country and within the State of California. San Jose, Contra Costa County and Ventura County all employ UGBs to limit urban sprawl and concentrate development. Some of the most well known UGBs include the Portland Metro area of Oregon and Boulder, CO.

Example from Ventura County: Fiscal Impacts of Sprawl

Low density urban expansion usually contributes to fiscal losses and city deficits – e.g. Ventura County agriculture requires about $0.65 in services for every $1.00 it generates in revenue – low density urban development requires about $1.25 in services for every $1.00 it generates in revenues. Annual revenue statistics for the six cities adjacent farmland (Camarillo, Fillmore, Moorpark, Oxnard, Santa Paula and Ventura) – low density urban development produces a negative cash flow of $5.2 million vs. a compact growth scenario that results in a positive cash flow of $4.9 million – difference of $10.1 million annually.

Growth boundaries can take multiple forms, and can be implemented both locally and regionally. For various reasons, regional boundaries (typically comprising at least one full county) are the most successful.

Following are some optional techniques for growth boundaries in Fresno County.

Management by Voter Approval

This approach may require voting at the City level and them forming a compact (or other form of intergovernmental agreement) for coordinating the boundaries. After each city set its boundary any expansion would need to be thoroughly examined by the voting public. Ideally this should result in both slower expansion of public services (and therefore the ability to better invest in the more focused service provision, especially transit and transportation in general), and the development community putting forth high quality projects for consideration. Places that have voter control of urban expansion often see a slower rate of land development than other similarly situated places. However, in these places development that does happen occurs as smaller projects designated for only one type of housing or employment. From the standpoint of encouraging development closer to established transit, these future developments, while minimized, would not support the expansion of ridership.

General Plan Density Adjustments

This description assumes that boundaries are formed either countywide, by vote or government action. The more permanent a UGB is the more important it will be to examine planning practices within developed areas. One technique has been to re-evaluate density patterns within existing cities, especially in downtowns or along significant transportation corridors. Planning for increases in density in the right places help to minimize the pressure on the boundary while simultaneously providing a means for community revitalization, and for the purpose of this project, increases in potential transit users. This approach has been shown to decrease the distance that people drive and increase alternate mode transportation. Infill development would likely result in the type of housing provided to future residents to shift away from single-family homes at the edge to more townhouses, apartments and condominiums closer to goods and services, and better served by transit.

Concurrency Requirements

Some communities with UGBs use them to control the rate of urban expansion so that growth does not get ahead of local governments ability to build infrastructure (i.e. roads, transit, schools, pipes). With a concurrency based system boundaries can be expanded whenever desired so long as plans and funding are in place to handle the needs of the people that will live and work in the expansion areas. Local or regional officials usually act as decision makers to ensure that projects are evaluated based on their ability to provide services rather than on other aspects of the project such as aesthetics or future land uses. Montgomery County Maryland is the most well known example of a concurrency based boundary. The effect there has been primarily to limit suburban expansion, with minimal focus on building higher density places.

Land Capacity Monitoring

One potential boundary management strategy is to monitor growth trends and land capacity to ensure that there is enough land available for housing and job growth over time while also keeping infill and other urban development commonplace. A capacity threshold could be created, such as a certain percentage growth or even room for a number of years of development. Ensuring a certain amount of vacant land at any given time can help to avoid causing a spike in land values that can reduce affordability or choke off development.

Using past growth rates and current land use designations it is relatively straightforward to calculate the amount of housing and job capacity within a given UGB area. Combining the capacity information with a forecast of future growth enables a city to estimate of the number of years of capacity remaining within a UGB. A capacity based management program would include a periodic evaluation of capacity, ideally in coordination with neighboring jurisdictions.

The Fresno PTIS research has shown that the region's current zoned or planned capacity is primarily at the edges of the urban areas where transit and other public services are minimal. A targeted approach for Fresno would likely include an adoption of performance targets for infill development. Under a system like this, boundaries would not be expanded significantly unless jurisdictions, through capacity analysis determined that there would be insufficient opportunities through increased zoning densities in existing urban areas.

Expanding UGBs

One of the key functions of a UGB is to establish a greater degree of certainty about the possible uses of land, and thus its value. Overly speculative real estate investment cannot be eliminated by a UGB, but it can serve to moderate the practice. Sale prices of agricultural land in the County are often higher than they should be if viewed only through the land's ability to generate income through farming. This suggests that some are buying land outside of cities with the hope and intention of eventual development. One option is for government to identify long in advance, the location of future UGB expansions. If, for example, all of the land that will be added to the UGBs during the next 30 years were mapped and readily available, speculation on the lands outside of the identified growth areas would likely cease. The added benefit is that the responsible agencies can do their infrastructure and land use planning far in advance of development. Having this time to do the planning will help to ensure that the land is used efficiently and that transit and other infrastructure can be provided efficiently. Another factor to consider, small incremental urban expansions, (whether or not there are UGBs), often provide just one type of development, such as subdivisions or office parks. Successful communities need a full range of housing and job options. Identifying future expansion areas and planning them based on the County's needs can help build better, more successful places.

9.0 Transit System and Investment Recommendations

In general, local agencies are not expected to generate additional analyses, documents, or quantitative data addressing land use issues in order to satisfy the reporting requirement for the existing land use, transit supportive land use plans and policies, and performance and impacts of policies criterion. In most instances, agencies will be able to rely on readily available materials that have been prepared in conjunction with the alternatives analysis or preliminary engineering effort, or other local studies and analyses (local and regional land use plans, local government land use actions, livable communities initiatives, economic development activities, etc.).

FTA Land Use Rating Categories and Factors

I. Existing Land Use

a. Existing Land Use

II. Transit Supportive Plans and Policies

a. Growth Management
b. Transit Supportive Corridor Policies
c. Supportive Zoning Regulations Near Transit Stations
d. Tools to Implement Land Use Policies

III. Performance and Impact of Policies

a. Performance of Land Use Policies
b. Potential Impact of Transit Project on Regional Land Use

IV. Other Land Use Considerations

Exceptional examples, e.g.:

- Historic
- Environmental
- Community preservation
- Brownfields redevelopment
- Designated Federal Enterprise Zone/ Empowerment Community

To assist the development of accurate project ratings, FTA requests agencies to submit corridor and station area maps, local comprehensive plans and zoning ordinances, local and regional policies and agreements regarding land use planning, documentation of station area planning efforts, and documentation of other tools, incentives, and programs affecting corridor and station area land use. Additional descriptions of the information requested for the existing land use, transit supportive land use plans and policies, and performance and impacts of policies criterion are provided in FTA's Reporting Instructions for Section 5309 New Starts Criteria.

9.1 Urban Transit Investment Recommendations:

Most of Fresno's travel market has its origins and destinations in metropolitan Fresno. 92% of Fresno residents work in Fresno County, and only 8% commute to destinations outside the county. Of the total commute trips in Fresno County, 77% drive alone, 20% carpool or vanpool, and 1% take transit, walk and work from home. [1]

The Public Transportation Infrastructure study makes the following recommendations for the urbanized metropolitan Fresno area:

1. Continue to pursue federal funding assistance to build bus rapid transit corridors along Blackstone Avenue and Ventura/Kings Canyon Road within 3 years (by 2013).

2. A current need was identified to expand transit service hours, days and the number of routes to serve the CSU Fresno campus. Construct the campus transit center and include bike lockers and shelters. Add a campus circulator shuttle to connect the large number of students who reside within 3 miles of campus. Work with CSU Fresno campus administrators to implement a Travel Demand Management (TDM) program to incentivize student and faculty bus use by discounting bus passes and increasing parking charges to subsidize the bus pass program.

3. Apply for funding for a third bus rapid transit corridor along Shaw Avenue from Highway 99 to Clovis, serving CSU Fresno within 5 or 6 years (2015 to 2020). The eastern end of the Shaw alignment could be either north on highway 168 to a future high density employment center, or it could continue into downtown Clovis on Shaw Avenue if sufficient base zoning has been implemented to support the high capacity investment.

4. The fourth priority for high capacity transit investments was identified for Cedar Avenue from Sheppard Avenue to near Butler Avenue (and serving the CSU Fresno campus). The timeframe for this investment has not been identified, but would depend on an assessment of transit travel demand on existing local buses serving that route.

5. Continue to pursue consolidation of transit services, particularly between Fresno and Clovis urban areas to create a seamless and time efficient transit travel experience between the two cities.

If policy decisions are made to implement higher density development, housing and mixed use projects downtown, and if the High Speed Rail project becomes a reality, the following transit investments are recommended for the 10 to 15 year horizon (2020 to 2025):

6. Recommend providing a direct link between the planned BRT system and the planned High Speed Rail (HSR) system to serve as a transit connection to destinations beyond downtown and to minimize the parking footprint needed for the future HSR station.

7. Pursue funding to build and operate a streetcar in downtown Fresno, serving Chinatown, the future High Speed Rail station and the regional medical center along Fresno Street, and terminating at San Joaquin Memorial High School as the top priority.

8. Pursue funding for an expansion of the streetcar project that would operate along Fulton or Van Ness to connect the downtown convention center, the Fulton Mall, and continuing up to the Tower District, terminating at Fresno City College.

If development densities are achieved in the BRT corridors that support a high capacity transit investment (about 21 dwelling units per acre), and if headways on the existing BRT lines are approaching or at 7 minutes to serve existing travel demand, then

9. Pursue federal funding assistance to convert the BRT lines to LRT, particularly along Blackstone Avenue and Ventura/Kings Canyon Road.

[1,2] *San Joaquin Valley Express Transit Study, funded by the Merced Association of County Governments, Nelson Nygaard, May 2009.*

9.2 Rural Transit Investment Recommendations

This Existing Conditions Analysis identified the following transit improvement needs for the future of rural Fresno County's transit system.

- A future need for commuter express bus service on Highway 99 to the north and south of Fresno, and north up Highway 41 as populations expand in these outlying areas.
- Coordinate future land use planning efforts with the recommended transit investment corridors to increase population and employment densities to the level where they will support the transit investment.
- Develop a range of strategies to market the City of Fresno and downtown Fresno in particular to employers who pay good wages for jobs in order to attract workers who will take transit by choice and can afford to live in TOD-style development in transit corridors.
- Develop a range of strategies to encourage development in the desired transit corridors and downtown and discourage fringe development projects like SEGA where transit expansions cannot be supported or are financially unsustainable.
- Recommend launch of a Title VI and Limited English Proficiency (LEP) outreach plan to understand the transit community's needs for communication and information translation.

9.3 Recommendations from Other Studies

Several other studies have looked at transportation improvement needs in the greater Fresno County area. The following recommendations are endorsed here by reference:

From the Blueprint Study: The broad transportation recommendations from the San Joaquin Valley Blueprint Study were the impetus for the more detailed plans and policies recommended by the PTIS Study:

Provide a Variety of Transportation Choices

Providing people with more choices in housing, shopping, communities, and transportation is a key aim of smart growth. Transportation is the key factor that will shape urban and rural development around the greenprint. The region's transportation investments will support the shared regional vision by providing:

- Connectivity between centers and to other regions.

Existing or new corridors will connect the major city centers within Fresno County. Where possible, the preference should be to enhance existing corridors, but new corridors may be needed where there are gaps in this system. It also will be important to work with the state to enhance the corridors that connect Fresno County to other parts of California, other states, and other nations, using a mix of road, rail, water and air.

- Develop Regional Transportation Corridors

The transportation and other infrastructure needed to connect our city centers to each other and to other regions will be identified. Transportation corridors will link centers into a region, and together with the greenprint, will establish the broad framework for where future growth should occur. The long–range regional transportation plan will address connectivity, relieve congestion, and expand travel choices. Particular emphasis will be given to developing regional transit corridors that can serve as the future backbone for travel, much like the major highways do today. To do so, we will need to coordinate planning activities across jurisdictions to include all modes—highway, rail, water, air, and space.

- Choices for moving people and goods.

Residents of Fresno County envision a regional transit system that connects existing and future urban centers in all parts of the region. They also envision local light rail, street car, or bus rapid transit systems that connect neighborhoods with the regional transit service. They seek to expand the use of freight rail and high–speed passenger rail to move people and freight between Fresno County and other regions. They desire a transportation system that includes accommodations and access for the disabled.

They also desire a street circulation system for bicyclists that encourages and supports bicycling as an alternative form of transportation. Residents also desire a system of greenways and trails for walking or bicycling. Such a system would improve the health of residents and result in a more active citizenry. A regional transportation plan should identify where these choices are most feasible and set priorities to implement these investments.

Governor Schwarzenegger signed the Complete Streets Act of 2008 into law September 30, 2008. The law requires cities and counties statewide to incorporate complete streets when updating their general plans.

- Concurrency with new development.

Local governments should work with developers to implement needed roads and transit systems along with anticipated growth. This balancing of growth and infrastructure should occur at both local and regional levels to better address impacts of growth that spill over city or county lines. Regional standards can help ensure that development in one county or municipality does not adversely impact other counties or municipalities.

- Strengthen and Direct Development Toward Existing Communities

Smart growth directs development toward existing communities already served by infrastructure, seeking to utilize the resources that existing neighborhoods offer, and conserve open space and natural resources on the urban fringe.

- Develop centers that will function as hubs of economic activity.

Jobs and housing can be spread throughout the region, enabling people to live close to their jobs. Plans should ensure that sufficient land is designated for economic centers with appropriate transportation and other infrastructure already in place.

- Take Advantage of Compact Building Design

Smart growth provides a means for communities to incorporate more compact building design as an alternative to conventional, land consumptive development.

- Build up not out

More compact building design provides an alternative to conventional, land consumptive development. Compact building design suggests that communities be designed in a way which permits more open space to be preserved, and that buildings be constructed which make efficient use of land and resources.

- Supports other modes of travel

Compact building design is necessary to support wider transportation choices in the county, and provides cost savings for localities. As we seek to encourage transit use to reduce air pollution and congestion, we recognize that minimum levels of density are required to make public transit networks viable.

From the San Joaquin Valley Express Study: For a majority of the region, investments in ridesharing are the most cost-effective strategy. The region's focus should be on expanding vanpool offerings in both the northern and southern parts of the Valley. The new Air District rule requiring trip reduction programs from large employers offers the opportunity for both a new funding stream, and an effective marketing strategy for expanded vanpool offerings.

Key Findings and Recommendations

1. The existing transit providers and carpool/vanpool programs are operating fairly efficiently considering the sprawling geographic area they are serving. The Vanpool program appears to be particularly successful in the region, serving low income farm and agricultural workers and should be expanded to serve more people.

Recommendations to improve carpooling and vanpooling in the Fresno area from the San Joaquin Valley Express Transit Study include:

a) Continue with plans to form a Joint Powers Authority in the southern portion of the Valley to operate KART and AITS Vanpool.

b) Prioritize vanpooling to Fresno.

c) Provide a single Valley-wide ride-matching and vanpool website.

d) Invest in more vanpool marketing to choice riders.

e) Expand park-and-ride opportunities.

f) Offer Guaranteed Ride Home throughout the Valley.

g) Seek to influence the development of the new Air District trip reduction rule, so that it can fund and promote ridesharing to large employers.

From the 2007 Fresno COG Regional Transportation Plan

The Fresno COG Regional Transportation Plan assumes public transit use, including passenger rail, will keep pace with the rise in population and that additional incentives, such as voluntary trip reduction programs, will be initiated to encourage transit use.

Recommends improvements to Amtrak service in the San Joaquin rail corridor, including:

a) Increasing service frequencies and improving on time performance;

b) Improving utilization of equipment so as to get the maximum number of car miles from this expensive equipment;

c) Extending service to fill the gaps in the current route. The first priority is to extend through service with an existing train on an overnight schedule from Bakersfield to Los Angeles with connections to San Diego;

d) Continuing efforts to make incremental track and signal system upgrades to improve speed, efficiency, and capacity;

e) Creating a fare structure to maximize revenue per passenger mile;

f) Restructuring on-board services in order to satisfy the needs of passenger train travelers, and;

g) Increasing the level of public awareness of the San Joaquins as their trains and communities along the route develop a pride of ownership.

From the Caltrans December 2005 Study: "California State Rail Plan 2005-06 to 2015-16"

a) Improve on-time performance to 90 percent by 2015-16.

b) 2010-11 Bakersfield to Sacramento, third round-trip to extend from Stockton to Sacramento (seventh round-trip on route).

c) Bakersfield to Oakland, fifth round-trip from Stockton to Oakland (eighth round trip on route).

d) Supports the investment in High Speed Rail in the San Joaquin Valley along the SR99 corridor with stations at Bakersfield, Visalia, Fresno, Merced, Modesto, Stockton and Sacramento.

10.0 Transit Operations and Maintenance Plan

BRT vs LRT Costing Methodology

This section summarizes the methodology used to estimate the annual operating and maintenance costs (O&M) for two transit investment scenarios: Bus Rapid Transit (BRT) versus Light Rail Transit (LRT) in phased investments for each of the three proposed land use density scenarios as described in detail in the Alternatives Analysis section of this report:

1. 2035 Build (COG Trend)
2. 2035 Constrained TOD with Exclusive Lanes
3. 2035 Full Buildout TOD with Exclusive Lanes (Aggressive TOD)

Each scenario above includes proposed bus rapid transit (BRT) on Blackstone Avenue (Audubon to Downtown), Ventura Avenue-Kings Canyon Road (Downtown to Clovis and to Southeast Growth Area), and Shaw Avenue (SR 99 to SR 168 at Temperance). It is assumed that high speed rail is funded and operational by this time and that the Blackstone/ Ventura/ Kings Canyon BRT alignments are extended downtown to interface directly with the future High Speed Rail station. With the exception of Year 2035 Full Buildout TOD, the Ventura Avenue/Kings Canyon BRT would extend to the Southeast Growth Area (SEGA). And, a modern streetcar would be operating downtown on two radial alignments along Van Ness or Fulton and along Fresno Street between high speed rail and the regional medical center.

If population and employment densities reach the levels as forecast in the Constrained or Full Build-out TOD scenarios by the year 2035, BRT on Blackstone and Ventura/Kings Canyon could be upgraded to LRT. As bus service frequencies are increased to less than 10 minute intervals in order to meet growing travel demand, the need to upgrade to LRT service becomes increasingly attractive with the larger carrying capacity of the vehicles, the ability to chain multiple vehicles together using just one driver, and the resulting lower operating cost per passenger. Table 1 and Table 2 provide a summary of the limits and phasing for each corridor for 2035 Constrained TOD with Exclusive Lanes and 2035 Full TOD with LRT on Blackstone and Ventura/Kings Canyon scenarios, respectively.

Table 9: 2035 Constrained TOD with Exclusive Lanes

Corridor	Description	Length (mi)	Begin Revenue Operations	Phasing Notes
Blackstone	BRT Service along Blackstone Ave from Audubon Dr south to Downtown Fresno	9.29	2013	Funding requested through FTA Very Small Starts Application (submitted Fall 2010)
Ventura/Kings Canyon	BRT Service along Ventura Ave/Kings Canyon Rd from Downtown Fresno east to Southeast Growth Area (SEGA)	7.95	2013	Funding requested through FTA Very Small Starts Application (submitted Fall 2010)
Shaw	BRT Service along Shaw Ave and SR 168 from SR 99 east to SR 168 at Temperance Ave	13.25	2020	Future project, estimated opening year of 2020. Funding yet to be identified

Table 10: 2035 Full TOD w/LRT on Blackstone and Ventura/Kings Canyon

Corridor	Description	Length (mi)	Begin Revenue Operations	Phasing Notes
Blackstone	BRT Service along Blackstone Ave from Audubon Dr south to Downtown Fresno	9.29	2030	Long-term project to be implemented 15-20 years (assume opening 2030) after beginning operations of Blackstone BRT system (2013). Assumes ridership will warrant LRT service and BRT rolling stock and infrastructure will be reaching the end of 20 year service life
Ventura/Kings Canyon	BRT Service along Ventura Ave/Kings Canyon Rd from Downtown Fresno east to Southeast Growth Area (SEGA)	7.95	2030	Long-term project to be implemented 15-20 years (assume opening 2030) after beginning operations of Ventura/Kings Canyon BRT system (2013). Assumes ridership will warrant LRT service and BRT rolling stock and infrastructure will be reaching the end of service life)
Shaw	BRT Service along Shaw Ave and SR 168 from SR 99 east to SR 168 at Temperance Ave	13.25	2020	Future project, estimated opening year of 2020. Funding yet to be identified

10.1 BRT and LRT Ridership Forecasts

10.1.1 BRT Only Service in Transit Improvement Corridors

Daily ridership forecasts for each planned BRT corridor were developed using the Fresno COG travel demand model. The following table lists the projected daily ridership for each corridor. The ridership for the Shaw corridor ranges from 6,000 to 12,000 daily riders for the three Year 2035 scenarios. Ventura-Kings Canyon corridor ranges between 10,000 and 20,000 riders depending upon the assumed growth scenario. Blackstone has the highest ridership at 14,000 to 27,000 daily riders.

10.1.2 LRT Service Along Blackstone and Ventura/Kings Canyon Corridors

The change in technology from BRT to LRT results in higher ridership numbers for the same population base, due to an "attractiveness factor" built into the model that reflects the actual experience of LRT ridership numbers in cities where it has been implemented. The reasons for the added attractiveness of LRT have been documented in other studies. The causes range from a sense of rider's security from seeing tracks in the street and knowing a train will come there soon, to the perception that a train is a step above a bus in terms of the onboard space and comfort of the ride.

Daily ridership projections were modeled for Blackstone and Ventura/Kings Canyon corridors for BRT ridership versus LRT ridership using the Fresno COG travel demand model. The last column of the table shows LRT and BRT ridership for the 2035 Full TOD with LRT growth scenario. In total across the three corridors, transit ridership increases by approximately 1,458 riders daily or 8% over the forecast for BRT only services operating in the three corridors. Even the Shaw corridor under the 2035 Full TOD with LRT scenario, which would continue to have BRT service, experiences a moderate increase in riders due to transfers from and to the Blackstone corridor which has LRT service.

Moreover, in the future land use scenarios with population and employment built up on both Blackstone and Ventura/Kings Canyon in addition to downtown, it was discovered that the two high capacity transit corridors worked as a pair, with multiple trip origins and destinations along both streets that link through the downtown. In the future scenario, the downtown is a strong destination, but not the only destination for transit riders. The daily ridership projections for BRT and LRT service are presented in Table 3.

10.2 BRT and LRT Service Levels

Transit service frequencies can reflect either policy direction (for example, vehicle headways—the time between consecutive arrivals at a transit stop—should not exceed 15 minutes peak, 30 minutes midday no matter the level of passenger demand) or be set to accommodate projected hourly and daily ridership. The latter approach was used to establish appropriate peak period service levels for future BRT and LRT improvements that are proposed in future land use development scenarios Service levels feed into the operating plans for BRT or LRT improvements, which are then translated into the operating and maintenance costs of transit service.

Table 11: BRT and LRT Daily Ridership Projections

Corridor	2035 Build w/ BRT Service All Corridors	2035 Constrained Excl Lanes w/ BRT Service All Corridors	2035 Full TOD w/ BRT Service All Corridors	2035 Full TOD w/LRT on Blackstone and Ventura/Kings Canyon
Blackstone	14,704	23,717	26,540	26,877
Ventura/Kings Canyon	10,648	17,175	19,219	20,275
Shaw	6,100	8,743	12,066	12,1312[2]
Total Daily Riders	**31,452**	**49,635**	**57,825**	**59,283**

[1] Source: Dowling and Associates; FCOG Travel Demand Forecast Model

[2] This is slightly higher than the 12,066 BRT riders under the 2035 Full TOD without LRT service and reflects the increased transfers from primarily the Blackstone and Ventura/Kings Canyon rail services.

Forecasts of daily transit ridership by mode were evaluated to determine the expected peak hour volume by direction on a proposed service. The peak load in each direction was calculated assuming approximately 10 percent of daily trips are made during the peak hour, both a.m. and p.m. A directional spit was then applied, with 60 percent of the trips assumed for the peak travel direction (i.e., to the major destination points, such as downtown Fresno or a major office/commercial center along the transit route) and 40 percent of the trips assumed to be traveling in the off-peak direction. The a.m. peak and p.m. peak directions typically are the opposite of the other. The peak factors applied were derived from the experience of FAX and other urban transit providers and by consulting available research.

The division of daily trips to hourly peak and off-peak direction trips provides an estimate of the number of riders passing by a point—designated the maximum load point—on a transit route and thereby the transit vehicle capacities required to accommodate these riders. Based on the carrying capacity of 75 riders per bus, the number of buses required to serve the demand was estimated. The resulting number of buses was used to determine the service frequency (headways) in minutes for BRT routes by converting buses per hour into minutes between bus arrivals/departures at any point along the BRT route, as indicated in the below table.

For proposed LRT service, a vehicle capacity of 130 riders was assumed and trains of up to two cars in length would be possible. Thus, single train capacity would be 250 riders if two-cars and 130 if one car. Forecast riders are higher for LRT service in a corridor than if it remained BRT only service. The estimated passenger demand per hour was divided by this train capacity to obtain trains per hour. LRT service frequency in minutes was similarly determined by converting trains per hour into minutes between train arrivals/departures.

For other periods of the day, including midday hours and evenings, service frequencies were established based on a combination of methods: estimating demand by applying factors for off-peak periods and establishing maximum headways based on policy. With respect to the latter, for example, the Federal Transit Administration (FTA) requires that service during the midday cannot exceed 15 minutes if federal transit system development funds (e.g., Small or Very Small Starts funds) are used to build a project. During peak commuter periods frequencies should be not greater than 10 minutes, based on FTA criteria.

Table 4 shows the service headways proposed for BRT or LRT service in 2035 under the various development scenarios. LRT service is not proposed for the Shaw corridor and therefore BRT service would remain on Shaw under the 2035 Full TOD with LRT scenario.

Table 12: Proposed BRT Headways (min) and LRT Headways on Blackstone/Ventura (min)

Corridor	Period	AM / Mid-day / PM Peak			
		2035 Build w/ BRT Service on All Corridors	2035 Constrained Excl Lanes w/ BRT Service on All Corridors	2035 Full TOD w/ BRT Service on All Corridors	2035 Full TOD w/ LRT on Blackstone & Ventura–KC
Blackstone	Weekday	7.5 / 10 / 7.5	5 / 5 / 5	5 / 5 / 5	10 / 10 /10
	Weekend	15 / 15 / 15	15 / 15 / 15	15 / 15 / 15	15 / 15 / 15
Ventura/Kings Canyon	Weekday	10 / 15 /10	7.5 / 10 / 7.5	5 / 5 / 5	10 / 10 / 10
	Weekend	20 / 20 / 20	15 / 15 / 15	15 / 15 / 15	15 / 15 / 15
Shaw	Weekday	10 / 15 /10	10 / 15 / 10	7.5 / 10 / 7.5	(BRT Service)
	Weekend	15 / 15 / 15	15 / 15 / 15	15 / 15 / 15	(BRT Service)

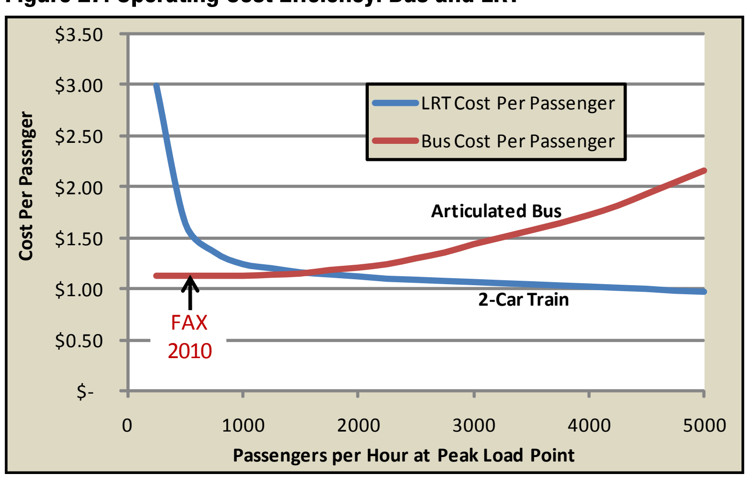
Source: Kimley–Horn and Associates, Inc.

The assumed weekend service frequencies are the same throughout the day for all lines and are 15 minutes. Weekday peak frequencies range from 10 minutes under the 2035 Build scenario to 5 minutes for the 2035 Full TOD Buildout scenario. When service frequencies approach 7 minutes, additional service technologies should be considered, such as streetcar or light rail. At 7 minute headways the BRT system will begin to become less efficient since buses cannot maintain equidistant spacing on increasing congested roadways and they tend to bunch. Uneven headways and unreliable service tend to discourage use of transit and would dampen transit growth in the Blackstone and Ventura/Kings Canyon corridors and also Shaw at some point.

At some level of demand and service frequencies, light rail becomes more cost efficient than buses to operate.

Figure 27 compares the costs, on a per passenger basis, of bus and LRT over increasing levels of passenger demand at the peak load point in a corridor. The capacity of an articulated bus, as used to develop the chart, is estimated to be 75 passengers. An single LRT vehicle is estimated to have room for 130 passengers; a two-car train has room for 260 passengers, therefore. At low to moderate volumes the bus is more efficient. But when demand begins to exceed 1200 passengers per hour

Figure 27: Operating Cost Effciency: Bus and LRT



Source: Kimley–Horn and Associates, Inc.

in the peak direction and bus frequencies fall below 5 minutes to provide sufficient capacity, a two car LRT train operating at 10 minute frequencies is probably cost competitive. The comparison is conceptual and influenced by an agency's cost structure and other corridor characteristics besides simply passenger demand.

The following sections summarize the estimated costs of the proposed transit improvements, both operating and capital, for each of the 2035 improvement alternatives. The operating costs are first shown as the total annual costs for the proposed services; then the incremental costs compared to a no-build, or no improvement, condition are shown. Incremental costs represent the additional costs that would be incurred to improve service as described relative to making no improvements and continuing to operate as previously.[2] Capital costs are the total costs as the proposed investment represents entirely new facilities and not a replacement of existing facilities.

10.3 BRT Annual O&M Costs

The annual O&M costs to operate proposed service under each development scenario are shown in Table 5. Costs are in constant 2010 dollars. BRT service in the Blackstone, Ventura/Kings Canyon and Shaw corridors were estimated by taking the service frequencies discussed in the previous section, converting the service to hours and miles of weekday and weekend bus operations, and applying FAX-established service-cost factors to the hours and miles of service.

The following factors were provided by FAX and reflect the incremental cost of each hour and mile of a change in bus service, with an adjustment in the cost per vehicle mile to reflect the proposed change in bus fleet that will be used to operate high-capacity BRT service.

$37.17 per vehicle hour
$1.58 per vehicle mile

The hourly cost reflects FAX's current marginal hours-related cost of a service change. The cost FAX per mile of $1.58 has been adjusted to be 125 percent (or 1.25 times) of FAX's current cost of miles-related expenses, which is $1.26. FAX proposes to procure and assign 60-foot articulated buses (possibly CNG hybrid propulsion) to BRT service. These vehicles will have somewhat lower fuel economy and higher maintenance costs than standard 40-foot buses due to the greater weight, additional tire wear (eight tires per bus), and more parts (e.g., windows, doors).

Marginal cost factors are appropriate in the analysis as BRT service represents a change in service composition for FAX. In large part BRT will replace existing local services, which is operating on lower frequencies than proposed for new BRT service and using 40-foot buses. Total or average cost factors are appropriate for estimating the impacts of totally new services that are in addition to existing services and which therefore would affect FAX administrative and related overhead costs.

Multiplying daily hours and miles of service by these factors provides an estimate of daily operating costs of BRT service in each corridor.

Weekday service costs were expanded to annual O&M costs by multiplying by the number of weekdays operated per year—253 on average. Weekend service was similarly expanded by multiplying by the number of Saturdays and Sundays in the year—104—and additional days of holiday service—8— which also is operated on the weekend schedule. Total weekend days is therefore 112.

[2] New BRT or LRT service would replace no-build (e.g., existing) bus service in the corridor. Thus the costs of no-build bus service in the corridor will be replaced by the costs of new service. However, new service is expected to to cost somewhat more than the existing service as higher levels of service, reflected in increased miles and hours of bus operations, are proposed. This represents the incremental cost.

Table 13: BRT Total Annual O&M Costs ($2010) for 2035 Operating Plan

Transit Corridor	2035 Build w/ BRT Service All Corridors		2035 Constrained TOD w/ Exclusive Lanes		2035 Full TOD w/ BRT Service on All Corridors	
	Length (ml)	Cost	Length (ml)	Cost	Length (ml)	Cost
Blackstone	9.29	$3,575,166	9.29	$4,862,344	9.29	$4,862,344
Ventura/Kings Canyon BRT	7.95	$2,668,616	7.95	$3,208,210	7.95	$3,559,391
Shaw	13.25	$3,487,734	13.25	$2,758,490	13.25	$4,091,522
Total Daily Riders	**30.49**	**$9,731,516**	**30.49**	**$10,829,044**	**30.49**	**$12,513,257**

[1] BRT O&M Cost estimates based on procedures from 2010 Blackstone/Ventura/Kings Canyon Very Small Starts submittal to FTA

Table 14: BRT Incremental Annual O&M Costs ($2010) for 2035 Operating Plans

Transit Corridor	2035 Build w/ BRT Service All Corridors		2035 Constrained TOD w/ Exclusive Lanes		2035 Full TOD w/ BRT Service on All Corridors	
	Length (ml)	Cost	Length (ml)	Cost	Length (ml)	Cost
Blackstone	9.29	$2,420,781	9.29	$3,707,959	9.29	$3,707,959
Ventura/Kings Canyon BRT	7.95	$2,072,787	7.95	$2,612,381	7.95	$2,963,563
Shaw	13.25	$2,641,612	13.25	$1,912,368	13.25	$3,245,400
Total Daily Riders	**30.49**	**$7,135,180**	**30.49**	**$8,232,708**	**30.49**	**$9,916,921**

[1] BRT O&M Cost estimates based on procedures from 2010 Blackstone/Ventura/Kings Canyon Very Small Starts submittal to FTA.

[2] Incremental costs reflect the net increase in O&M costs of operating new BRT service with the elimination of existing FAX bus service for each BRT corridor (Blackstone-Route 30; Ventura/Kings Canyon-Route 28; Shaw-Route 9).

Other Costs Required to Operate and Maintain BRT Service and Facilities

The proposed BRT corridors include various capital improvements that will generate maintenance costs for FAX that are not accounted for in the vehicle hours and miles cost estimates. These include maintenance of enhanced passenger stations and the passenger amenities provided. Among the latter are fare collection equipment, automated passenger information, and possibly other equipment. In addition, BRT service is proposed to operate with off-board fare collection wholly or in part. This will significantly reduce boarding and alighting time at stations. Passengers must have proof-of-payment of fares and FAX will use inspectors to check and enforce fare payment.

These costs were estimated as part of the overall cost estimates provided to FTA in FAX's September 2010 Very Small Starts submittal and are approximately $925,000 annually for BRT on Blackstone and Ventura/Kings Canyon. They have been prorated to reflect any changes in the length of BRT improvements in these corridors proposed under each of the 2035 land us development scenarios and also to reflect similar costs that would be associated with new BRT service along Shaw Avenue. The costs have been combined with the service hours and miles costs.

The resulting total annual operating costs for each BRT service scenario are shown in Table 5. As noted, these services will replace existing local service in each corridor, and thus the costs of eliminating local service can be credited towards the total costs of new BRT service. This provides an estimate of the incremental costs to FAX of BRT service. The calculation is summarized in Table 6.

10.4 BRT Capital Costs

Capital costs for the BRT improvements in the Blackstone and Ventura/Kings Canyon corridors were derived from the cost estimated prepared for FAX's Very Small Starts submittal to FTA in September 2010. The submittal was the basis of FAX's request for federal funds to implement a near term BRT project in these corridors. FTA has given FAX and the city of Fresno approval to continue with project development activities with a likely commitment of federal funds. The project could be completed in 2013.

The estimated costs for BRT stations, passenger amenities, traffic signal priority systems for BRT buses, bus queue jump lanes at congested intersections, and other transit lane improvements were approximately $48 million, or about $3 million per mile. The assumption of the FTA submittal was service along Kings Canyon will end at Clovis Avenue. Also, as the downtown HSR station would not exist, there was no extension of BRT improvements to west Fresno. Under the 2035 Build and 2035 Constrained Exclusive BRT Lanes growth scenarios, BRT improvements—and service—would be extended to the planned high speed rail station in west Fresno and also farther east of Clovis Avenue to fast growing east Fresno. Therefore the additional costs of these extensions were added to the baseline capital cost estimate developed for the Very Small Starts submittal. The result is BRT improvements along Blackstone are estimated to cost $27.9 million and improvements along Ventura/Kings Canyon are estimated to cost $23.9 million, or $51.7 million combined.

The third BRT project is along the Shaw Avenue corridor, with initial improvements proposed over 13.6 miles from Route 99 to Highway 68. One alternate alignment for an extension of Shaw BRT service proposes operations on Highway 168 to North Clovis in a future HOV lane with no stops until it reaches its final destination. Another alternative would have BRT continue on Shaw Avenue through downtown Clovis and terminate at the planned Loma Vista Community Center between DeWolf and Leonard Streets. The Central Clovis alignment option would depend on the City of Clovis adopting significantly higher zoned densities along Shaw Avenue in order to support the BRT investment, in addition to restricting the supply and development of future public and private parking spaces. The average cost per mile of the Blackstone/Ventura/Kings Canyon BRT project provided a reasonable basis for estimating the costs of future BRT improvements along Show.

Table 15 shows the estimated capital costs of BRT service in the three corridors.

Table 15: BRT Total Capital Costs ($2010) of BRT Improvements

Transit Corridor	2035 Build w/ BRT Service All Corridors		2035 Constrained TOD w/ Exclusive Lanes		2035 Full TOD w/ BRT Service on All Corridors	
	Length (ml)	Cost	Length (ml)	Cost	Length (ml)	Cost
Blackstone	9.29	$27,870,000	9.29	$27,870,000	9.29	$27,870,000
Ventura/Kings Canyon BRT	7.95	$23,850,000	7.95	$23,850,000	7.95	$16,350,000
Shaw	13.25	$39,750,000	13.25	$39,750,000	13.25	$39,750,000
Total Daily Riders	**30.49**	**$91,470,000**	**30.49**	**$91,470,000**	**30.49**	**$83,970,000**

[1] Kimley-Horn and Associates, Inc.

The Cost of Extending BRT to SEGA

Under both the 2035 Full Build and the 2035 Constrained TOD with Exclusive BRT Lanes growth scenarios BRT service would extend to the SEGA development area of southeast Fresno. The Very Small Starts submittal to FTA assumes the line will initially terminate at Clovis Avenue. The incremental cost of extending BRT along Ventura/Kings Canyon for 2.5 miles to the SEGA development is estimated to generate approximately $847,000 in additional annual O&M costs for FAX and have capital costs of approximately $7.5 million compared to the costs of FAX's proposed Very Small Starts project. The O&M cost is an estimate based on prorating costs on a per route mile basis. The capital cost is derived from the average capital cost per mile of $3.0 million. As such, both figures are order of magnitude.

10.5 Summary of BRT Improvement Costs

Annual O&M costs of the proposed BRT improvements range from $9.7 million under 2035 Build conditions, to $12.5 million uner 2035 Full TOD conditions. The incremental annual O&M Costs, which exclude the annual costs of providing existing bus service, as they will be replaced by the new BRT service, ranges from $7.1 million to $9.9 million. These costs would be in addition to the O&M costs of operating the rest of the transit routes in the region.

The capital costs of construction of the BRT system improvements in the Blackstone, Ventura/Kings Canyon, and Shaw corridors are estimated to range from $84.0 million to $91.5 million. The primary factor behind the range in capital costs is the varying extent of the Ventura/Kings Canyon BRT corridor between project alternatives. As discussed previously, the Ventura/Kings Canyon corridor would extend 7.95 miles from Downtown Fresno to SEGA under 2035 Build and 2035 Contrained TOD alternatives. However, under the 2035 Full TOD scenario, the Ventura/Kings Canyon BRT alignment would operate along 5.45 miles from Downtown Fresno to Clovis Avenue. This shortened alignment results in lower total capital costs for the 2035 Full TOD scenario.

10.6 LRT O&M Costs

Methodology for Estimating Costs

FAX does not have experience with light rail operations; therefore, no cost history is available from which to establish cost estimating factors for application to future service scenarios. Instead, cost factors from industry experience were developed and applied in a similar fashion as bus O&M cost factors were applied to BRT service scenarios. This is a reasonable approach as the assumption is, should LRT be implemented in the Fresno region (and FAX be the operator), the costs of system operation would mirror those of other current LRT operators with similar systems as proposed for Fresno. The envisioned system is light rail running within public rights of way, possibly in a dedicated transitway (or guideway) and/or in a shared lane with traffic. LRT along the Blackstone and Ventura/Kings Canyon corridors is not anticipated to be grade separated, such as on viaducts or in tunnel, except in limited locations where grade separations are necessary for the safety and reliability of rail operations. An example is the crossing of other passenger (e.g., Amtrak) or freight rail lines or a major expressway.

The Fresno system, if built, is envisioned to be similar to existing light rail in Sacramento, San Diego, Phoenix, Salt Lake City, or Portland, for examples. Therefore the cost experience of these peer systems is assumed to be representative of future LRT costs in Fresno. An evaluation was made of these systems to determine, as for bus, unit costs of each vehicle hour or mile of service. The estimated cost of service per vehicle hour was selected as the preferred cost factor for cost estimation. (INSERT FOOTNOTE) This is shown in Table 8.

The service assumptions in Table 4 were converted to daily and annual hours of LRT service in the Blackstone and Ventura/ Kings Canyon corridors for the 2035 Full TOD land use development scenario. This is the only growth scenario for the

[3] Costs per vehicle mile were not estimated for LRT as cost databases for peer agencies supported the calculation of either cost per hour or cost per mile separately; cost per hour was preferred for cost estimation purposes.

Fresno region where LRT improvements are proposed. Annual O&M costs were calculated by applying a cost factor of $180 per revenue vehicle hour (i.e., to each hour a vehicle is in passenger-carrying service).

The total annual O&M costs for LRT service in the Blackstone and Ventura/Kings Canyon corridors are summarized in Table 9. The table also shows the BRT O&M costs for the Shaw corridor, which are the same as in Tables 5 and 6 for this service scenario.

While Table 9 reflects total annual O&M costs, the proposed services will replace existing bus services in the three transit corridors. It can be assumed along Blackstone and Ventura/Kings Canyon LRT service will replace all existing local bus just as BRT service is assumed to replace all local bus services under the 2035 Build, 2035 Constrained TOD with Exclusive Lanes, and the 2035 Full TOD with BRT Service All Corridors. Table 10 shows this incremental cost increase of implementing LRT service on the Blackstone and Ventura/Kings Canyon corridors, with BRT service on the Shaw corridor for the 2035 Full TOD scenario.

To estimate the capital costs of implementing LRT facilities along the Blackstone and Ventura/Kings Canyon corridors, a second peer group of LRT systems was evaluated to determine a reasonable range in construction costs. The peer group included six agencies and nine projects, most currently in progress. One project was completed in 2006. The capital costs per mile were calculated and then compared with industry research as a second check. Capital costs for transit projects can range considerably and depend on the level of improvements, and particularly are affected by the inclusion of structures and tunnels. The peer systems selected are typically at-grade and include in-street running or running along a surface corridor.

The analysis determined that a reasonable cost for a new LRT system, as envisioned for Fresno, would be in the range of $50 million per mile, including the light rail vehicles necessary for operations. This figure is in $2010. Basic amenities for passengers are assumed in this figure; however, adding amenities and separating major portions of any alignment from the roadway or other obstacles, such as railroads or major expressways, would increase this average cost substantially.

Multiplying the average capital cost per mile times the length of each LRT corridor give the total capital cost of the improvements. The costs, shown in Table 11 are in $2010 and would need to be escalated to the midpoint of construction, termed the average year of expenditure, to give the estimated cost at completion with an allowance for inflation from today through the period of construction.

The financial analysis takes account of future inflation and should be referred to if inflated capital costs are desired, rather than $2010 presented below.

Capital costs of improvements to Shaw Avenue are for BRT facilities only. In the other corridors, LRT improvements are estimated to cost $273 million along Ventura/Kings Canyon Road and $465 million along Blackstone Avenue over the distances shown.

Combined, LRT and BRT improvements under the 2035 Full TOD with LRT on Blackstone and Ventura/Kings Canyon growth

Table 16: Operating Costs of Peer Group LRT Systems

System	Length (miles)	Vehicle Revenue Hours	Annual O&M Cost ($2010)[1]	Cost per Vehicle Revenue Hour ($2010)
SRTD (Sacramento, CA)	37.5	213,129	$51,683,065	$236.58
SDMTS (San Diego, CA)	51.1	409,519	$60,725,827	$134.34
UTA (Salt Lake City, UT)	19.0	265,490	$29,739,095	$109.28
Metro Transit (Minneapolis-St. Paul, MN)	12.3	134,557	$25,627,485	$185.81
LYNX (Charlotte, NC)	9.6	54,687	$17,220,202	$307.21
RTD (Denver, CO)	39.4	412,796	$52,275,044	$123.55
Simple Average	**28.15**	**248,363**	**$39,545,119**	**$180.00[2]**

[1] Escalated to 2010 from reported year (2009 or 2006 for SDMTS) at 2.5% per year.

[2] Rounded and simple average of costs excluding high and low values of peer group.
Source: National Transit Database, 2009
Source: National Transit Database

scenario are estimated to cost $777 million in current dollars.

10.7 Summary of LRT Improvement Costs

Table 17: LRT Total Annual O&M Costs ($2010) for 2035 Operating Plan

System	2035 Full TOD w/ LRT on Blackstone and Ventura/Kings Canyon w/ BRT on Shaw	
	Length (ml)	Cost
Blackstone LRT	9.29	$9,792,880
Ventura/Kings Canyon LRT	5.45	$7,042,300
Shaw BRT	13.25	$4,091,522
Total	**27.99**	**$20,926,702**

[1] BRT O&M Cost estimates based on procedures from 2010 Blackstone/Ventura/Kings Canyon Very Small Starts submittal to FTA.

[2] LRT O&M Cost estimates based on average costs per vehicle revenue hour for comparable existing LRT systems. (Source: National Transit Database 2009 O&M Data by Mode)

Under the 2035 Full TOD with LRT on Blackstone and Ventura/Kings Canyon growth scenario, LRT is a transit improvement option along the Blackstone and Ventura/Kings Canyon corridors in approximately 2035 when development generates high transit demand. High capacity transit is then viable.

Annual O&M costs of the proposed improvements total $20.9 million. These are the costs of LRT and BRT service improvements only. The incremental cost of the service improvement, which removes from the estimate the costs of

Table 18: LRT Incremental Annual O&M Costs ($2010) for 2035 Operating Plan

Transit Corridor	2035 Full TOD w/ LRT on Blackstone and Ventura/Kings Canyon w/ BRT on Shaw	
	Length (ml)	Cost
Blackstone LRT	9.29	$8,638,495
Ventura/Kings Canyon LRT	5.45	$6,446,471
Shaw BRT	13.25	$3,245,400
Total	**27.99**	**$18,330,366**

[1] BRT O&M Cost estimates based on procedures from 2010 Blackstone/Ventura/Kings Canyon Very Small Starts submittal to FTA.

[2] LRT O&M Cost estimates based on average costs per vehicle revenue hour for comparable existing LRT systems. (Source: National Transit Database 2009 O&M Data by Mode)

[3] Incremental costs reflect the net increase in O&M costs of operating new BRT service with the elimination of existing FAX bus service for each BRT corridor (Blackstone–Route 30; Ventura/Kings Canyon–Route 28; Shaw–Route 9).

providing existing bus service as they will be replaced by new LRT and BRT services, is approximately $18.3 million annually. These costs would be in addition to the O&M costs of operating the rest of the transit routes in the region.

The capital costs of construction LRT improvements in the Blackstone and Ventura/Kings Canyon corridors are estimated to be $465 million and $273 million, respectively. Adding to these costs the construction of BRT along Shaw Avenue would bring the total capital costs for this growth scenario to approximately $777 million.

Table 12 summarizes the estimated capital costs and annual O&M costs of the proposed BRT and LRT improvements for each of the growth scenarios. The total capital costs (2010 dollars) for BRT service on the Blackstone, Ventura/Kings Canyon and Shaw corridors ranges from approximately $84.0 million to $91.5 million. The total capital costs to implement LRT service on the Blackstone and Ventura/Kings Canyon corridors, with BRT service along the Shaw corridor, equates to approximately $777 million. The average annual O&M costs for BRT service along all three transit corridors ranges from $9.7 to $12.5 million, while the average annual cost for LRT service on Blackstone and Ventura/Kings Canyon, and BRT service on Shaw is approximately $20.9 million.

10.8 Evaluation of Alternatives

Overall assumptions applied to all of the land use alternatives include:

1. That population growth is a constant and the figures match the COG model forecast for the region. It is assumed that Fresno County will continue to absorb about 15,000 new residents per year, as it has over the past 10 years. The population forecast for Fresno County is estimated to be 1.5 million people by 2035. Only the amount of the new population that will be living in the BRT corridors and downtown changes in the scenarios.

Table 19: LRT Capital Improvement Costs ($2010)

Transit Corridor	2035 Full TOD w/ LRT on Blackstone and Ventura/Kings Canyon w/ BRT on Shaw	
	Length (ml)	Cost
Blackstone LRT	9.29	$464,500,000
Ventura/Kings Canyon LRT	5.45	$272,500,000
Shaw BRT	13.25	$39,750,000
Total	**27.99**	**$776,750,000**

[1] Note: LRT costs based on an average of $50 million per mile, inclusive of facilities and vehicles. Average costs are based on review of similar LRT projects and industry research.

2. The eventuality of the Central Valley High Speed Rail project coming to fruition will create an anomaly in the forecasts that is not incorporated into the modeled population and travel forecasts. However, for the purposes of this study, assumptions were made about mode share and ridership numbers on BRT linked to boardings at the high speed rail station downtown. Those assumptions are detailed below.

Impact of High Speed Rail on BRT Ridership and Growth Forecasts

Ridership on BRT, LRT and Streetcars is thought to be enhanced by the operation of high speed rail service between Sacramento and San Jose with a station in Fresno. Ridership assumptions used for the analysis are from the high speed rail planning consultants:

This information represents year 2030 forecasts from the HSR ridership and revenue model for the “May 2009 Operating Plan scenario” with the full statewide HSR system. The results in the shapefile are total trips for all modes of station access and egress. The results assume that the Fresno HSR station will be served by local bus (public transit and private shuttles) and Amtrak rail, and will also have access/egress by bicycle, walking, rental car, taxi and private vehicle (park and drop-off). On a daily basis, the Fresno HSR station is predicted to have up to 16,625 passengers entering and exiting at this location. It is estimated that 12% of those passengers would take transit to access the station, adding nearly 2,000 passengers to the FAX transit system each day.

In the PTIS land use scenarios for 2035, six times more growth was assumed to occur in downtown Fresno compared to the growth forecast by the COG travel model. The TOD scenarios shifted approximately 15,000 households from other types of housing choices throughout the region into downtown. This is a substantial housing profile change for Fresno.

The future impact of HSR stations in downtowns is currently a topic of considerable debate. Though it is difficult to predict the impact of a high speed rail station in Fresno, consultants working on the HSR project for California predict that most of the growth will be in jobs. The estimate of new jobs downtown was considerably increased by 35,000 to 37,000 new jobs over the COG forecast and housing was increased by nearly 15,000 new units (see the table above). In the planning phase of High Speed Rail, few examples exist in the United States, therefore, planned growth was shifted to downtown Fresno based on economic analysis, land use and transportation scenarios using transportation models to inform our best assumptions.

Table 20: BRT/LRT Total Capital and Operations & Maintenance Costs ($2010)

Transit Corridor	2035 Build w/ BRT Service on All Corridors		2035 Constrained TOD w/ Exclusive Lanes		2035 Full TOD w/ BRT Service on All Corridors		2035 Full TOD w/ LRT on Blackstone and Ventura/Kings Canyon w/ BRT on Shaw	
	Length (mi)	Cost	Length (mi)	Cost	Length (mi)	Cost	Length (mi)	Cost
CAPITAL COSTS								
Blackstone BRT/LRT	9.29	$27,870,000	9.29	$27,870,000	9.29	$83,970,000	9.29	$464,500,000
Ventura/Kings Canyon BRT/LRT	7.95	$23,850,000	7.95	$23,850,000	5.45	$16,350,000	5.45	$272,500,000
Shaw BRT	13.25	$29,750,000	13.25	$39,750,000	13.25	$39,750,000	13.25	$39,750,000
Total	**30.49**	**$91,470,000**	**30.49**	**$91,470,000**	**27.99**	**$83,970,000**	**27.99**	**$776,750,000**
ANNUAL OPERATING & MAINTENANCE COSTS								
Blackstone BRT/LRT	9.29	$3,575,166	9.29	$4,862,344	9.29	$4,862,344	9.29	$9,792,880
Ventura/Kings Canyon BRT/LRT	7.95	$2,668,616	7.95	$3,208,210	5.45	$3,559,391	5.45	$7,042,300
Shaw BRT	13.25	$3,487,734	13.25	$2,758,490	13.25	$4,091,522	13.25	$4,091,522
Total	**30.49**	**$9,731,516**	**30.49**	**$10,829,044**	**27.99**	**$12,513,257**	**27.99**	**$20,926,702**

[1] Source: Kimley-Horn and Associates

10.9 Summary Findings and Conclusions

1. As population density and mix of uses in the major transit corridors and downtown Fresno increases, so does the performance of the transit system. At about 36 dwelling units per acre, the Full Build Out scenario with dedicated BRT lanes performs the best overall: VMT is reduced 5.83%, work based transit trips increase 138% and total walking and bicycle trips increase over 15% [1]

2. The Constrained TOD Scenario, at about 21 dwelling units per acre, and with dedicated BRT lanes, results in a VMT reduction of 2.64% and an 89.5% increase in work based transit trips. Total walking and bicycle trips increase by 4.8%.

3. Maintaining the status quo in density (2.5 units per acre in Fresno County and 7.8 units per acre in the City of Fresno) results in a continued decline in transit's share of regional trips and an increase in VMT, even with the current planned investment of $251 million in the transit system, including building BRT on Blackstone and Ventura/Kings Canyon.

4. Because of ample roadway capacity in Fresno, and the tendency of traffic to divert to other streets to avoid delays and congestion, travel time comparisons between transit and autos along major transit corridors do not show any deterrence to driving, even in the high density future. Transit travel times only improve with the introduction of BRT in dedicated lanes. For example, in the Blackstone corridor from the Riverpark Transit Center to downtown Fresno, it currently takes 20 minutes longer to take the bus than it does driving a car. In the future scenarios with BRT and dedicated travel lanes, transit improves significantly but still takes 8 to 10 minutes longer than driving a car. Travel times by car, even with the increased density in the corridor, only increase on average 2 minutes in the future scenario. With increased transit oriented development transit would become truly competitive with the auto in these corridors. [2]

Table 21: Downtown Growth Increment for 2035

Measure	Virtual Future (COG Forecast)	Constrained TOD Strategy	Aggressive TOD Scenario
Housing Units	2,780	17,000	17,072
Employment	3,265	38,285	40,288

Source: Fregonese and Associates

5. In the higher density future, with employment and residential land use densities built up along the BRT corridors and downtown Fresno, LRT becomes a viable transit investment option. However travel forecasts of ridership potential demonstrate that connectivity is important in attracting people to LRT. Both Blackstone and Ventura/Kings Canyon should be linked as there is limited ridership improvement if only converting BRT to LRT on just one leg of the corridor (i.e. adding LRT to just Blackstone or just Ventura/Kings Canyon). This is because the two corridors are linked with multiple trips that begin and end on both corridors. Downtown Fresno is not the only destination in the higher density future. The two corridors function together as a unit.

6. In the future, when transit travel demand requires BRT buses to operate on headways of 7 minutes or less to provide sufficient capacity, this is the time to begin planning the conversion from bus to rail service in the corridor. At 5 minute headways on BRT, the transit system begins to create its own delays unless separated from traffic and grade separated through major intersections. Buses can queue up at stations, waiting to board and alight passengers.

7. The operating costs of bus service in city streets—even in dedicated lanes—begin to exceed those of LRT at high service frequencies. LRT capacity can be expanded without adding another driver (LRT cars can be added to create longer trainsets). For example, an articulated bus has room for approximately 75 passengers as the average peak load. In contrast, a two-car LRT train can carry over 250 passengers, more than a 3-to-1 capacity advantage. Industry research indicates that when demand reaches a certain threshold, definite operating cost efficiencies exist with upgrading a system from BRT to LRT. The future demand along the Blackstone and Ventura/Kings Canyon BRT corridors requires operating with headways of 7 minutes or less. As frequencies increase beyond this point, LRT could become a more effective option from a service standpoint.

8. High capacity transit, whether BRT or LRT, which has a distinct identity and operates in dedicated lanes or, at minimum, is designed to include preferential treatments through congestion, has been shown to attract more riders than comparable express or high frequency local bus service. Designed property and integrated into the fabric of the communities through which it operates, BRT or LRT will attract choice riders in addition to transit dependent riders. This is important to getting people out of their cars and stopping, or at least slowing, the growth in congestion. Transit can be a catalyst for change.

9. TOD will be necessary to tip the balance towards transit in certain transportation corridors, based on the results of future scenarios evaluated in this study. TOD means establishing origin and destination nodes that generate substantial trips, many of which are possible on transit and by walking or bicycling. Environments favorable to transit and a demographic looking for alternatives to the auto should be developed along high capacity corridors such as Blackstone, Ventura/Kings Canyon and Downtown Fresno in the near term and along Shaw Avenue in the longer term future.

[1] *See Fresno PTIS Performance Measures by Dowling Associates in the technical appendix of this document.*
[2] *See Table G5: Travel Times for Selected Origins and Destinations in the Appendix G of this document.*

11.0 Infrastructure Financing Plan

The outlook for funding new transit infrastructure in Fresno exists within a larger economic and transit environment. This section of the Financing Plan places the identified infrastructure expansions within this larger context, and identifies opportunities and challenges for paying to build, operate, and maintain them. The Financing Plan includes:

- Current and future environment for transit infrastructure investment
- Potential funding sources for capital and operating needs
- Key elements of a successful financial plan
- Funding plans for specific projects
- Summary

CURRENT AND FUTURE ENVIRONMENT FOR INFRASTRUCTURE INVESTMENT

Current Environment

The situation for capital and operating transit funding in Fresno County is very challenging. Sources that traditionally fund transit capital and operating costs include sales taxes and gas taxes, and these have been adversely affected by the economic slowdown. The state of California has diverted some transportation revenues to be used for other purposes. Regional transit funds have also been affected in Fresno. In 2006 voters reauthorized the local sales tax for transportation (Measure C). Measure C was anticipated to generate $1.7 billion over the life of the Measure. However, it is unlikely that those revenue targets will be achieved. Federal funding sources have been and are projected to be more stable over the near and mid-term.

The consequences of these revenue cutbacks can be seen by looking at the largest transit provider in the region, Fresno Area Express (FAX). When Measure C was approved, it was assumed that by FY2010, FAX would receive more than $9 million annually in funds. The approved FY2011 budget shows that FAX is estimated to receive $5.1 million or approximately 40 percent less than the anticipated revenue.

The consequences of the revenue shortfalls can be seen in Table 22. FAX has had to reduce its budget and staff.

Table 22: FAX Budget Changes

	FY2009 Actuals	FY2011 Approved Budget	Percentage Change: FY2009 to FY2011
FAX Operating Expenditures	$38,057,191	$24,986,600	-34.3%
Authorized Positions	420.8	342.0	-18.7%

These reductions were necessary to balance the budget, even though FAX ridership grew significantly from 1999 to 2009. Revenue miles increased from 3.3 million to 4.7 million (42.9 percent) and ridership increased from 11 million to 18 million (63.8 percent) during this period.[1]

The challenges in Fresno extend to employment as well. In December 2010, the unemployment rate in Fresno County was 17.2 percent, up from 16.9 percent in November 2010 and higher than the 16.6 percent rate in December 2009. By comparison, in December 2010, the unadjusted unemployment rate for California was 12.3 percent, and for the nation as a whole was 9.1 percent.[2]

1 2011 Regional Transportation Plan, Council of Fresno County Governments.

2 Data are from www.labormarketinfo.edd.ca.gov Unemployment Rates and Labor Force data for the Fresno County Local Area Profile.

Table 23: Annual BRT Performance Metrics ($2010)

O&M Costs ($2010)	Metric	2035 Build	BRT 2035 Constrained Excl Lanes	BRT 2035 Full TOD	2035 Full TOD w/ LRT on Blackstone & Ventura–KC	2008 FAX Metric
Blackstone	**Service Efficiency**					
	Operating cost/Vehicle Revenue Mile (annual)	$6.82	$6.14	$6.14	$17.81	$7.88
	Operating cost/Vehicle Revenue Hour (annual)	$72.82	$67.18	$67.18	$198.78	$91.99
	Cost Effectiveness					
	Operating expense/passenger mile	$0.38	$0.32	$0.28	$0.56	$1.02
	Operating expense/unlinked passenger trip	$0.82	$0.69	$0.62	$1.23	$2.17
Ventura/Kings Canyon	**Service Efficiency**					
	Operating cost/Vehicle Revenue Mile (annual)	$7.93	$7.16	$7.66	$ 22.91	$7.88
	Operating cost/Vehicle Revenue Hour (annual)	$81.76	$75.62	$69.53	$207.22	$91.99
	Cost Effectiveness					
	Operating expense/passenger mile	$0.39	$0.29	$0.29	$0.54	$1.02
	Operating expense/unlinked passenger trip	$0.85	$0.63	$0.63	$1.17	$2.17
Shaw/Hwy 168	**Service Efficiency**					
	Operating cost/Vehicle Revenue Mile (annual)	$5.81	$7.67	$5.48	$5.48	$7.88
	Operating cost/Vehicle Revenue Hour (annual)	$80.12	$80.95	$76.44	$76.44	$91.99
	Cost Effectiveness					
	Operating expense/passenger mile	$0.88	$0.49	$0.52	$0.52	$1.02
	Operating expense/unlinked passenger trip	$1.93	$1.07	$1.15	$1.14	$2.17

Source: Nancy Whelan Consulting, Kimley-Horn and Associates, Inc.

The situation faced by FAX is mirrored by transit agencies across the country. In May 2009, the American Public Transportation Association (APTA) surveyed 98 transit agency members. The responders represented more than half of the nation's transit riders and included 10 of the top 15 agencies in terms of annual ridership3. Key survey findings include:

- More than 80 percent report flat or decreased local and/or regional funding and flat or decreased state funding.
- For those with decreased state, regional, and/or local funding, 89 percent have had to raise fares or cut service and 47 percent have had to do both.
- Half of the systems have had to eliminate staff positions.
- Of those facing decreases in either local/regional or state funds, 55 percent have transferred capital funds to support operating costs.
- Even given increased fares, service cuts, lower fuel costs, and job losses, 60 percent of the systems reported increased ridership in the first quarter of 2009 compared to the first quarter of 2008.

Future Environment

Some of the infrastructure scenarios presented in this report are based upon aggressive assumptions about population growth. In order for this growth to occur, the economic situation must change to permit the creation of new jobs. In addition, housing and job growth would need to occur along existing transit corridors, rather than being permitted to occur in outlying low density areas.

High Speed Rail (HSR) is expected to increase the demand for transit in the region; it is not clear that this would translate into additional funding for transit service in Fresno. Final plans for HSR are not yet complete. The goal is to intensify development around HSR station sites; however, locations have not been finalized and the financial impact of increased densities is not yet known. Revenue generation opportunities may be available from impact fees and other development based revenue sources.

FUNDING CAPITAL AND OPERATING NEEDS

Overview

Support for public transportation is derived from a broad range of sources, many of which have been established to avoid competing with other public services. Sales taxes are the most widely used source of dedicated local and regional funding for transit.4 In Fresno, approximately 20 percent of the operating budget is supported with local sales tax revenue.

Transit revenue sources are generally grouped into two categories based on eligible uses: capital and operating. Capital funds may only be used on physical items that have a lifespan of more than a year, and meet certain cost thresholds. Examples of capital expenditures are new track, new transit stations, and the acquisition of rolling stock (such as buses and rail cars). With very limited exceptions (such as federal Congestion Mitigation and Air Quality Improvement funds), capital funds cannot be used to pay for operating costs, or for maintaining assets already built or owned. Rather, only operating funds may be used to pay for the ongoing, daily cost of operating and maintaining a transit system. Many sources of operating funds are eligible for use on either operating or capital purposes.

New or expanded transit service may consist of operations expenses and/or capital expenses. For example, a service expansion that uses existing vehicles but increases hours of service would not be eligible for capital revenues. By contrast,

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3 Challenge of State and Local Funding Constraints on Transit Systems: Effects on Service, Fares, Employment and Ridership, Survey Results, June 2009, American Public Transportation Association.

4 Local and Regional Funding Mechanisms for Public Transportation, TCRP Report 129, Transportation Research Board, 2009.

an expansion that requires construction (i.e., creation of a dedicated bus lane as part of Bus Rapid Transit project), would be eligible for capital revenues for those elements and the increased operating costs would require operating sources of funds.

Sources and Uses of Capital and Operating Funds

The proposed Bus Rapid Transit and Light Rail Transit investment over the next 20 years will require between $51.7 and $828,5 million in capital funding, and incremental operating costs are estimated to be between $6.3 and $18.3 million annually (in 2010 dollars). These investments are viewed within a timeframe of near terms, mid term and long term. In that context, in the near term two of the three corridors are designed for BRT service in the near term, with a third BRT corridor in the mid term. The first two BRTs would be converted to LRT service when demand grows to require the added capacity in the long term.

Major capital investments such as new rail lines or extensions are costly and almost always require a variety of funding sources from all levels of government. Rarely is a new fixed guideway project funded from one or two sources. Given the state of the economy, California's traditional capital funding sources have decreased or have been deferred or eliminated. Federal sources, in particular New Starts funding, remain critical for significant capital investment. The Federal Transit Administration's New Starts program is a competitive funding program for expansions to "fixed guideway" transit systems including dedicated Bus Rapid Transit. FAX submitted a proposal for Very Small Starts funding as a part of the New Starts program in September 2010 and has been selected for funding.

Funding transit operations is relatively more difficult than funding capital projects. The number and variety of sources is not as varied or plentiful, and most sources are not within the control of the transit agency. The possibility of fare increases is always considered as a potential revenue source because transit agencies directly control fares. There are limits to fare increases as riders will choose other modes of transportation if they cannot afford it or if they perceive that the fare is too high. Thus, fare increases alone cannot address significant funding gaps. In its Short Range Transit Plan, FAX projected that fare revenues would cover 19.3 percent of its operating costs from FY2010 through FY2015, or about $9.2 million annually.5 Fresno's travel model assumes that fares will increase over time, consistent with the cost of living index. However, FAX has not increased fares for several years, so fares have not been keeping up with inflation. FAX is currently working on a plan to increase fares from the current $1.25 to $2.00 at the end of five years.

Revenues are only one half of the financial picture. The other side of the budget equation is costs. As with transit agencies across the country, FAX has dealt with revenue shortfalls through cost cutting measures including cuts in service and driver and management staff layoffs.

Transit agencies are finding that service cuts and layoffs are not sufficient to address significant shortfalls. The underlying structural problem of costs increasing at a pace greater than revenues is getting serious attention. Some agencies have begun to implement efficiencies through better scheduling and routing, new work rules within labor contracts, revising benefits and pensions structures, and contracting for services. In the San Francisco Bay Area, the Metropolitan Transportation Commission has embarked on a Transit Sustainability Project to study the cost structure of the largest transit operators and how costs can be controlled through revisions to labor contracts, more efficient service provision, contracting out, and increasing revenues. AC Transit has recently implemented a contract with its operators that addresses many of these issues.

Transit capital and operations and maintenance have been funded from variety of federal, state, and regional/local

5 Short Range Transit Plan: 2010–2014, June 30, 2009, prepared by the City of Fresno.

sources in Fresno. Existing capital funds, most of which have been used in the past or are presently in use in Fresno, are summarized in Table 24. Operating and maintenance funds are summarized in Table 25. These revenues are currently fully used to operate the transit system and are unlikely to increase in the near future. More detailed descriptions of these sources, eligible uses, and potential for use on Fresno transit projects are provided in Appendices 1 and 2.

Table 24: Revenues Available for Transit Capital

Level	Source
Federal	SAFETEA-LU — Congestion Mitigation and Air Quality Improvement Program (CMAQ) SAFETEA-LU — Surface Transportation Program (STP) SAFETEA-LU — Safe Routes to School FTA Section 5307 - Urbanized Area Formula Program FTA Section 5309 - Bus and Bus Facilities FTA Section 5309 - Fixed Guideway Modernization FTA Section 5309 - New and Small Starts Program[3] FTA Section 5311 - Formula Grants for Other than Urbanized Areas FTA Section 5316 - Jobs Access Reverse Commute (JARC) FTA Section 5317 - New Freedom Program Highway Safety Improvement Program (HSIP) American Recovery and Reinvestment Act (ARRA) - Various Programs
State	Transportation Development Act/Local Transportation Fund (LTF) - Art. 4 Transportation Development Act/State Transit Assistance Funds (STA) Caltrans Community Based Transportation Program (CBTP) Bicycle Transportation Account (BTA) Safe Routes to School (SR2S) STIP - RTIP STIP - TE Proposition 1B/Traffic Light Synchronization Program Proposition 1B/Public Transportation Modernization, Improvement, and Service Enhancement Account (PTMISEA) Proposition 1B/TSSDRA AB 2766 Air District Funds Gas Tax Apportionments AB 118 - Alternative & Renewable Fuel and Vehicle Technology Program
Regional/Local	Measure C Property-Based Business Improvement District (PBID) Developer Fees City Sources Fares

Table 25: Revenues Available for Transit Operations and Maintenance

Level	Source
Federal	SAFETEA-LU -- Congestion Mitigation and Air Quality Improvement Program (CMAQ) FTA Section 5307 Urbanized Area Formula Program FTA Section 5311 - Formula Grants for Other than Urbanized Areas FTA Section 5317 New Freedom Program
State	Transportation Development Act/Local Transportation Fund (LTF) - Art. 4 Transportation Development Act/State Transit Assistance Funds (STA)
Regional/Local	Measure C Property-Based Business Improvement District (PBID) City Sources Fares

Given the imbalance of cost and revenue growth in transit, most agencies continue to seek new sources of revenue in addition to implementing cost control measures. Opportunities exist for new revenue sources at all levels. Reauthorization of the federal transit bill is on the horizon and transit agencies across the nation will be weighing in with their congressional delegations and industry organizations on the content of the bill. In California, the new administration has pledged to align state and local funding with responsibility for service provision. The details of how this will impact transit are not known. Additionally, SB 375 provides a structure for transit to be part of planning for a sustainable future, and future revenues may be available to support those plans. Fresno will need to be a strong advocate for federal and state initiatives benefitting the maintenance and expansion of the system.

Numerous potential new funding opportunities are available at the regional and local level. Selected sources that might be applicable to new and existing transit service in Fresno are listed in Table 26. A more detailed description of these new sources can be found in Appendix 3.

Implementing new revenue sources is time consuming and can be costly. Many sources require technical studies and long lead times for ballot initiatives. Certain sources do not require voter approval, but they do require approval by governing boards and some require approval of property owners or business owners. Potential sources should be evaluated for revenue yield, administrative and compliance costs, equity, political and public acceptance, and technical feasibility. Certain of these evaluation criteria are addressed in Appendix 3.

Table 26: New Revenues Sources

Type	Potential Sources	
Voter Approval Required	Local Sales Tax Utility Users Tax Business Taxes (Payroll) Parcel Tax	Local Gas Tax Regional Gas Tax Vehicle Miles Travelled Tax (VMT)
Voter Approval Not Required	Parking Fees and Surcharges Transient Occupancy (Hotel) Tax Employer Sponsored Transit Development Impact Fee	Benefit Assessment Districts Mello-Roos Community Facilities District Business Improvement Districts (BID)

KEY ELEMENTS OF A SUCCESSFUL FINANCIAL PLAN

It is not sufficient to identify potential capital and operating sources to build and operate expansion projects. A successful funding strategy will be based on sound project planning, and will require a good deal of political will. The efforts undertaken through the PTIS to identify strategies for transportation investments and land use policies provides an excellent foundation for the financial plan. Specifically, the following achievements will facilitate implementation of the financial plan:

- Transit needs have been identified and public consensus reached on transit investments
- Specific improvements, the rationale, and benefits have been identified
- Roles and responsibilities have been established. The Fresno Council of Governments and FAX are responsible for executing the planned improvements, partnering with the community and other local entities
- Polices to focus development on transit corridors create the potential for land based or development based revenues dedicated to transit

Building on these achievements, several important elements are needed to be successful in funding the program:

- Conduct a thorough evaluation of all existing and potential funding sources needed to support capital and operating requirements.
- Target likely sources of funds.
  - Building on the success of Fresno's Very Small Starts application, future Small Starts and New Starts are very likely sources.
  - A preliminary assessment of locally controlled sources indicates that an expansion of the existing Development Impact Fee program could address a variety of transit needs. A nexus study is required to make transit costs eligible for Development Impact Fees.
  - Consider a parcel tax or utility tax dedicated to transit.
- Monitor existing traditional transit sources and non-traditional sources for funding availability. Position the projects and services to take advantage of funding opportunities as they become available.
- Design and execute an advocacy strategy including:
  - Identification of champions and community leaders for the plan
  - Support from elected officials at all levels
  - Creation of coalitions of opinion leaders, stakeholders, and citizens
  - Financial support for technical studies, polling, and campaigns
  - Preparation of public education materials
  - Presentations to the media and the public

- Establish a timetable for achieving milestones on the path to full funding.
- Persist in the effort to raise new revenues. It may take longer than expected.
- Ensure that technical requirements are met. The projects must be included in regional planning documents.
- Advance project development, including both federal and California (NEPA/CEQA) environmental clearance. Project readiness is essential to take advantage of funding that becomes available unexpectedly. Project readiness is a competitive advantage.
- Stabilize and maintain existing transit service. Controlling costs and seeking new revenues to maintain the core system is essential to any expansion strategy. Financial sustainability of the system is evaluated in the New Starts rating process and it is important to the public. It is difficult to have successful ballot measures while service is being cut.

PROJECT SPECIFIC FUNDING PLANS

The previous sections presented an overview of the universe of opportunities to address operating and capital needs for projects and defined the elements of a successful financial plan for Fresno. This section focuses on the specific infrastructure investments under consideration in Fresno and how those projects might be funded.

The timing of the projects varies, depending on estimates regarding population growth, demand for transit, and funding. The timeframes can be characterized as near term, mid term, and long term. Each is considered separately, as a standalone scenario.

In the near term, two Bus Rapid Transit (BRT) projects are well underway in terms of planning, with revenue ready dates of 2013. In the mid term, a third BRT project is planned for to be revenue ready in 2020. Finally, in the longer term, the Light Rail Transit (LRT) projects are planned to replace the Blackstone and Venture/Kings Canyon BRT projects when demand grows in those corridors. If demand warrants, they are expected to be in service in 2030. Their implementation is dependent on significant population growth, focused on the BRT corridors.

For significant capital investments in transit, the federal New Starts Program continues to be the likely source from which to seek funding. In September 2010, FAX prepared a Very Small Starts Submittal Request to Enter Project Development for Blackstone and Ventura/Kings Canyon BRT. Financial plans include 80 percent New Starts funding with a 20 percent match from state Proposition 1B funds these two projects. FAX proposes to cover operating costs with existing operating revenues, plus new or increased revenues that can be used in support of operating costs. The net, combined annual cost of operating both services is projected to be $6,320,340. The net cost reflects the fact that there will be some operating savings as well, since this service will replace existing service. It should be noted that the operating cost of $6.3 million annually represents 25 percent of FAX's total FY2011 Adopted Expenditure budget.

For the near term scenarios, a summary of the two BRT projects currently planned, and their funding plans can be seen in Table 27.

Table 27: Proposed Near Term Bus Rapid Transit (BRT) Scenario

Blackstone BRT	
Description	Service along Blackstone Ave. from Audubon Dr. South to Downtown Fresno
Length	9.29 miles
Begin Revenue Operations	2013
Capital Cost (2010 $)	$27,870,000
Capital Revenues	$22,296,000 – Very Small Starts Funding (New Starts) $5,574,000 – California Prop 1B funds
Incremental O&M Cost (2010 $)	$3,707,959
Ventura/Kings Canyon BRT	
Description	Service along Ventura Ave/Kings Canyon Rd from Downtown Fresno east to Southeast Growth Area (SEGA)
Length	7.95 miles
Begin Revenue Operations	2013
Capital Cost (2010 $)	$23,850,000
Capital Revenues	$19,080,000 – Very Small Starts Funding (New Starts) $4,770,000 -- California Prop 1B funds
Incremental O&M Cost (2010 $)	$2,612,381
Note: Cost estimates used are that of 2035 Constrained TOD with Exclusive Lanes scenario	

Source: Nancy Whelan Consulting, Kimley-Horn and Associates, Inc.

In the mid term, a third BRT project is planned for Shaw Avenue. This project is planned to begin revenue service in 2020. Because this project is nine years in the future, the financing plan is more general. It is assumed that the New Starts program will still be in existence with a similar structure, or that it will have been replaced by a program that is very similar. The Shaw BRT project fits within the Small Starts Program, as the total cost is less than $250 million and the federal funding requested is less than $75 million. Even when costs are inflated to Year of Expenditure, it should still qualify for Small Starts. For preliminary planning purposes, 80 percent federal New Starts funding is assumed. FAX would need to identify match funds, which are almost $8.0 million in 2010 dollars.

For the mid term scenario, a summary of the three BRT projects and their funding plans can be seen in Table 28.

Table 28: Proposed Mid-Term Bus Rapid Transit (BRT) Scenario

Blackstone BRT	
Description	Service along Blackstone Ave. from Audubon Dr. South to Downtown Fresno
Length	9.29 miles
Begin Revenue Operations	2013
Capital Cost (2010 $)	$27,870,000
Capital Revenues	$22,296,000 – Very Small Starts Funding (New Starts) $5,574,000 – California Prop 1B funds
Incremental O&M Cost (2010 $)	$3,707,959
Ventura/Kings Canyon BRT	
Description	Service along Ventura Ave/Kings Canyon Rd from Downtown Fresno east to Southeast Growth Area (SEGA)
Length	7.95 miles
Begin Revenue Operations	2013
Capital Cost (2010 $)	$23,850,000
Capital Revenues	$19,080,000 – Very Small Starts Funding (New Starts) $4,770,000 -- California Prop 1B funds
Incremental O&M Cost (2010 $)	$2,612,381
Shaw BRT	
Description	BRT Service along Shaw Ave and SR 168 from SR 99 east to SR 168 at Temperance Ave
Length	13.25 miles
Begin Revenue Operations	2020
Capital Cost (2010 $)	$39,750,000
Capital Revenues	$31,800,000 – Small Starts Funding (New Starts) $7,950,000 -- Local, regional, or state funds
Incremental O&M Cost (2010 $)	$1,912,368
Note: Cost estimates used are that of 2035 Constrained TOD with Exclusive Lanes scenario	

Source: Nancy Whelan Consulting, Kimley-Horn and Associates, Inc.

In the long term, if demand warrants it, it is proposed that the first two BRT projects be converted to LRT, an expensive capital investment. Projects that exceed the thresholds for Small Starts can participate in the New Starts program. One of the features of this larger program is the need to match the New Starts funding dollar for dollar. The two LRT projects that are proposed to replace the Blackstone and Ventura/Kings Canyon BRT in 2030 fall under the New Starts heading, and would require a 50 percent local match. It should be noted that residential and employment densities would need to exceed those in the Full Buildout TOD scenario in order to justify the investment of LRT. It is unlikely that these densities will be surpassed; consequently LRT is unlikely to be built in the next 25 years. Because these projects would not be built in the near future, it is difficult to identify the sources that would comprise the matching funds. The local match for the LRT projects totals more than $368 million in 2010 dollars. By the time these projects are in operation, new capital and operating revenue sources will be required.

For the long term scenario, a summary of the LRT projects and funding plans, with LRT replacing BRT on two of the three corridors, is shown in Table 29.

Table 29: Proposed Long Term Bus Rapid Transit (BRT) with upgrade to Light Rail Transit (LRT) Scenario

Blackstone LRT	
Description	Service along Blackstone Ave from Audubon Dr. South to Downtown Fresno
Length	9.29 miles
Begin Revenue Operations	2030
Capital Cost (2010 $)	$464,500,000
Capital Revenues	$232,250,000 — New Starts Funding $232,250,000 — Local, regional, and/or state funds
Incremental O&M Cost (2010 $)	$8,638,495
Ventura/Kings Canyon LRT	
Description	LRT Service along Ventura Ave/Kings Canyon Rd from Downtown Fresno east to Clovis Ave
Length	7.95 miles
Begin Revenue Operations	2030
Capital Cost (2010 $)	$272,500,000
Capital Revenues	$136,250,000 — New Starts Funding $136,250,000 — Local, regional, and/or state funds
Incremental O&M Cost (2010 $)	$6,446,471
Shaw BRT	
Description	BRT Service along Shaw Ave and SR 168 from SR 99 east to SR 168 at Temperance Ave
Length	13.25 miles
Begin Revenue Operations	2020
Capital Cost (2010 $)	$39,750,000
Capital Revenues	$31,800,000 — Small Starts Funding (New Starts)
Incremental O&M Cost (2010 $)	$7,950,000 — Local, regional, or state funds $3,245,400
Note: Cost estimates used are that of 2035 Full Buildout TOD with Exclusive Lanes scenario	

Source: Nancy Whelan Consulting, Kimley-Horn and Associates, Inc.

Because the funding plans for all of the BRT and LRT projects include New Starts funding, it will be important for Fresno to plan for continued participation in the Small Starts portion of the program for BRT projects and to prepare for the more rigorous evaluation and analysis required under the full New Starts process for LRT projects. FAX's experience in the Very Small Starts program provides a good background for pursuing future New Starts funding.

The New Starts planning and development process is a very detailed, proscribed series of analyses and milestones undertaken by the project sponsor and the FTA together, and can take several years to complete, depending on the complexity of the project and its finances.

The New Starts project development process follows Federal statutory requirements, including coordination with local and regional planning efforts, technical evaluations using standardized methodologies in an effort to "level the playing field" for all New Starts projects, and regular coordination and review by FTA. Based on the results of the technical analyses – including an extensive review of the financial condition of the project and the project sponsor – FTA must approve the project to enter into Preliminary Engineering and Final Design. Upon approved entry into Final Design, FTA may enter into a multi-year commitment to fund a portion of the project's construction, referred to as a full funding grant agreement.

The ongoing technical analyses and updates provide FTA with data for evaluating the project readiness against several mandated criteria including project cost effectiveness, transit supportiveness of existing and future land uses, and the local financial commitment. Additional requirements include assurance that the cost and benefit analyses are reliable, and that the project sponsor has the financial and technical capacity to design, build, operate and maintain the project both within budget and schedule. Projects in the New Starts pipeline are required to conduct more extensive technical analyses than those not funded by New Starts.

FAX will need to demonstrate the financial capacity to operate and maintain the service, once it is built. Given the current fiscal realities, new funding sources and innovative service delivery options are needed in the next few years to help achieve financial stability and to demonstrate future financial capacity as required by FTA.

Streetcar Project

There have been discussions about building and operating a streetcar in downtown Fresno. This project is still in the early planning stages, without final determination of boundaries or routes. As those details are evaluated and finalized, a funding plan can be developed.

SUMMARY

Transit in Fresno County faces the challenge faced by transit agencies across the nation, namely operating and maintaining current service levels. A financial strategy is needed in the very near term to ensure that current transit service levels can be maintained and that future expansions are affordable. A variety of funding sources will be required to accomplish the vision set out in the PTIS. Initiating the development of a strategy now will help realize the funding needed over the next 20 years.

1 FY2010–2011 Fresno City Adopted Budget

Table 30: Potential New Revenue Sources For Fresno Transit Projects

Source	Description	Capital or Operating Expenditure Eligibility	Legal/ Legislative Requirements	Voter Approvals Required	Revenue Stability	Ease of Administration and Collection	Implementation Experience
Local Sales Tax	An incremental addition to County/local sales for transportation	Both	Requires governing Board to approve a ballot measure to be submitted for voter approval	Approval by two thirds of the electorate	Medium	High	Half Cent Sales tax measure (Measure C) in place in Fresno since 2006; most counties in California
Utility Users Tax	Tax imposed on utility services to be used for a specific or general purpose	Both	Requires governing Board to approve a ballot measure to be submitted for voter approval	Approval by two thirds of the electorate if dedicated to specific use, such as transit	High	High	Pullman, Washington
Business Taxes (Payroll)	A local payroll tax imposed through employer withholding	Both	Requires the Board of Supervisors to approve a ballot measure to be submitted for voter approval	Majority vote of the electorate if general tax. Two thirds approval required if dedicated (special tax).	Medium	Medium	San Francisco
Parcel Tax	Flat tax on each parcel of real property.	Both	Requires governing Board to approve a ballot measure to be submitted for voter approval	Approval by two thirds vote of the electorate	High	High	Cities and counties throughout California; AC Transit in Alameda and Contra Costa Counties
Employer Sponsored Transit	Employers participate financially in the transit service serving their business.	Both	None	None	Low	Low	San Mateo, San Francisco, and Alameda Counties
Local Gas Tax	Tax imposed on each gallon of gas sold in local community	Both	Governing Board must approve ballot initiative.	Two thirds vote of the electorate.	Low	Medium	None known
Regional Gas Tax	Tax imposed on each gallon of gas sold in the region	Both	Governing Boards of any communities in the region affected must approve ballot initiative	Approval by two thirds of the region's electorate	Medium	Medium	None known
Parking Fees and Surcharges	Local government imposed fee or surcharge on on-street and garage parking, usually metered	Both	Governing Board approval	None	Medium	High	Most California cities, including Fresno; revenue dedicated to transit in San Francisco

Source: Nancy Whelan Consulting

Source	Description	Capital or Operating Expenditure Eligibility	Legal/ Legislative Requirements	Voter Approvals Required	Revenue Stability	Ease of Administration and Collection	Implementation Experience
Transient Occupancy (Hotel) Tax	Tax imposed on hotel users by local government	Both	Governing Board approval	None	Low	High	Most California cities, including Fresno
Vehicle Miles Travelled Tax (VMT)	Tax on automobile miles travelled	Both	Likely to require state enabling legislation and Governing Board approval of ballot initiative.	Two thirds vote of the electorate.	Medium	Low	Oregon pilot project
Development Impact Fee	One- time fee charged on new development.	Capital	State law requires demonstration of a direct nexus between the fee charges and the impact improvements funded. Approval by governing Board required.	None	Low	Low	Cities and counties throughout California. Only San Francisco specific to transit.
Benefit Assessment Districts	An assessment on properties within a defined area; the assessment is related to the amount of benefit that the property receives.	Both	Local government to determine funding needs and establish boundaries.	Property owners within the district must approve. A majority of the weighted ballots exceed the weighted ballots opposing the creation of the district.	Low	Medium	Cities and counties throughout California. Los Angeles specific to transit.
Mello-Roos Community Facilities District	Tax on properties within a defined area to fund public improvements within that district.	Capital	Local government establishes boundaries and sets rate.	Two-thirds majority vote of property owners within the proposed boundaries of the district.	Low	Medium	Cities and counties throughout California
Business Improvement Districts (BID)	Assessment district in which business owners choose to be assessed a fee, which is collected on their behalf by the City, for use in improving the business in the area	Both	Governing Board approves creation of the district	A majority of business owners may protest the formation of the BID.	Low	Medium	Cities and counties throughout California. Emeryville specific to transit.

Source: Nancy Whelan Consulting

APPENDICES

A. BRT Very Small Starts Application

FRESNO AREA EXPRESS

Blackstone/Kings Canyon Bus Rapid Transit

September 2010
Update to the 2009 Submittal
Prepared by:

FAX
FRESNO AREA EXPRESS

FY 2012 Very Small Starts Submittal
Request to Enter Project Development

Table of Contents

City of
FRESNO

FRESNO AREA EXPRESS

2223 "G" Street • 559-621-1393
Fresno, California 93706-1600
www.fresno.gov

Ken Hamm
Director of Transportation

August 30, 2010

Mr. Dwayne Weeks
Office of Planning and Environment (TPE)
Federal Transit Administration
1200 New Jersey Avenue SE, East Building
Washington, DC 20590

Dear Mr. Weeks:

SUBJECT: FY 2012 VERY SMALL STARTS SUBMITTAL (REVISION TO THE FY 2011 SUBMITTAL) AND REQUEST TO ENTER PROJECT DEVELOPMENT BY FRESNO AREA EXPRESS (FAX) FOR THE BLACKSTONE/KINGS CANYON BUS RAPID TRANSIT

Fresno Area Express (FAX) is pleased to submit for your review and approval a request to enter Project Development for the proposed Blackstone/Kings Canyon BRT Project.

The proposed project is a 13.8-mile bus rapid transit service extending from north Fresno through downtown to near the city's Southeast Growth Area at its eastern end. The project will be a Very Small Start, with a project cost estimated at $48.2 million in year-of-expenditure dollars. The proposed BRT alignment will follow Blackstone Avenue in the northern portion of the corridor, M Street and P Street through downtown Fresno, and Ventura Avenue – Kings Canyon Road in the eastern portion, providing frequent transit service to 26 stations (including termini). The stations will include features such as shelters, boarding platforms, benches, security features, and fare machines. Buses will run in dedicated lanes within the existing roadway for roughly 20 percent of the corridor. Other features of the project include: transit signal priority and signal coordination; queue jump lanes; real-time bus arrival information at stations; barrier-free self-service, proof-of-payment fare collection; and low-floor, low emission 60-foot articulated buses. The project is expected to open for revenue service in 2013.

The Blackstone/Kings Canyon BRT Project will improve speed and reliability of service to current riders in a corridor with existing high transit demand (over 7,000 daily boardings). The project will provide a nearby connection between the Southeast Growth Area (anticipated to add up to 55,000 new residents by 2025), downtown Fresno, and north Fresno, which has substantial trip generators including education campuses, medical centers, and commercial centers. The BRT project will connect to two existing high volume transit centers, one located in downtown and the other located in the northern portion at the Manchester Center. The BRT Project will also encourage redevelopment of underdeveloped parcels and attract infill and transit-supportive development along the corridor.

The project was selected following a Bus Rapid Transit Master Plan Study (completed in June 2008) and an alternatives analysis process culminating in the selection of the Blackstone/Kings Canyon BRT Project as the investment that best solves the transportation problems in the

Blackstone Avenue and Kings Canyon Road corridor. The project is included in the Short Range Transit Plan (SRTP) for the Fresno-Clovis Urbanized Area and the Ventura/Kings Canyon segment is included in the unconstrained portion Regional Transportation Plan (RTP). The complete LPA selected by the Fresno City Council on August 27, 2009, which included the Blackstone segment, was amended to the RTP in November, 2009.

FAX anticipates a contribution of 20 percent of the project cost from local funding with the balance from Very Small Starts funding.

This submittal includes the following documentation:

- Project description and Case for the Project
- Corridor riders
- Capital costs and operating and maintenance costs
- Evidence of Basic Project Readiness including alternatives analysis, before & after study plan, and project management plan (PMP)
- Local financial commitment and financial documentation

FAX has worked closely with FTA staff in San Francisco over the past year. The staff at FAX would like to thank you, Paul Page, and Ray Sukys (both from Region IX), for guiding us through this process. This submittal culminates our request for inclusion in the Fiscal Year 2012 Report to Congress on New Starts/Small Starts and to enter Project Development. Technical methods and assumptions used to prepare this submittal for the Very Small Starts application for the Blackstone/Kings Canyon BRT Project are fully in compliance with FTA's guidance and Small Starts reporting instructions.

FAX will await your guidance as we prepare to enter the project development phase. If you have any questions regarding this submittal, or about the Blackstone/Kings Canyon BRT Project, please contact Mr. John Downs at (559) 621-1502.

Sincerely,

FRESNO ARES EXPRESS

Kenneth P. Hamm

Kenneth P. Hamm
Director of Transportation

c: Paul Page, FTA Region IX
Ray Sukys, FTA Region IX
John Downs, FAX

1.0 Project Description

1.0 Project Description

This section provides a general description of Fresno Area Express (FAX) Blackstone Avenue/Kings Canyon Road BRT project and sets forth the "Making the Case" narrative. The narrative includes a summary of the purpose and need for the Blackstone Avenue/Kings Canyon Road BRT project and a discussion of the benefits of this capital investment priority in Fresno County.

Section 1.0 is organized as follows:

- Section 1.1 - Blackstone Avenue/Kings Canyon Road BRT Project Description;
- Section 1.2 - The Case for the Blackstone Avenue/Kings Canyon Road BRT.

1.1. Blackstone Avenue/Kings Canyon Road BRT Project Description

The proposed project is located in the City of Fresno (see Project Location map in Figure 1). The Blackstone Avenue/Kings Canyon Road BRT Project would provide high-quality, fast, and frequent express bus service along a 13.8-mile-long, urbanized corridor. The project extends from Audubon Drive at the northern end, through Downtown Fresno, to Clovis Avenue to the east. The project cost is estimated at $48.19 million (year-of-expenditure (YOE) dollars) which includes costs to purchase eight vehicles. Excluding vehicle costs, the project cost is approximately $39.90 million (YOE dollars) or $2.89 million per mile.

The proposed alignment follows N. Blackstone Avenue in the northern portion of the corridor, M and P Streets through Downtown Fresno and Ventura Avenue-Kings Canyon Road in the eastern portion of the corridor (see Figure 1). The alignment begins just north of the RiverPark Shopping Center on Friant Road at Audubon Drive and continues south on Blackstone Avenue to Hedges Avenue. Then the alignment follows the one-way couplet through Downtown Fresno (southbound on Blackstone Avenue to M Street, northbound on P Street and Abby Street). This distance is approximately 9.4 miles.

The alignment heads east on Ventura Avenue which turns into Kings Canyon Road east of Cedar Avenue and terminates at Clovis Avenue, a distance of approximately 4.4 miles. The Kings Canyon Road-Ventura Avenue corridor connects a major growth area of southeast Fresno (up to 55,000 new residents provided for in the 2025 General Plan) to downtown Fresno. It serves (east to west) large scale commercial and newly developing land uses such as the Fancher Creek 7 planned community; Internal Revenue Service complex; Sunnyside High School; medium density residential interspersed with tracts of undeveloped land; apartment and shopping complexes; medium-density housing; large retail centers near Chester Avenue; county social services offices; county fairgrounds; University Medical Center; and upon entering downtown, office, civic, and extensive governmental land uses. With major trip generators sometimes separated by underdeveloped parcels, the Kings Canyon/Ventura corridor is attractive for infill and transit-supportive development.

Figure 2 presents a map of the 26 proposed stations, the spacing between each station (in miles), and the existing ridership (total daily boardings) of two of FAX's top three routes (Routes 28 and 30) that operate within the proposed BRT corridor.

Figure 1 Project Location Map

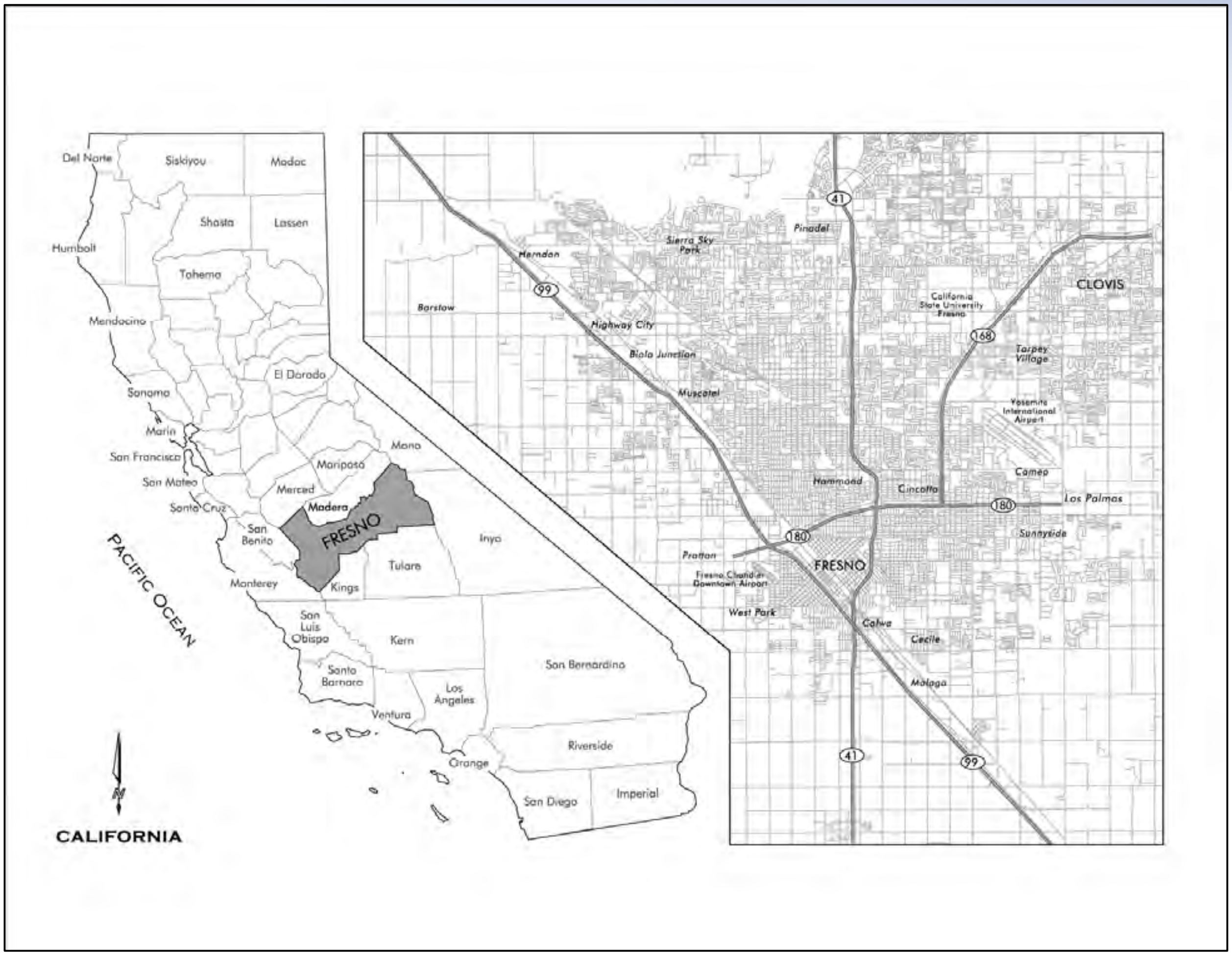


Figure 2 Blackstone Avenue/Kings Canyon Road Bus Rapid Transit Alignment and Proposed BRT Stations

The N. Blackstone Avenue corridor currently has the most intensive development outside of downtown and is therefore a strong transit corridor. It runs south-north out of downtown, with major activity centers including the Community Regional Medical Center (on Divisadero); University of California, San Francisco, medical library; Fresno City College; Manchester Shopping Center, which includes a major Fresno Area Express (FAX) transit center; and the River Park Shopping Center. Other office, commercial, and retail uses line this major arterial.

The proposed BRT service would increase ridership on the already strong bus network; buses along the proposed BRT project alignment are currently serving over 7,000 boardings per day. The project includes the following features:

- **Dedicated Bus Lanes** – The BRT transitway consists of traffic lanes converted to bus-only use for approximately 20 percent of the 13.8-mile corridor. The dedicated lanes will be provided on Ventura Avenue and a portion of Kings Canyon Road and will provide improved travel times and better schedule reliability. Transit lanes will be established by converting a combination of mixed-flow lanes and a wide curbside parking lane to transit-only lanes.

- **Intelligent Transportation Systems Elements (ITS)** – Three main elements of ITS would be implemented as part of the Blackstone Avenue/Kings Canyon Road BRT Project: 1) transit signal priority treatments and signal coordination throughout the BRT project alignment; 2) queue jump lanes at key intersections, and 3) real-time bus arrival information displayed (and announced) at stations as well as available on the internet.

  All signalized intersections in the Blackstone Avenue and Ventura Avenue-Kings Canyon Road BRT corridors will be upgraded to contain traffic signal coordination and transit signal priority. These upgrades will be included in the construction packages when the BRT system is out for bidding to contractors.

- **Bus Frequencies of 10-Minute Headways during Peak and 15-Minute Midday Periods** – Bus service along the project alignment would be operated along the BRT transitway as express service.

- **Twenty -Six BRT Stations** – The BRT system would include 26 stations, spaced on average approximately 1/2 mile apart. Stations would include: comfortable shelters, level boarding platforms, benches, security technologies, and fare machines, among other features. Each station has two stops, one in each direction except at the terminus, for a total of 50 stops.

- **Fare Collection** – The proposed BRT fare system would be barrier-free self service, proof-of-payment fare collection. Ticket vending machines will be installed at bus stops that are classified as Major stops (see Figure 2 for location of stops that are classified as Major). FAX is in the process of implementing an electronic fare payment system where card readers are installed at the entrance and exits of buses and riders can swipe a card that contains a pre-paid fare. As part of this electronic fare payment system, fare inspectors will conduct random checks to ensure collection of fares. At Minor or Basic stations, riders will pay their fare upon entering the bus via cash or electronic fare payment.

- **BRT Vehicles** – Fresno Area Express would deploy low-floor, low emission, 60-foot articulated CNG (or CNG-hybrid) buses on Blackstone Avenue/Kings Canyon Road BRT service.

- **BRT Branding** – FAX is proposing to distinguish BRT service from their existing service via different branding of the vehicles and stations.

  Vehicles

  The BRT vehicles will have a color scheme and lettering that is noticeably different from the existing buses. As shown below, a rendering of the proposed BRT vehicle is shown compared to the existing FAX buses. The exact color scheme and look will be refined further as part of the project development phase.

Proposed FAX BRT Vehicle

Existing FAX Vehicle
(Source: Fresno Area Express)

Stations

The BRT stations will be classified into three categories: Major, Minor, and Basic. The Major stations will include a custom bus shelter, ticket vending machines, benches, security technologies, electronic real-time arrival sign, information kiosk, and bike racks. The Minor station will include similar amenities as the Major bus station but contain fewer amenities. The Basic station will include electronic real-time arrival sign, benches, trash receptacles, and a less expensive bus shelter. Level-boarding platforms are proposed at Major stations and at most of the Minor stations. The level-boarding platforms will be constructed to American with Disabilities Act (ADA) standards and will be designed to work with existing or future BRT vehicles. An illustration of a level-boarding platform along with representative photos of each station type is illustrated below.

Typical Level Boarding Platform proposed at Major and at several Minor Stations
(Source: Mexico City MetroBús)

Major Station **Minor Station** **Basic Station**

1.2. The Case for the Blackstone Avenue/Kings Canyon Road BRT Project

Project Identification

The Blackstone Avenue/Kings Canyon Road BRT Project would provide improved transit service between Fresno North, Downtown, and the Southeast Growth Area (see Figure 2). The project would operate in an exclusive lane for roughly 20 percent of its 13.8-mile length, and includes 26 stations and proof-of-payment fare collection. Other features of the project to enhance operations and ensure fast, reliable service include: level boarding, transit signal priority, signal coordination, queue jump lanes, and real-time bus arrival information. The BRT project will operate between 5:30 AM and 10:30 PM on weekdays with high-frequency peak (ten-minute headways) and midday periods (15-minute headways) and on weekends between 6:00 AM and 7:00 PM on 20-minute headways. The project cost has been estimated at $48.19 million in year of expenditure (YOE) dollars which includes costs to purchase eight additional vehicles.

Setting

Location

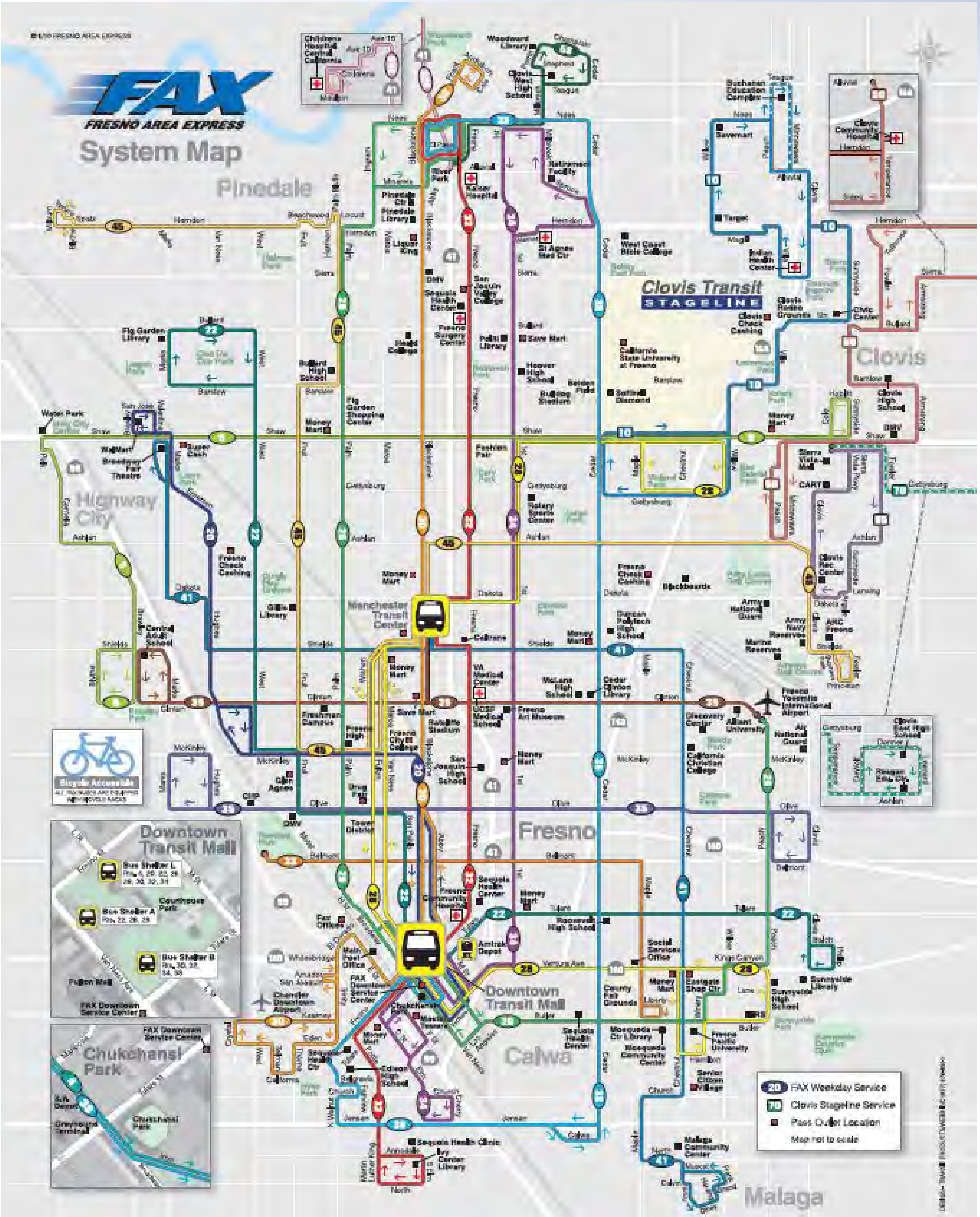
The east-west portion of the corridor runs parallel to and south of SR 180 and provides a connection between the Southeast Growth Areas (up to 55,000 new residents provided for in the 2025 General Plan) to Downtown Fresno. A portion of the east-west corridor on Kings Canyon Road (east of Clovis Avenue) is designated SR 180. The north-south portion of the corridor connects Downtown Fresno to North Fresno and runs parallel to and west of SR 41. The proposed 13.8-mile BRT project will operate on N. Blackstone Avenue in the northern portion of the corridor, M and P Streets through Downtown Fresno, and Ventura Avenue-Kings Canyon Road in the eastern portion of the corridor. The entire BRT project is at-grade.

Current Transit Services

Fresno Area Express (FAX) is the public transit service provider in Fresno and also has routes extending into Clovis. The FAX system map is shown in Figure 3. FAX carries about 18.05 million passengers (unlinked trips) annually, all on fixed-route services. The proposed BRT corridor contains two of FAX's top three routes (Routes 28 and 30) in terms of ridership and their productivity ranking (based on a composite of passengers per hour and per mile, cost per passenger, cost per hour, and fares as a percent of operating costs).

Route 28 serves Kings Canyon Road/Ventura Avenue and north of downtown is parallel to Blackstone Avenue until Shields Avenue. It also serves Shaw Avenue between 1st Avenue and Sunnyside Road. Route 30 is both the third highest ridership and third most productive route; it operates along Blackstone Avenue. A major transit center, Manchester Transit Center, is located on Blackstone Avenue in the proposed BRT alignment. This transit center provides a connection to six FAX routes. The proposed BRT alignment, through Downtown Fresno, would travel within a one to two block radius of the Downtown Transit Center located at Fresno Street between Van Ness Avenue and M Street. The Downtown Transit Center serves eight FAX routes.

Figure 3: FAX Bus Network



Source: Fresno Area Express

Current Conditions

Population and Employment

The Fresno area is one of the fastest growing communities in the Central Valley. Fresno County's current population is around 942,300 (California Department of Finance, Demographic Unit, January 1, 2009 estimate). Besides being the state's tenth most populous, the county is the sixth largest in area, straddling the Central Valley and containing rich farmlands that have made it the nation's top producing agricultural county in terms of the value of farm products. Fresno city population is currently estimated at 495,900 (53 percent of the county total).

Land Uses

Land uses along the eastern portion of the corridor (Kings Canyon Road) are large scale commercial and newly developing land uses including medium density residential, apartment and shopping centers, government offices, medical center, and downtown office, civic, and governmental land uses. The northern portion of the corridor (Blackstone Avenue) includes major generators (regional medical center, medical libraries, Fresno City College, large shopping centers, and a major FAX transit center). Other uses include office, commercial, and retail uses.

Future Conditions

Population, Households, and Jobs

Fresno County's current population of 900,000 is projected to increase to 1,290,000 (in 2025) and to 1,928,000 (in 2050), a more than doubling in just over 40 years. The Council of Fresno County Governments projects City of Fresno 2025 population to be approximately 794,000, a 47 percent increase from 2005 levels. Employment growth will be even faster, increasing by 52 percent in the city of Fresno (384,000 jobs in 2025).

Development Patterns

Fresno County recognizes the importance of agriculture to the area's economy and the city of Fresno views itself as the leading agricultural business city in California. However, the rapid growth in the Fresno-Clovis metropolitan area has been predominantly low density, with sprawl consuming valuable cropland. Unless patterns are altered, the American Farmland Trust foresees 100,000 acres (156 square miles) of land threatened by conversion to urban uses.

Travel Demand and Deteriorating Roadway Operations

Travel Demand and Congestion

Rapid development has created fast-growing demand on the region's transportation system and, not surprisingly, transportation and other related problems. Fresno County has attempted to address its surface transportation problems by locally funding improvements. Fresno County is a self-help county, passing a ½ cent sales tax in 1986 that was renewed in 2006 with 78 percent voter approval.

The "new" Measure C extends to 2027 and generates approximately $85.7 million annually for transportation improvements. A number of major roadway projects have been completed and others are programmed. However, the roadway network is becoming increasingly congested. For example, the only inter-regional (and intrastate) north-south facility, State Route 99, which connects all of the major Central Valley communities from Bakersfield to Sacramento, is inadequate and will require extensive upgrade and expansion. Local roads and expressways do not suffer as significant congestion at this time but, increasingly, roadway expansion is seen to offer only a limited solution to looming problems.

Air Quality Concerns

Fresno County is one of eight counties in the San Joaquin Valley Unified Air Pollution Control District which currently does not meet several of the air quality standards set forth in the Federal Clean Air Act or the California Clean Air Act. The district is a designated non-attainment area for ozone ("serious") and particulates (both PM10 "serious" and PM2.5) and is a maintenance area for carbon monoxide. It similarly fails to meet California standards for these pollutants. As a result, Fresno County must satisfy federal requirements calling for consideration of transportation control measures to reduce emissions and demonstrate conformity with the State Implementation Plan for Air Quality. Transportation projects in the federal Transportation Improvement Program for the Fresno area, which proposes projects for funding and implementation in the near future, should not result in a deterioration of existing air quality problems and must support efforts to bring the area into acceptable attainment status.

Auto/truck travel is a major cause of poor air quality. The Fresno area cannot expect to substantially improve conditions if it continues to build roadways for low-occupancy vehicle travel. The area must address problem emissions by also providing more efficient high-capacity modes of transportation that are competitive with autos and it must limit sprawl. Adding to concerns over National Ambient Air Quality pollutant emissions, are greenhouse gas emissions, related to undesirable climate change. Auto and truck travel is a major contributor of carbon dioxide.

Mobility Needs of Low Income Groups and Environmental Justice.

Much of the area's population growth over the last 25 years has been due to an influx of ethnic minorities and the higher than average birth rates of new immigrants. Fresno County is approximately 34 percent white, 49 percent Hispanic, just under 10 percent Asian, and about 7 percent Other. The California Department of Finance projects by 2050 the county will be less than 20 percent white, over 60 percent Hispanic, just over 10 percent Asian, and still 7 percent Other. Unfortunately, sizeable segments of the area's ethnic populations are lower income.

The poverty rate among Fresno County households (i.e., percentage of households with incomes below the federal poverty rate in 2000 according to the U.S. Census) is among the highest in the state, at 23 percent, with adjacent Tulare County the highest at 24 percent. The high poverty rate is largely related to the status of agricultural workers and the seasonal nature of their work. Fresno County's poverty rate also reflects the fact, on average; recent immigrants tend to be less educated than the rest of the population and cannot command as high a wage or salary and benefits. Unemployment fluctuates considerably, but at 15 percent as of July 1, 2009 (State of California Employment Development Department) it has consistently been above state and national averages. Auto availability tends to be lower than average for California counties, with 28,311 zero-auto households, or 11 percent of all Fresno County households, according to the 2000 U.S. Census. These factors limit the mobility of these populations and require that steps be taken to provide residents more and reasonably priced travel options.

Transit

The *BRT Master Plan* estimated ridership in the project corridor for 2006 and in 2030. (Ridership is up substantially on most routes since 2006.) Kings Canyon/Ventura and Blackstone performance was combined. The weekday passenger boardings estimates are as follows:

Corridor Segment	Current	2030 NB*	2030 Ranged**
Kings Canyon Rd/Ventura Ave/Blackstone Ave	12,700	14,500	23,400 29,600

*NB= No-Build condition and includes both Routes 28 and 30.
** Assumes BRT improvements in place through the corridor.

The ridership totals indicate the potential for substantial ridership growth with both service enhancements and provision of BRT preferential treatments and passenger amenities. The proposed BRT alignment along Blackstone Avenue, M and P Streets in downtown Fresno, and Kings Canyon Road/Ventura Avenue has over 7,000 boardings today, excluding boardings on proximate, parallel routes from which BRT service will likely attract passengers.

1.3. Purpose of the Project

The Blackstone Avenue/Kings Canyon Road BRT Project will:

- Improve Transit Service and Better Accommodate Existing Bus Ridership – The project would improve speed and reliability of service to current riders, including large numbers of minority, low-income, and transit-dependent residents, by offering higher frequency service, reduced travel time, and greater schedule reliability. The proposed project would provide a connection between the Southeast Growth Area (anticipated to add up to 55,000 new residents by 2025), Downtown Fresno, and north Fresno.
- Increase Transit Ridership by Providing a Viable and Competitive Transit Alternative to the Private Automobile. The project would attract new riders and reduce single occupant automobile use by providing a rail-like experience by improving transit service and facilities along the corridor. The project would improve the two factors most important in attracting motorists to transit service: competitive transit travel times and a high degree of reliability.
- Provide another catalyst to changing the patterns of development in Fresno County. Growth in the Fresno-Clovis metropolitan area has been predominantly low density, with sprawl consuming valuable cropland. The BRT project will encourage redevelopment of underdeveloped along the corridor.

1.4. Project Merits

Project benefits are both quantitative and qualitative. Improvements will include transit signal priority (TSP) at several of the most congested or otherwise problematic intersections, bus stop enhancements, and improved passenger information and amenities.

The proposed Blackstone/Kings Canyon BRT project will improve transit travel time and reliability, and increase the capacity of the roadway to handle more buses and of the system to handle more riders. The benefits are:

- Significant ridership increases and the resulting additional capacity and travel time savings. Peak hour weekday headways will be reduced from the current 15 minutes to 10 minutes.
- Attraction of new riders and expansion of benefits to existing riders.
- Reduction in growth of vehicle miles traveled (VMT). Improved transit service will help to provide a viable and competitive alternative to the automobile and reduce auto emissions.
- Increased mobility for low income and transit dependent populations that currently live within one-half mile of the BRT corridor.
- Construction of infrastructure, including distinctive stations that provide nodes for new activity, supporting transit-oriented residential and commercial development.

Uncertainties

Capital Cost and Schedule

Every effort has been made to anticipate and plan for variations in cost. Sources of risk include cost-inflation assumptions, field conditions compared to basis for costing, and the implementation and construction schedule.

The cost estimate was developed in 2010 dollars; an average escalation factor of 4 percent was applied to convert the project cost to year-of-expenditure dollars (YOE). The escalation factor may change over the next couple of years until the project goes into construction (year 2012).

Another source of risk related to project cost is related to actual field conditions for several cost items, including:

- The costs associated with guide way construction were based upon rehabilitation of the existing roadway pavement structural section. Should pavement conditions be worse than assumed, more expensive construction techniques might be needed along some parts of the transit way.
- As detail design progresses, additional utility work could be needed, thus increasing project costs for utility work and relocations.

Finally, the cost estimates were developed assuming a realistic schedule for project development and implementation. However, project delays will result in increased escalation of construction and professional service costs.

While there are several sources of cost uncertainty, this project has few design elements that are associated with a high degree of risk:

- The project is 100 percent at-grade, with no tunnels, bridges, or other aerial structures;
- Construction is mostly within existing roadways through conversion of existing mixed-flow traffic lanes to dedicated busways;
- There is little below grade excavation; and
- There are minor right-of-way requirements and little right-of-way risk, again because the project is primarily constructed within existing roadways.

In conclusion, while the cost estimates for this project contains a number of elements of risk, the risk is accounted for by conservative contingencies assumptions built into the preliminary cost estimates.

Ridership and Benefits

Future ridership and travel time benefits associated with the Blackstone Avenue/Kings Canyon Road BRT Project are dependent upon continuing population and employment growth. Should either falter substantially, growth in travel demand and transit ridership would also be less than anticipated.

Letters of Support

As indicated above, the proposed Blackstone Avenue/Kings Canyon Road BRT project will provide numerous benefits to the residents of Fresno. Attached at the end of this chapter are letters of support for the proposed project from key policy makers and business leaders, including:

- Fresno County of Council Governments, Executive Director, Tony Boren
- City of Fresno, Mayor, Ashley Swearengin
- Economic Development Corporation, Chief Operating Officer, Lee Ann Eager
- Fresno County Workforce Board, Executive Director, Blake Konczal
- Greater Fresno Area Chamber of Commerce, President and CEO, Al Smith
- San Joaquin Valley Air Pollution Control District, Executive Director, Seyed Sadredin

It should be noted that an additional letter of support for the proposed project has been provided by US Senator Diane Feinstein (California). This letter has been sent to FTA under separate cover.

Summary

The Blackstone Avenue/Kings Canyon Road BRT project will provide improved transit service in an urbanized corridor that will connect a major growth area (southeast Fresno) to downtown Fresno and contains major trip generators. The proposed BRT project will improve end-to-end transit travel times, attract daily new riders, and generate travel-time savings for existing riders. The project will reduce vehicle miles travel thus improving air quality, support transit oriented development and attract and encourage redevelopment along the corridor. Uncertainties associated with cost, ridership, and community support for the project are not significant.

Project Description Template

And

List of Stations

PROJECT DESCRIPTION TEMPLATE

PROJECT NAME:	Fresno Area Express Blackstone/Kings Canyon Bus Rapid Transit	
Participating Agencies		
Lead Agency	Name	City of Fresno - Fresno Area Express (FAX)
	Contact Person	John Downs
	Address	2035 Tulare Street, Suite 201, Fresno, California 93721
	Telephone Number	(559) 621-1502
	Fax Number	(559) 488-1065
	Email	John.Downs@fresno.gov
Metropolitan Planning Organization	Name	Council of Fresno County Governments (Fresno COG)
	Contact Person	Tony Boren
	Address	2035 Tulare Street, Suite 201, Fresno, California 93721
	Telephone Number	(559) 233-4148
	Fax Number	(559) 233-9645
	Email	tboren@fresnocog.org
Transit Agency	Name	City of Fresno - Fresno Area Express (FAX)
	Contact Person	Kenneth Hamm
	Address	2223 'G' Street, Fresno CA 93706
	Telephone Number	(559) 621-1440
	Fax Number	(559) 488-1065
	Email	kenneth.hamm@fresno.gov
State Department of Transportation	Name	California Department of Transportation (Caltrans)
	Contact Person	Steve Curti
	Address	1352 W. Olive, Fresno CA 93728
	Telephone Number	(559) 488-4162
	Fax Number	(559) 488-4088
	Email	steve_curti@dot.ca.gov
Other Relevant Agencies	Name	
	Contact Person	
	Address	
	Telephone Number	
	Fax Number	
	Email	
Other Relevant Agencies	Name	
	Contact Person	
	Address	
	Telephone Number	
	Fax Number	
	Email	
Other Relevant Agencies	Name	
	Contact Person	
	Address	
	Telephone Number	
	Fax Number	
	Email	

PROJECT DESCRIPTION TEMPLATE (Page 2)		
Project Definition	**Length (miles)**	13.79 miles
	Mode/Technology	BRT
	Number of Stations	26 (2 bi-direction stops per station, except at terminus, or 50 total stops)
	List each station separately, including the number of park and ride spaces at each and whether structured or surface parking	See attachment for list of individual stations;
	List each station with major transfer facilities to other modes	See attachment for list of individual stations and transfers; Fresno BRT provides connections to other FAX
	Number of vehicles/rolling stock	17 peak vehicles, an increase of 3 over existing Routes 28 & 30 replaced segments
Type of Alignment by Segment (Number of Miles)	**Above grade**	0
	Below grade	0
	At grade	13.8
	Exclusive	2.51
	Mixed Traffic	11.29
Status of Existing Right of Way	**Ownership – who owns the right of way?**	City of Fresno
	Current Use: active freight or passenger service?	No

PROJECT DESCRIPTION TEMPLATE (Page 3)

Project Planning Dates	**Base Year**		**Base Year/Opening Year**
			2010/2013
Capital Cost Estimate	**2009 constant dollars**		$ 44,118
	Year of Expenditure		$ 48,188
Levels of Service	**Headways**		
	Weekday Peak		6:30 AM - 9:00 AM & 3:30 PM - 5:30 PM, 10 minutes
	Weekday Off-peak		9:00 AM to 3:30 PM, 15 minutes
	Weekday Evening		5:30 PM to 10:30 PM, 30 minutes
	Weekend		6:00 AM - 7:00 PM, 20 minutes
	Hours of Service		
	Weekday		5:30 AM - 10:30 PM
	Weekend		6:00 AM - 7:00 PM
Opening Year Travel Forecast			2009 Base Ridership
Fare Policy Assumptions Used in Travel Forecasts [footnote 1]			Same as 2009 Existing fare structure
Project Planning and Development Schedule	***Project Schedule***		
	Insert anticipated or actual dates/durations		
	Planning Studies Initiated		Jun-08
	Planning Studies Completed		May-09
	LPA selected		Aug-09
	LPA included in the financially constrained long range plan		Nov-09
	Included in Financially Constrained TIP		2010
	Initiation of Categorical Exclusion (Type "D")		Jan-11
	Completion of Categorical Exclusion (Type "D")		Jul-11
	Public Referenda (where applicable)		n/a
	Preliminary Engineering (duration – dates of beginning and ending)		Jan-11 to Jun-11
	Final Design (duration)		Jul-11 to Dec-11
	FFGA- submit request to award (duration)		Jun-11
	Construction (duration)		Jan-12 to Jul-13
	Testing (duration)		Jan-13 to Jul-13
	Revenue Operations		Aug-13
Project Management			
Project Manager		**Name**	John Downs
		Address	2035 Tulare Street, Suite 201, Fresno, California 93721
		Phone	(559) 621-1502
		Fax	(559) 488-1065
		Email	John.Downs@fresno.gov
Agency CEO		**Name**	Kenneth Hamm
		Address	2223 'G' Street, Fresno, CA 93706
		Phone	(559)621-1440
		Fax	(559) 488-1065
		Email	khamm@fresnocog.org
Key Agency Staff: Overall New Starts Criteria		**Name**	John Downs
		Address	2035 Tulare Street, Suite 201, Fresno, California 93721
		Phone	(559) 621-1502
		Fax	(559) 488-1065
		Email	John.Downs@fresno.gov
Key Agency Staff: Ridership Forecasts		**Name**	John Downs
		Address	2035 Tulare Street, Suite 201, Fresno, California 93721
		Phone	(559) 621-1502
		Fax	(559) 488-1065
		Email	John.Downs@fresno.gov
Key Agency Staff: Cost Estimates		**Name**	John Downs
		Address	2035 Tulare Street, Suite 201, Fresno, California 93721
		Phone	(559) 621-1502
		Fax	(559) 488-1065
		Email	John.Downs@fresno.gov

[1] Please summarize fare policy assumptions used for all regional transit services modeled in the forecast year. Attach this summary to the Project Description Template.

PROJECT DESCRIPTION TEMPLATE (Page 4)

Project Management (continued)

Key Agency Staff: Environmental Documentation	Name	John Downs
	Address	2035 Tulare Street, Suite 201, Fresno, California 93721
	Phone	(559) 621-1502
	Fax	(559) 488-1065
	Email	John.Downs@fresno.gov
Key Agency Staff: Land Use Assessment	Name	John Downs
	Address	2035 Tulare Street, Suite 201, Fresno, California 93721
	Phone	(559) 621-1502
	Fax	(559) 488-1065
	Email	John.Downs@fresno.gov
Key Agency Staff: Financial Assessment	Name	John Downs
	Address	2035 Tulare Street, Suite 201, Fresno, California 93721
	Phone	(559) 621-1502
	Fax	(559) 488-1065
	Email	John.Downs@fresno.gov
Key Agency Staff: Project Maps	Name	John Downs
	Address	2035 Tulare Street, Suite 201, Fresno, California 93721
	Phone	(559) 621-1502
	Fax	(559) 488-1065
	Email	John.Downs@fresno.gov
Contractors		
Current Prime Contractor	Name	Kimley-Horn and Associates, Inc.
	Address	555 12th Street, Suite 1230, Oakland, CA 94607
	Phone	(510) 625-0712
	Fax	(510) 625-0714
	Email	Jeff.Allen@kimley-horn.com
Prime Contractor: Project Manager	Name	Jeff Allen
	Address	555 12th Street, Suite 1230, Oakland, CA 94607
	Phone	(510) 625-0712
	Fax	(510) 625-0714
	Email	Jeff.Allen@kimley-horn.com
Contractor Responsible for Travel Forecasts	Name	Jeff Allen
	Address	555 12th Street, Suite 1230, Oakland, CA 94607
	Phone	(510) 625-0712
	Fax	(510) 625-0714
	Email	Jeff.Allen@kimley-horn.com
Contractor Responsible for Capital Cost Estimates	Name	Jeff Allen, Kimley-Horn and Associates, Inc.
	Address	555 12th Street, Suite 1230, Oakland, CA 94607
	Phone	(510) 625-0712
	Fax	(510) 625-0714
	Email	Jeff.Allen@kimley-horn.com

FRESNO AREA EXPRESS BRT
List of Stations

Station Location			Bus Classification (Major, Minor, Basic)	Distance from Previous Station (miles)
1	**Friant Road**	at Audubon Dr (End of Line)	Minor	-
2	**Blackstone Avenue**	at N. of El Paso (NB & SB)	Minor	1.16
3		at Herndon Ave (NB & SB)	Minor	0.61
4		at Sierra Ave (NB & SB)	Minor	0.50
5		at Bullard Ave (NB & SB)	Basic	0.50
6		at Barstow Ave (NB & SB)	Minor	0.50
7		at Shaw Avenue (NB & SB)	Major	0.49
8		at Gettysburg Ave (NB & SB)	Basic	0.51
9		at Ashlan Ave (NB & SB)	Minor	0.49
10		at Griffith Way (NB & SB)	Minor	0.25
11		at Manchester Center	Major	0.48
12		at Clinton Avenue (NB & SB)	Minor	0.51
13		at McKinley Avenue (NB & SB)	Minor	0.25
14		at Olive Avenue (NB & SB)	Minor	0.53
15		at Belmont Avenue (SB) at Abby Street (NB)	Minor	0.51
16	**Stanislaus St**	at P Street (NB & SB)	Minor	0.52
17	**M St** **P St**	at Mariposa St (SB) at Fresno St (NB)	Basic Major	0.43
18	**Ventura St**	at P St (EB & WB)	Minor	0.62
19		at 1st Street (EB & WB)	Minor	0.43
20		at 5th/6th St (EB & WB)	Basic	0.41
21	**Kings Canyon Road**	at Cedar Avenue (EB & WB)	Major	0.59
22		at Maple Avenue (EB & WB)	Minor	0.50
23		at Chestnut Avenue (EB & WB)	Major	0.51
24		at Helm/Transit Village/Wal-Mart (EB & WB)	Major	0.54
25		at Peach Avenue (EB & WB)	Minor	0.19
26		at Clovis Avenue (EB & WB)	Minor	1.02
			Total Distance to Clovis Ave (mi)	13.79
			Average Spacing (mi)	0.55

B. Streetcar Feasibility Study

Streetcar Summary Report

A feasibility study for a streetcar operating in downtown Fresno was launched in early 2010 as a separate task under the auspices of the Fresno Public Transportation Infrastructure Study (PTIS), funded jointly by the City of Fresno and Measure "C" sales tax initiative approved by Fresno County residents in 2008. The purpose of the streetcar study was to determine whether the streetcar could serve as an impetus for economic development projects downtown, where the streetcar should go, how it might be funded, and the timing considerations involved in its future implementation.

A series of one-on-one interviews, open houses and public meetings were held in March through September of 2010. The streetcar was also featured in a number of large public events during the spring and summer of 2010. The history of streetcars in downtown Fresno was researched, informational brochures about historic and future streetcar alignments, destinations and technology options were developed, and people voted on their preferences. Overwhelmingly, downtown Fresno merchants and property owners preferred the look of the modern streetcars as part of an overall effort to modernize the image of Fresno.

Following a coordinated public workshop with the Moule and Polyzoides design team for The Downtown Specific Plan project, two preferred alignments were selected. The top priority alignment was determined to be Fresno Street between the future high speed rail station just south of Broadway and the Regional Medical Center with a new underpass under the railroad tracks at "R" Street, and continuing up Fresno Street to San Joaquin Memorial High School, terminating on Floradora Street. This alignment connects the top two destinations downtown, providing high speed rail travelers a convenient link to downtown destinations and hospital employees a convenient transport mode to restaurants downtown and to the downtown transit center. A future extension of the streetcar eastbound on Floradora Street could connect to the Fresno Regional Airport.

The second priority alignment was determined to be along Van Ness and/or Fulton Streets through downtown with the potential of the streetcar to help revitalize the Fulton Mall, which is undergoing a redevelopment effort through the Downtown Specific Plan effort. It is unclear at this time how the Fulton Mall corridor will be redeveloped and if a significant investment in revitalizing the mall would complement a streetcar alignment here. It was envisioned that both Fulton and Van Ness streetcar alignments could continue as a one-way loop north to the Tower District, terminating at the City College Campus.

The capital cost of the Fresno Street line is estimated at $123 million, including the cost of the new railroad underpass and purchasing vehicles. The capital cost of the Van Ness/Fulton line is estimated at $102 to $116 million, including vehicles. A total of 44 stations were envisioned for the downtown. Each alignment would get five streetcars for startup operating at 15 minute frequencies from 7:00am to 9:00pm seven days a week. Ridership on the Fresno Street corridor is estimated at 1,200 daily boardings and on the Fulton/Van Ness/Wishon corridor at 900 daily boardings in the 2035 built out land use scenario. These estimates could be conservative (low) as a streetcar properly coordinated with revitalization of the downtown could experience synergistic benefits. The stronger the downtown, the greater the likelihood of higher streetcar patronage. Opening of the planned high speed rail station downtown coupled with intensified development around the station and downtown in general could double these conservative patronage estimates.

Prominent developers of downtown property were interviewed for their opinions on the potential impacts of streetcars, with the following results:

- The streetcar will have minimal impact on development unless other public investments are coordinated and implemented.

- Short-term impact will be very limited, but the streetcar can complement a ten to twenty year development strategy.
- The streetcar route must link major destinations to build early ridership, but also run adjacent to high-potential opportunity sites to encourage later development.
- The streetcar can reduce the length of time before 4- to 5-story higher-density residential projects can be built in Downtown, but the overall market suggests these buildings are many years away.
- A district-wide parking strategy will be necessary to complement the streetcar.
- The streetcar itself is unlikely to allow significant parking reductions.

The reports from the High Speed Rail authority do state that economic benefits will be greatest near stations, but do not go into great detail. They suggest increased property values and intensified use near stations, but do not go into detail. If development intensifies near the downtown station it stands to reason that the patronage potential for a streetcar would increase. In fact "last mile" access improvements to the station provided by a streetcar should enhance high speed rail ridership.

It is difficult to isolate the benefits of the streetcar from the economic benefits of other complementary actions. It is also difficult to determine if the streetcar alone would have led to the resulting benefits. The consensus in the planning community is that the streetcar by itself does not lead to economic benefits and that its investment needs to be closely coordinated with other actions. Sometime the streetcar is the tipping factor that promotes smart growth to occur.

With the high speed rail station appearing to become the front door to Fresno and the Central Valley, the impressive Regional Medical Center, concentration of civic center services/jobs, and cultural facilities downtown, the pieces seem to be coming into place for a vibrant downtown. Policies to deal with crime, measures to mitigate railroad noise and aggressive measures to attract market rate housing and supporting retail uses would seem to be the missing pieces. A streetcar could facilitate the later and help to integrate the Regional Medical Center into Fresno's Downtown (4,000 to 5,000 jobs). A streetcar operating in downtown Fresno would be one of the components of good urban design and transit accessibility that are magnets for growth and development. Cities that are growing share many of the following features with Fresno:

1. Flat terrain with Arizona like weather;
2. Convenient excellent medical facilities;
3. Pedestrian oriented street and development patterns;
4. Civic services;
5. Cultural activities including the ballpark;
6. Excellent rail service links to Bay Area, LA and Sacramento (think family and friends):
7. Central Valley cost housing: and
8. Modest priced labor

Seniors are one of the fastest growing population groups, they tend not to want a huge house to upkeep and generally they like the eight factors listed above. Apartments and condos downtown with minimal parking would seem well suited to the growing baby boomer market, particularly those cashing out of expensive Bay Area and LA homes.

Streetcar Funding and Implementation Schedule

Given the timing considerations for high speed rail to become a reality and the current depressed economic situation in downtown Fresno, it is not realistic to contemplate getting a streetcar system up and running in less than five years, particularly without the funding in place. It would be difficult to get both the federal and the local match at this time.

Specifically, in order to be eligible for federal funds, the project must be in the Transportation Improvement Program/Federal Transportation Improvement Program (TIP/FTIP) and the Regional Transportation Plan (RTP). The City of Fresno would be well advised to add streetcar development match money to the next allocation of Measure "C" funding for the 5 to 10-year scenario and add the streetcar project to the RTP. Once the future of high speed rail becomes more certain, the streetcar project would complement and help drive the new construction projects that will come to provide housing and offices downtown.

During the next development phase of the Streetcar Project, a more refined funding strategy should be built. Through additional analysis, a better understanding of the capacity of existing revenue sources to absorb the Project's capital and operating costs would be developed, as well as plans to close any funding gaps. Opportunities for private funding should be considered, as well as new sources of local funding such as redevelopment areas, new sales tax measures, and the implementation of a Vehicle Registration Fee.

1.0 Introduction

A key early step of the corridor planning process is a well-specified statement of the problem, or need that will be addressed by alternative solutions. When undertaken as part of the National Environmental Policy Act (NEPA) process to establish a basis for potential federal funding, a study "need and purpose" establishes the problems that must be addressed in the analysis; serves as the basis for the development of project goals, objectives, and evaluation measures; and provides a framework for determining which alternatives should be considered as reasonable options in a given corridor. More fundamentally, the statement of need and purpose serves to articulate – and justify - why an agency is proposing to spend potentially large amounts of taxpayers' money to study and implement a project that may cause significant environmental impacts, and why these impacts are acceptable.

1.1 Streetcar Need and Purpose

Need – Over the last 30-plus years, Downtown Fresno has experienced a significant decline in commercial and service sector activity resulting in increased county-wide trip generation required to access these now geographically disbursed destinations. The Downtown is now comprised largely of governmental and institutional services with little demand for commercial activity past work hours or on weekends. City administrators, downtown merchants and real estate developers have expressed an interest in investing in a fixed guideway streetcar project that could serve as a catalyst for reinvestment in the Downtown, following the demonstrated success of other streetcar projects across the country.

A streetcar system has the potential not only to link existing and future Downtown activity and transit centers, but also can provide the all-important permanence of a fixed guideway to invite complementary redevelopment by property owners.

Purpose – The purpose of the Downtown Fresno Streetcar Study is to investigate the feasibility, both technically and fiscally, of implementing a preferred fixed guideway streetcar concept that serves as catalyst for economic development while serving an identified transportation need for the Downtown. Through evaluation of a range of alternative alignments and operating scenarios, a preferred streetcar concept will be recommended that will have the most positive impact based on the following criteria:

1. Link existing major activity centers and redevelopment opportunity sites to support and stimulate economic development and the evolution of a more vibrant and economically healthy Downtown community;
2. Supplement the existing and planned transit system with a cross-town link to connecting regional transit facilities;

3. Provide an efficient and attractive option for how people move about the Downtown thereby reducing reliance on automobile trips, and contributing to reducing congestion and improved air quality in the greater Fresno area.

1.2 Streetcar Goals and Objectives

The following draft goals and objectives for the Study were refined based on the outcome of interviews with key Downtown stakeholders.

Goal A: Support and stimulate economic development.

- Invest in a permanent fixed transit system that attracts mixed-use development and encourages growth resulting in an overall increase in transit trips compared to the kind of development and trip patterns that occur without an enhanced transit investment.
- Provide economic and transportation benefits to residents, public institutions and businesses.
- Support and invite development and redevelopment of key opportunity sites in the Downtown by providing permanent transit infrastructure.
- Leverage publicly funded transportation infrastructure improvements to spur development at higher intensity than would otherwise occur.
- Provide alternatives to auto ownership and access to lower private sector development costs by reducing the demand for structured parking.
- Provide a transit link that supports the regional tourism industry.

Goal B: Support existing and future transit investments and customers.

- Improve regional transit access to the Downtown by providing connections to existing and planned transit facilities including future capacity to complement the proposed/planned Fresno Bus Rapid Transit service, the High Speed Rail station and the existing Amtrak station.
- Maximize the utility of existing transit investments by continuing to incrementally expand service and build ridership to justify future investments.

Goal C: Reduce reliance on single-occupant vehicle trips within the Downtown by providing a safe, convenient and reliable mobility option for how people choose to move about.

- Provide transit access between housing, jobs, and recreational and entertainment opportunities. Special consideration should be given to the previously identified Kerns Corridor to connect the Santa Fe Amtrak Depot, Civic Center Square, Fulton Mall and Chinatown.
- Link lodging and entertainment opportunities in downtown Fresno with visitor destinations in the Cultural Arts District, the Convention Center, Grizzlies Stadium and Chinatown.
- Provide transit access to government and medical services to the transit dependent members of the community.
- Reduces congestion downtown and contributes to improved air quality.

2.0 Streetcar Public Outreach

The Downtown Streetcar Feasibility Study began in March of 2010 with a series of one-on-one interviews with key stakeholders in the success of downtown Fresno. A total of 22 interviews were conducted during March 2nd through the 4th with property owners, merchants, builders and association representatives (such as Downtown Fresno Association). Also included were elected officials and representatives of special interest organizations such as historic preservation, community redevelopment, transit, health care and the environment.

An open house, held at the Chamber of Commerce on March 2nd drew 27 participants in to identify key streetcar destinations and potential alignments for downtown. A total of 72 streetcar-supportive businesses and destinations were found in the areas between downtown, the Tower District and San Joaquin Memorial High School. The locations of these destinations are mapped in Figure 1 and the names and addresses of these destinations are provided in Table 8 in the Appendix of this report.

The recommended streetcar alignments were finalized following a joint planning charrette with the Downtown Specific Plan consulting Team on September 29th, 2010. The preferred alignments are shown in Figure 2.

2.1 Streetcar Key Stakeholder Interviews

An important element in shaping a successful streetcar alternative is eliciting invaluable input from key stakeholders in the community. Kimley-Horn & Associates and sub-consultant Rhodes Consulting interviewed 21 different stakeholders from March 2 – 4, 2010. As shown below, this cross-section of stakeholders included property and business owners, local developers, business associations, non-profit organizations, public agencies, and private entities, as follows:

Table 1: Key Stakeholders Interviewed

Business/Agency		Contact Person
1.	Proctor's Jewelers	Brent Weiner
2.	Downtown Fresno Association	Jan Minami
3.	Downtown Revitalization Department	Elliot Balch
4.	Fresno Economic Opportunities Commission	Paul McLain-Lugowski
5.	Historic Preservation Commission	Karana Hattersley-Drayton
6.	Fresno Coalition for Art, Science & History	Cynthia Cooper
7.	Fresno Convention & Visitors Bureau	Jeff Eben
8.	Fresno Business Council	Deborah Nankivell
9.	Downtown Association/Fresno Discount Mall	Morgan Doizaki
10.	Downtown & Community Revitalization	Craig Scharton
11.	Building Industry Association	Mike Prandini
12.	Club One Casino	Kyle Kirkland
13.	Fresno Redevelopment Agency	Marlene Murphey
14.	Central Valley Bank (Chair of Downtown Association & PBID Committee)	Dan Doyle
15.	Fresno Chamber of Commerce	Al Smith
16.	Downtown Association/Tuolumne Hall	Jim Koch
17.	Pyramid Homes	Reza Assemi
18.	Fresno Economic Development Corporation	Steve Geil
19.	Lance-Kashian & Company	Ed Kashian
20.	Granville Homes	Jeff Roberts
21.	Tutelian & Company	Cliff Tutelian

2.2 Streetcar Interview Questions:

1. Do you think higher density and mixed use development needs to happen downtown before a streetcar project would work downtown?
2. Or, do you think a streetcar system in the downtown area would lead to significant redevelopment and investment in Fresno?
3. What kinds of development in particular do you think are needed to create a more vibrant Downtown? What do we need more of?
4. One of the goals of the study is to identify "opportunity sites" for redevelopment which might be stimulated by introduction of streetcar service. Are you aware of any areas or parcels in particular where a streetcar could be the catalyst for new investment by the private sector?
5. As a developer, what kinds of incentives would you like to see to redevelop parcels downtown?
6. What key destinations downtown do you think should be served by the streetcar? (see the map for this discussion)
7. What do you think the hours of operation and frequency of the streetcar service should be? (see the map for this discussion)
8. There are several ways the operating costs for the streetcar can be funded. Do you like or dislike any of the following suggestions?
   - Business Improvement Districts (BID) fees
   - A Tourism Tax (adds to hotel charges)
   - Streetcar fares
   - Raise on-street parking rates or specify capture area to dedicate proceeds to Streetcar operations
   - Dedicate a percentage from publicly owned parking garages downtown
   - Tax privately owned garages on a per stall or gross receipts basis?
   - Switch out operating revenues for the existing downtown circulator (and then eliminate it)
   - Increase fines for parking violations and dedicate that percentage to streetcars
   - Private sponsorship of stops and vehicles

9. Do you have any other ideas that would help make the streetcar project a success?

2.3 Streetcar Interview Results

The diversity of stakeholders interviewed yielded a wide range of comments on their perceptions of Downtown Fresno based on their unique needs and those of their constituents. Clear views were expressed on ways to stimulate economic development; housing opportunities; infrastructure needs; the role of streetcars and key origins and destinations that it should serve; and funding mechanisms. Several common themes emerged.

Economic Development Opportunities

Stakeholders generally agree that Downtown Fresno is ripe for economic development, particularly with improvement in the current economy. Universally, however, the development community emphasizes that significant upgrades to the infrastructure are needed (water; sewer; street alignments; etc.) to attract and sustain a critical mass of development activity. They also strongly believe that there must be a fair and equitable mechanism to fund these improvements in order to make development economically feasible.

There is general acceptance that the proposed Downtown Fresno Property-Based Business Improvement District (PBID)—(an assessment district that generates special benefits to the properties located within the district boundaries) is an approach that may stimulate economic development Downtown by improving sales and property values, as proven in other California cities; but it is not a panacea.

Some indicated that the lack of interest in redevelopment from local and absentee property owners who are happy to collect nominal rents and wait for some external catalyst to generate interest in their property, is a major impediment. A recurring theme heard from stakeholders is that many properties have a long family history of ownership and are paid for, and that owners are afraid to invest in improvements unless neighboring properties do likewise. This has resulted in a disjointed approach by owners and appears to be a "cultural" issue that has not been explored with creative incentives and approaches.

There is agreement that this attitude must be overcome and that the Redevelopment Agency perhaps should play a more aggressive role in development through public-private partnerships, land banking, and/or adopting new policies to expedite development.

Several developers feel that the Cultural Arts and Tower Districts are more ripe for redevelopment and may have more demand for mixed-use development than Downtown. Many stakeholders believe that those areas should definitely be considered for potential streetcar service.

Many expressed an interest in reopening the Fulton Mall to traffic and aligning the streetcar on this new street to invigorate the Mall. Some believe that reopening the Mall would generate increased retail and commercial exposure that could eventually lead to an "entertainment district model" that would include restaurants, bars, concerts in the stadium, and reuse of historic theaters. There also is general consensus that the perception that Downtown Fresno is dangerous needs to be addressed in order to draw people Downtown and stimulate nightlife.

Streetcar as a Catalyst for Downtown Redevelopment

Most stakeholders believe a streetcar system could help catalyze redevelopment in Downtown Fresno. There are varying opinions on whether the streetcar itself would stimulate development or whether new development would need to occur to support a streetcar. There is a need for more housing, more amenities and open space, and creation of "destination magnets" to draw people Downtown and to attract streetcar ridership.

Many feel that higher densities are essential for a streetcar system to thrive. They believe that a streetcar certainly would be a value added to incentivize developers to invest in Downtown.

The most common streetcar destinations mentioned include City and County government centers; Chukchansi Park; the Convention Center; Fulton Mall; the Regional Medical Center; the Cultural Arts and Tower Districts; Fresno City College; and the anticipated high-speed rail station.

Role of Housing in Downtown Fresno

Most stakeholders support increasing housing opportunities Downtown but emphasize the need for affordability. There is support for new housing with a wide range of price points to accommodate economic demographics.

Granville Homes is one of the few developers building any housing (apartment units) Downtown and is now constructing its fourth project. Developers strongly believe that a significant investment in public utilities infrastructure to support housing and other commercial developments is needed and will yield tangible results.

Many stakeholders indicated the need for retail goods and services to create “complete” neighborhoods. More entertainment and restaurant venues also should help draw people Downtown and create needed momentum.

Zoning and Development Patterns

There is agreement that the current zoning and the development process “needs to change.” Some suggest that a complete overhaul of the current system is needed. Many want redevelopment rules that are “smart, fast, and cheap” to make Downtown more vibrant.

There is a lot of expectation for the new specific plans to simplify zoning and to reduce the time and cost involved in redevelopment. Some feel that the Fulton Corridor Specific Plan and the Downtown Neighborhood Community Plan efforts will lead to the elimination of conflicting and onerous regulations and that a “complete reboot” of the planning process is needed.

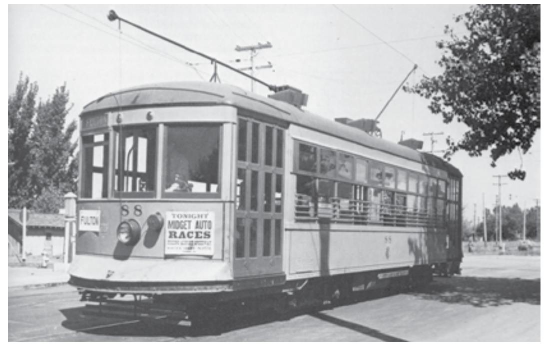
Downtown Parking Concerns

There are numerous concerns about the state of parking Downtown. Many want to see an overhaul of the public parking management system, including improved wayfinding, more promotion, and a new look at the pricing structure.

Many stated that on-street parking costs are lower than off-street parking costs but should be priced higher to encourage use of lots and garages for long-term parking. Generally, many believe that Fresno residents still maintain an agricultural town perspective on parking and do not like parking garages. A suggestion was made to create an economic incentive for people to park once and then utilize the streetcar for easier mobility Downtown.

Funding of Infrastructure Improvements

A variety of approaches were suggested to fund Downtown infrastructure improvements, including a streetcar system. There was general agreement that costs and fees must be distributed fairly, with developers stating that the development community should not and cannot bear the burden alone.



Some stakeholders mentioned instituting a gasoline sales tax and use of parking fees to offset infrastructure costs. Some believe that what inhibits growth is the lack of private investment to create tax increment financing (TIF) to fund infrastructure. Eliminating roads or excess right-of-ways that have low usage could add land to the tax rolls generating more TIF. Many believe a strong incentive for redevelopment is the elimination of fees entirely, at least in targeted areas which rotate periodically to address redevelopment priorities. There was a suggestion that the City could fund new infrastructure through creation of a Mello-Roos Community Facilities District (CFD) and that tax increment dollars could be rebated to property owners to offset some of the cost. Further, the Mello-Roos funds could be used to operate the streetcar; and a non-profit corporation could operate the parking system, streetcar, and convention center and have the ability to issue bonds. (A CFD includes all properties that will benefit from capital and/or service improvements to be provided. A two-thirds majority vote of residents living within the proposed boundaries is needed.)

Conclusion

Fresno leaders have expressed an unwavering interest in revitalizing Downtown Fresno. There have been significant recent efforts to prudently plan for a rebirth of the area and to accomplish this through successful public-private collaboration. Willingness to collaborate with the private sector is imperative to propel Downtown.

Many successes are already evident from this public-private collaboration including, among others, Chukchansi Park, the Exhibit Hall Expansion and Convention Center Parking Garage, UCSF Fresno Medical Education Center, the Federal Courthouse, Civic Center Square, and the Santa Fe Promenade and Depot Renovation. New initiatives include a new full-service hotel, revitalization of Fulton Mall, and several other notable projects. The planned high speed rail station downtown could potentially be a "game changer" for downtown economic development. A streetcar system could strengthen the potential benefits of high speed rail. In many respects downtown's future with high speed rail should be the foundation for opportunity planning more so than the past or near term thinking.

And, high speed rail could indeed be a game changer for downtown redevelopment over the next 20 years. If it is built as proposed and becomes the gateway to the central valley in some lesser form, it will transform development opportunities in the downtown and the streetcar could leverage benefits. Hopefully the downtown plan will be a bold vision that could take advantage of the opportunities that high speed rail presents. For example, the regional medical center is poised to expand dramatically with Fresno's burgeoning population and hopefully the downtown plan will encourage this type of expansion.

The reports coming out of the High Speed Rail Authority do state the obvious that benefits will be greatest near stations, but do not go into great detail. They suggest increased property values and intensified use near stations, but do not go into detail. If development intensifies near the downtown station it stands to reason that the patronage potential for a streetcar would increase. In fact "last mile" access improvements to the station provided by a streetcar should enhance high speed rail ridership.

Regarding examples of economic benefits from other cities' streetcar projects, the evidence is consistently positive. However, it is difficult to isolate the benefits of the streetcar from the economic benefits of other complementary actions. It is also difficult to determine if the streetcar alone would have led to the resulting benefits. The consensus in the planning community is that the streetcar by itself does not lead to economic benefits and that its investment needs to be closely coordinated with other actions. Sometime the streetcar is the tipping factor that promotes smart growth to occur. For example, the Seattle streetcar project was an integral part of the South Lake Union development plan (Microsoft's Paul Allen). The project probably would have moved forward without the streetcar, but perhaps not at the same scale or form.

With the high speed rail station appearing to become the front door to Fresno and the Central Valley, the impressive Regional Medical Center, concentration of civic center services/jobs, and cultural facilities downtown, the pieces seem to be coming into place for a vibrant downtown. Policies to deal with crime, measures to mitigate railroad noise and aggressive measures to attract market rate housing and supporting retail uses would seem to be the missing pieces. A streetcar could facilitate the later and help to integrate the Regional Medical Center into Fresno's Downtown (4,000 to 5,000 jobs). Growth attractors in other cities that Fresno shares include:

1. Flat terrain with Arizona like weather;
2. Convenient excellent medical facilities;
3. Pedestrian oriented street and development patterns;
4. Civic services;
5. Cultural activities including the ballpark;
6. Excellent rail service links to Bay Area, LA and Sacramento (think family and friends):
7. Central Valley cost housing: and
8. Modest cost labor?

Seniors are one of the fastest growing population groups, they tend not to want a huge house to upkeep and generally they like the eight factors listed above. Apartments and condos downtown with minimal parking would seem well suited to the growing baby boomer market, particularly those cashing out of expensive Bay Area and LA homes.

There is support for streetcar service and a strong belief that successful residential, retail and commercial development, and dependable transit approaches will provide needed synergy and will help catalyze Downtown Fresno. There is a need for links to major activity centers and redevelopment opportunity sites to support and stimulate economic development and the evolution of a more vibrant and economically healthy Downtown community. Efficient and attractive transportation options also will reduce reliance on single-occupancy vehicle cars, help reduce congestion, and improve air quality.

A clear message conveyed by stakeholders is that strong leadership can make changes to ease the economic development burden and provide the impetus needed to reinvigorate Downtown Fresno. Stakeholders want to see positive movement and tangible results rather than false starts and promises and another study on the shelf.

The community must be engaged in the process during all phases. And most importantly, there must be a unified, consistent plan and voice.

2.4 Streetcar Meeting, August 2010

A targeted informational and voting meeting for downtown merchants, property owners and key stakeholders was held on August 3, 2010. The purpose of the meeting was to inform attendees of progress on the streetcar study and to seek their input on preferred routes and selection of the streetcar technology (historic trolleys or modern streetcars). The meeting, held at the Chamber of Commerce, was attended by 30 participants who actively engaged in the dialogue about the future of downtown.

Table 2: Types of Streetcar Systems, Similarities and Differences

	Modern Streetcar	Vintage Trolley
Maneuverability	Has a front car at both ends, easy to reverse directions.	Most are one-way only, need a loop or turn-style to turn around.
Level boarding for faster service	Yes	Steps up
Accessible to the Disabled	Yes	No, but can add special lifts at stations
Passenger Capacity	150 – 160 (with standees)	70 – 90 (with standees)
Typical Cost	$3,500,000	$900,000
Operates in Mixed Traffic	Yes	Yes
Maintenance Cost	Lower	Higher

Summary of Comments

The Modern Streetcar technology was selected as the preferred technology. Given the choices of going two-way through Fulton Mall, two-way on Van Ness or a one-way Fulton/Van Ness loop, people preferred Fulton Street/Van Ness Avenue as a one-way loop through Fulton Mall. The Tower District/City College Extension as a one-way loop north on Van Ness and Wishon is preferred over the two-way on Wishon only. Using P Street to get close to the hospital and serve City Hall was voted for the most by far. Votes were across the board for whether or not to complete the Railroad Underpass to Hospital and up Fresno Street now, later, or never, but completing the underpass now got the most votes and there was much concern from the voters that a connection to the high speed rail station was necessary. The three most common votes for streetcar operating cost funding mechanisms were to dedicate a percentage of the PBID at renewal (next 5 years), private sponsorship of stops and vehicles (restaurants, Convention Center, etc.) as part of a larger marketing campaign ("Take the Streetcar to Dinner"), and Using Measure C funds. Voters seemed to be either passionately in support of or opposed to the idea of using Measure C "New Technology" funds for the streetcar project.

3.0 Downtown Streetcar Economic Impacts Analysis

Strategic Economics provided the following analysis of the proposed streetcar project in September of 2010:

- The potential functions and roles of a streetcar in Downtown Fresno
- A description of the alternative alignments under consideration;
- Evaluation of assessed value of existing development;
- Evaluation of the alternative alignments and locations of jobs;
- Evaluation of the alternative alignments and locations of existing and proposed housing in Downtown Fresno;
- Summary of developer opinions on the impact of the streetcar on development and property values; and Summary of next steps.

3.1 The Functions and Roles of a Streetcar in Downtown Fresno

At its most basic level, a streetcar provides local transportation circulation. Unlike bus rapid transit, regional light rail or heavy rail, a streetcar spans relatively short, walkable distances, has closely-spaced stops, and moves at lower speeds.

Streetcars generate economic benefits by creating local connectivity and thereby supporting or complementing pedestrian activity. Streetcars 'enhance walking' by shortening perceived distances between places, increasing visibility on blocks along or near the route, and connecting a larger area to regional transit and/or parking facilities. Unlike a bus, streetcars are often more appealing to riders and include significant public infrastructure investments that indicate permanence and dedication to quality performance. That permanence can reduce risk and increase value for developers and businesses that seek to locate along the alignment based on the increased visibility and pedestrian circulation.

In recent years, it has become clear that the presence of transit can increase property values and result in valuable development opportunities under certain market conditions. Several studies have documented a value "premium" for properties near transit, and many transit agencies and other stakeholders have become interested in harnessing this value. While such studies have found that new streetcar facilities may provide a value boost, one reason that property value is impacted is that when a streetcar is put in place, cities allow higher density development. Such impacts are possible because the streetcar may allow for higher density without necessitating as much parking or other new transportation facilities beyond the streetcar.

A recent study conducted by Reconnecting America found that underutilized parcels that are just far enough away from existing activity centers to not be walkable can become more attractive for development when a streetcar connects existing activity centers and creates new ones. Streetcars have offered a powerful connection between vacant and underutilized parcels in communities like Channelside (Tampa, Florida), the Pearl (Portland, Oregon), and South Lake Union (Seattle, Washington). In Portland, development occurred at higher densities, closer to the maximums allowed, than in other parts of the city. The Reconnecting America study found that vacant land increased in value over 100 percent in areas near the streetcar lines in all three cities during the five- to six-year time period researched.

The specific land use context of a streetcar system and conditions in the local real estate market can result in dramatically different property value impacts. While Fresno differs from many of the cities that have recently implemented streetcars and the current market conditions differ from those in place at the time of other recent streetcar projects, linking existing neighborhoods and employment centers to one another has the potential to create value in the "in between" places.

3.2 Fresno Streetcar Alternative Alignments

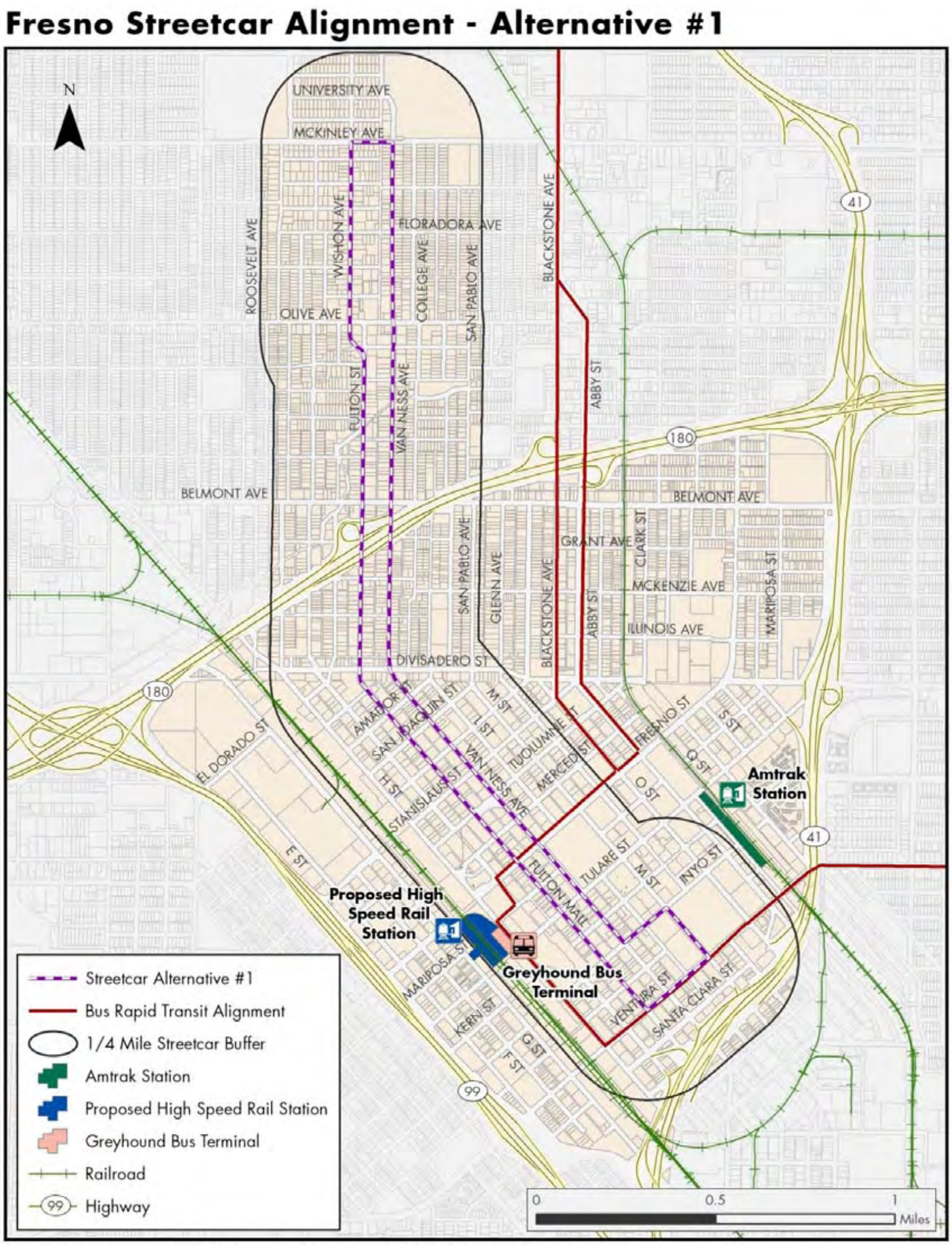
This analysis is based on the alternative alignments currently under consideration as part of the PTIS. The Kimley-Horn team held meetings in early August to consider alternative alignments for the Fresno streetcar. The team conducted a voting exercise with stakeholders to determine two alternative alignments, allowing for the possibility of a third alignment that may come out of the Downtown Specific Plan meetings to be held the last week of September, 2010.

Figure 3 illustrates Alternative #1, which is a one-way loop through the Downtown on the Fulton Mall and Van Ness Avenue with the Tower District/City College Extension on Wishon Avenue and Van Ness Avenue.

Figure 4 illustrates Alternative #2, which is a phased alignment. Phase 1 is a two-way alignment on Van Ness Avenue through the downtown travelling through the Tower District on Fulton Street and Wishon Avenue. Phase 2 of Alternative #2 is a two-way alignment with a loop Southwest of the proposed High Speed Rail Station traveling North on Fresno Street through the Downtown to Floradora Avenue.

Figures 1 and 2 also include the locations for the existing Amtrak Station and Greyhound Bus Terminal and the proposed High Speed Rail Terminal as well as the alignment for the proposed Bus Rapid Transit.

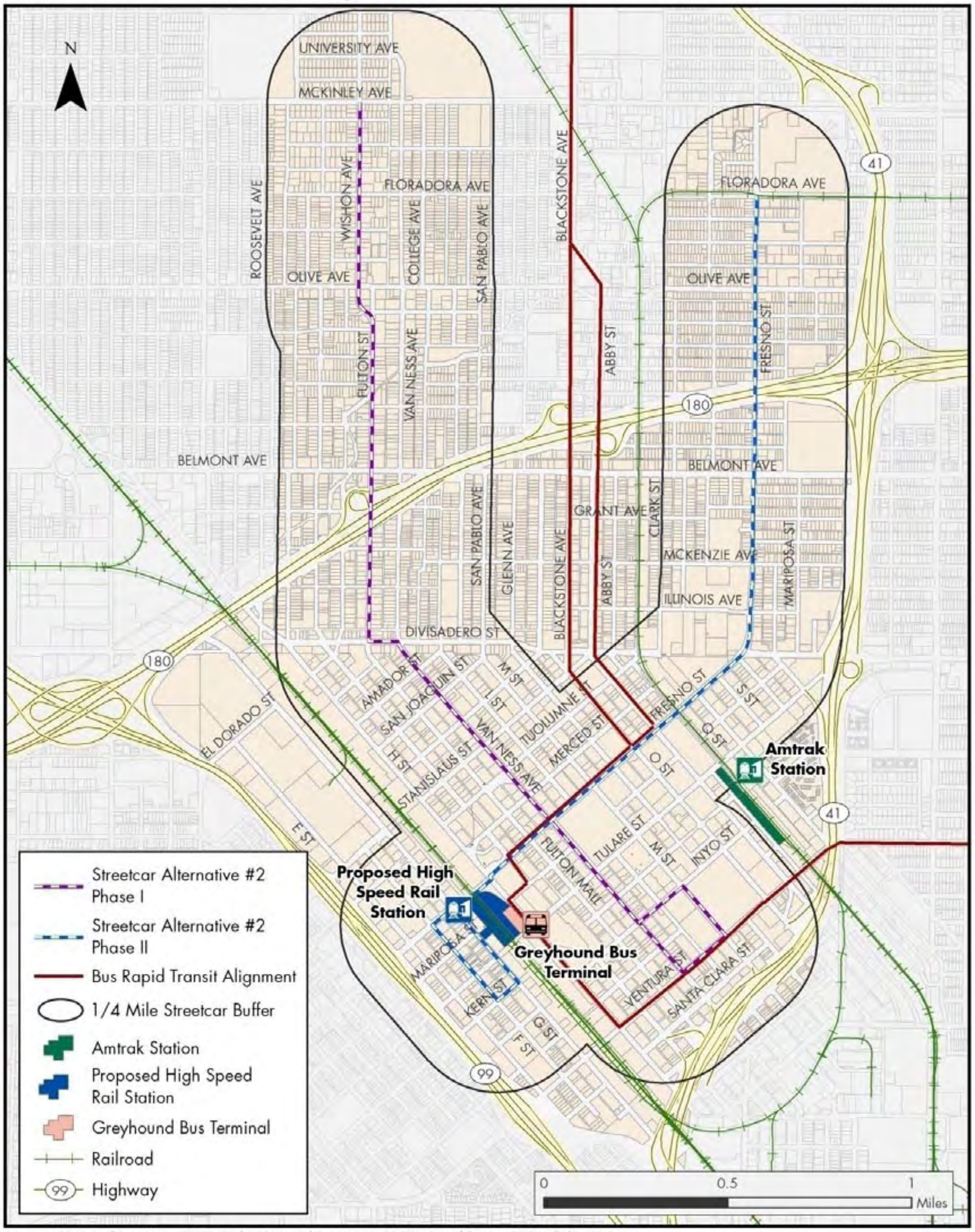
Figure 3: Fresno Streetcar Alignment – Alternative 1



Sources: Strategic Economics, 2010; Kimley-Horn and Associates, 2010; City of Fresno, 2010; ESRI; US Census.

Figure 4: Fresno Streetcar Alignment – Alternative 2

Fresno Streetcar Alignment - Alternative #2



Sources: Strategic Economics, 2010; Kimley-Horn and Associates, 2010; City of Fresno, 2010; ESRI; US Census.

3.4 Evaluation of Existing Development

This section provides a preliminary assessment of the potential for new or enhanced development associated with the two alternative alignments. The potential for new or enhanced development is important in consideration of alternative alignments because many of the most valuable local streetcar funding sources are closely tied to new development. If an increase in property value can be attributed to a new transit facility or system and some of that transit premium can be captured to help pay for the facility it could be a significant source of revenue for financing a new system.

Strategic Economics analyzed and mapped the assessed value of existing development in relation to the two alignment alternatives. The analysis identified those parcels that are currently vacant or underdeveloped using Fresno County Assessor's data to determine which parcels were likely candidates for new development or redevelopment.

To identify development opportunity sites around the potential Downtown Fresno Streetcar alignment, Strategic Economics used a ratio that divided the two components that determine a parcel's assessed value – improvement value and land value. The resulting "improvement to land value ratio" is a simple measure used to analyze the economic utility of a parcel. If the ratio is above 1.0, the on-site improvement has more value than the land on which it resides. If the ratio is less than 1.0, the assessed value of the land is higher than the on-site improvement, indicating that the property is currently "underutilized" and might be more likely to redevelop over time. This basic threshold is a standard measure of potential for redevelopment and has been found to represent the point where the market would identify land as eligible for redevelopment.1

This improvement to land ratio was calculated for the entire Downtown Triangle and a ¼ mile buffer around the alignment alternatives extending outside of the Downtown Triangle.

Figure 5 on the following page is a map showing the area considered in this analysis. This area was considered to allow the comparison of development potential for Alternatives #1 and #2 described above, but also to provide data for the consideration of other potential alignment options. Figure 3 shows the locations of the vacant and underutilized parcels in relation to the two alternative alignments.

As shown in Table 3, the total assessed value of the study area being considered is over $1.1 billion. Of the 5,283 parcels in the study area, 366 are vacant and 551 are underutilized using the ratio described above. Vacant parcels in the study area account for about $15 million in assessed value and the underutilized parcels account for about $49 million in assessed value.

1 *The California Infill Parcel Locator, Landis et al, 2006.*

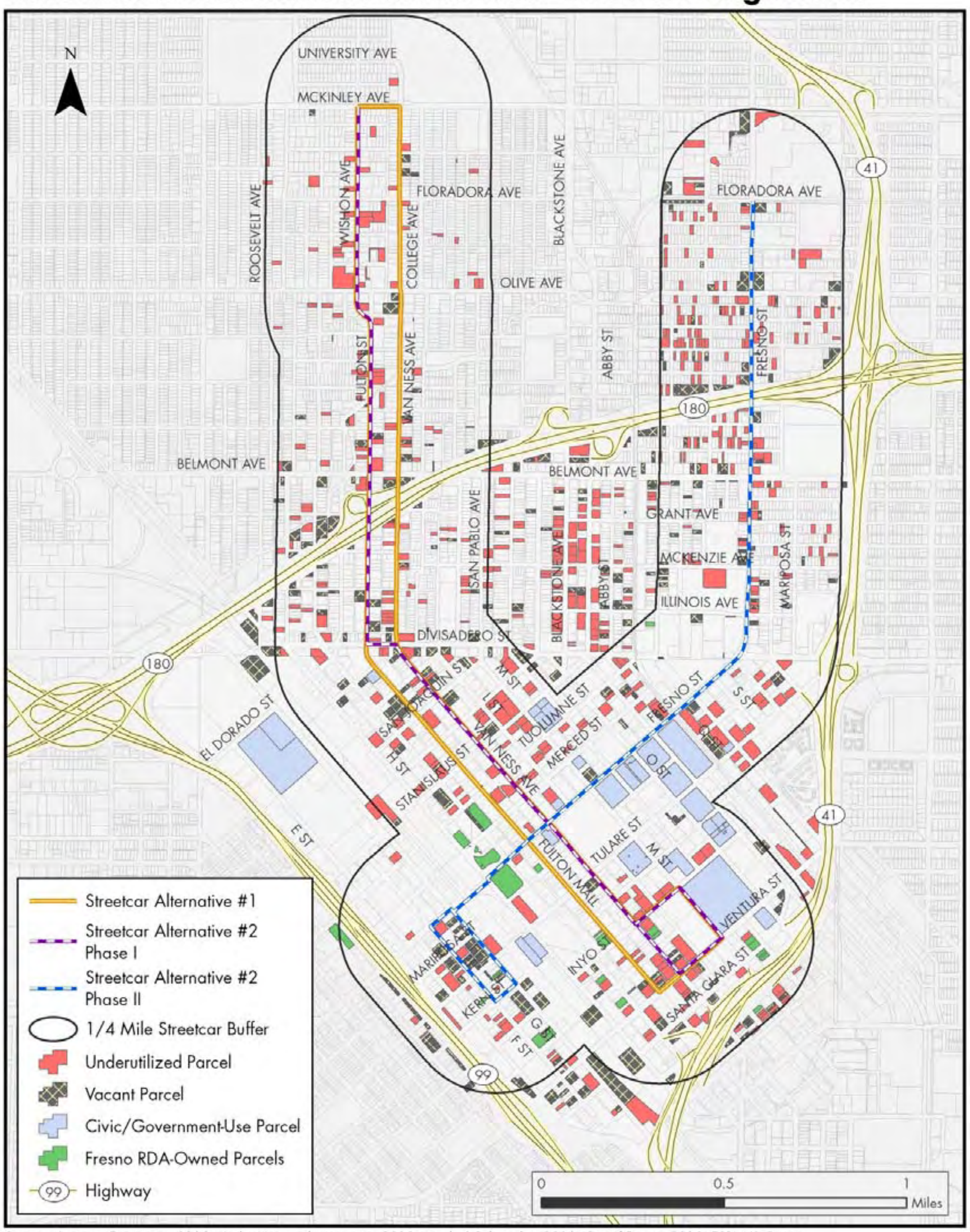
Table 3: Existing Assessed Value of Vacant and Underutilized Parcels in Downtown Fresno Streetcar Study Area

Parcel Type	Total Parcels	Total Assessed Value
Vacant	366	$15,352,000
Underutilized	516	$46,031,000
Other	4,401	$1,085,652,000
Total	5,283	$1,147,035,000

Sources: Fresno County Assessor's Office, 2010; Strategic Economics, 2010.

Figure 5: Vacant or Underutilized Parcels near Streetcar Alignments

Vacant or Underutilized Parcels Near Streetcar Alignments



Sources: Strategic Economics, 2010; Kimley-Horn and Associates, 2010; Moule & Polyzoides, 2010; City of Fresno, 2010; ESRI; US Census.

Table 4 summarizes the zoned uses for the underutilized parcels in the study area. Of the underutilized parcels included in the analysis, 255 parcels with existing value of almost $35 Million are zoned for commercial uses and 261 parcels with existing value of $11 Million are zoned for residential use.

Table 4: Zoned Uses for Underutilized Parcels in the Downtown Fresno Streetcar Study Area

Underutilized Parcel Type	Total Parcels	Total Assessed Value
Commercial	255	$34,960,000
Residential	261	$11,071,000
Total	516	$46,031,000

Sources: Fresno County Assessor's Office, 2010; Strategic Economics, 2010.

As illustrated in Figure 5 many of the vacant and underutilized parcels are located directly on the alternative alignments and may therefore be likely candidates for new development or redevelopment should the streetcar be located on those alignments. The improvement to land analysis excluded governmental, institutional and other tax-exempt properties, but Figure 3 does highlight (in green) those parcels owned by the Fresno Redevelopment Agency because they are likely to redevelop.

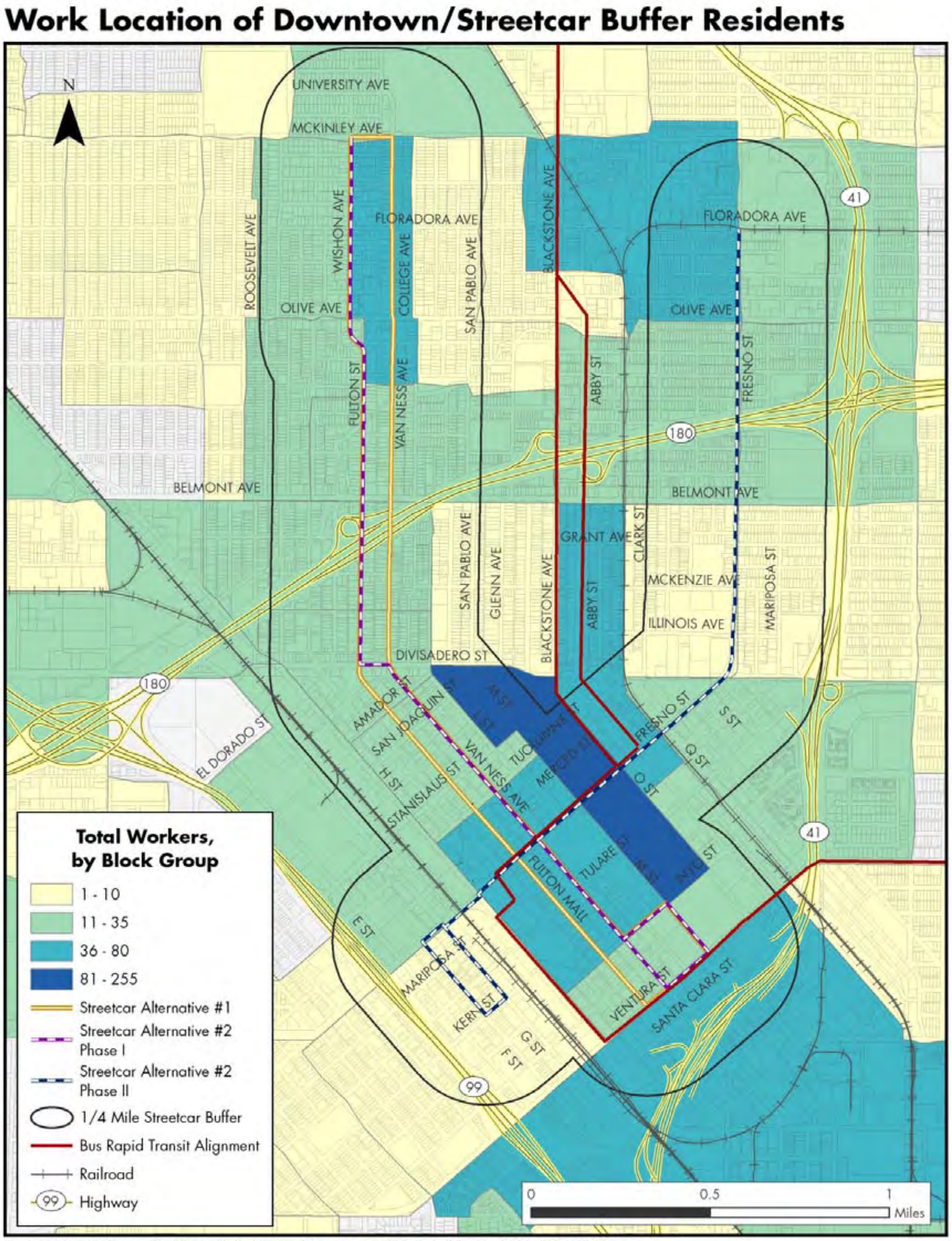
3.5 Relationship Between Alignment Alternatives and Location of Jobs

The Downtown Fresno Streetcar could help get commuters to their places of work. As discussed above streetcars are walk enhancers, shortening perceived distances between places. Streetcars can therefore provide a solution to the "last mile" connection issue by incentivizing workers to leave their cars at home. The proposed Bus Rapid Transit system would provide commuters with the option to get to Downtown Fresno, but the addition of a streetcar could help improve the last mile connection by getting more commuters closer to their places of work without using their car. Research on the role of transit in economic development also suggests that employers who offer workers the choice of taking high quality transit tend to experience lower absenteeism rates, which can help increase productivity and potential business growth.

Strategic Economics evaluated commute patterns for residents of Downtown Fresno, using the U.S. Census Bureau's 2008 Longitudinal Employer Household Dynamics (LEHD) data. This data enables evaluation of the place of residence for workers in any given block group throughout the United States ("Where Workers Live"), and of the place of work for residents of any given block group ("Where Residents Work"). In this analysis, Strategic Economics looked at where residents of the downtown neighborhoods work, to evaluate how far they are commuting and to where.

Figure 6 on the following page maps the place of work for residents of the Downtown Triangle to see if the streetcar could help get local residents to work. In the map, the darker blue areas represent the places where residents work in higher concentration. For example, a relatively high percentage of residents of the Downtown work between O Street and M Street and therefore that area within the map is darker than any other area in the map. The total number of residents who live in the study area and work in the study area is only about 750.

Figure 6: Work Location of Downtown/Streetcar Buffer Residents



Sources: Strategic Economics, 2010; Kimley-Horn and Associates, 2010; City of Fresno, 2010; ESRI; US Census.

The analysis of place of work indicates that residents of the study area work in highest concentration within the Downtown Triangle or in the industrial area to the south of Downtown. Residents may choose to live in the Downtown because their housing and transportation costs are lower. The place of work analysis indicates that they may also live in the Downtown because of the proximity to their places of work.

To further examine the relationship between the alignment alternatives and jobs, Strategic Economics analyzed and mapped the number of jobs in relation to the alignment alternatives based on InfoUSA data. The streetcar has the potential of enhancing lunchtime dining and shopping options for Downtown workers. The concentration of jobs in the Central Business District (12,660 jobs) and the Civic Center (11,934 jobs) offers a built-in base of shoppers and lunchtime diners who could help to increase weekday retail sales activity in the Downtown and on the Fulton Mall specifically. Table 5 summarizes the number of jobs in the Downtown Triangle.

Table 5: Location and Number of Jobs In the Downtown Triangle

Location	Number of Jobs
Central Business District	12,660
Chinatown	1,934
Civic Center	11,934
Cultural Arts District	1,432
Jefferson	1,348
Lowell	587
South Stadium	1,142
Total Downtown Triangle	31,037

Sources: InfoUSA, 2010; ESRI; US Census; Strategic Economics, 2010.

Figures 7 and 8 on the following pages show the number of total jobs and the industry employment mix in relation to Alternatives #1 and 2. There are about 18,000 jobs within the buffer for Alternative #1 and about 34,000 jobs within the buffer for Alternative #2 (including Phases I and II).

Figure 7: Total Employment Adjacent to Streetcar Alternative 1

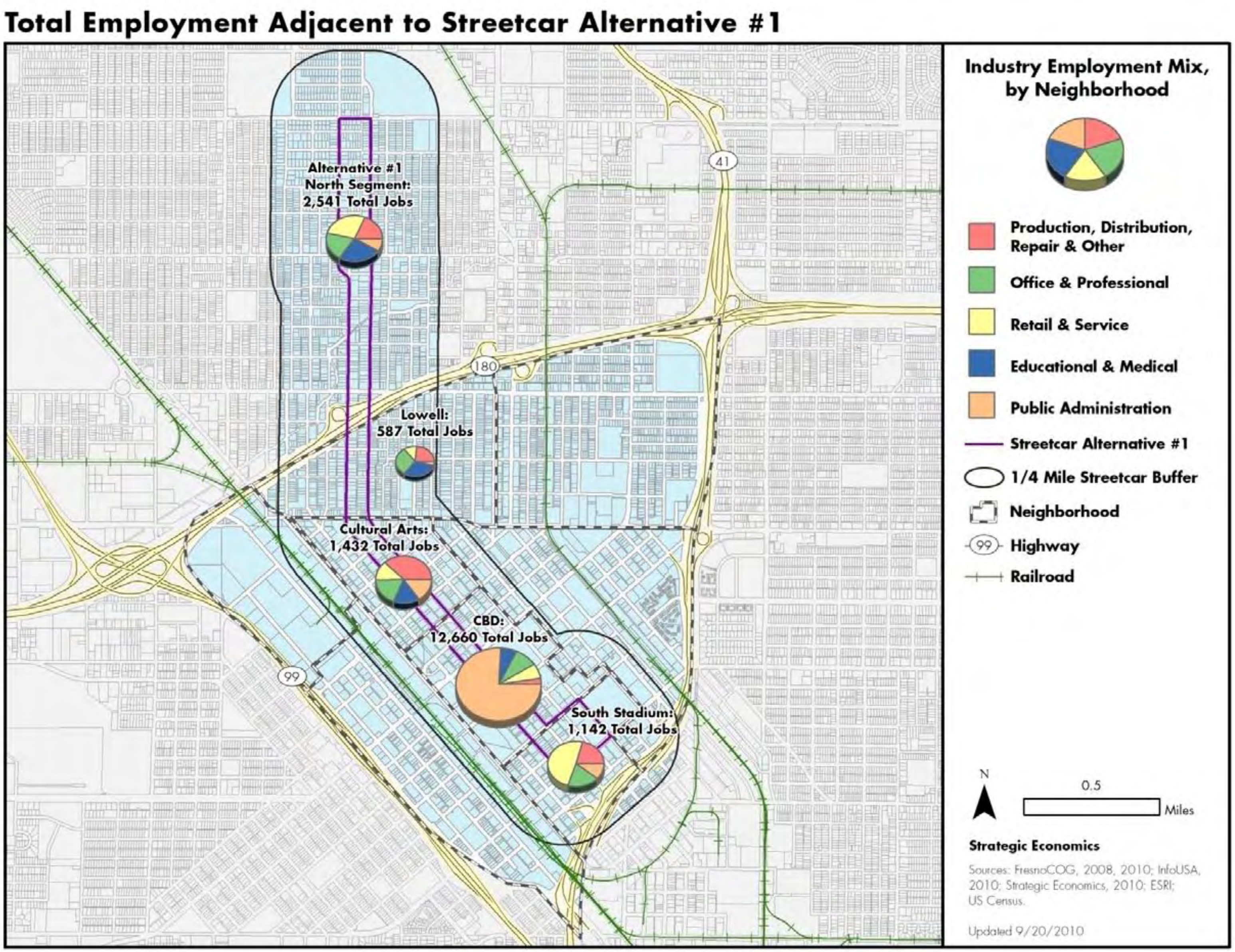
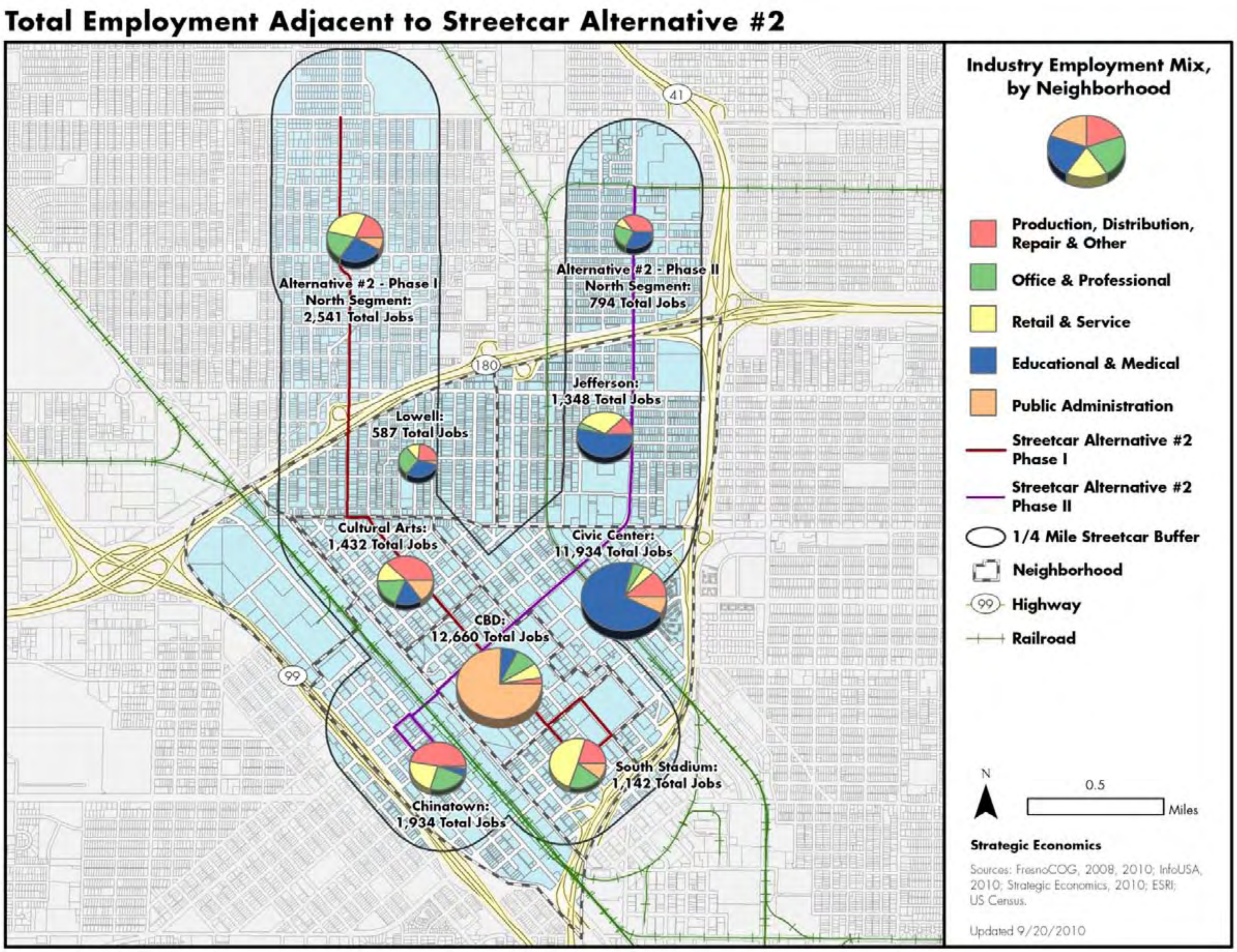


Figure 8: Total Employment Adjacent to Streetcar Alternative 2



3.6 Relationship between Alignment Alternatives and Existing and Proposed Housing and Amenities

Strategic Economics mapped new and proposed housing projects in the Downtown in order to show where market activity is currently occurring in relation to the alignment alternatives.

Within the Downtown, the majority of new or rehabilitated housing is being built in the Cultural Arts District. As shown in Table 6, at least 316 units were recently constructed/rehabilitated or are planned and proposed for the Cultural Arts District, out of approximately 639 known units recently completed or planned within the Downtown. These projects generally consist of rental units in multi-family housing, with a mix of new construction and rehabilitation of existing buildings; however, the majority of these projects were publicly-assisted.

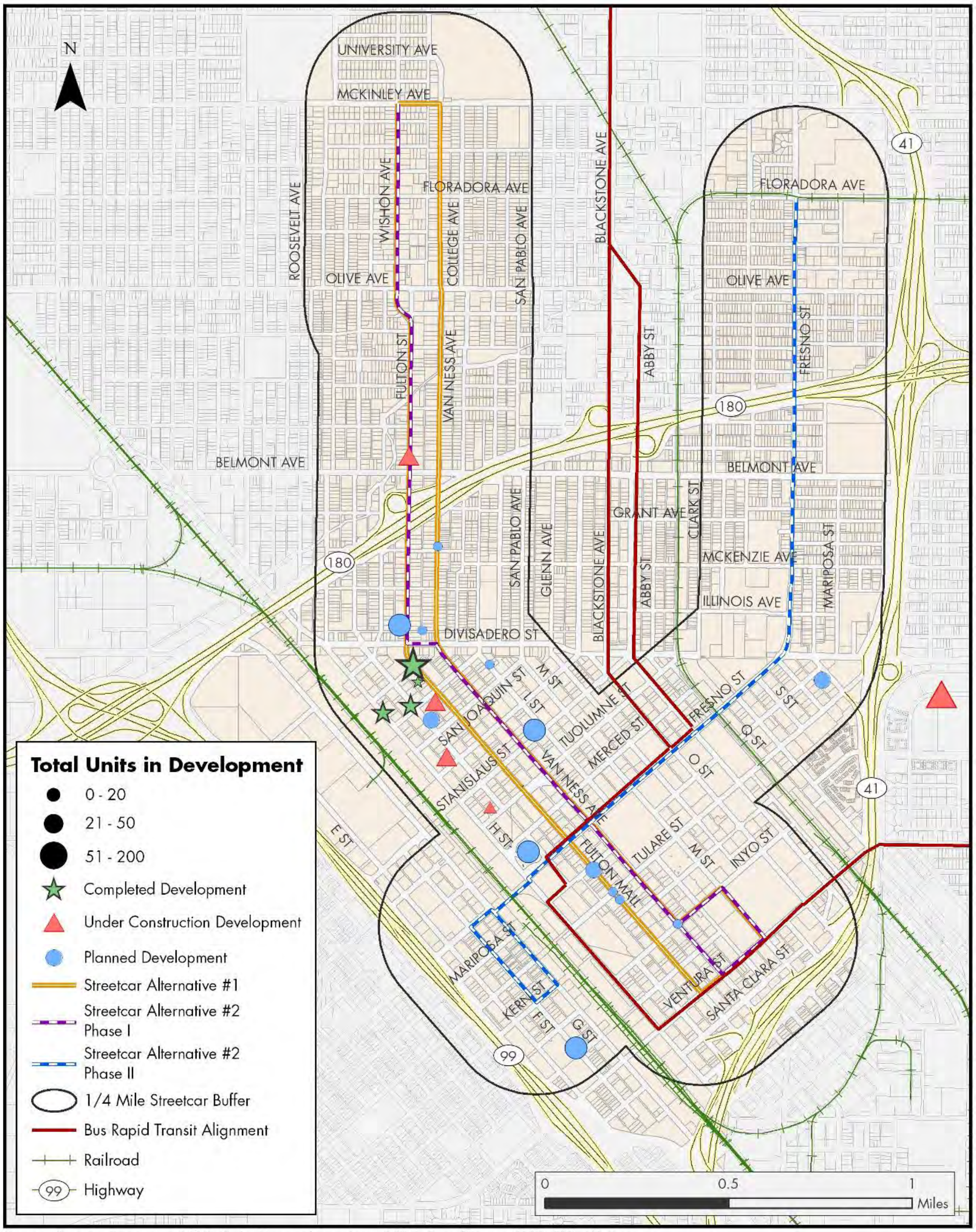
Table 6: Recently-Built, Planned, and Proposed Housing Projects in the Downtown Fresno Streetcar Study Area

Name	Location*	Type	Tenure	Status	Units
Mariposa and U	Jefferson	New	Rental	Planned	37
Van Ness Row Houses	Lowell	New	Unknown	Planned	20
Los Pinos	Lowell	Renovation	Rental	Planned	52
64 N. Fulton	Lowell	Renovation	Unknown	Under construction	19
Numerous	Lowell-Jefferson	Renovation	Various	Under construction	15
Mayflower Lofts	CBD	Renovation	Rental	Under construction	15
Broadway Lofts	CBD	Renovation	Rental	Under construction	23
Hotel Fresno	CBD	Renovation	Rental	Planned	68
Security Bank Building	CBD	Renovation	Own	Planned	27
JC Penney Building	CBD	Renovation	Pending	Planned	Pending
Berkeley Block	CBD	Renovation	Pending	Planned	Pending
Chinatown Lofts	Chinatown	New	Rental	Planned	200
Iron Bird Lofts	Cultural Arts	New	Rental	Completed	80
Fulton Village / Fulton Lofts	Cultural Arts	New	Rental	Under construction	68
Vagabond Lofts	Cultural Arts	New	Rental	Completed	38
H Street Lofts	Cultural Arts	New	Rental	Completed	26
Factory Tire	Cultural Arts	Unknown	Rental	Planned	39
Bastian Court	Cultural Arts	New	Rental	Planned	61
L Street Homes	Cultural Arts	Unknown	Pending	Planned	Pending
Pearl Building	Cultural Arts	Renovation	Rental	Completed	4
Droge Building	South Stadium	Renovation	Rental	Planned	14
				Completed New and Renovated Units	148
				Planned or Under Construction New and Renovated Units	639+

Source: City of Fresno, 2010; Strategic Economics, 2010

Figure 9 on the following page shows the locations of recently built, planned, and proposed housing projects in the Downtown Fresno Streetcar study area. In the figure, the different shapes denote the status and size of the development projects, with stars representing completed projects, triangles representing projects under construction, and circles representing planned projects. As detailed in the legend on the figure, the size of the various shapes corresponds to the size of the project.

Figure 9: Development Projects near Fresno Streetcar Alignments

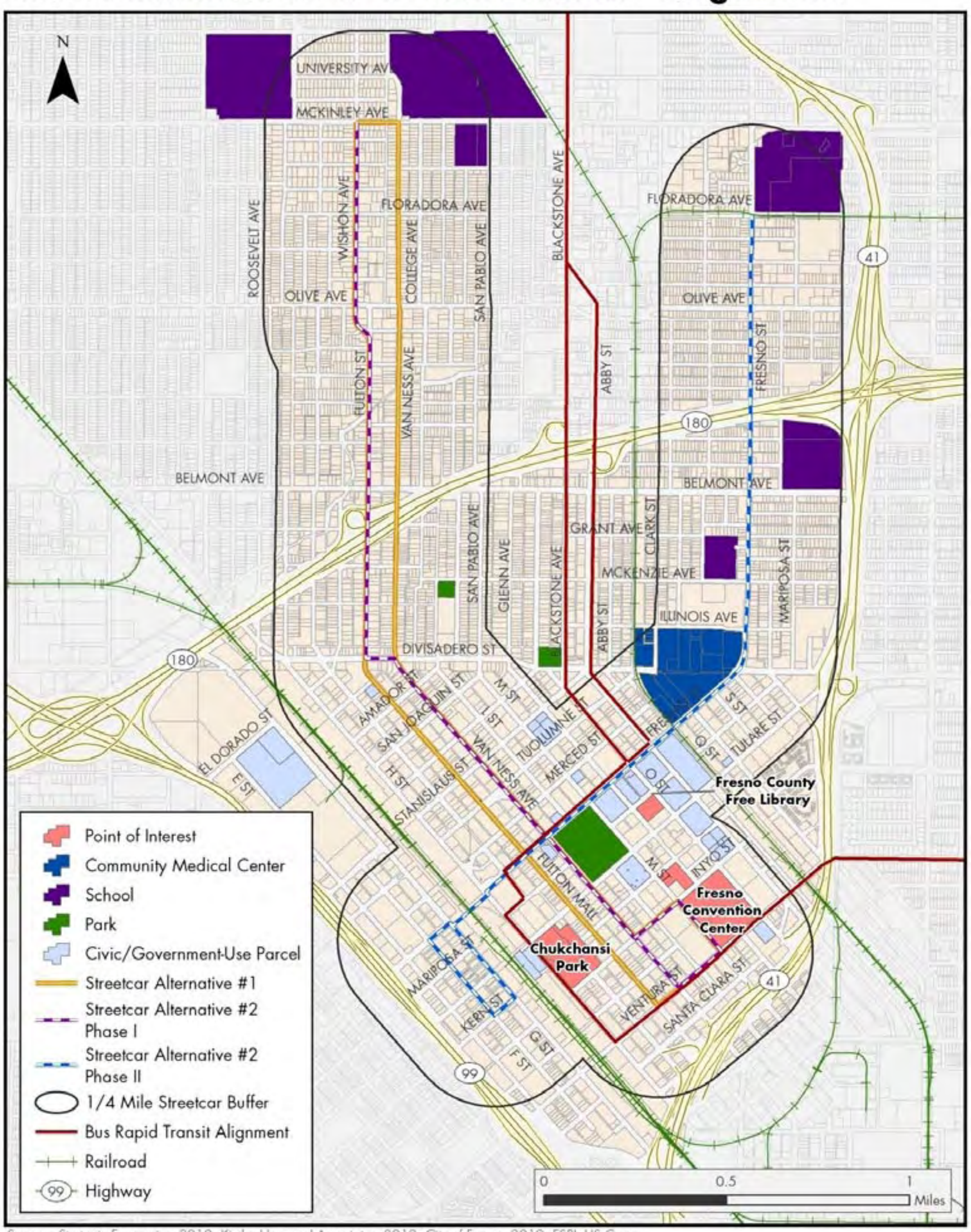


Sources: Strategic Economics, 2010; Kimley-Horn and Associates, 2010; City of Fresno, 2010; ESRI; US Census.

The alternative alignments under consideration have the potential to improve access to Downtown for students, faculty, and staff of Fresno City College, Fresno High School, and San Joaquin Memorial High School. National studies show that students and employees at higher education institutions have a greater tendency to walk, bike, and take transit than other employment sectors. Although it is a commuter campus, the Fresno City College offers a natural source of ridership for the streetcar if students and staff have somewhere to go in the Downtown.

Figure 10: Local Amenities near Fresno Streetcar Alignments

Local Amenities Near Fresno Streetcar Alignments



Sources: Strategic Economics, 2010; Kimley-Horn and Associates, 2010; City of Fresno, 2010; ESRI; US Census.

3.7 Streetcar Impact on Development and Property Values

This section discusses the potential impact of a streetcar on new development in Downtown Fresno. As discussed above the streetcar has the potential to impact redevelopment in the Downtown. Other cities where a streetcar was introduced have experienced a positive impact on local property values because the streetcar connected neighborhoods and created new ones.

The Fulton Corridor Specific Plan process is currently underway, but preliminary land use alternatives include up to 25 million square feet of capacity for new development in the Downtown. Table 7 shows square feet of various land uses under low, medium, and high scenarios for development capacity in the Downtown.

Table 7: Range of Development Capacity Under the Fulton Corridor Specific Plan

Land Use Category	Low	Mid	High
Dwelling Units	1,590	5,247	13,629
Dwelling Units (SF)	1,908,124	6,295,976	16,354,485
Office (SF)	605,645	1,885,144	4,885,680
Retail (SF)	345,680	1,160,355	3,049,502
Industrial (SF)	123,795	235,740	462,942
Total	**2,983,244**	**9,577,216**	**24,752,608**

The mid-range development capacity scenario is generally consistent with the market analysis conducted by Strategic Economics. The mid-range development capacity scenario shown in Table 7 would result in an additional 13,000 residents and 10,000 employees in the Downtown.

The proposed high speed rail station in Downtown Fresno has the potential to further impact the types and amounts of development that occur in the area. The streetcar could be complementary to the high speed rail system, allowing patrons to make last mile connections throughout the Downtown area.

Results of the Developer Interviews

Strategic Economics conducted interviews with several local developers to qualitatively gauge the potential impact of a streetcar on the development market in Downtown Fresno. The findings below summarize developer opinions based on their local experience and expertise.

The streetcar will have minimal impact on development unless other public investments are coordinated and implemented.

As a standalone project, the streetcar is unlikely to increase the pace or intensity of development in Downtown Fresno. Instead, the streetcar must be accompanied by significant coordination and cooperation among City departments to meet several oft-stated needs: 1) improve the water and sewer infrastructure, 2) seamless coordination of goals and actions between City departments, and 3) willingness to work closely with developers in obtaining public sector funding resources, whether local, state, or federal. The development community recognizes the weak market in Downtown, but these public-sector obstacles tend to be consistently raised as barriers to building better momentum.

Short-term impact will be very limited, but the streetcar can complement a ten to twenty year development strategy.

The Fresno region does contain demographic segments typically interested in 'downtown-living,' but capturing this segment is difficult in a place long-focused on automobile accessibility and suburban lifestyles. Interviewees stated that Downtown Fresno may take at least 15 to 20 years to become a vibrant place, but the streetcar can fit into that long-term strategy and make a slight difference in pace. Most interviewees felt that such a strategy must initially focus on connecting destinations and encouraging development of a residential population.

The streetcar route must link major destinations to build early ridership, but also run adjacent to high-potential opportunity sites to encourage later development.

Given the long perceived timeline for improvements in the Downtown development market, interviewees expressed a strong need for the streetcar to build early momentum by connecting major destinations. It must be recognized that the streetcar may often run empty at night until significant additions of housing and nightlife occur. In this interim period, interviewees noted that the streetcar route must, at a minimum, connect the length of the Fulton Mall, Chukchansi Park, the Civic Center area, the Convention Center, the Community Regional Medical Center, and the Cultural Arts District. Between these destinations, the routing must also run adjacent to high numbers of vacant or underutilized properties to encourage later development potential.

The streetcar can reduce the length of time before 4- to 5-story higher-density residential projects can be built in Downtown, but the overall market suggests these buildings are many years away.

The streetcar can make minor improvements in the pace of development in Downtown, which may eventually lead to a maximum of four- to five-story residential projects; for the foreseeable future, however, development is likely to be less intense, at a maximum of thirty to forty units per acre. Early residential projects are needed to increase Downtown vibrancy, but there will be a need to balance early, less-intense projects with preservation of sites for future projects.

A district-wide parking strategy will be necessary to complement the streetcar.

Interviewees were quick to dismiss project-specific parking requirements in Downtown. There is widespread recognition that Downtown has significant parking, but it is poorly utilized. By shortening perceived distances as a “walk-extender,” the streetcar can complement a district-wide parking strategy that takes advantage of available spaces while reducing project-specific requirements.

The streetcar itself is unlikely to allow significant parking reductions.

Although the streetcar can enable more efficient use of existing and future parking, Fresno remains an automobile-centric area. Developers noted that market-based requirements, which closely parallel existing regulations, are not likely to decrease with the addition of a streetcar. Owners and renters of new condominiums and apartments are highly likely to own vehicles, if only because of the limits of Fresno’s Downtown and the large land area of the region; commercial uses will need parking for similar reasons. Developers suggested that the strategy to complement the streetcar must focus on off-site and more efficient use of district-wide parking rather than on-site, project-specific requirements.

4.0 Potential for Value Capture

To date, the most significant local contributions to financing streetcars in other locations has come from creating some type of benefit assessment district and “capturing value” from that increment of new development. Property owners are willing to pay into these districts for three reasons depending on what kind of property they own:

- First are the property owners who will receive entitlements to build significant increments of new developments, in some cases that would not have been possible without the increased accessibility offered by a streetcar. For these owners, the marginal increase in the value of their property will outweigh any additional costs related to the assessment.
- Second are existing businesses that will get an increase in sales as a result of increased pedestrian activity in their area.
- Third are those big institutions or employers who want to grow without increasing auto trips and understand that contributing to transit is much more cost effective than building new parking facilities, or even moving to a more auto-oriented location.

In order to provide a qualitative assessment of the potential for value capture in a local funding strategy for Fresno, Strategic Economics polled developer interviewees regarding several potential local funding and financing mechanisms for streetcar operation and capital. In general, interviewees were critical of nearly all local value capture techniques due to the potential increase in costs and perceived negative impact on attracting visitors, businesses, and residents in what is already a very weak market with little unsubsidized development activity.

The following list briefly summarizes developer opinion of the subject funding techniques:

Benefit Assessment: Multiple interviewees suggested an assessment district or other fees for new development, with the goal of placing the primary cost burden on sites and new projects directly adjacent to the streetcar route; however, such a technique is more often used to fund capital costs rather than operating costs.

PBID Revenue: Strong opposition, though this may change if the recently-approved PBID proves successful. Passage was contentious, and many property owners view the fees as a further barrier to financial feasibility for their properties or developments.

Transient Occupancy Tax: Generally garnered weak support due to poor hotel performance, but such a tax may become more viable if hotel performance improves; the tax must be kept low.

On–Board Fare Collection: Strong support was expressed for a minimal fare, with possible free rides for special events or times of day.

Raise On-Street Parking Costs or Create a Parking Revenue Capture Zone: Minimal support, with most interviewees stating that people are angry about the parking meters and unaccustomed to paying for parking.

Capture a Percentage of Revenue from Publicly–Owned Garages: Mixed support, with caveats that maintenance needs take a higher priority and that fees shouldn't be increased to support the streetcar.

Tax Privately–Owned Garages on a Per–Stall Basis: Almost no support. Very few such garages exist due to the high cost to build and operate them. A tax may make more sense if the Downtown area is permitted flexible use of spaces rather than dedicating a given space solely to a particular office or residence's mandated parking requirement.

Transfer Operating Revenues from the Existing Circulator: Overwhelming support.

Dedicate an Increase in Fines for Parking Violations to the Streetcar: Almost no support. Parking tickets are one of the greatest complaints about coming to Downtown.

Private Sponsorship of Vehicles and Stops: Overwhelming support; however, most interviewees doubt this can raise much money in Fresno.

Value Capture Findings and Recommendations

One single source will not pay for either the construction or operation of the streetcar. Most recent streetcar projects have relied on a patchwork of funding sources with federal participation but at least some local funding. The Fresno Downtown Streetcar will also likely be funded through a number of different local and possibly federal sources.

To date, the most significant local contributions to financing streetcars in other locations has come from creating some type of benefit assessment district and capturing value from that increment of new development and benefits to existing development.

5.0 Capital Development Costs

The cost to construct a streetcar system in Fresno could vary widely based on length of the system, type of streetcar selected, number of stations, means of hanging the overhead power lines, the extent of roadway reconstruction and extent of utility relocation required. Some unknown amount of these costs might be carried by other improvement projects in the city. In general the costs including rolling stock will be $30 million per mile or more, so streetcar systems are not inexpensive to construct and the longer the network the higher the costs.

Cost estimates were developed for seven major project elements and soft cost and contingency costs were then added to these basic costs. The estimated costs we believe are on the high side and that more detailed engineering should lead to lower costs. The seven major elements were:

Track construction elements

Roadway reconstruction/improvement elements

Power and Systems elements

Utility relocation elements

Stations

Maintenance and storage facility for trains

Train-sets

Track Construction

Cost to construct track is primarily driven by the length of track required. The number of switches and amount of special track work (like at turns) also impacts costs. To some degree the track costs are also dependent on the speed and weight of the trains, but for estimating purposes modern streetcars similar to those operated in Portland, Tacoma and South Lake Union Seattle were assumed.

Roadway Reconstruction/Improvement Elements

These costs are primarily driven by the length of roadway being demolished and reconstructed. Single track segments tend to have higher roadway reconstruction cost per track-mile than double track segments. The costs also depend on location within the street the track is located and the degree that sidewalks, curb/gutter and other elements must be reconstructed. Roadway costs also include modifications to traffic signal controllers, displays and detection along with signage and striping changes required to accommodate the streetcar service. If signals are being upgraded and pavement overlays are planned some of these costs can be avoided. The major costs, however, are associated with the roadway demolition and reconstruction itself. As it is a major cost, the underpass of the BNSF tracks was separately estimated. We suspect that up to one half of its costs could be funded as a railroad grade separation project with the other half coming from Measure C rail consolidation funds. For purposes of this analysis costs for the Fulton Mall segment was treated similarly to the costs of general roadways. This assumption also was used for utility relocation costs. If refurbishment of the Mall is planned some of these costs could be avoided (if costs are assigned to the Mall Project). Sometimes these ancillary improvement costs are pushed onto public transit projects (for funding reasons) and the cost per mile are higher and not lower.

Power and Systems Elements

This cost category includes power substations, the overhead wire system for power distribution and signal and communications systems. At least one substation every mile is assumed. The cost also envision that new poles will need to be installed to suspend the overhead power lines, however with new building construction it might be possible to suspend some wire with eyebolts into the buildings. In general, the costs of double track wire is substantially less than single track wire measured in terms of track feet of operations.

Utility Relocation

Utility relocation is a major cost and construction disruption impact. Water, sewer and other utilities are modernized and relocated along with rail transit construction for a wide variety of reasons. This helps to minimize disruptions to streetcar service once it begins operations and it minimizes corrosive impacts of “stray currents” on underground utilities. If the utilities in downtown must be upgraded to support more intense new development some of these costs move from relocation costs to modernization costs. They still must be funded, but they benefit more than just the streetcar project.

Stations

Stations can be very simple like the curb extension stations in Portland to very elaborate like those used for most light rail stations. Ticket vending machines and other station amenities can also substantially increase costs. Basic shelters and next train information systems tend to be modest cost items. For cost estimating purposes we are assuming that the stations are “side platform” or curb extension stations similar to Portland stations.

Maintenance and Storage Facility

These facilities can be very simple shed type structures or modern reinforced concrete buildings. The size depends on the size of the fleet envisioned. It is possible to initiate service with a modest interim shed and upgrade/expand in the future as site area permits. It must be located near the passenger service tracks, but can be located in marginal locations. Portland has its streetcar barn located underneath an elevated freeway. Location under the planned high speed rail tracks might be possible in Fresno. For cost estimating purposes a facility for six trains is envisioned.

Trains

The streetcar segments being considered are generally about six miles roundtrip. At 10 mph average operating speed 36 minutes would be required for a roundtrip. Allowing nine minutes for schedule recovery/layover per roundtrip would require three streetcars to operate 15 minute headway service. An additional streetcar is needed for a backup train to allow servicing etc. It is desirable to have fifth train as a spare to address mechanical and other problems that arise. While a fifth streetcar vehicle would be expensive to add, it would help ensure the desired 15 minute or better headway (if the estimated 10 mph speed proved unattainable) and the fifth car could augment capacity if needed for special events (like a ballgame).

Soft costs

These costs cover the planning and design of the system, mobilization, construction management, traffic management, project insurance and start up debugging of the new system. A factor of 36 percent was added to the total of all of the “hard costs” (elements 1-7) in order to account for these softcosts. Ten percent was estimated for construction management, 2 percent for traffic management, 20 percent for planning/design/permits, 2 percent for insurance, 2 percent for start up costs

Contingencies

There are a huge number of unknowns at this time that will impact costs and most of these factors tend to increase costs. To allow for these unknown a 15% contingency was added to the hard cost (items 1-7).

5.1 Alternative 1: Tower District Loop

Alternative 1 consists of a one-way loop (clockwise) linking the Convention Center area with Fresno City College. It includes about 32,000 feet of one way track. For cost estimating purposes a total of 24 stations were defined. The total cost for this alternative is estimated at $116 million, comprised of the following:

- $14.3 million for track installation;
- $10.5 million for roadway/traffic improvements;
- $15.5 million for power and systems;
- $9.6 million for utility relocation;
- $1.8 million for stations;
- $5.0 million for maintenance and storage facility;
- $20.0 million for vehicles;
- $ 27.6 million for soft costs; and
- $ 11.6 million for contingencies.

It might be possible to phase the implementation of this option, constructing the section south of Divisadero first. A short additional section of track and power would need to be added on Divisadero between Fulton and Van Ness to allow this phasing. It would save the initial expense of perhaps two streetcars, several stations and more than one mile of track. Thus about a third of the $116 million could be deferred to phase two. It is unclear, however, how strong the patronage would be for the downtown only loop. It would fail to attract City College riders and it would weaken the potential commuter use of the service.

5.2 Alternative 2 Phase 1: Tower District Line

Alternative 2's Tower District line is similar to Alternative 1's, except it is a two way line, rather than a one-way loop service. With similar termini the lengths of the systems are similar. Alternative 2, however, reconstructs only about half the street lengths as Alternative 1. Phase 1 is estimated to cost $102 million for its 13,300 feet of two-way track and 3,800 feet of one-way track. Twenty four stations are defined for this roughly three mile line.

- $12.9 million for track installation;
- $8.6 million for roadway and traffic improvements;
- $11.3 million for power and systems;
- $7.8 million for utility relocation;
- $1.8 million for stations;
- $5.0 million for maintenance and storage facility;
- $20.0 million for vehicles;
- $24.2 million for softcosts; and
- $10.2 million for contingencies.

Significant cost savings accrue for track, roadway, catenary and utility elements of the project, which also helped to reduce softcosts and contingency costs.

Similar to Alternative 1, it might be possible to phase the implementation of this line to reduce initial costs. Patronage demand for the shorten service is questionable.

5.3 Alternative 2 Phase 2: Fresno Street Line

Phase 2 is a slightly shorter line than the Tower District lines. It would consist of about 2.3 miles of double track and have about 20 stations. Five trains are estimated to provide the service, with two serving as spares. The cost of Phase 2 is estimated to be $123 million including the full cost of an underpass under the BNSF tracks. This cost element accounts for about 30% of the total project costs. Thus, if the underpass is considered a separately funded project, the cost of the Phase 2 Fresno Street Line would be about $86 million.

- $10.2 million for track installation;
- $31.2 million for roadway (and underpass);
- $9.5 million for power and systems;
- $6.2 million for utility relocation;
- $1.5 million for stations;
- $3.0 million for maintenance and storage facility;
- $20.0 million for trains;
- $29.4 million for soft costs;
- $12.2 million for contingencies.

The maintenance and facility costs assume an expansion of a Phase 1 facility.

If the Fresno Street line were ultimately extended east to the Fresno Yosemite International Airport via current Floradora freight rail tracks as a "time separated" operation it is estimated to cost and additional $ 35 million. This assumes 30 minute frequency service utilizing trainsets not requiring overhead power lines. The extension would be about two miles in length.

Phase two could be itself phased with the initial phase being from high speed rail to the Regional Medical Center, either terminating at Divisadero or at Belmont Street. An initial operating segment between the high speed rail station and Divisadero would cost about $90 million including the underpass. An initial operating segment (IOS) terminating at Belmont would cost about $107 million including the underpass. The cost of the underpass totals about $38 million and if funded separately would reduce the Divisadero IOS costs to $52 million and the Belmont IOS costs to $69 million.

6.0 Streetcar Ridership Analysis

Many factors influence people to use streetcars. These include intensity of mobility demands in the corridor, and competitiveness of the streetcar option versus walking or driving. Ideal environments for streetcar use include:

- Mixed use destinations and attractions within close proximity, but beyond comfortable walking distances – the larger the number of trips generated by these uses the stronger the demand for streetcar travel;
- Connections to major transportation hubs including rail stations, bus transit stations and downtown fringe intercept parking lots – streetcars function like moving sidewalks to extend the acceptable walking distances to these hubs; and
- Presence of tourist uses in the corridor.

These market features should include current needs, but opportunities associated with future redevelopment of the corridor also are important. Most streetcar projects are implemented as economic development strategies more so than transportation projects. Streetcars operate slower than buses, so long distance transportation linkage connections do not lend themselves to streetcar use. Short linkages also favor frequent fare free service. It is more expensive to provide frequent fare free service on long distance corridors. Desirably the corridor should have a high activity street free from traffic congestion.

Market–sheds for Streetcars – While temperatures in the summertime are high, Downtown Fresno is otherwise a comfortable place to walk. It is flat and traffic does not constitute a major walking deterrent (signal cycles downtown tend to be short). Rather than wait for a 10 or 15 minute frequency streetcar, most people would likely walk five blocks downtown (length of Fulton Mall is six blocks). More than five blocks, it becomes more attractive to use the streetcar. Blocks are generally about 400 feet in length. Factoring in delays crossing streets and averaging walk times for younger and older pedestrians, the average block takes about two minutes to walk – so five blocks would take about ten minutes to walk or almost the suggested 15 minute streetcar frequency. It should be noted that streetcar stops would themselves be located about three to four blocks apart – so some walking would be required to access the stops. Walking distances for trips beginning or ending at locations not directly along the streetcar route would add to the required walking distances to reach stops.

If five block "no rider sheds" were defined for the high speed rail station, Regional Medical Center, City Hall, Fulton Mall, and Convention Center:

- High Speed Rail Station – San Joaquin, M Street, Ventura and Highway 99;
- Regional Medical Center – Highway 41, N Street, Blackstone and Illinois Street;
- City Hall – Ventura, Van Ness, San Joaquin and Divisadero

- Fulton Mall – O Street and F Street; and
- Convention Center – Ventura, H Street, Tuolumne Street and BNSF tracks.

Thus, patrons at the new high speed rail station would be more likely to walk than ride the streetcar for trips shorter than M Street or Highway 99 along Fresno Street and shorter than Ventura or San Joaquin Streets along H Street. Trips destined to City Hall and the Regional Medical Center from the high speed rail station would likely use a streetcar rather than walk. Few trips would use the streetcar from the convention center to City Hall or overall civic center complex.

Van Ness/Fulton/Wishon Corridor – The extent of streetcar patronage from the Van Ness/Fulton/Wishon corridor north of Divisadero Street will likely be two to three times the current Route 28 bus service patronage. Boardings along this section of Route 28 (Divisadero to south of City College) are not high. Obviously if the development density were to double or triple along this section of the corridor, the potential streetcar boardings would also increase.

The Van Ness/Fulton corridor is estimate to have about 20,000 jobs and 7,000 housing units within 1,000 feet of the streetcar line in 2035. Most of the jobs are downtown and most of the housing is north of Divisadero Street. For an approximate three mile long corridor this translates into 6,500 jobs per mile and 2,300 housing units per mile. Estimate is that this corridor might generate about 300 boardings per mile or about 900 daily boardings.

Fresno Street Corridor – The COFCG travel model provides an indication of travel activity by traffic analysis zones within the downtown area. For the Year 2035 the Fresno Street alignment from high speed rail to Floradora Street is estimated to have about 10,000 dwelling units and 30,000 jobs within about 1,000 feet of the alignment. Most of the housing is located north of Highway 180. Half of the jobs are located in the area from H Street to O Street between Fresno and Tulare Streets and the Regional Medical Center. For an approximate three mile long corridor this translates into about 10,000 jobs per mile and 3,300 housing units per mile. Estimate is that this base market might generate 400 boardings per mile or a total of 1,200 daily boardings (one percent mode choice).

High Speed Rail Station – Patronage forecasts for the new high speed rail station are 13,300 daily passengers in 2035. Half of the total boardings and alighting are estimated to be Fresno residents and the other half residents of other communities served by high speed rail. Twenty percent of these trips are estimated to be home based work trips. In addition to these passenger trips, other trips will be made by staff of the station and by well wishers and greeters. Absence, detailed information on well wishers, greeter and staff a total of 25,000 daily person trips are envisioned for the high speed rail station. If 20% of these trips were to/from the downtown area and a fifth of these were to use the streetcar, 1,000 daily trips would patronize the streetcar to/from the high speed rail station.

Regional Medical Center – With 4,000 employees at the Regional Medical Center it would also be a major market for streetcar patrons. In addition to this staff, visitors make a large number of trips to this site. So postulating 5,000 daily population and 2.5 trips per person this site would generate about 12,500 daily person trips. Most of the commute trips will be made by car, but another 1,250 daily person trips might walk or use the streetcar – say 800 additional streetcar riders.

City College – Usage by City College students is possible, particularly if offered fare free. This service would compete with the planned BRT on Blackstone which will require full fare payment.

Summary Assessment of Patronage Potential – Factoring in the ridership potential for City College (1,000 boardings), High Speed Rail Station (1,000 riders) and the Regional Medical Center (800 riders) the Van Ness/Fulton corridor is estimate to attract 1,500 to 2,000 daily riders (depending on free fare diversion from BRT) and the Fresno Corridor is estimated to attract 2,500 to 3,000 daily boardings

VI. Streetcar Operations and Management Plan

Operations of the streetcar service will be critical to its success. Service must be sufficient frequent, reliable and speedy and cover the hours and days of service demanded by its market-shed. The service must also be nimble and able to adjust to changing needs and opportunity markets.

6.1 Streetcar Operations Plan

Most streetcar systems operate from 8am to 8pm seven days a week. FAX's current bus services are operated from about 6am to 9pm on weekdays and 7am to 6pm on weekdays. Route 28 which currently operated along the Fulton and Van Ness corridors operates from 6am to 11pm on weekdays and 7am to 7pm on weekends. The free downtown shuttle operates from 6am to 6pm on weekdays and does not operate on weekends.

Major activity centers that will be potentially served by the streetcar service span all seven days of the week and most hours of the day. The planned high speed rail service is envisioned to operate from 6am or earlier to midnight or later seven days a week. The Regional Medical Center is a 24 hour seven day a week operation. Its major shift is essentially from 8am to 5pm. The clinical staff tends to work 12 hour shifts with 7am to 7pm being the major shift. City College classes primarily are between 8am and 10pm weekdays.

For streetcars serving the Fulton and Van Ness Corridor it will be important to coordinate their service with conventional bus service. It makes little sense to operate a free fare streetcar service on the same streets as a full fare Route 28 bus. Thus, service on the Route 28 bus will need to be modified to complement the streetcar service. Route 28 is one of FAX's most popular bus lines and its connects Kings Canyon to Clovis via Tulare, Downtown, City College, Manchester Center, Fashion Fair, and Shaw Avenue. Route 28 will be revamped or eliminated to accommodate the planned BRT service on Kings Canyon and Blackstone. This will leave the Fulton and Van Ness Corridor between downtown and City College unserved except for the streetcar service.

This setting suggests that a Streetcar service for the Fulton/Van Ness Corridor should operate from 7am to 9pm on weekdays. On weekends service might start at 9am. For the Fresno Street Corridor service from 7am to 9pm is suggested seven days a week to serve the high speed rail station and Regional Medical Center. The 7am to 9pm operation would likely consist of three streetcars operating 14 hours a day (almost two eight hour shifts when report and turn in time is added). This totals 300 revenue hours a week of service and allowing for five annual holidays, about 15,000 revenue vehicles annually of service.

With estimated daily patronage of 1,500 to 2,000 for the Fulton/Van Ness Corridor and 2,500 to 3,000 daily for the Fresno Street Corridor this would translate to 35 to 45 average boardings per vehicle hour of service and 70 average boardings per vehicle hour of service respectively for these two corridors. These are generally within the capacities of the envisioned service.

The cost to operate this service will depend on how it is provided and local labor and other cost factors. In addition to the cost of the streetcar operators and mechanics, there are also cost associated with maintaining the track and overhead power distribution system. Average cost per revenue vehicle bus hour at FAX is approximately $100 today. The modern tram in Portland costs about 50% more per hour to operate than their buses. Thus, the cost to operate a streetcar in Fresno can be expected to run about $150 per train-hour.

At $150 per train-hour the Fulton/ Van Ness and the Fresno Street streetcar service could each be expected to cost $2.3 million annually to operate.

6.2 Streetcar Management Plan

Options exist for governance, ownership and operations management. The entity that sets policy, oversees operations, owns the equipment, obtains/distributes funds and is legally responsible are all important. Typically the city owns the equipment and is the recipient of federal and state funding for streetcar systems. Most of the streetcar options use city right of way (public streets) and thus the city has in place the governance, ownership, legal and operational resources to implement and manage a streetcar service. If the operations and capital funding for the streetcar service is from city-wide sources or conduits, the city would be the logical entity to manage and operate the streetcar. This is also true if a portion of the funds come from a local downtown assessment tax directed towards covering operating subsidies.

Portland's streetcar system is run by a non-profit group – Portland Streetcar Inc. (PSI). PSI is a group of local property owners which contracts with a management firm and then with Tri-Met for local operations. Tri-Met is the regional public transit provider of bus and light services. PSI serves as a coordinator between private and public sectors. King County Metro operates the new South Lake Union Streetcar service.

7.0 Phasing Strategy for Streetcar Implementation

Downtown could benefit from a streetcar service in the future, but current demand conditions are not strong enough to support the investment. Opening of the high speed rail service with a downtown station will increase patronage demands and associated revitalization and intensification of uses and activities downtown would further benefit to/from streetcar service. Plans currently envision high speed rail service commencing in 2020. The on-going recession, possible political changes and environmental issues might push opening back to 2025. Once the project becomes a certainty and the details of the downtown station are defined it is likely that investors will become energized and will move forward to develop projects downtown. Having a plan in place for the streetcar with its implementation defined, will further encourage higher density uses in the downtown and help to avoid future development conflicts. For example, it might help to convince developers that less off street parking will be needed, helping to make new residential units more affordable. As it typically requires five years or more to plan, design (including environmental clearances), fund and open a major transit investment project Fresno should start the process by 2015 at the latest. Desirably the process should start in 2012 at which time political, recession and other factors influencing implementation of high speed rail should be better known. The environmental studies for high speed rail are planned for completion at the end of 2011. The earlier the process begins the more a streetcar project will help the city achieve its vision for the downtown.

This strategy is prudent for the Fresno Street streetcar alternative, which directly connects the high speed rail station to the Regional Medical Center. It also is appropriate for the Tower District which will benefit indirectly from revitalization in the downtown associated with opening of high speed rail service. By 2012 more information could be developed about increased densities along the Fulton Corridor. These increased development densities would be needed to justify local and federal funding for the streetcar system.

Given the timing considerations for high speed rail to become a reality and the current depressed economic situation in downtown Fresno, it is not realistic to contemplate getting a streetcar system up and running in less than five years, particularly without the funding in place. It would be difficult to get both the federal and the local match at this time. The high speed rail station to the regional hospital would be the strongest market and should be the City's top priority line to implement once the economic situation changes. It is less clear at this time how the Fulton Mall corridor will be redeveloped and if a significant investment in revitalizing the mall would complement a streetcar alignment here.

8.0 Streetcar Financing Plan

Overview

The matrix of funding sources provides a broad overview of federal, state, and local funding programs, matching the conceptual nature of the feasibility plan for the Streetcar Project. It presents a comprehensive listing of potential sources. As the plan for the Streetcar Project is refined, it will be possible to identify funding sources that are well suited to the project. If that refinement does not occur in the short run, the revenue sources should be revisited whenever it does occur to see if eligibility requirements have changed or if there are new sources of funding available.

Regional Funding Environment

As is true throughout the state, regional and local agencies confront ongoing revenue shortfalls in funding capital projects for service expansion and revenue shortfalls for funding maintenance and operations of existing transit services. For example, in 2006 the voters in Fresno County approved an ½ cent local sales tax measure, called “Measure C.” It is projected to raise $1.7 billion over the 20 year lifetime of the tax. Currently identified needs for Measure C funding, not including the Streetcar Project, are approximately $4.6 billion or 2.7 times the funding projected to be available.

8.1 Funding and Financing Sources and Strategies

This section of the memorandum provides an overview of funding sources and strategies for streetcar construction and operations, focusing on the kinds of strategies that are most likely to be useful within the Fresno context. It also provides a qualitative assessment of the potential for value capture in a local funding strategy for Fresno.

Streetcar Funding Sources

A wide variety of funding sources and financing mechanisms are available for the development of streetcar systems, but their applicability to the Fresno Streetcar will vary depending on alignment selected and other factors. Successful streetcar funding strategies have typically included multiple local, state, and federal sources, so it is important to carefully consider the variety of potentially available and appropriate sources.

Through its work locally and nationally Strategic Economics has reviewed a broad range of funding sources and strategies that have been used (or are under consideration) elsewhere or could potentially be used to finance streetcar construction and operations. This scan of funding sources is intended to inform work in the future to develop a funding plan for the Fresno Streetcar (not part of this scope).

Table 8: Summary of Funding Sources for Streetcar Capital, Planning and Operations

Funding Source Name	Description	Permitted Use of Funding	Where Used / Under Consideration
Federal			
Congestion Mitigation and Air Quality	Funding for transportation projects that contribute to air quality improvements and reduce congestion.	Capital, Operations	Tampa, FL; Kenosha, WI
Department of Energy - State Energy Grants	Need to prove energy efficiency.	Capital	Oakland, CA
Federal Transit Act - New Starts Program	Grants for capital costs of new fixed guideway systems, extensions, and bus corridors.	Capital	Little Rock, AR
Federal Transit Act - Small Starts Program	Grants for capital costs of new fixed guideway systems, extensions, and bus corridors.	Capital	Portland, OR
Transportation and Community System Preservation	Funds for research and grants to improve the efficiency of the transportation system, reduce environmental impacts of transportation, reduce the need for costly future public infrastructure investments, ensure efficient access to jobs, services, and centers of trade, examine community development patterns and identify strategies to encourage private sector development patterns and investments that support these goals.	Planning	Little Rock, AR
Housing and Urban Development Grants	Federal source that can be used for property acquisition.	Capital	
New Market Tax Credits	Must be organization focused on low income communities.	Capital	
Economic Development Administration Grants	Can be used for infrastructure planning or construction.	Planning, Capital	
Environmental Protection Agency (Brownfields)	Used for planning brownfield redevelopment.	Planning, Capital	
Housing and Urban Development Brownfields Economic Development Initiative	Environmental remediation and property development.	Planning, Capital	
Community Development Block Grants	Funds for the benefit of low- and moderate-income persons that prevent or eliminate slums or blight, or address urgent community development needs.	Planning, Capital	

Funding Source Name	Description	Permitted Use of Funding	Where Used / Under Consideration
Federal, continued			
Housing and Urban Development Section 108 Loans	Can be used same as CDBG, property acquisition, rehabilitation of publicly owned property, construction or reconstruction of public facilities including street, sidewalk, and other site improvements.	Capital	
Urbanized Area Formula Grant	Makes Federal resources available to urbanized areas and to Governors for transit capital and operating assistance in urbanized areas and for transportation related planning.	Capital	
Surface Transportation Program	Flexible funding that may be used (as capital funding) for public transportation capital improvements, among other uses.	Capital	
Federal Transit Act - Livable Community Grants	Livable Communities Initiative encourages transportation agencies and local governments to introduce proposed transportation improvements to communities in the early stages of the planning process.	Planning	Little Rock, AR
Federal Transit Act - Urban Circulator Grants	Grants for capital costs of new fixed guideway systems, not to exceed $25 million.	Capital	
State			
Intermodal Development Fund	State funding for major capital investments in public rail and fixed-guideway transportation facilities and systems which provide intermodal access.	Capital	Florida
License Fee and Title Registration Fees	Tax assessed annually on each vehicle owned.	Capital, Operations	California, Other States
Local Option Gas Tax	Sales tax on gasoline.	Capital, Operations	California
Local Option Transit Tax	Usually a sales tax .	Capital, Operations	Charlotte, NC; Denver, CO; Miami,
Motor Vehicle ExciseTax	Sales tax on motor vehicles, dedicated to transportation.	Capital	Minnesota
State Capital Funding	State bond programs.	Capital	North Carolina, California
State Infrastructure Bank	Low interest loans provided to finance public infrastructure .	Capital	Florida, California
Tax Abatement Reallocation	Similar to tax increment financing, revenues from a tax collected by a City can be held for a designated use.	Capital	Minnesota
Transportation Development State Sales Tax	Statewide sales tax with revenues designated for transportation purposes.	Capital	California
Vehicle Property Tax	Tax assessed on the value of motor vehicles.	Capital, Operations	Massachusettes

Funding Source Name	Description	Permitted Use of Funding	Where Used / Under Consideration
Local and Regional			
Local/Regional Sales Tax	Sales tax imposed by local government.	Capital, Operations, Planning	
Transit Occupancy Tax	Revenues generated from hotel stays.	Capital, Operations, Planning	
Rental Car Tax	Sales tax imposed on rental cars.	Capital, Operations, Planning	Wisconsin
Convention Center Rental Tax	Charge for use of convention center.	Capital, Operations, Planning	
Event Ticket Tax	Charge added to event tickets.	Capital, Operations	Columbus, OH
Restaurant Tax	Charge added to restaurant bills.	Capital, Operations	
Utility Users Tax	Charge for transit added to utility bill.	Capital, Operations, Planning	
Parking Revenue	Revenues from parking meters or structures.	Capital, Operations, Planning	Portland, OR
Parking Surcharge	Charge added to parking fees, designated for transit / transportation purposes.	Capital, Operations, Planning	
Transit Pass Program / Farebox	Revenues generated from rider fares.	Capital, Operations, Planning	
Philanthropic Donations / Foundation Grants	Private money gifted for transit program.	Capital, Planning	Galveston, TX; Detroit, MI
Redevelopment / Tax Increment Financing (TIF)	TIF freezes the property tax revenue at its “base rate” in the current year, and diverts any additional tax revenue each year into a separate pool of money used to finance the improvements.	Capital	Portland, OR

Funding Source Name	Description	Permitted Use of Funding	Where Used / Under Consideration
Local and Regional, continued			
Assessment District	Revenues from district established to provide improvements and assess property owners.	Capital, Operations, Planning	Tampa, FL
Business Improvement District	District established to provide special services	Capital, Operations, Planning	Seattle, WA; Portland, OR
Community Facilities District	Revenue from special taxes imposed to finance public facilities with debt secured by a lien on property within the district.		
Development Impact Fees / In Lieu Fees	One-time charge to new development for the construction of public capital improvements to mitigate for impacts of development.	Capital	Tampa, FL
General Obligation Bonds	Revenue generated from municipal bonds backed by property taxing power of local government.	Capital	
Naming Rights	Revenue generated from sponsorship or naming of the system, cars, or shelters for a fee.	Capital, Operations	Portland, OR; Seattle, WA; Tampa, FL
Vehicle and Shelter Advertising	Revenue generated from monthly advertising on interior/exterior of cars or shelters.	Capital, Operations	Portland, OR; Seattle, WA; Tampa, FL
Vehicle Air Pollution Fees	Air Quality Management Districts levy a tax on vehicles	Planning	California
Energy Development Grant	Energy efficiency.	Capital	Cincinnati, OH

8.2 Funding and Financing Strategic Issues

This section highlights key potential funding sources and strategic issues for consideration in Fresno. All strategic issues presented here would need to be addressed in a financing strategy for the streetcar.

Federal Sources

Federal sources have made significant contributions to other streetcar projects. Other recent streetcar projects have received federal funding ranging from 10 to over 50 percent of total project costs.

Federal contributions to streetcar projects are likely to come from the Federal Transit Administration, which has recently established new funding programs and policies that make funding for streetcars more accessible, including the Urban Circulator Grants, which are providing grants up to $25 million for fixed guideway systems. The most recent funding cycle is closed, but this new source of funding demonstrates the type of urban livability project funding that could be available for projects that have local support in place.

In recent experience the Federal Transit Administration has provided funds to streetcar projects in other cities for up to 50 percent of the capital costs or $25 million, whichever is lowest. There have been exceptions to this practice, but $25 million is currently a reasonable assumption for a federal contribution to a good project. Downtown Fresno is not a highly visible downtown, but linking the streetcar to the high speed rail program and to the City of Fresno's investments in the downtown should help obtain federal funding.

In order to qualify and be competitive for such federal funding, Fresno would need to be prepared to assemble a significant local contribution. It is unlikely that federal funds will be made available to a project that does not have adequate local support to generate a significant financial contribution.

Local Funding Sources

Local funding of other streetcar projects came from a wide variety of sources, including bonding against future city parking revenue in Portland, local development impact fees in Tampa, and a local improvement district in Seattle. Streetcar financing typically requires a broad patchwork of funding sources. Potential local sources of funding and financing for Fresno with the potential to pay for infrastructure and that should be further studied are described below.

Property-Based Sources

To date, the most significant local contributions to financing streetcars have come from capturing the value from new development. Potential property-based sources are:

- **Tax Increment Financing:** Most of the areas adjacent to the two alternative alignments under consideration lie within various project areas of the Fresno Redevelopment Agency. Therefore, tax increment financing (TIF) should be considered a potential funding source for the streetcar.
- **Community Facilities District:** Outside of a tax increment financing approach, the most common debt financing mechanisms for major infrastructure improvements such as a streetcar or other circulator is the Mello-Roos, also known as a Community Facilities District (CFD), or a benefit assessment district. The CFD allows the City to issue a bond that covers the cost of making infrastructure improvements, in exchange for payment of an annual fee by each property owner, which is usually set on a per-unit and/or per-square-foot basis. The boundaries of a CFD can be drawn in any way, but would usually include properties that are set to benefit from the improvements being made. A

CFD requires a two-thirds majority vote of residents living within the proposed boundaries. Because of that approval requirement, however, the Mello-Roos or CFD is most commonly used where there are a limited number of property owners.

- **Assessment District:** An Assessment District is conceptually similar to a CFD, but is less flexible. An Assessment District allows the city to issue a bond against special assessments on included properties, but can be difficult to establish since the assessment must be directly proportional to the benefits received. Also, an assessment district is a direct lien on included properties for bond repayment rather than the CFD's tax-based lien. Assessment Districts are frequently used to help fund streetcar projects.
- **Business Improvement District or Property Based Improvement District:** A Business Improvement District (BID) assesses businesses, and a Property Based Improvement District (PBID) assesses businesses and property owners. BIDs and PBIDs are formed via a vote of potential members and most often support maintenance, safety, and marketing efforts for the district. However, BIDs and PBIDs can be used to support improvements, especially operating expenses.

Other Local, Regional, and State Sources

- **Measure C:** Fresno County voters originally approved Measure C for transportation purposes in 1986. Measure C was extended beyond its original 20 year term in2007. This half cent sales tax is projected to generate $1.7 billion in new revenues for transportation improvements through 2027. About a third of the projected revenues, or $593.6 million, is designate for the Local Transportation Program with the goal of improving the local transportation systems of the cities in Fresno County. As mentioned previously in this report current identified needs for Measure C funding, not including the Streetcar Project, exceed the funding projected to be available.
- **Parking Revenue:** A streetcar has the potential to make management of parking more efficient, thus enabling new development and enhanced retail competitiveness without a proportional growth in parking need. Such parking efficiencies could provide a source of funding for both capital and operating needs. Parking revenues have been a significant source of funding for several other streetcar systems. In Portland, parking garage bonds and other parking revenues played a significant part, making up over half of the funding.
- **Advertising and Naming Rights:** Other streetcar systems have generated revenue from selling sponsorships or naming rights to the system, cars, or shelters and from advertising on shelters or on the interior or exterior of cars. Advertising revenue can be used for operating costs. In Tampa, the streetcar received $1 million for naming rights to the entire system as well as $250,000 for naming rights to a car and $100,000 for naming rights for eight of ten station stops.2 Shelter and car advertising provides ongoing operations funding in Portland, Seattle, and Tampa.
- **Institutional Cooperation:** The City could partner with institutions that would contribute to the construction and /or operation of the streetcar, including Fresno City College and the Community Regional Medical Center.

There are many creative local sources that can potentially offer funding for operations for the streetcar and encourage ridership, including:

- Naming rights for public facilities.
- Shelter advertising.
- Streetcar passes in exchange for increased parking fees.
- "Energy efficient" rebates on utility bills in exchange for purchase of streetcar passes.

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2 *Street Smart: Streetcars and Cities in the Twenty First Century, 2009.*

Next Steps

Given the likely cost of the streetcar project, it is prudent to begin thinking about funding now. In order to be eligible for certain types of funding, the project must take steps to be included in regional planning documents. Specifically, in order to be eligible for federal funds, the project must be in the Transportation Improvement Program/Federal Transportation Improvement Program (TIP/FTIP) and the Regional Transportation Plan (RTP).

During the next development phase of the Streetcar Project, a more refined funding strategy should be built. The strategy will be a road map that targets specific revenue sources and includes an advocacy component. Through additional analysis, a better understanding of the capacity of existing revenue sources to absorb the Project's capital and operating costs would be developed, as well as plans to close any funding gaps. During this phase, the opportunities for private funding should be considered, as well as new sources of local funding such as redevelopment areas, new sales tax measures, and the implementation of a Vehicle Registration Fee.

Appendix A

Table 8: List of Key Businesses/Destinations Along Downtown Fresno Streetcar Alignment

No.	Name	Address	Type
1	Broadway Lofts	1625 Broadway Street	Key Destination
2	Luau Restaurant	1663 Fulton Street	Streetcar-Supportive Business
3	Fresno Farmers Market	1612 Fulton Street	Streetcar-Supportive Business
4	Arte Americas	1630 Van Ness Avenue	Streetcar-Supportive Business
5	Jon Jon's Grand Central Station	1432 H Street	Streetcar-Supportive Business
6	Broadway Studios	1416 Broadway Street	Key Destination
7	KJWL Radio	1415 Fulton Street	Streetcar-Supportive Business
8	Warnors Theater	1400 Fulton Street	Key Destination
9	CVS Pharmacy	1302 Fulton Mall	Streetcar-Supportive Business
10	Mezcal Bar and Grill	1310 Van Ness Avenue	Streetcar-Supportive Business
11	Packing Shed Restaurant	2119 Merced Street	Streetcar-Supportive Business
12	America's Best Value Inn	2425 Merced Street	Streetcar-Supportive Business
13	Parsley Garden Café	1237 Fulton Mall	Streetcar-Supportive Business
14	Rotary Amhitheater	2135 Fresno Street	Key Destination
15	Fresno Chamber of Commerce	2331 Fresno Street	Key Destination
16	Legion of Valor Museum	2425 Fresno Street	Key Destination
17	Community Regional Medical Center	2823 Fresno Street	Key Destination
18	Fresno County Office of Education	1111 Van Ness Avenue	Key Destination
19	Fresno County Plaza / Downtown Transit Center	1101 M Street	Key Destination
20	Fresno Water Tower Center	2444 Fresno Street	Key Destination
21	United States Government: Federal Office Building	2500 Tulare Street	Key Destination
22	Fresno City Hall	2600 Fresno Street	Key Destination
23	Los Panchos Restaurant	1000 Fulton Mall	Streetcar-Supportive Business
24	Downtown Association of Fresno	2014 Tulare Street	Key Destination
25	US Post Office / Fresno Unified School District	2309 Tulare Street	Key Destination
26	Fresno County Library	2420 Mariposa Street	Key Destination
27	State of California - Fresno Office	2550 Mariposa Mall	Key Destination

No.	Name	Address	Type
28	Coney Island Restaurant	1906 Tulare Street	Streetcar-Supportive Business
29	Club Brazil Restaurant	968 Broadway Street	Streetcar-Supportive Business
30	Tommy's Restaurant	944 Fulton Mall	Streetcar-Supportive Business
31	Galeria Mexico	932 Fulton Mall	Streetcar-Supportive Business
32	Kikku Japanese Food	2336 Tulare Street	Streetcar-Supportive Business
33	Downtown Association of Fresno	2014 Tulare Street	Key Destination
34	Fresno County Offices	2221 Kern Street	Key Destination
35	Downtown Express	915 N Street	Streetcar-Supportive Business
36	Sushi Hana	2321 Kern Street	Streetcar-Supportive Business
37	Lily's Café	2326 Tulare Street	Streetcar-Supportive Business
38	Shepherd's Inn Restaurant	935 Santa Fe Avenue	Streetcar-Supportive Business
39	US District Court	2500 Tulare Street	Key Destination
40	Fresno Amtrak Station	2650 Tulare Street	Key Destination
41	Joe's Steak House & Grill	831 Van Ness Avenue	Streetcar-Supportive Business
42	Hero's Sports Lounge & Pizza	820 Van Ness Avenue	Streetcar-Supportive Business
43	Super 8 Motel	2127 Inyo Street	Streetcar-Supportive Business
44	Downtown Club	2120 Kern Street	Streetcar-Supportive Business
45	Fresno Convention & Entertainment Center	848 M Street	Key Destination
46	Radisson Hotel & Conference Center Fresno	2233 Ventura Street	Streetcar-Supportive Business
47	Bobby Salazar's Mexican Restaurant	2405 Capitol Street	Streetcar-Supportive Business
48	Mecca Billiards	732 Fulton Street	Streetcar-Supportive Business
49	Fig Tree Gallery	644 Van Ness Avenue	Key Destination
50	Selland Arena	700 M Street	Key Destination
51	Holliday Inn Fresno Downtown Hotel	1055 Van Ness Avenue	Streetcar-Supportive Business
52	Basque French Bakery	2625 Inyo Street	Streetcar-Supportive Business
53	Canteen of Fresno Inc.	527 L Street	Streetcar-Supportive Business
54	Yeraz Restaurant	2348 Ventura Street	Streetcar-Supportive Business
55	Holy Trinity Armenian Apostolic Church	537 M Street	Key Destination
56	Valley Lahvosh Baking Co.	502 M Street	Streetcar-Supportive Business

No.	Name	Address	Type
57	First Presbyterian Church	1540 M Street	Key Destination
58	Wells Fargo Bank	1206 Van Ness Avenue	Streetcar-Supportive Business
59	African American Museum	1857 Fulton Street	Key Destination
60	Downtown Transit Center	n/a	Key Destination
61	Proposed High Speed Rail Station	n/a	Key Destination
62	Chukchansi Park	n/a	Streetcar-Supportive Business
63	US Internal Revenue Service (IRS)	2525 Capitol Street	Streetcar-Supportive Business
64	Fresno County Superior Court	255 N Fulton Street	Key Destination
65	Fresno Police Department CU	1004 N Van Ness Avenue	Streetcar-Supportive Business
66	Tower District (Tower Theater, Restaurants, Businesses)	n/a	Key Destination
67	Fresno City College	1101 University Avenue	Key Destination
68	Fresno High School	1839 Echo Avenue	Key Destination
69	San Joaquin Memorial High School	1406 N Fresno Street	Streetcar-Supportive Business
70	La Estrella Market	449 N Fresno Street	Streetcar-Supportive Business
71	Fresno Central Market	294 N Fresno Street	Streetcar-Supportive Business
72	Port of Subs	264 N Fresno Street	Streetcar-Supportive Business

C. Personal Rapid Transit Test Case

Assessment of New Technologies: Personal Rapid Transit

INTRODUCTION

This section presents the results of the assessment of new technology in transportation. Specifically, the application of Personal Rapid Transit (PRT) or Group Rapid Transit (GRT) in appropriate locations within the Fresno metropolitan area. This section describes PRT, explains its relationship to the PTIS and Measure C, summarizes a case study application of PRT at California State University Fresno, and presents a procedure identifying applications for PRT in Fresno County.

he PTIS' assessment of PRT is intended as an objective evaluation of the technology's feasibility and an analysis of the types of applications it might have in Fresno County. This section does not delve deeply into the technology and operational characteristics of PRT. The appendix contains a technical report on the development of the CSU Fresno prototype and many additional technical resources may be found on the internet.

What is Personal Rapid Transit?

PRT is a form of public transportation that operates on a network of fixed guideways using small cars intended to accommodate an individual or a single party of travelers, typically carrying no more than four to six passengers per car (see Figure B1). PRT is distinguished from other forms of transit by being completely automated and providing non-stop service to the passenger's destination. Similar to other types of fixed guideway transit, like Light Rail Transit or subways, PRT uses stations. However, PRT stations are located on sidings off of the main guideway that allow cars in service to bypass stations. See sidebar for guidelines that define true PRT.

According to the proponents of PRT, this system of direct personal travel provides the following benefits as compared to conventional forms of public transportation (Komerska, 2007).

- Customer-oriented approach which provides on-demand non-stop service anywhere in the network and which allows the individual the privacy to travel alone or in a small group.
- Automated vehicle control and station fare collection which reduces labor operating costs.
- Higher seat-utilization than other forms of mass transit which yields increased operational revenues.
- Minimal stop-and-go travel, thereby reducing travel time and increasing customer appeal.
- Reduced guideway size and right-of-way requirements due to smaller vehicles and dynamic loading effects; reducing guideway costs and visual impact.
- Reduced station size resulting from smaller vehicles, high station densities, high station vehicle throughput and real-time allocation of vehicles; reduce station costs and visual impact.
- Feasible with off-the-shelf technology, due in part to advances in vehicle propulsion, lightweight materials, solid state electronics, automated fare collection and passenger handling, and computer control.

Figure B1. The ULTra PRT System Vehicle as deployed at London Heathrow Airport.

- Ability to be implemented in an incremental manner; beginning as a single loop, networks can evolve into comprehensive systems as demand warrants.

PRT is not a long-range transit system. It is often called a "last mile solution" because it is intended to transport people from one mode of transportation to their final destination or from place to place within an area that, while compact, may be too far to walk. Common examples of PRT applications are from airport parking lots to terminals, from train stations to central business districts, or as a circulator with a central business or large office campus. **Figure B2** illustrates a conceptual application of PRT within a central business district connecting public transportation, parking, and key destinations.

To date, PRT as a form of public transportation with multiple lines and closely-spaced stations as defined above has yet to be constructed in the United States[1]. Despite this fact, PRT remains an active topic within the transportation planning and engineering profession and some municipalities and agencies are currently studying the feasibility of PRT or GRT applications.

The PTIS PRT assessment includes a similar technology called Group Rapid Transit (GRT). GRT is much like PRT but employs vehicles with greater passenger capacity and serves groups with different origin-destination pairs, similar to other forms of fixed-guideway systems. As a result GRT may have fewer non-stop trips than PRT but still experiences fewer stops than conventional fixed guideway systems which stop at every station. GRT has different applications than PRT such as venues where high numbers of passengers need to be moved in a short period of time (i.e., a stadium after a sports event). The application criteria developed in the PTIS distinguishes between applications for PRT and those for GRT.

WHAT IS PERSONAL RAPID TRANSIT?

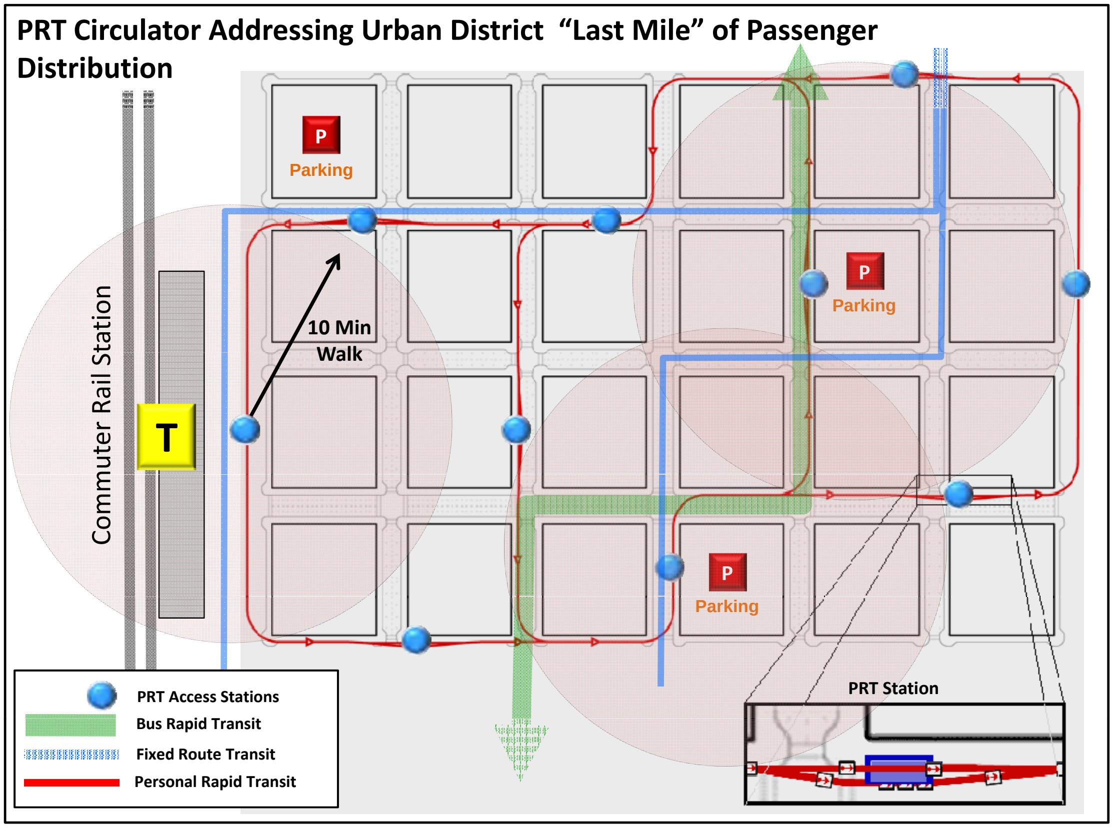
Personal Rapid Transit (PRT) is a form of public transportation known as Automated People Movers (APMs). The Advanced Transit Association, an organization that advocates the research, development, and commercial application of PRT, adopted the following guidelines that define a true PRT system.

1. Fully automated vehicles capable of operation without human drivers.
2. Vehicles operate on an exclusive fixed guideway.
3. Small vehicles available for exclusive use by an individual or a small group, typically 1 to 6 passengers, traveling together by choice and available 24 hours a day.
4. Small guideways that can be located aboveground, at ground level or underground.
5. Vehicles able to use all guideways and stations on a fully coupled PRT network.
6. Direct origin to destination service, without a necessity to transfer or stop at intervening stations.
7. Service available on demand rather than on fixed schedules.

Source: The Advanced Transit Association (ATRA).

[1] *The only "PRT type" of transit technology that has been in service for a number of years is currently operating at West Virginia University in Morgantown. However, the original manufacturer, Boeing Aircraft Company, never developed the technology further following this single project in the 1970's.*

Figure B2. Schematic illustration of a conceptual PRT application in an urban downtown



Overview of Measures C Funding for New Technology

The Regional Public Transit Program of the Measure C Expenditure Plan allocates reserve funding for New Technology Reserve. This funding allocation (about 2% identified in the Final 2006 Measure "C" Extension Expenditure Plan) is available to be programmed for efforts needed to implement transit technologies such as Personal Rapid Transit (PRT) or similar advanced public transportation. The expenditure plan identifies the need for a detailed feasibility study and identification of a timeframe or the funding reserve may revert to other programs. The PTIS is one of the mechanisms for evaluating the feasibility of PRT.

Objective

The objective of the PRT assessment is to describe to Fresno County's decision-makers the requirements to implement such this new technology from a technical and cost perspective and to identify and evaluate potential applications. The technical and cost description is based on a detailed prototypical application of PRT at the California State University Fresno campus. Potential applications are based on criteria developed by the PTIS consultants using their experience, professional judgment, and available international research on PRT applications.

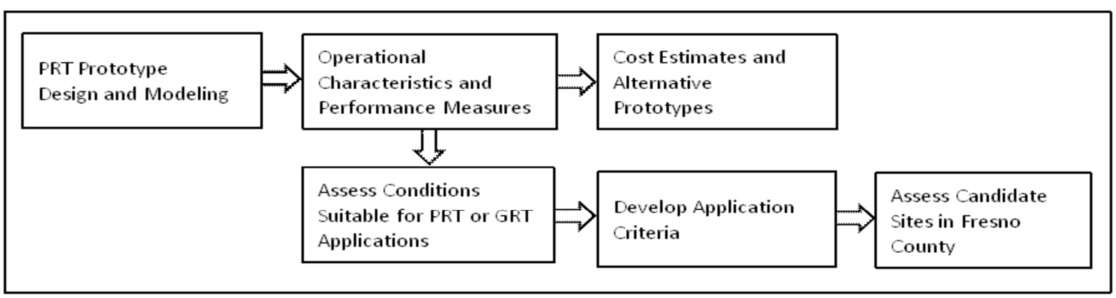
The outcome of the PRT assessment is intended to provide the County with a tool to assist in determining the use of the Measure C New Technology Reserve. The assessment is not intended to determine if PRT is feasible or infeasible; nor is it intended to recommend a definitive application of PRT in Fresno County.

Scope of PRT Evaluation

Assessment Process

The consultant team established the process shown in Figure B3 to assess PRT applications in Fresno County.

Figure B3. Steps in the PRT assessment process.



The process is comprised of two parallel tracks, one track to develop a technical model and a second track to develop the application criteria. The technical track feeds operational and performance characteristics into the development of application criteria.

The process began with the development of a prototypical PRT system at an actual Fresno location (California State University Fresno was selected) to develop operational characteristics and cost estimates. The operational and performance characteristics of the prototype determined the conditions suitable for PRT or GRT which were the basis of the application criteria. The application criteria were applied at candidate sites to test the operational feasibility of PRT in Fresno. The steps in the process are described in more detail in the following sections.

Develop Prototypical PRT System

Simulating a PRT application at the CSU Fresno campus analyzes the operational characteristics, cost implications, and transit user benefits of this emerging, advanced transit technology. However, no PRT system has ever been designed, constructed, and operated on the scale or complexity of the CSU Fresno prototype or some of the other potential applications being considered for Fresno. Therefore, the PTIS' approach used a simulation model of a specific location under hypothetical demand and operational conditions, to develop metrics for assessing PRT in other locations within the Fresno region. The simulation-based performance and operational information also assisted in preparing estimates of capital, operating and maintenance costs, as well as ridership and level-of-service which can be compared against conventional forms of public transportation.

The PTIS consultant team worked with CSU Fresno planners to define a PRT system that would provide a campus access and circulation function. The goals of the conceptual campus PRT system are to:

- Connect the planned new campus intermodal transit station on Shaw Avenue with all parts of the main campus.
- Connect the parking facilities around the perimeter of the campus with all parts of the main campus.
- Connect all parts of the main campus with university property on the fringe; the CSU sports complex on the west side and the Save Mart Center/Student Recreation Center on the east side.
- Provide an internal circulation function within the main campus to serve students moving between classes.
- Provide a more convenient access to the main campus from nearby student housing areas to the west and northwest of the main campus.
- Connect the main campus with the new Campus Pointe mixed use development adjacent to Save Mart Center.

The length of the PRT track system (guideway) and the number of stations (the physical attributes) of the CSU Fresno prototype listed below are benchmarks for reference as other potential dense urban settings are evaluated for PRT applications.

- Number of Stations: 20
- System Route Miles: 5.3
- Stations per Route-Mile: 3.8

The physical attributes of the campus model reflect the way that the PRT system would fit into a typical urban district which has a moderately dense cluster of destinations. The prototype then serves as a template for approximating PRT systems in other urban locations which have a mix of moderate and low demand stations, combined with a few high demand generators that must be served by multiple stations, within a mixed-use environment such as a central business district, a large office campus, or a sprawling mixed-use area.

Application Criteria for Implementing PRT in Fresno County

Not all contexts and conditions are suitable for PRT or GRT. Certain conditions should exist (or will exist) to 1) incent people to use the system, and 2) justify the cost of constructing and maintaining the system. A small town central business district consisting of several blocks within a few minutes walk is an obvious example of a context not suitable for PRT. Other contexts may not be suitable for PRT but may be suitable for GRT.

Development of the application criteria first explored the conditions (operational, physical, environmental) that are suitable for PRT or GRT then examined the types of "places" or contexts in these conditions exist. The conditions and their associated contexts are described below.

Conditions Suitable for Personal Rapid Transit

The following lists operational or contextual conditions where PRT might be a viable transportation option:

- Uniform and continuous demand for travel between origins and destinations.
- Random arrival of demand at stations (no surges at regular intervals).
- Walk distance between origins and destinations typically exceeds 10-15 minutes.
- Existence of physical barriers that either significantly increases walking distance, create an undesirable or insecure environment for pedestrians, or require the use of motorized transportation to overcome (e.g., freeway, river, steep topography).
- Locations where there is a need to minimize land used for parking or automobile circulation due to cost of land, need for higher densities, or other factors.
- Connectivity between one transit system and another, particularly where the transfer of luggage is required.
- Locations where public transportation requires grade-separation (e.g., need land for denser development, or to avoid conflicts with pedestrians and bicyclists).
- Locations where access to the interior of buildings is desirable (e.g., hospitals, or places with inclement weather).
- Property with a single owner or developer interest where it is less challenging to build consensus on the configuration, or share the costs of, a significant and permanent fixed guideway system.

Conditions Suitable for Group Rapid Transit

While GRT shares some of the conditions that make PRT viable, GRT has its own distinct list of conditions. The following lists operational or contextual conditions where GRT might be a viable transportation option:

- Locations where there are peaked surges of demand such as sporting events.
- Employment sites with remote parking and/or regular shift changes where many people travel between worksite and parking at the same time.
- Locations or corridors where there is very high demand between a single origin and destination similar to the line haul function of a bus system.
- The need to connect adjacent activity centers that are outside a reasonable walking distance or are separated by barriers.

Place Types Suitable for PRT / GRT

The operational and contextual conditions listed above were distilled into place types (individual facilities, institutions, or districts) in which PRT or GRT might be considered.

- **Major activity center(s) –** multi-use districts or multiple adjacent activity centers where users link trips, but distance are too far to walk. Examples include regional shopping centers.
- **Sprawling mixed–use districts –** large areas of separated, but diverse, land uses where there is demand to travel between the uses. Typically such districts have areas of high density residential, shopping, entertainment, and employment.
- **Very large institutional or corporate campus –** locations comprised of a single entity or type of land use where there is travel demand between the uses, but because of design, size, topography or environment the destinations are too widespread for convenient walking. Examples include regional medical centers and surrounding offices, college campuses, and business parks.

- **Downtown with widespread venues –** central business districts of large cities where diverse uses are widespread or where there is demand to connect to relatively distant outer districts or facilities such as stadiums, convention centers, shopping or entertainment districts.
- **Remote parking for major employers, and events –** locations or individual facilities with remote parking typically outside reasonable or convenient walking distance such as sporting venues, convention facilities, corporate campuses, or regular large special events.
- **Connecting major travel modes to other destinations –** especially connecting rail stations (which are fixed by the location of the railroad line) with other nearby destinations or other modes of travel such as major bus transfer centers or other rail stations.
- **Large Communities on Urban Fringe (Edge Cities) –** new high growth communities outside of the established metropolitan edge or un-served by public transportation may be planned with PRT or GRT to connect its internal activity centers, particularly growth areas planned under new urban principles.

Case Study Selections

The PRT assessment includes the evaluation of potential applications in the Fresno metropolitan area where the place types described above are likely to exist. This section identifies the case study place types that were selected. A subsequent section provides a brief evaluation of each case study site and expands on a case study which was found to be the most viable location for the application of PRT.

In addition to the CSU Fresno prototype case study, the place types identified for Fresno-specific case studies include the five listed below. Some of these candidate case study types contain multiple place types and thus the five types below address nearly all of the place types identified in the previous section.

- Major activity center (office/retail/entertainment/high-density housing)
- Downtown / Central Business District
- Regional medical center and surrounding medical-related districts
- Individual compact residential / commercial development
- Large-scale new town on fringe of metro area

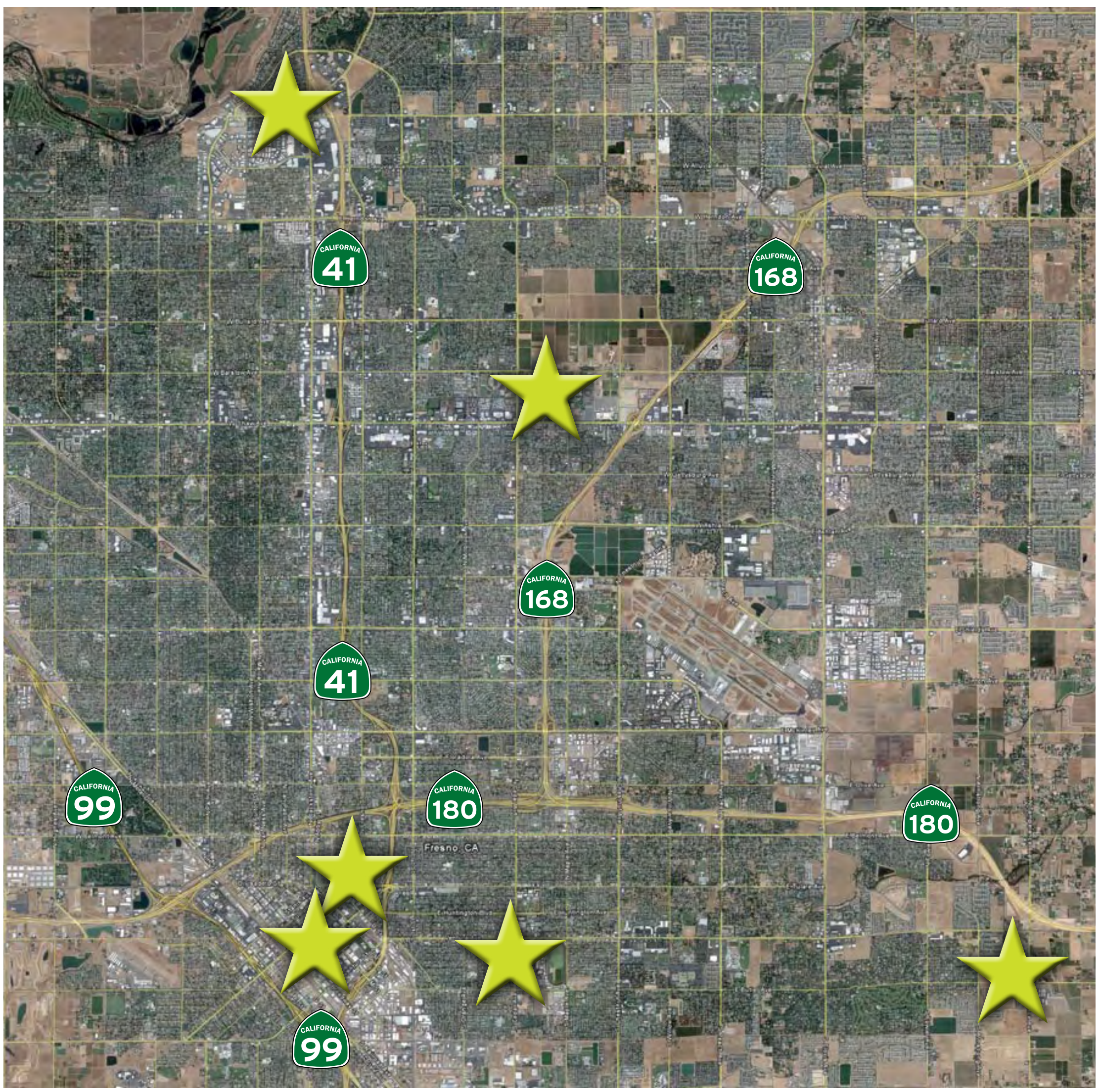
Figure B4 identifies the general location of the five case studies and CSU Fresno within the metropolitan area.The section on Selecting and Evaluating Case Studies identifies the specific locations that were explored under each of the place types identified above.

AN OVERVIEW OF PERSONAL RAPID TRANSIT AND APPLICATIONS

Findings of the CSU Fresno PRT Prototype

The study of a hypothetical PRT system on the campus of CSU Fresno has proven useful for the analysis of PRT for larger urban settings, since it provides a pedestrian intensive environment with a well defined pattern of trips throughout the day. As a prototype, CSU Fresno represents two conditions that need to be assessed in order to evaluate a range of place types. The campus' trip patterns have origin/destination pairs that exhibit both 1) high surge flow conditions, and 2) more distributed and random flow conditions. The study of both conditions is useful for assessing PRT in a diversity of urban applications.

Figure B4. General Location of Case Study Sites Within the Fresno Metropolitan Area



Summary of Key Findings

This section provides a high level summary of the key findings of the evaluation of the prototype CSU Fresno PRT system.

- PRT on the CSU Fresno campus is technically feasible to construct and operate. There is space for the guideway system, stations, storage and maintenance facility and other ancillary fixtures. It can be operated efficiently and would capture about 17% of the daily pedestrian travel that occurs on campus.
- The PRT system, as designed and rested in concept, provides high level of service. It can accommodate a moderate proportion of the campus' daily pedestrian travel between classes, and between parking and the main campus. It can also be configured to accommodate high demand sporting events or special events at the Save Mart Center. Finally, it can connect all of the campus' points to the Campus Pointe development and a transit intermodal center on Shaw Avenue.
- The size of the system (number of vehicles and stations) was challenged in attempting to accommodate peak surges of riders at class change and, as a result, passengers experienced delay during the peaks, and the system incurred extra cost for more vehicles and track.
- The analysis determined that walking competes with PRT. In addition to the general youthfulness of the majority of riders, campus parking is relatively close to most campus destinations, and because the interval between classes is short, delays caused peak surges resulted in competitive travel times with walking. This issue could, in part, be resolved with using GRT rather than PRT on high demand segments of the system.
- Because many of the campus' trips travel similar origin-destination pairs, some segments of the system could more effective by using GRT based on a line-haul function with connecting loops of PRT for less traveled routes.
- The cost of the system ($265 million or about $25 million per mile, see next section for details) may appear cost-prohibitive. However, the prototype was designed to meet peak demands at class change to the extent possible and therefore required a substantial number of stations and vehicles which added dramatically to the cost. The appendix contains an alternative case study—the "Condensed Parking" scenario—which looked at a smaller system (reduced by 1.8 miles of guideway), fewer stations, and a focus on moving people between the main campus and parking[1]. This alternative case study resulted in about the same ridership and other similar metrics as the full system but at a lower cost ($215 million).
- It is important to note that because a PRT system has never been constructed in the United States and the technology is advancing quickly but still evolving, estimates of cost, by the nature of an evolving technology, are high. However, as with any technology, once PRT as several commercial applications and multiple manufacturers are competing for the design and implementation of systems, the costs are expected to reduce dramatically to a point similar to ULTra's $7 to $15 million range, competitive with Light Rail Transit, streetcar, and high-end Bus Rapid Transit. The timing of such advancements may be a decade or more or only a few years depending on successful trials in Europe and the United States and customers willing to invest in such a system.

1 The Condensed Parking case study reflects a 2025 future demand scenario and models a modified configuration of the basic PRT system in which the scale of the alignment and the area served by the system is reduced. In the reduced scale system the eastern loop that had served the Campus Pointe development has been removed. Similarly, the western loop that served the stadium and athletic complex has also been removed, leaving only the core campus and the Save Mart Center with direct PRT system access/circulation.

PRT Model Development

University planners and their master planning consultant team collaborated with the PTIS consulting team to prepare sketch-planning level alignment studies. These studies, combined with site visits to investigate the campus layout, led to the development of a baseline configuration reflecting the ultimate buildout of a PRT network serving the campus. To represent a represent a lower cost first phase of PRT implementation the ultimate network was scaled down. This variation of the full prototype is presented in the technical documentation of the PTIS report.

The CSU Fresno campus was selected as the location for a prototype design because it has the attributes listed below which produce conditions suitable for PRT:

- Large campus environment
- Very high on-site walk demand between campus locations
- Walk demand spread over the entire campus (wide geographic distribution of trips)
- Parking is relatively distant from campus core and spread over entire campus
- Distance between some campus facilities exceeds the maximum walk distance
- Regular special events with peaked demand are held on campus (e.g., Save Mart Center, sports events)
- The campus is served by external transit with a common transfer point
- The campus has land for expansion and is developing a nearby mixed-use districts

Figure B5 shows the alignment analyzed for operational performance and passenger service levels. The baseline system comprised a double guideway loop that ringed the center of the campus where the majority of the classroom buildings are located, with several station sidings located along its length. Extending across this campus loop were three single-guideway connectors to serve stations internal to the main loop – one on the east end, one central to the campus, and one on the west end. Also extending outside the double-guideway loop were additional single-guideway loops that served Save Mart Center and Campus Pointe on the east, the parking facilities on the northwest edge of the campus, and the west stadium area. Although a number of additional possible configurations could have been developed the conceptual system shown in Figure B5 was sufficient for analyzing PRT in general.

Figure B5. Conceptual PRT system developed for California State University Fresno campus.

Future PRT Modeling Results

This section summarizes a variety of operational metrics and performance measures for the Year 2025 future conditions scenario. Trip demand that drives this scenario represent a hypothetical class schedule for student and faculty person-trips in 2025, approximated by factoring the 2009 class schedules using a 34.5% growth rate. The PRT ridership person-trip activity not only represent an escalation of student person-trip activity for the future year, it also represents an assumption that 20% of the regional access trips come by way of FAX transit to the proposed new intermodal center on Shaw Avenue. Table B1 presents the operational metrics drawn from the computer models for the future conditions scenario.

Table B1. Summary of Operational Metrics for CSU Fresno Campus PRT System

Operational Metric	Year 2030 Campus Conditions
Operating Mode	Shared ride service
Daily Ridership	14,249 people
Total Daily Pedestrian Trips on CSU Fresno Campus	86,086 person-trips
Share of Total Daily Pedestrian Trips Using PRT	17 percent
Fleet Size Requirement	140 vehicles
Average Wait Time to Board PRT Vehicle	2.3 minutes
Average Trip Time [1]	5.95 minutes
Average Travel Time from Departure to Arrival	3.58 minutes
Vehicle Miles Traveled [2]	10,028 miles
Passenger Miles Traveled	11,253 miles
Average Trip Length	0.79 miles
Average Vehicle Occupancy [3]	2.33 passengers
System Capital Cost (see cost section below) [4]	$265,000,000
System Operations & Maintenance Cost [4]	$3,100,000

Notes:
[1] Including wait in the station to board.
[2] Including both empty vehicles and vehicles carrying passengers.
[3] Empty vehicles not included in the averaging.
[4] In 2010 dollars. See section on Estimated Operations and Maintenance Costs below.
Source: Kimley–Horn and Associates, Inc.

Comparison of PRT and Alternative Modes of Transportation

In this case study, implementing PRT has the highest cost when compared to alternative forms of campus circulators or with the current form of on-campus transportation – walking. Table B2 compares the capital construction and operating costs of three types of transit system that might be considered for large area circulators: trolley bus, streetcar, and PRT. Clearly, trolley bus systems are the most cost-effective when compared to the fixed guideway systems used by streetcars and PRT. The comparison, however, is wholly academic because campus planners are unlikely to implement trolley bus or streetcar systems at-grade in the interior of the campus where conflicts with pedestrians would be significant. Trolley and streetcar systems would likely only be implemented on vehicular streets circumscribing the campus and penetrating into the campus infrequently. Therefore, unless grade-separated like PRT an alternative system would not provide the same connectivity or level of service as PRT.

Table B2. Comparison of Capital and Operating Costs of Alternative Campus Circulators

Circulator System [1]	Capital Construction Cost	Daily Operating Costs
Trolley bus [2]	$1.1 million	$1.60 - $2.00 per route-mile
Streetcar [3]	$53-$79.5 million	$12 - $15 per route-mile
Personal Rapid Transit [4]	$79.5 – $265 million	$1,800 - $2,000 per route-mile

Notes:

[1] Each system cost based on a similar 5.3–mile route connecting the same origins and destinations as the CSU Fresno prototype PRT System described in detail in the following sections.

[2] Capital cost for three rubber–tired trolley vehicles.

[3] Streetcar cost estimates based on general per–mile costs published by the Federal Transit Administration in recent requests for grant.

[4] The lower end of the range to construct PRT is based on $15 million per mile from ULTra, the company that design and manufactured the Heathrow Airport PRT system. The upper end of the range was estimated by Kimley–Horn and Associates based on the prototype design. See cost estimating section below and appendices for details.

Source: Kimley–Horn and Associates, Inc.

ESTIMATING THE COST OF PRT

Introduction

The estimated costs for the conceptual PRT system on the CSU Fresno campus are order-of-magnitude approximations, since the design is conceptual and the ridership estimates are hypothetical. The capital cost estimates are, however, suitable cost-per-mile approximations as a basis for estimating PRT applications at alternative sites. The estimates presented here are based on sources from multiple automated transit system projects, including “automated people movers” (APM’s) as well as preliminary cost data drawn from other PRT projects.

At the present time, no PRT system on the scale and complexity of the CSU Fresno campus prototype has ever been built, and as a result there is no historical cost data for reference. Therefore, the approach to cost estimation presented here is defendable in light of the past 25 years of actual APM costs. Furthermore, various elements common to APM systems are also required for implementation of a PRT system on the scale defined for the CSU Fresno campus, so their use in the CSU Fresno estimates is justified.

Estimated Capital Costs of CSU Fresno Prototype

A detailed explanation of the basis of the capital cost estimates as well as the operations and maintenance (O&M) costs are presented in the technical appendices of this report. In this section, Table B3 summarizes the capital costs for the system equipment (vehicles) and the fixed facilities.

Table B3. Summary of Capital Cost for the CSU Fresno Campus Prototype PRT System

System Equipment [1]	$80,000,000
Fixed Facilities [2]	$124,540,000
Engineering Design	$24,000,000
Contingency (10%)	$36,000,000
Total System Capital Cost	**$264,540,000**
System Lane Miles (both uni-directional and bi-directional):	10.3
Cost Per Mile:	**$25,800,000**

Notes:

[1] Includes vehicles, power and control, spare parts and provisions for maintenance facility, operations control center equipment, office/employee facilities, and includes costs for developing, installing, testing and commissioning the computer control system.
[2] Includes guideway structures, stations, operations control center and maintenance and storage facility.

Source: Kimley–Horn and Associates, Inc.

Estimated Operations and Maintenance Costs of CSU Fresno Prototype

The operations and maintenance (O&M) costs of the CSU Fresno PRT prototype were estimated considering other similar scaled automated transit projects adjusted to reflect the prototype's specific operating characteristics. Of significance in developing the O&M estimates is that most of the operating fleet required to service the peak demand conditions upon class change remains fairly idle throughout the rest of the day. In fact, the average total mileage for the entire fleet totaled a relatively low 9,000 to 10,000 vehicle miles per day, less than 70 vehicle-miles per day. This allows the fleet to be operated and maintained by a fairly small work force. This fact, combined with the availability of technically capable students who would be willing to work part time allows the O&M costs to be kept fairly low. Table B4 summarizes the system's annual operating and maintenance costs.

Table B4. Estimated Annual Operating and Maintenance Costs for the PRT System

Expense	Annual Cost
Payroll (Manager, Admin, Supervisors and Mechanics)	$1,956,738
Maintenance Expenses	$652,246
Energy Expenses	$211,980
Contingency (10%)	$282,096
Total Annual Operations and Maintenance Cost	**$3,103,061**

Source: Kimley–Horn and Associates, Inc.

Although the O&M costs do not include the costs for depreciation costs for replacement of vehicles, stations and guideways, the operating life of these elements should be quite long. The most common item for transit systems that typically needs replacement within 10 years are the vehicles. However, the very low accumulation of mileage per vehicle will allow vehicle replacement cost to be pushed well into the future. Under moderate to high usage the vehicles would wear out faster and the depreciation / replacement cost of the fleet would be about $3,000,000 annually over the 20-year lifespan of the vehicles.

The State-of-the-Industry in PRT Cost Estimates

Based on available literature of the costs of constructing PRT systems, costs to construct and operate a PRT system will vary significantly depending on the complexity of the system, and by the ridership demand placed on the system. While the guideway and computer control systems will generally remain constant, station capacity and the number of vehicles will vary widely based on the amount of passengers for which the system is designed. The following information is paraphrased from material published by ULTra, the company that designed and built the Heathrow International Airport PRT system currently operational and undergoing testing.

ULTra identifies a generic range of $7,000,000 to $15,000,000 per mile based on a composite cost derived from a typical anticipated PRT application including vehicles, guideway structure, stations, and control system. ULTra's generic cost does not appear to include all of the costs included in the CSU Fresno prototype estimate such as storage and maintenance facilities, control center, and employee facilities.

This range is similar to the range published by The Association of Advanced Transit (ATRA) which states:

"……one can reliably predict that fully costed PRT will run about $12.5 million (M) per mile. Utilizing a "fudge factor" of plus or minus 20% gives us a cost range of $10M/mile to $15M/mile. Although somewhat higher than most PRT estimates, this range provides an added degree of confidence until an actual system is deployed. For purposes of estimating the costs of PRT in transit projections, most transit professionals accept a range of $10M/mile to $15M/mile for all economic costs of putting into operation a PRT system."

To be objective, it is prudent to disclose that there are challenges to ULTra's general per mile cost estimates. Below is a quote from www.publictransit.us where author Michael D. Setty writes:

"The website for the personal rapid transit (PRT) system claimed by proponents as closest to revenue operation, the 2.5 mile "ULTra" PRT parking lot shuttle currently undergoing testing at Heathrow International Airport outside London, recently released more information regarding construction costs. In most applications, ULTra estimates costs of $7 to $15 million per one–way guideway mile. After reviewing this cost, it is highly probable that ULTra proponents have underestimated likely PRT capital costs per mile by at least a factor of two to three."

The author goes on to describe a technical analysis related to the lifespan and replacement needs of the PRT vehicles and concludes that the cost of the ULTra system under circumstances similar to the Heathrow International Airport system is more likely to cost in the range of $20-$40 million per one-way guideway mile if reinforcement of the vehicles for longevity and associated reinforcement of the guideway was to be implemented[2]. To be fair, the author appears to be skeptical of PRT as a cost-effective for of public transportation.

Table B5 presents a comparison of other cost information collected by the US DOT and the cost estimates developed for the European EDICT program. Table B5 was published in a report titled "Viability of Personal Rapid Transit in New Jersey"[3]. The report identified a range of "conservative" capital cost estimates for PRT and other transit systems. The low end of the theoretical costs for PRT presented in Table B5 are similar to the per mile costs developed by Kimley-Horn and Associates, Inc. for the CSU Fresno Prototype.

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2 The reader is referenced to www.publictransit.us/index.php?option=com_content&task=view&id=201for details of the technical discussion.
3 Carnegie, Jon A., Hoffman, Paul S., Alan M. Voorhees Transportation Center Rutgers at The State University of New Jersey and Booz Allen Hamilton, Inc. The Viability of Personal Rapid Transit In New Jersey Final Report. Governor Jon S. Corzine and The New Jersey State Legislature, New Jersey Department of Transportation Bureau of Research and NJ Transit. February 2007.

Table B5. Capital Costs – Conventional Transit Versus PRT

Mode	Capital Cost/Mile ($M)		
	Low	Average	High
Observed Construction Costs			
Heavy Rail	$110	$175- $250	$2,000
Light Rail	$25	$50-$70	$195
APM – Urban	$30	$100-$120	$145
APM – Airport	$50	$100-$150	$237
BRT Busway	$7	$14-$25	$50
BRT Tunnel	$150	$200 - $250	$300
Theoretical Engineering Cost Estimates			
PRT One Way	$15	$20-$35	$50
PRT Two Way	$25	$30- $50	$75
CSU Fresno Prototype	$25	$43	$61
Notes: Sources: See Footnote. Authors cite sources of costs as Kerr 2005, TCRP R90, GAO 2000, Vendor estimates & case studies.			

Additional Sources and Examples of PRT Cost Estimates

Morgantown / West Virginia University GRT System

The Morgantown / West Virginia University system is the only operating near-PRT system in the United States. Built in the 1970's by Boeing Aircraft, the system remains in operation today. Being the only near PRT system in long term use it's useful to compare the cost of Morgantown with estimated costs of the CSU Fresno prototype. While there are many differences between the systems and their configurations (e.g., PRT versus GRT) there some noteworthy similarities as shown in Table B6.

The following section is a qualitative analysis of the Morgantown / CSU Fresno comparison by Mr. Dennis Manning, a member of the Advanced Transit Association and member of the PTIS Technical Advisory Committee.

Table B6. Comparison of Operating and Cost Characteristics (Morgantown GRT versus CSU Fresno Prototype)

Characteristics	Morgantown (GRT)	CSU Fresno Prototype (PRT)
Students and Faculty	28,000	22,000
Miles of guideway	8.7	10.2
Stations	5	21
Ridership (approx.)	15,000	15,000
Number of vehicles	70	135
Vehicle size (passengers)	20	4
End to end distance (miles)	3.6	2
Total capital cost (2010 dollars)	$484m	$265m
Cost/mile (2010 dollars)	$55m	$26m
Annual O&M (2010 dollars)	$2.0m	$4.3m
Fare box return	50%	N/A
Source: Dennis Manning, Member of the PTIS Technical Advisory Committee.		

At first glance it would appear that the Morgantown capital costs are double the CSU Fresno prototype estimate. On closer inspection and in light of 35 years of technical and planning advances the modern equivalent could be built for a cost of under $20 million per mile [in Mr. Manning's estimation].

According to Mr. Manning there were a number of extenuating circumstances that resulted in the high construction cost of Morgantown, circumstances that would be easy to overcome with today's advances in the technology. Mr. Manning summarizes these circumstances below[4].

- As a result of an extremely rushed schedule there was a series of planning and design errors. All design was from scratch and there were no test facilities built prior to the project. Note that these "experimental" costs are not included in the CSU Fresno prototype estimate based the assumption that any CSU Fresno prototype will have completed testing of vehicles and will have control system technology already completed.
- The guideway was over built because the vehicle weight was unknown at the time of the design. So it was designed to carry far more than was necessary.
- The vehicle's heating system was an afterthought and the design resulted in an overly costly heating system. The operational cost runs are four times higher than the power requirement for the entire system. No heating system is included in the CSU Fresno prototype design.
- Midway through the project, Boeing redesigned the vehicles for four-wheel steering in order match the width of the predesigned guideway.
- The Morgantown system was built over challenging terrain with grades as high as 10%.

4 *Source of Mr. Manning's information: www.tinyurl.com/25dxhhv www.tinyurl.com/2ekb9n6*

- There is no information on right of way costs except that much of the alignment required acquisition of right of way outside the campus in contrast to the CSU Fresno prototype which assumed all right of way was owned by the university.
- During construction of Morgantown there was a change in the principal contractor adding another cost burden to the project.

Mr. Manning concludes that the Morgantown system's cost, under scrutiny, provides evidence that a modern well designed and planned PRT system should cost no more than $20 million per mile for capital costs.

Vendor Stated Costs and Feasibility Study Cost Estimates of PRT Systems

Table B7 summarizes PRT system costs (on a per mile basis, operations and maintenance or per trip basis if available) from data compiled by Mr. Manning. The source of this information is identified in the notes section of the table. The following summary is Mr. Manning's analysis of this and other data presented above.

As stated previously PRT has a wide range of possible costs. The range appears to be about $15 to $30 million per mile for a full system layout. Using a cost per mile is an old standard for cost comparisons. Mr. Manning concludes that overall capital cost divided by the number of stations (cost per system station) is an important metric that defines the cost of the walking area provided. For example the Morgantown system has five stations at a cost of $484 million or a cost per station of $96.8 million. For this example, assume walking distance is the same at each station and covers an area of 1.0 square mile. Therefore, the cost of providing 1.0 square mile of walking area (1 station) is $96.8m. Assuming the same coverage area, the CSU Fresno prototype cost is $265 million divided by 21 stations or $12.6 million for each one square mile of walking area.

Factors That Influence the Cost of PRT

Many factors will influence the cost of constructing a complex PRT station and cause the costs to increase significant above the basic rule of thumb of $7 to $15 million per mile. Such is the case for the CSU Fresno prototype where many stations were designed into the system to reduce wait time and make PRT competitive with walking.

ULTra has identified primary and secondary factors that will influence the variation of cost for any individual PRT system, as well as identified elements of a PRT system that would result in a cost-effective optimal system. These factors are listed below.

Table B7. Summary of Vendor Stated Costs and Costs Cited in Feasibility Studies

Vendor / Supplier	Cost Per Mile	Other Cost Data (If Available)
PRT System Vendor Stated Costs		
2getthere [1]	$5.5 to $11.0 million (system cost only)	O&M cost: 8% - 10% of overall investment
Vectus [2]	$21 million +/- 15%	Cost per trip: $0.50
ULTra [3]	$13 million (system cost only)	
Cabintaxi [4]	$28 million (or under)	
Skyweb Express [5]	22m/mi. - $33m (may include supplier profit margin)	
PRT International [6]	$10 to $15 million (system only)	
PRT Minnesota [7]	$10 million (system only)	
Cybertran (GRT) [8]	$25 to $30 million Bi-directional system	
PRT Feasibility or Planning Studies		
Agency / Client /Sponsor	**Cost Per Mile**	**Other Cost Data (If Available)**
State of New Jersey [9]	$30 to $50 million Bi-directional system	
City of Ithaca [10]	$30 to $50 million Bi-directional system (from NJ study)	Cost per passenger mile: $0.40
Daventry, UK [11]	$22 million Bi-directional system	
Swedish Studies (multiple cities) [12]	$18 million	
Fort Carson [13]	$14 million	

Notes:

[1] Source: Email from 2getthere Marketing Manager Robbert Lohmann to Dennis Manning.

[2] Source: Minnesota Dept. of Transportation (MnDOT) Request For Information (RFI) responses www.tinyurl.com/28dxyja (very large file of 116mb).

[3] Source: MnDOT RFI responses www.tinyurl.com/28dxyja

[4] Source: Email from Marsden Berger. He indicated that Cabintaxi does not divulge costs because business plan calls for private financing with Cabintaxi as system owner.

[5] Source: www.tinyurl.com/2bybjer

[6] Source: MnDOT RFI responses www.tinyurl.com/28dxyja

[7] Source: MnDOT RFI responses www.tinyurl.com/28dxyja

[8] Source: Email from CEO Neil Sinclair to Dennis Manning.

[9] Source: www.tinyurl.com/cljgld

[10] Source: ftp://ftp.cscos/com User name: ithacaprt Password: cscompanies

[11] Source: www.tinyurl.com/2ct6j89

[12] Source: www.tinyurl.com/287bufc

[13] Source: www.tinyurl.com/2ee5ph8

Table compiled by Kimley-Horn and Associates, Inc.

Primary Capital Cost Factors

- System size (particularly if custom elements are required)
- Station density - stations required per guideway mile
- Desired average passenger wait time
- Peak system loading
- Amount of uni-directional versus bi-directional guideway
- Amount of elevated/at-grade/tunnel/culvert/cantilever guideway
- Open environment deployment (urban and public areas or semi open/closed, controlled access such as airports and private campus areas
- Integration with other site facilities/roads/pedestrian areas etc.
- Security requirements
- Level of architecture and amenity of station design.
- Custom vehicle appearances and characteristics

Secondary Capital Cost Factors

- Raw material commodity costs (concrete and steel)
- Soil conditions
- Seismic conditions and associated engineering requirements
- Presence of utilities
- Geographic location of system installation
- Inflation and cost construction labor
- Site access and integration with other site activities (most systems are prefabricated off site)
- Time available for deployment
- Local safety legislation

Optimum Cost Systems

An optimum capital cost system would typically have:

- Ten or more miles of guideway
- A high percentage of at-grade guideway
- Fewer [2 - 2.5] stations per mile of guideway
- Lower passenger demand
- Simple stations
- Favorable soil conditions
- Lower regional construction costs
- High use of standardized components
- Higher Cost systems
- A relatively higher capital cost system would typically have
- 3 or fewer miles of one-way guideway
- A high percentage of elevated, tunnel, or culvert guideway
- More stations per mile of guideway
- Higher passenger demand
- Stations with high level of architectural interest or amenities
- Poor soil conditions
- High regional construction costs
- High customer requirement for system customizations

Leveraging the Measure C New Technology Reserve Funds

The New Technology Funding Reserve (NTFR) set aside was approximately $35 to $40 million when the 2006 Expenditure Plan was prepared. This reserve has likely reduced under current projections of sales tax revenues (or extended well beyond original estimates). Based on the significant amount of cost data presented above it is clear the reserve, even under its full allocation, is insufficient to construct a working PRT system of any practical or functional value. However, the funds may be used to leverage other sources of funds to develop some form of research and development or testing facility. There are benefits to applying the NTFR in this manner.

Fresno is the only jurisdiction in the United States with funds set aside to develop PRT. If not utilized within a specific timeframe there is a possibility that the Measure C NTFR will be diverted to other high priority transportation needs. Once used for other needs, it is unlikely that the NTFR would ever again be available for PRT.

This section of the report presents a strategy for using the reserve to leverage additional funds from federal, state, regional, institutional, capital venture, international or private sources to advance PRT towards commercial viability in the United States. This strategy is also consistent with the PTIS' strategy to identify and promote/recruit new industry to the Fresno Metropolitan area—industries that would attract young professionals who desire a transit-supportive lifestyle in a redeveloped Downtown Fresno or within high capacity transit corridors.

A possible first step of the strategy is to construct a PRT test facility. This step is consistent with the NTFR priority to "identify best potential projects for new technology funds" and is proposed for the following reasons:

1. Enable the leverage of matching funds available from federal or state sources in the future, or from other public or private sources.
2. Use reserve as a job creation and industry attracting program by leveraging public funds and attracting critical private investment for high tech firms that manufacture and deploy PRT in Fresno or throughout the Country.
3. Create an operational platform to develop and evaluate performance capability and costs of PRT for government, industry, consultants, academia, etc.
4. Establish a PRT regulatory and safety evaluation platform for government, industry, consultants, academia, and a platform for the development and testing of industry manufacturing and safety standards.
5. Assert Fresno CleanTech leadership in developing 21st century economic development by creating an industry nucleus that attracts ancillary and supporting businesses.
6. Develop ongoing PRT Research and Development Center that can be a nexus of innovation for development of AB 32 and SB 375 compliance strategies for Fresno and the San Joaquin Valley.
7. Help the United States become competitive with the more highly developed PRT industry in Europe and Asia.

For more information on the individual strategies identified above, please refer to "The Need For Building a PRT Test Facility in Fresno" (Dennis Manning in 2010) located in the appendix of this report.

APPLICATION CRITERIA FOR PRT

This section summarizes the development of criteria to determine the applicability of PRT within the Fresno metropolitan area. The criteria build upon the conditions that the PTIS consulting team found suitable for the application of PRT or GRT presented earlier in this chapter. This section provides an overview of the criteria and discusses the case studies used to test the criteria. Finally, this section presents a hypothetical application of PRT to the most promising case study site.

Overview of Application Criteria

Because of its cost, complexity and permanence Personal Rapid Transit is not always an appropriate solution even when high frequency and high quality public transportation is justified. An appropriate site for PRT or GRT must possess certain travel demand characteristics and must have the correct physical attributes that create an environment where PRT is a cost-effective alternative. The criteria are divided into categories that represent travel demand characteristics, physical attributes, site operational characteristics, land use / land value characteristics, and special attributes suitable for Group Rapid Transit. The criteria are:

Travel Demand Related Criteria

- **Uniform and continuous rider demand—**passengers arrive at stations in a uniform flow but frequently. Arrivals are split between individual passengers and groups. Some groups may be larger than vehicle capacity (4 to 6) but infrequently.
- **No peak surges—**passengers arrive randomly and not in highly peaked surges. Peak surges such as shift changes, release of special events, of class changes at schools puts substantial demand on the system which either needs to be designed to handle peak loads or viewed as an inadequate system during peaks.
- **Need to connect adjacent activity centers—**where there is a demonstrated high level of travel interchange between adjacent activity centers such as between two large shopping centers or an employment center and a retail center.

Physical Attribute-Related Criteria

- **Large district / campus (exceeds reasonable walk)—**where there is a demonstrated demand for travel interchange within an individual large site or district and driving between buildings or parking lots is undesirable but origin and destination pairs are outside of a reasonable walking distance (greater than 15 minutes), or there is demand to circulate within a district but the area is so large as to make it impractical to traverse the district by walking.
- **Barriers to traversing site by walking—**where there is a demonstrated demand for travel interchange within an individual large site or district but pedestrian and bicycle travel is impeded by a significant physical or perceptional barrier such as topography, body of water, freeway, vacant land, etc.
- Site Operational-Related Criteria
- **Remote parking—**where, because of price, availability or simply because of distance, a site's parking area is outside of a reasonable walking distance. The site must generate enough parking demand to meet the other requirements for travel demand listed above, such as a large employment site or center, a large retail site, or an institutional use such as a hospital, college or university.
- **Connectivity to other transit modes—**where a major public transit mode is separated from another transit mode either by distance or inconvenience and there is a demonstrated demand for transfer between modes. An example might be the High Speed Rail station and the Blackstone Bus Rapid Transit line.
- **Access to interior of buildings—**where access to the interior of a building is desirable due to inclement weather, or for the buildings operational needs such as a hospital where patients are transported from other buildings or parking and should remain within the hospital environment.

Land Use and Land Value-Related Criteria

- **Require grade–separation—**where land value is significant enough that circulation infrastructure should be grade-separated to allow use of the land below for more valuable purposes, or where the combination of travel modes creates numerous conflicts which only grade-separation can resolve.
- **Minimize parking footprint and car circulation—**sites with significant land value where parking and automobile infrastructure (i.e., streets) is located remotely in order to maximize the amount of developable land.
- **Single owner or developer interest—**a large site which meets other criteria listed above and is owned or controlled by a single owner, entity or interest creates an easier environment to plan, fund, and implement PRT.
- **Master planned development—**a wholly new development or major redevelopment site in which PRT infrastructure can be planned and designed into the development's fundamental armature in order to establish a permanent public transportation system in advance of development, occupancy, and even travel demand. Examples would include large Greenfield developments, or new communities on the fringe of urban areas.

Group Rapid Transit Special Criteria

- **Peaked surge demand—**any site where large numbers of passengers desire transportation at the same time. Examples include class change at colleges, release of sporting event, concerts, or major entertainment venues. It also includes shift change or end of work day employee releases at very large employment centers.
- **Regular special events—**similar to above, any site which holds regular highly attended evenets but parking or other public transportation is distant.
- **Remote parking with shift changes—**employment sites where because of price, availability, or Transportation Demand Management, parking is located remotely from the site and large numbers of employees surge to parking at the end and the beginning of shifts.

Selection and Evaluation of Case Studies

The PTIS scope of work for assessing PRT includes testing the application criteria at up to five actual sites within the Fresno metropolitan area. The five sites were chosen to match the place types discussed earlier—place types are sites and uses that have appropriate operational and contextual conditions in which PRT or GRT might be considered.

Table B8 presents the results of the case study evaluation of the five candidate sites. Each case study is discussed on the next page.

Site A: River Park Activity Center

A large area (approximately 500 acres) comprised of a segregated mix of office park, large retail centers, entertainment uses, medical facilities, and moderate to high density housing. See Figure B6.

The River Park Activity Center also meets the criteria for application of PRT. Within its more than 500 acres the activity center contains a mix of uses that generate internal travel demand. As shown in Figure B7. These uses include moderate and high-density residential, a large business park, institutional uses including two medical centers, a corridor lined with strip commercial, big box retail, and community shopping centers, schools, a regional park and other recreational facilities, a regional retail and entertainment center, and some isolated industrial uses. The site straddles the Woodward Park and Bullard Community Plan areas, and the planned Blackstone Avenue Bus Rapid Transit route passes through the activity center and terminates in the business park in the northernmost end of the site.

The land uses comprising the activity center draw travel from the entire region but also create a substantial amount of internal travel demand for shopping, dining, medical visits, office visitors, deliveries, and social and recreational trips. These trips are uniformly spread throughout the day with moderate peaks in the morning, midday and evening. Thus the activity center meets the travel demand criteria. The area is very large and while individual developments are walkable, it is not practical to walk from one segregated activity center or land use to another. Furthermore, barriers to pedestrian travel are created by Highway 41 bisecting the site and numerous large parking lots surrounding most uses creating an auto-dominated environment.

Table B8. Evaluation of Case Study Sites for PRT or GRT Applicability

Application Criteria	Downtown Fresno	Activity Center	Medical Center	Mixed Use Development	Fringe New Town
Travel Demand Related Criteria					
Uniform and continuous demand	✓	✓	✓	NO	✓
Random arrival of demand (no peak surges)	✓	✓	✓	NO	✓
Connect adjacent activity centers	✓	✓	✓	NO	✓
Physical Attribute Related Criteria					
Large district / campus (exceeds 15 min walk)	✓	✓	NO	NO	✓
Barriers to traversing site by walking	NO	✓	NO	NO	✓
Site Operational Related Criteria					
Remote parking	✓	✓	NO	NO	✓
Connectivity to other transit modes	✓	✓	NO	NO	✓
Access to interior of building	NO	NO	✓	NO	NO
Land Use and Land Value Related Criteria					
Require grade-separation	P	NO	✓	NO	NO
Minimize parking footprint and car circulation	✓	✓	✓	NO	✓
Single owner or developer interest	NO	NO	✓	NO	NO
Master planned development	NO	NO	NO	✓	✓
Group Rapid Transit Special Criteria					
Peaked surged demands	✓	NO	Shift Change	NO	NO
Regular special events	✓	NO	NO	NO	NO
Remote parking with shift changes	NO	NO	Potentially (future)	NO	NO
Suitable for: Personal Rapid Transit	YES Circulator	YES	If Expanded with Remote Parking	NO	Connect Town Centers and Employment
Suitable for: Group Rapid Transit	Some Sites – Stadium, High Speed Rail, Remote Parking	YES	NO	NO	YES

Source: Kimley–Horn and Associates, Inc.

Figure B6. River Park is a major multi-use activity center in north Fresno.

Figure B7: River Park Mixed-Use District

The activity center offers an opportunity for remote parking in the future but presently there is ample free parking for all of the land uses in the activity center. The need to connect multiple activity centers and land uses with demonstrated trip interchange and the long distances between the uses, combined with the random arrival patterns of users spread throughout the day and evening justifies the application of PRT or GRT. Based on the evaluation criteria the River Park Activity Center is a potential application for PRT or GRT.

Site B: Downtown Fresno

Site B is comprised of the Central Business District bounded by Highway 99, Divisadero Street, and Highway 41. This area would include the future High Speed Rail Station, the Chukchansi Park stadium, the Fresno Convention Center, the City and County government centers, the Amtrak Train Station, and the FAX downtown transit center. See Figure B8.

Downtown Fresno meets most of the criteria for application of PRT. Downtowns, in general, benefit from the circulating function of PRT. Under travel demand related criteria, Downtown Fresno's diverse range of land uses ensures uniform and continuous demand with random arrivals. The size of the downtown reflects a series of major activity centers (e.g., government center, Fulton Mall, convention center, stadium area, Chinatown, etc.) that are too distant to walk. While there are few physical barriers to walking downtown the distance between certain districts in itself becomes a barrier.

With the opening of the proposed High Speed Rail (HSR) Station there will be a need to connect HSR with Amtrak, the FAX transit center and Bus Rapid Transit. Parking is distributed throughout downtown and is low cost at the present. This situation might change as the downtown revitalizes and intensifies and parking becomes a commodity. Lower cost remote parking at the downtown fringe might then attract employees and the need for circulator connectivity to employment centers. Land in the downtown is valuable and street capacity may require preservation if streets are narrowed in the future to accommodate wider sidewalks and parking. Land and street value then justifies a grade-separated transit system.

Some uses in the downtown meet the special criteria for Group Rapid Transit such as Chukchansi Park stadium and the Fresno Convention Center, and potentially the HSR station. Based on the evaluation criteria Downtown Fresno is a potential application for PRT or a combination of PRT and GRT.

Site C: Regional Medical Center District

A district located northeast of Downtown Fresno containing the Community Regional Medical Center, medical related educational facilities, and surrounding medical office buildings. See Figure B9.

Generally, institutional facilities in a campus environment such as major medical centers or universities are good candidates for PRT because of their sprawling nature and high level of travel demand between the individual uses within the campus.

Figure B8. Downtown Fresno case study site.

Figure B9. The Community Regional Medical Center lies within the heart of the regional medical center district case study area.

However, Fresno's Regional Medical Center District does not have great distances between uses nor does it have remote employee parking that would be suitable for PRT. The current campus has several parking structures in the immediate vicinity of the main buildings. The District is relatively compact and walkable at the present. However, should the medical facilities continue to expand in the future, and particularly if the educational element of the District expands and/or remote employee parking is implemented, the District might regain candidacy site for PRT or GRT. Based on the evaluation criteria the Regional Medical Center District is not currently a potential application for PRT.

Site D: Fancher Creek Development

Fancher Creek is a mixed-use master planned development that will contain residential, a town center, retail, senior housing, a business park and park space. The project is currently under construction within the Kings Canyon Road corridor as shown in Figure B10. The development will eventually cover 500 acres and provide 1,800 residential units, about 1,000,000 square feet of commercial and about 1,500,000 square feet of business park. A transit station is being planned on-site.

Although the Fancher Creek development is about the same acreage as the River Park Activity Center the density of the development is suburban. The housing is mostly single family homes and the commercial is auto-oriented with a low floor area ratio. This means that there will be less internalization of trips than if the development had much higher density residential and intensive levels of employment. Although the project is in single ownership (meeting the criteria for ease of planning and designing PRT) the lower levels of development in Fancher Creek would challenge funding a PRT system. Based on the evaluation criteria the Fancher Creek development is not a potential application for PRT.

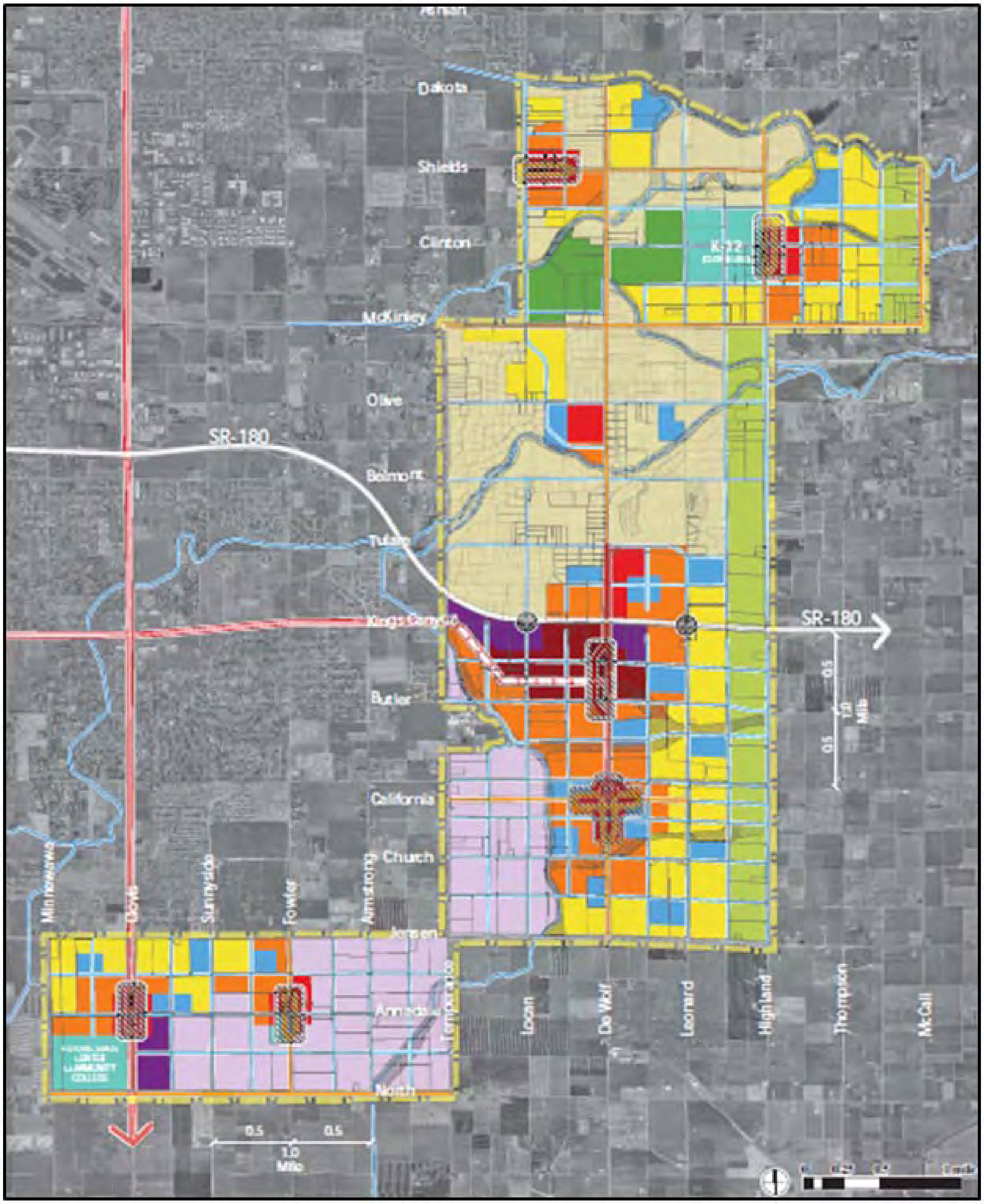
Site E: Southeast Growth Area (SEGA)

The Southeast Growth Area is a significant master planned community located in agricultural lands on the fringe of Fresno's current urban boundary. This development will contain a range of residential densities, town centers, retail, employment centers, industrial uses, schools, and other uses. The current plan calls for nearly 45,000 housing units (between 50,000 and 100,000 population) and 37,000 jobs. Figure B11 presents an illustrative plan of SEGA's general land use categories. SEGA's Specific Plan emphasizes a balance of housing and jobs, internalization of trips, and transit-orientation.

The SEGA project is still undergoing planning and final approvals. Therefore, the project plans are still at a coarse level of detail. However, based on the land use plan shown in Figure B11 this master planned community is an opportunity to plan and design PRT, GRT, or a combination of both, in the initial stages of land use planning along with SEGA's circulation armature. SEGA will take many years, perhaps decades, to build out, and during that time PRT technology will continue to evolve. If SEGA's long-range transportation system includes flexibility for future PRT, or at least doesn't preclude it, SEGA remains a strong opportunity for a PRT or GRT application. Based on the evaluation criteria the Southeast Growth Area is a potential long-range application for PRT or GRT.

Figure B10. Fancher Creek is a relatively small planned unit development on the east side of Fresno.

Figure B11. The Southeast Growth Area (SEGA) is a greenfield community located on the fringe of Fresno's metropolitan area.



Conceptual PRT System Applied to the River Park Multi-Use Area Case Study

This section illustrates a conceptual application of PRT in one of the five case study sites. In the judgment of the consultant team the most applicable case study site for planning a conceptual PRT system is the River Park Activity Center. This site mostly exists today (although there is still substantial vacant land within the bounds of the activity center) which facilitates the development of a conceptual PRT system.

The following general principles were used to develop the conceptual system:

- All areas of the site are within a maximum 10-minute walk (1/4-mile) of a PRT station.
- Align the aerial guideway along public streets to the extent feasible, but utilize private parking lots to ensure the most direct route to the next station.
- Design the system to interline with the planned Bus Rapid Transit (BRT) route and provide at least one intermodal transit center where BRT and PRT are linked.
- Design a maximum of two separate "lines" or "loops" either of which can operate PRT or GRT vehicles.
- Keep the length of the entire system approximately 5-6 miles and assume a 90 to 100 vehicle fleet.

The conceptual system is illustrated on **Figure B12**. It is comprised of approximately 5.2 miles of bi-directional aerial guideway containing 19 stations. There is some flexibility to eliminate stations because the 10-minute walk radius around stations does overlap at certain points.

Table B9 provides a rough and conservative estimate of the cost using the same PRT system unit costs as were used in the CSU Fresno prototype estimate.

Table B9. Rough Cost Estimate for River Park Conceptual PRT System

System Component	Unit Cost	Cost
System Equipment (90 vehicle fleet)	$593,000/vehicle	$53,000,000
Aerial Guideway (80% of 5.3 mile system)	$10,868,000/mile	$46,080,000
At-Grade Guideway (20% of 5.3 mile system)	$3,809,000/mile	$4,038,000
Stations (19)	$1,125,000 each	$21,375,000
Ops Center, Maintenance and Storage Facility	$5,000,000 LS	$5,000,000
Engineering Design (15%)		$19,424,000
Contingency (10%)		$14,892,000
Total System Capital Cost		$163,809,000
System Cost Per Mile		$30,907,000
Source: Kimley–Horn and Associates, Inc.		

Figure B12: Land Uses within the River Park Activity Center:

D. Walkability and Bikeability Survey

-Sidewalk and Transit Shelter Amenity Criteria

-Charlotte's Ranking Criteria Application

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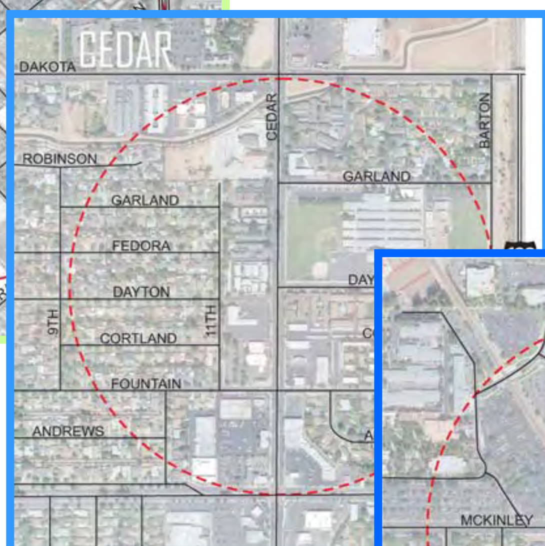

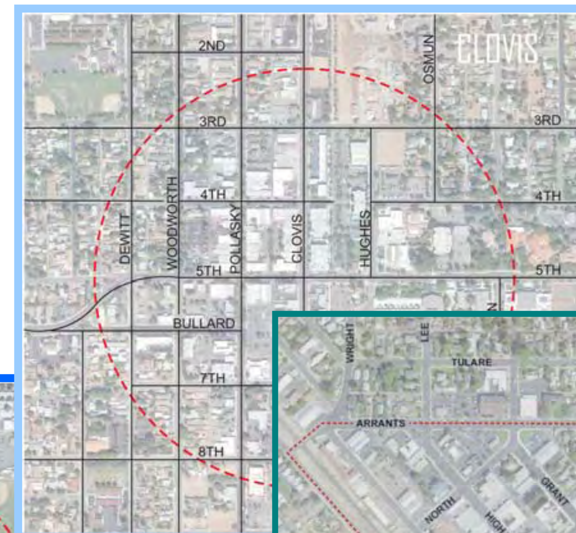

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Fresno County PTIS:
- Non-Motorized Transportation Assessment -

1. INTRODUCTION

The Fresno County Non-Motorized Transportation Assessment was prepared to identify existing transit, bicycle and pedestrian facilities within four (4) assigned study areas in the cities of Fresno and Clovis. These particular study areas were chosen because these cities are proposed by the PTIS to be locations for future implementation of Bus Rapid Transit (BRT) services. Consequently, assuring quality continuity and interconnectedness of pedestrian, bicycle, and transit accommodations are important so that these cities and Fresno County can prepare their communities to offer convenient and safe non-motorized choices for accessing the future BRT services.

During intense field walks of the study areas, the quality and extent of the existing transit, bicycle and pedestrian accommodations were observed and noted. Gaps in connectivity and lacking facility accommodations were identified. Recommendations for needed improvements to close the gaps in continuity from the outlying areas to the study areas or for additional or improved amenities are proposed at the conclusion of each study area summaries which follow.

As part of this Non-Motorized Transportation Assessment, a "Healthy Community Assessment" form was developed. This assessment was designed for two purposes:

1.) As an evaluation tool of the 4 assigned study areas for this Non-Motorized Transportation Assessment portion of the PTIS, and
2.) As a tool for future use by city and county staff to facilitate the critical thought processes necessary to first understand how their individual community rates in existing accommodations and amenities, and then, second, to determine needed improvements for accommodations to walk or bike in an area, particularly to access the future BRT or other public transit services directly or through interconnecting transit routes to facilitate fewer vehicle trips.

Collectively, incorporating pedestrian and bicycle improvements to access transit and future BRT will create sustainable, more livable communities. Providing safe, convenient, continuous, and pleasant non-motorized transportation travel connections to existing or future public bus transit or future BRT will help encourage people out of their cars, thereby benefiting personal health and overall health of the community. The assessment form is structured to allow surveyors to conduct walkability and bikeability surveys separately. In either instance the Assessment will enable surveyors to identify areas with adequate facilities as well as areas in need of improvements. Questions relating to streetscape, land use, transit, walkability and bikeability prompt the surveyor to think about the existing amenities and identify opportunities to promote a more walkable, bikeable, sustainable community.

In addition to the four (4) assigned study areas located in Fresno and Clovis, a fifth study area in the City of Selma was also included in this Transportation Assessment to test the adequacy of a "Healthy Community Assessment" form. Past and present City of Selma officials took part in a 1 mile walking tour through Downtown Selma using the Healthy Community Assessment as a guide for their evaluation of the area. The field-applied test experience and feedback from the tour participants enabled improvements to be made for the final Assessment form. (See Appendix A for the Healthy Community Assessment form.)

2. METHODOLOGY

2.1 Inventory

In order to access the extent and quality of the existing amenities supporting the current non-motorized transportation systems, field surveys were conducted for each of the five (5) study areas and an inventory made of all pedestrian, bicycle, and transit facilities within each study area. The field surveys consisted of a field walk of each study area, observing the land uses, streetscapes, and pedestrian, bicycle, and transit facilities and the connectivity and interaction of all facilities to surrounding neighborhoods and retail activity. All blocks within the quarter mile radius were surveyed during the field walk and a photo log was created. A detailed inventory of all pedestrian, bicycle, and transit facilities within each study area was collected with deficient facilities or amenities noted. Items included in the inventory are as follows:

- Land Use – including types, general architecture,
- Pedestrian – including sidewalks, curb ramps, pedestrian push buttons/walk/don't walk signs, signage
- Bicycle – including marked bike lanes, route, paths, trails, signage
- Transit – including signage, bus stop amenities

2.2 Healthy Community Assessment

In addition to the four (4) assigned study areas located in Fresno and Clovis, a fifth study area in the City of Selma downtown was also included in this Transportation Assessment. This study area was chosen to test the adequacy of a "Healthy Community Assessment" form designed as part of this Fresno County Non-Motorized Transportation Assessment.

The Assessment form consists of two (2) parts; one or both of the Assessment parts can be completed for a study area, as follows:

- A tour conducted on foot, and/or
- A tour conducted on bicycle.

The Assessment form allows a surveyor to rate the overall walkability or bikeability of a defined study area from 1 (awful) to 6 (excellent), as shown in the Walkability rating example shown below:

Overall "Walkability" Rating: (circle one)

1	2	3	4	5	6
awful	**many problems**	**some problems**	**good**	**very good**	**excellent**

Past and present City of Selma officials, including one participant in a wheelchair, took part in a 1-mile walking tour through downtown Selma using the Healthy Community Assessment as a guide for their evaluation of the area. The field-applied test experience and feedback from the tour participants enabled improvements to be made for the final Assessment form. (See Appendix A for the Healthy Community Assessment form template.)

"The Tour was a great learning experience from a wheelchair perspective." – *Phil Carpio, Beautification Committee Member, Youth Sports Assistant, Retired from Selma Unified School District, Disabled.*

"I give the Walkability Assessment Program an A+, and the City a B+. I have already encouraged other Mayors to try this in their communities. It was an eye-opener for us!" – *Mayor Dennis Lujan*

The Healthy Community Assessment form was then also utilized for each of the other 4 assigned study areas. These assessments are included in Appendices B-F to this memorandum.

The Assessment forms were completed during the field reviews conducted on foot for the Selma test area and each of the other 4 assigned study areas. A qualitative review of the study area pedestrian and bicycle accommodations and amenities including such factors as safety, ease of use, driver behavior, and connectivity of facilities were evaluated. Five (5) components of the walkability portion of the survey: streetscape, land use, transit, walkability and bikeability, were rated on the 1-6 scale shown above, and then totaled to determine an area's overall rating. The walking tour section component ratings were then summed to determine the overall rating for the study area. The overall quantitative rating and corresponding qualitative interpretative results for the tours conducted on foot are as follows:

Overall Rating	Rating Description
21-24	Celebrate! You have a great neighborhood..
17-20	Celebrate a little. Your neighborhood is pretty good.
13-16	Okay, but it needs work.
9-12	It needs lots of work. You deserve better than that.
4-8	It's a disaster!

Tours conducted on bicycle would be rated according to the individual component rating scale on the separate bikeability assessment form.

When completed, the audits are intended to provide an assessment of one's ability to navigate through a study area on foot or on bike to connect to key locations, particularly transit and future BRT services by identifying areas with adequate facilities, areas in need of improvement, and generating ideas or steps needed to improve the safety, convenience, look and feel (pleasantness), and connectivity of walking or biking routes. In an environment where walking or riding a bicycle becomes a mode of choice because it feels safe, there are no obstructions and the journey is pleasant, people will naturally choose to walk or bicycle for short trips in their neighborhoods. And as more people choose to walk and bike, their health benefits and so does the health of the community. People who are out walking on the street create safe streets through natural surveillance. People who are out walking and riding bikes begin to meet their neighbors and choose to socialize with them. Healthy communities encourage physical activity, safer streets, and create cleaner and friendlier neighborhoods for people to live, work and play in.

3. DOWNTOWN FRESNO ANALYSIS

The field survey for the Downtown Fresno study area was completed on Tuesday, February 2 and Thursday, February 4, 2010. The Downtown Fresno study area, shown in *Image 1*, included a quarter mile radius area generally bounded by Ventura Street (south), Divisadero Street (north), Van Ness Avenue (west) and State Route 41 (east). A field walk was conducted and all pedestrian, bicycle, and transit facilities, or lack of, were noted. A Healthy Community Assessment was also prepared for the Downtown Fresno study area and is included in Appendix B.

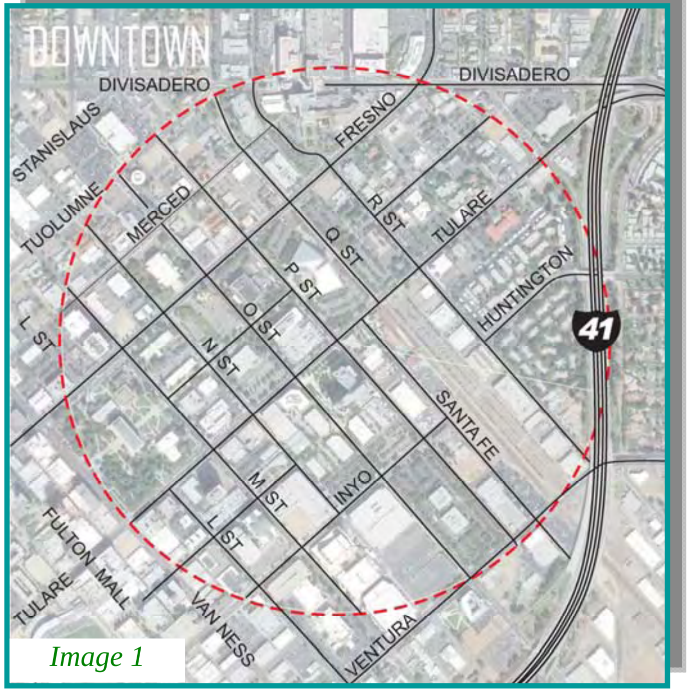


Image 1

3.1. Transit Facilities

Existing Area Transit Amenities:

Fresno Area Express (FAX) and Downtown Circulator Trolley transit stop amenities in the downtown study area ranged from route signage only to shelters, benches and trash facilities. Lighting at the transit stop facilities is provided by the nearest streetlight located along the roadways. All thirty-one (31) transit stops, servicing FAX Routes 20, 22, 26, 28, 30, 32, 34 and 38, within or adjacent to the study area consisted of a minimum of route signage. Seven (7) FAX transit stops in the study area lack shelter, bench, schedule, and trash facilities. These transit facilities are located as follows:

- Tulare Street southwest of Divisadero Street – southwest-bound stop
- Tulare Street southwest of M Street – southwest-bound stop
- Ventura Street southwest of R Street – northeast-bound stop
- Ventura Street southwest of N Street – northeast-bound stop
- Fresno Street southwest of O Street – southwest-bound stop
- Fresno Street southwest of P Street – southwest-bound stop
- Fresno Street northeast of L Street – southwest-bound stop

Image 2 shows the transit route signage located on Fresno Street, northeast of L Street.


Image 2

Seven (7) FAX transit stops serving the downtown study area include bus route signage, bench and trash facilities. These transit facilities are located as follows:

- Tulare Street northeast of P Street – northeast-bound stop
- Tulare Street between R and S Streets – northeast-bound stop
- Tulare Street northeast of SR 41 SB on ramp – northeast-bound stop
- Tulare Street southwest of Q Street – northeast-bound stop
- Ventura Street southwest of P Street – northeast-bound stop
- Ventura Street southwest of O Street – northeast-bound stop
- Ventura Street southwest of M Street – southwest-bound stop

The FAX transit facility located at Tulare Street, northeast of SR 41 SB on ramp is shown in *Image 3*.


Image 3

The southwest-bound FAX transit stop on Ventura Street southwest of R Street currently consists of route signage and a bench with no trash facilities. A southwest-bound FAX transit stop located on Tulare Street southwest of O Street consists of route signage and shelter and bench facilities but also lacks trash facilities.

Twelve (12) FAX transit stops in or adjacent to the Downtown Fresno study area consist of route signage and shelter, bench and trash facilities. The locations of these transit stops are as follows:

- Tulare Street between R and S Streets – southwest-bound stop
- Ventura Street southwest of P Street – northeast-bound stop
- M Street southeast of Inyo Street – southeast-bound stop
- M Street southeast of Ventura Street – southeast-bound stop
- Fresno Street northeast of N Street – northeast-bound stop
- Fresno Street northeast of O Street – southwest-bound stop

- Fresno Street northeast of P Street – northeast-bound stop
- Fresno Street southwest of R Street – southwest-bound stop
- Fresno Street northeast of R Street – northeast-bound stop
- Fresno Street north of Divisadero Street – northbound stop
- Tuolumne Street between O & P Street – southwest-bound stop
- M Street at Mariposa Street – southeast-bound stop

Image 4

Image 4 shows the FAX transit stop facility located at M Street, southwest of Inyo Street.

In addition to the FAX transit stops listed above, three (3) transit transfer hubs also exist within the Downtown Fresno study area. Shelter A, shown in *Image 5*, is located on Van Ness Avenue, southeast of Fresno Street and consists of the following amenities:

- Route signage
- Fifteen (15) benches
- Three (3) trash cans.

Image 5

Image 6

Shelter B, shown in *Image 6*, is located on Van Ness Avenue, northwest of Tulare Street and consists of following amenities:

- Route signage
- Sixteen (16) benches
- Three (3) trash cans
- One (1) telephone

Image 7 shows a systems map located in the plaza area between Shelters A and B. Shelter A provides service for FAX routes 22, 26 and 28 while Shelter B services FAX routes 30, 32, 34 and 38.

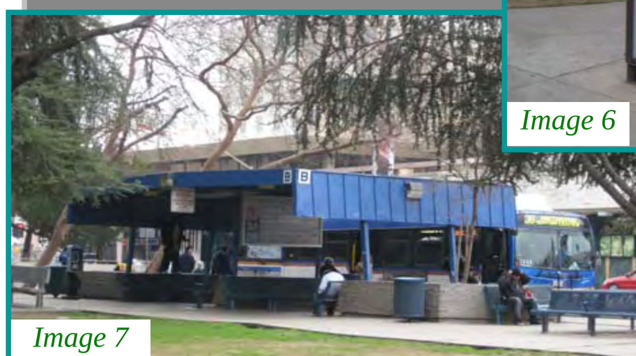


Image 7

The third transit transfer hub, Shelter L, is located on Fresno Street at L Street and consists of three (3) sheltered areas containing the following amenities:

- Fourteen (14) benches
- Seven (7) trash cans.

Shelter L provides service for FAX Routes 20, 22, 26, 28, 30, 32 and 34.

The FAX Route 4, Downtown Circulator Trolley also services four (4) stops within the Downtown Fresno study area. All four (4) stops consisted of route signage only with no benches, trash facilities or shelters and were located at the following locations:

- Inyo Street between L and M Streets –southwest-bound stop
- O Street between Fresno and Mariposa Streets – southeast-bound stop
- Tuolumne Street northeast of N Street – northeast-bound stop
- Tuolumne Street between L Street and Van Ness Avenue – southwest-bound stop

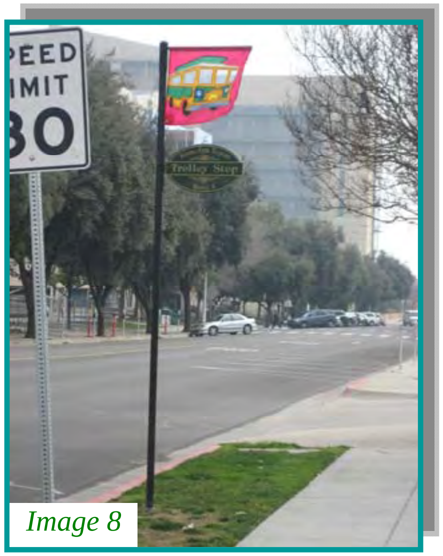


Image 8

Image 8 shows the FAX Route 4 stop located along O Street between Fresno and Mariposa Streets.

Also located in the Downtown Fresno study area is the Amtrak Train Station. The Station is located on the corner of Tulare Street and Santa Fe Street and provides pedestrians with a waiting area, restrooms, and telephone facilities during station hours.

Recommended Area Transit Amenity Improvements:

The following possible improvements to the existing area transit facility amenities are as follows:

- Installation of schedule information, bench, trash and shelter facilities at the eleven (11) FAX transit and trolley stops currently consisting of only route signage
- Installation of schedule information and shelter facilities at the seven (7) FAX transit stops currently consisting of only route signage, bench and trash facilities
- Installation of schedule information, shelter and trash facilities at the two (2) FAX transit stops currently consisting of only route signage and bench facilities

All area transit amenity improvements should be consistent with ADA standards and City of Fresno design standard policies as well as Fresno Area Express' bus stop standards.

2. Bicycle Facilities

Existing Area Bicycle Facilities:

Currently, there are no designated bicycle facilities in the Downtown Fresno study area.

Recommended Area Bicycle Facility Improvements:

As part of the City of Fresno's Bicycle Master Plan update, the installation of bicycle facilities are proposed in the Downtown Fresno study area. The following is a list of Downtown Fresno study area bicycle facility improvements by locations.

- Installation of a Class I bike path
  - Along the Burlington Northern/Santa Fe railroad alignment through the Downtown Fresno study area
- Installation of Class II bike lanes
  - Along Tuolumne Street from Divisadero Street to H Street
  - Along Inyo Street between H and O Street
  - Along Ventura Street between O and R Streets
  - Along M Street between Tuolumne and Ventura Streets
  - Along Tulare Street from R Street to east of the Downtown Fresno study area
  - Along Huntington Boulevard from R Street to east of the Downtown Fresno study area
  - Along R Street between Fresno and Ventura Streets
- Installation of Class III bike routes
  - Along O Street between Tuolumne and Ventura Streets
  - Along Mariposa Street between Santa Fe and U Streets
  - Along U Street between Divisadero and Tulare Streets
- Installation of Class II bike lanes or Class III bike routes
  - Along Kern Street between Van Ness and P Streets
- Installation of pedestrian mall facilities (bicycle use allowed in the pedestrian malls)

- ~ Along Mariposa Street between Fulton and O Streets
- ~ Along Fulton Street between Tuolumne and Inyo Streets

In addition to these Downtown Fresno study area bicycle facilities, many facilities connecting the study area with outlying areas are also proposed. The following is a list of bicycle facilities, by location, proposed adjacent to but outside of the study area boundaries.

- Installation of a Class I bike path
  - ~ Along H Street
- Installation of Class II bike lanes
  - ~ Along Tulare Street
  - ~ Along Tuolumne Street
  - ~ Along Stanislaus Street
  - ~ Along Mono Street
  - ~ Along Divisadero Street
  - ~ Along Broadway Street
  - ~ Along Fulton Street
  - ~ Along Santa Clara Street

All area bicycle facility improvements should provide connectivity with bicycle facilities located outside of the Downtown Fresno study area and should be consistent with the City of Fresno design standard policies and the Fresno Bicycle Master Plan.

3. Pedestrian Facilities

Existing Area Pedestrian Facilities:

Pedestrian facilities such as sidewalks, ramp curbs, striped pedestrian crosswalks, and pedestrian push buttons at signalized intersections currently exist in the Downtown Fresno study area providing connectivity throughout the downtown area.

Sidewalks connect most areas within the Downtown Fresno study area. Areas lacking sidewalk facilities or that have non-standard sidewalk facilities include the following:

- Santa Fe Street – northeast and southwest sides between Ventura and Inyo Street
- Santa Fe Street – southwest side between Inyo and Kern Streets
- Mono Street – northwest side between P and Santa Fe Streets
- Mono Street – southeast side northeast of R Street
- Ventura Street – northwest side, northeast of R Street southwest to railroad tracks
- Ventura Street – southeast side, northeast of railroad tracks
- P Street – northwest side southeast of Ventura Street

Image 9

Image 9 shows the area on the southeast side of Ventura Street, northeast of the railroad tracks. Sidewalks in the Downtown Fresno study area and adjacent areas are generally wide enough for one (1) or two (2) pedestrians to walk abreast.

Images 10 and *11* show the sidewalk facilities located along Tulare Street, southwest of O Street and along Kern Street, southwest of M Street.

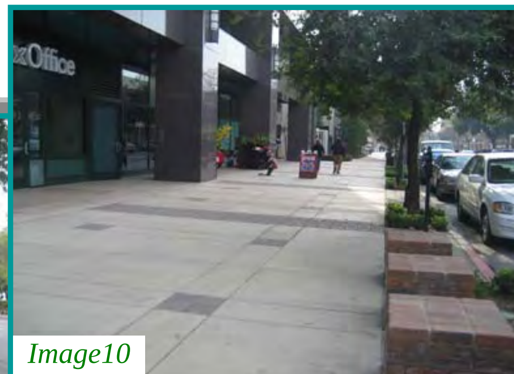


Image10

Image 11

Curb ramps provide for the mobility of users of all abilities. Curb ramps currently exist at all sidewalk corner locations in the Downtown Fresno study area. The curb ramp facility located at the intersection of Tulare Street at P Street is shown in *Image 12*.

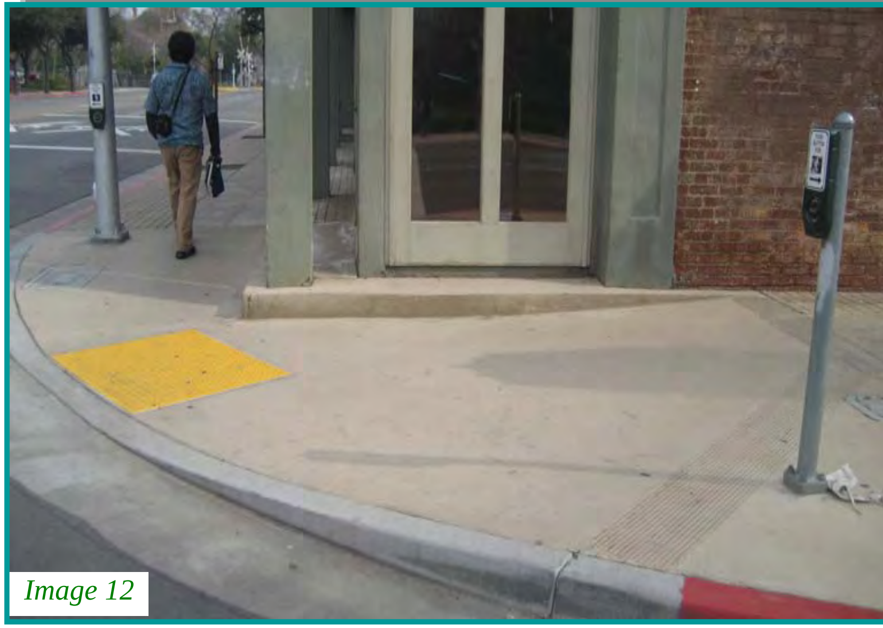


Image 12

Striped and/or decorative pedestrian crosswalks currently exist at most intersections within the Downtown Fresno study area. The following locations are lacking striped pedestrian crosswalks:

- Tuolumne Street at O Street – northeast leg
- Merced Street at L Street – all legs
- Merced Street at O Street – all legs
- Merced Street at P Street – all legs
- Merced Street at Santa Fe Street – all legs
- Fresno Street at L Street – southwest leg
- Fresno Street at Q Street – all legs
- Fresno Street at S Street – southeast leg
- Mariposa Street at R Street – southwest leg
- Mariposa Street at S Street – all legs
- Mariposa Street at T Street – all legs
- Mariposa Street at U Street – northwest leg
- Kern Street at P Street – all legs
- Kern Street at Santa Fe Street – all legs
- Capitol Street at N Street – all legs
- Capitol Street at O Street – all legs
- Capitol Street at P Street – all legs
- Inyo Street at L Street – southwest leg
- Inyo Street at P Street – all legs
- Inyo Street at Santa Fe Street – all legs
- Mono Street at Van Ness Street – northwest, northeast, and southeast legs
- Mono Street at L Street – all legs

- Mono Street at P Street – all legs
- Mono Street at Santa Fe Street – all legs
- Ventura Street at N Street – southeast leg
- Ventura Street at Santa Fe Street – northwest and southeast legs

Image 13

Image 13 shows the striped crosswalk facilities in the Downtown Fresno study area located at the intersection of Fresno Street at L Street. In addition to the intersection pedestrian facilities, midblock pedestrian facilities currently exist at the following locations:

- Tulare Street northeast of railroad tracks
- M Street between Fresno and Tulare Streets
- M Street between Inyo and Ventura Streets
- N Street between Fresno and Tulare Streets
- O Street between Fresno and Tulare Street
- P Street between Fresno and Tulare Streets

The midblock crossing locations along Tulare Avenue, northeast of the railroad tracks and along P Street at City Hall are shown in *Images 14* and *15*, respectively. Pedestrian walk/don't walk signals, pre-timed or pedestrian activated, are located at all signalized intersections in the Downtown Fresno study area. Pedestrian activated crosswalks also exist at the intersection of M Street at Mariposa Street and along M Street between Inyo and Ventura Streets.

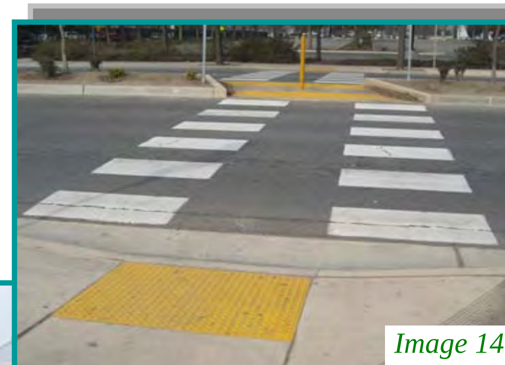


Image 14

Image 15


Image 16

School crossing signage is currently in place on Divisadero Street near Jefferson Elementary School. *Image 16* shows the school crossing signage located along Divisadero Street at the SR 41 southbound off ramp intersection.

In addition to the pedestrian roadway crossing facilities, the Downtown Fresno study area is home to many pedestrian friendly-areas. These areas include the pedestrian mall area located between O and N Streets at Kern Street, shown in *Image 17*, the Fulton Mall, the Mariposa Mall area as well as the Fresno County Plaza.


Image 17

Recommended Area Pedestrian Facility Improvements:

To improve the connectivity of the Downtown Fresno study area and provide access to the proposed BRT stop locations, the following area pedestrian facility improvements are recommended:

- Installation of sidewalk facilities along the northeast and southwest sides of anta Fe Street between Ventura and Inyo Street
- Installation of sidewalk facilities along the southwest side of Santa Fe Street between Inyo and Kern Streets
- Installation of sidewalk facilities along the northwest side of Mono Street between P and Santa Fe Streets
- Installation of sidewalk facilities along the southeast side of Mono Street northeast of R Street
- Installation of sidewalk facilities along the northwest side of Ventura Street from northeast of R Street southwest to railroad tracks
- Installation of sidewalk facilities along the southeast side of Ventura Street, northeast of railroad tracks
- Installation of sidewalk facilities along the northwest side of P Street, southeast of Ventura Street

Even though areas along the southwest side of Santa Fe Street between Inyo and Kern Streets, along the northwest side of Mono Street between P and Santa Fe Streets, along the southeast sides of Mono Street northeast of R Street, and along the northwest side of P Street southeast of Ventura Street are lacking sidewalk facilities or, sidewalk facilities currently exist on the opposite side of the roadway allowing connectivity within the Downtown Fresno study area. Therefore, installation of sidewalks at these locations may not be required to provide connectivity within the Downtown Fresno study area. All area sidewalk facility improvements should be consistent with the City of Fresno design standard policies.

Curb ramps on all intersection corners provide users of all abilities the facilities to be able to navigate easily throughout the Downtown Fresno study area. As stated previously, curb ramps currently exist at all intersection locations. Any improvements to the existing Downtown Fresno study area curb ramps should be consistent with the City of Fresno design standard policies.

Striped crosswalk facilities provide a designated area for pedestrians to cross a roadway, visible to both the pedestrian and motorist. In order to increase the visibility of pedestrians crossing the roadways in the Downtown Fresno study area, installation of striped crosswalk facilities are recommend at the following locations:

- Tuolumne Street at O Street – northeast leg
- Merced Street at L Street – all legs
- Merced Street at O Street – all legs
- Merced Street at P Street – all legs
- Merced Street at Santa Fe Street – all legs
- Fresno Street at L Street – southwest leg
- Fresno Street at Q Street – all legs
- Fresno Street at S Street – southeast leg
- Mariposa Street at R Street – southwest leg
- Mariposa Street at S Street – all legs
- Mariposa Street at T Street – all legs
- Mariposa Street at U Street – northwest leg
- Kern Street at P Street – all legs
- Kern Street at Santa Fe Street – all legs
- Capitol Street at N Street – all legs

- Capitol Street at O Street – all legs
- Capitol Street at P Street – all legs
- Inyo Street at L Street – southwest leg
- Inyo Street at P Street – all legs
- Inyo Street at Santa Fe Street – all legs
- Mono Street at Van Ness Street – northwest, northeast, and southeast legs
- Mono Street at L Street – all legs
- Mono Street at P Street – all legs
- Mono Street at Santa Fe Street – all legs
- Ventura Street at N Street – southeast leg
- Ventura Street at Santa Fe Street – northwest and southeast legs

All crosswalk facilities should be consistent with the City of Fresno design standard policies.

4. Bus Rapid Transit Facilities

Bus Rapid Transit (BRT) facilities locations proposed within the Downtown Fresno study area include:

- O Street at Tuolumne Street
- M Street at Mariposa Street
- M Street at Inyo Street
- P Street at Inyo Street
- P Street at City Hall

The existing FAX transit stop locations and existing pedestrian facilities provide connectivity and access to the proposed BRT facilities. Installation of the proposed Downtown Fresno study area bicycle facilities would provide connectivity for the bicyclists and the BRT facilities.

5. Healthy Community Assessment

A Healthy Community Assessment (Assessment) was prepared for the Downtown Fresno study area. The Assessment is a tool to help facilitate the thought processes necessary to plan and design sustainable communities and includes topics related to the streetscape, land uses, walkability and bikeability of an area. The Assessment is divided into two (2) parts: tours conducted on foot and tours conducted on a bicycle. The Downtown Fresno study area Assessment results are based on the walking tour. The streetscape and walkability components of the walking tour Assessment each received a rating of 5, "Very Good" while the land use and transit components each received a rating of 4, "Good". The overall rating of the Downtown Fresno study area based on the walking tour Assessment was 18, "Celebrate a little. Your neighborhood is pretty good." The complete Assessment is included in Appendix B.

4. CEDAR AVENUE CORRIDOR ANALYSIS

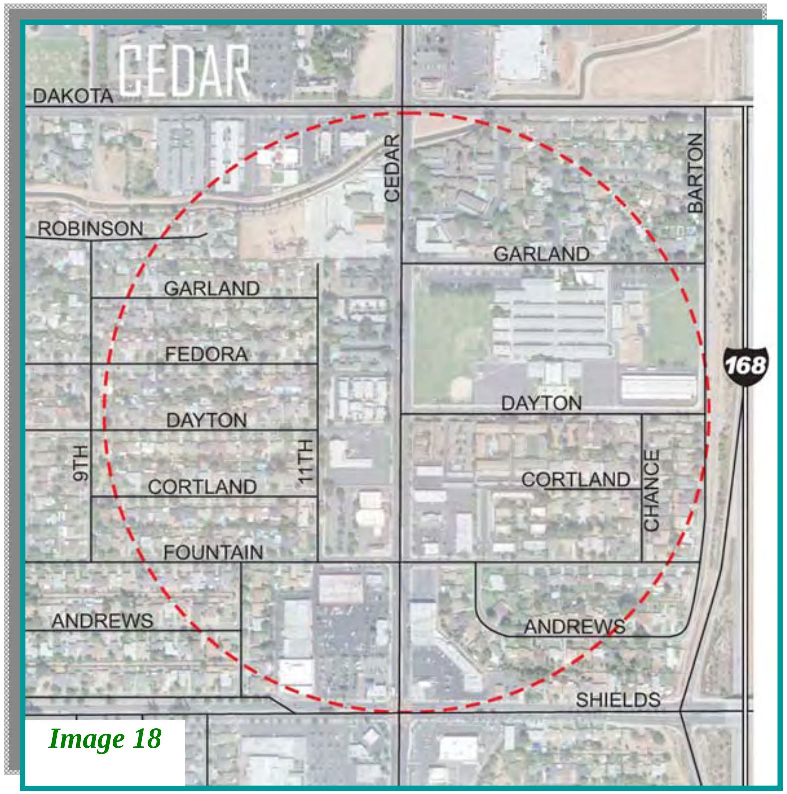


Image 18

The field survey for the Cedar Avenue Corridor was completed on Wednesday, February 10, 2010. The study area, shown in *Image 18* included a quarter mile radius area generally bounded by Shields Avenue (south), Dakota Avenue (north), Ninth Street (west) and Barton Avenue (east). A field walk was conducted and all pedestrian, bicycle, and transit facilities, or lack of, were noted. A Healthy Community Assessment was also prepared for the Cedar Avenue Corridor study area and is included in Appendix C.

4.1. Transit Facilities

Existing Area Transit Amenities:

Fresno Area Express (FAX) transit stop amenities in the Cedar Avenue Corridor study area ranged from route signage to shelters, benches and trash facilities. Lighting at the transit stop facilities is provided by the nearest streetlight located along the roadways. All twelve (12) transit stops within or adjacent to the Cedar Avenue Corridor study area consisted of route signage. Three (3) stop locations serving FAX Routes 38 and 41 consist of only route signage. These transit facilities are located as follows:

- Shields Avenue west of Cedar Avenue – eastbound stop
- Shields Avenue west of SR 168 – westbound stop
- Cedar Avenue south of Dayton Avenue – northbound stop (shown in *Image 19 on next page)*


Image 19

One (1) FAX transit stop serving Route 38 includes route signage, a bench and trash facilities. This transit facility is at the following location:

- Cedar Avenue south of Garland Avenue – northbound stop

All remaining transit stop locations within or adjacent to the Cedar Avenue Corridor study area are equipped with route signage, shelters, benches and trash facilities similar to the FAX Route 38 transit stop along southbound Cedar Avenue, north of Shields Avenue as shown in *Image 20*.


Image 20

Recommended Area Transit Amenity Improvements:

The following possible improvements to the existing area transit facility amenities are as follows:

- Installation of bench, trash and shelter facilities at two (2) FAX Route 41 locations along Cedar Avenue (eastbound Shields, west of Cedar Avenue, and westbound Shields, west of SR 168) and one (1) location along FAX Route 38 (northbound Cedar Avenue, south of Dayton Avenue)
- Installation of shelter facilities at the FAX Route 38 location along northbound Cedar Avenue, south of Garland Avenue
- All area transit amenity improvements should be consistent with ADA standards and City of Fresno design standard policies as well as Fresno Area Express' bus stop standards.

4.2. Bicycle Facilities

Existing Area Bicycle Facilities:

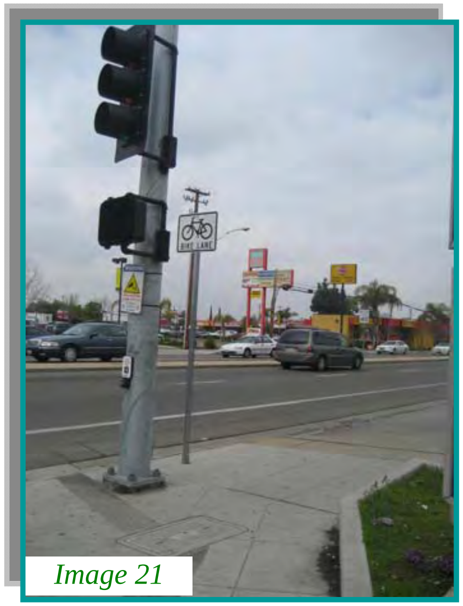


Image 21

Currently, signed and striped Class II bike lanes exist along the following roadways:

- Cedar Avenue, both northbound and southbound from Shields Avenue north through Dakota Avenue,
- Shields Avenue from SR 168 to the Shields Avenue Frontage Road.

A Class III bike route in the Cedar Avenue Corridor study area is located as follows:

- Shields Avenue, both westbound and eastbound west of Cedar Avenue

The Class II bike lane westbound and eastbound along Shields Avenue, west of Cedar Avenue, terminates and transitions into a Class III bike route at the Shields Avenue Frontage Road. No bike facilities currently exist along Cedar Avenue south of Shields Avenue or along Dakota Avenue adjacent to the Cedar Avenue Corridor study area. *Image 21* shows the Class II bike lane facility and signage located along Cedar Avenue, north of Shields Avenue and *Image 22* shows the Class II bike route signage located on Shields Avenue, west of Cedar Avenue.

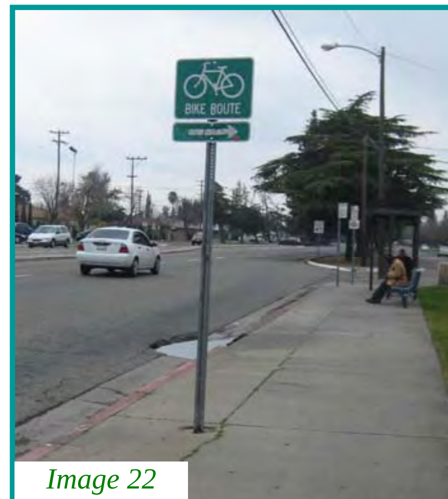


Image 22

Recommended Area Bicycle Facility Improvements:

The following area bicycle facility improvements are proposed as part of the City of Fresno's Bicycle Master Plan update:

- Installation of Class II bike lanes along Cedar Avenue, south of Shields Avenue
- Installation of Class II bike lanes along Dakota Avenue, east and west of Cedar Avenue

All area bicycle facility improvements should provide connectivity with bicycle facilities located outside of the Cedar Avenue Corridor study area and should be consistent with the City of Fresno design standard policies and the Fresno Bicycle Master Plan.

4.3. Pedestrian Facilities

Existing Area Pedestrian Facilities:


Image 23

Pedestrian facilities such as sidewalks, curb ramps, striped pedestrian crosswalks, and pedestrian push buttons at signalized intersections currently exist in the Cedar Avenue Corridor study area providing connectivity between most neighborhoods, retail areas, transit facilities, and schools.

Sidewalks connect most areas within the Cedar Avenue Corridor study area. Areas lacking sidewalk facilities include the following:

- Fountain Way - south side between Andrews Ave. and Barton Ave. (*Image 23)*
- Andrews Ave. - east/north side and west/south side between Fountain Way and Barton Avenue.
- Robinson Ave. - south side, east of 9th St.


Image 25

Sidewalks in the Cedar Avenue Corridor study area and adjacent areas are generally wide enough for one (1) or two (2) pedestrians to walk abreast. *Image 24 sh*ows the sidewalk facility located along the east side of Cedar Avenue, north of Dayton Avenue. The sidewalk facilities along northbound Barton Avenue tend to be narrower in width and are littered with poles, as shown in *Image 25,* making pedestrian use difficult. However, the south-bound sidewalk facilities along Barton Avenue provide ample space for pedestrians.

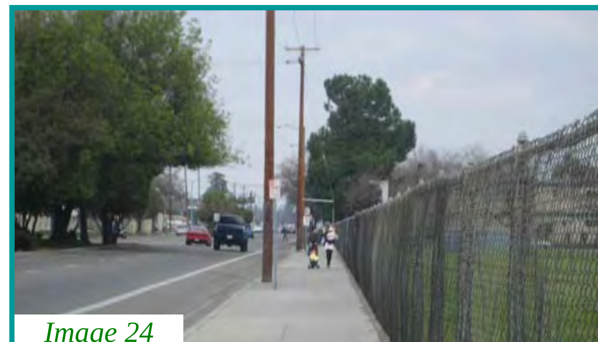


Image 24

Curb ramps provide for the mobility of users of all abilities. Curb ramps currently exist at all sidewalk corner locations. *Image 26* shows the curb ramp located on the northeast corner of Cedar Avenue and Fountain Way.

Striped pedestrian crosswalks and pedestrian push buttons currently exist at the following locations:

- Cedar Avenue at Shields Avenue: striped crosswalks and pedestrian push buttons (*Image 27*)
- Cedar Avenue at SR 168: striped crosswalks and pedestrian push buttons
- Cedar Avenue at Dayton Avenue (north leg): striped crosswalks and pedestrian push buttons
- Cedar Avenue at Garland Avenue: striped crosswalk
- Cedar Avenue at Dakota Avenue: striped crosswalks and pedestrian push buttons

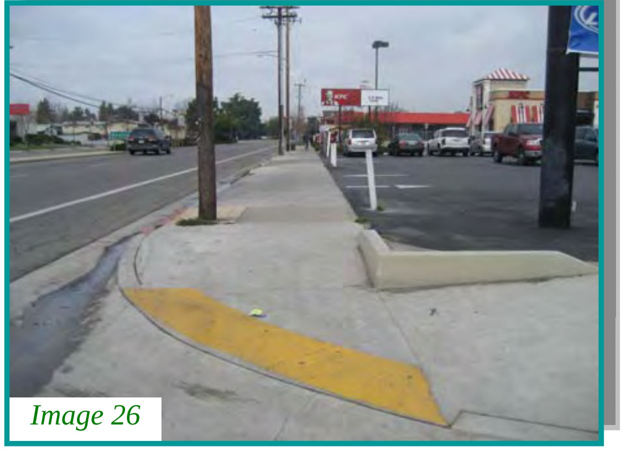


Image 26

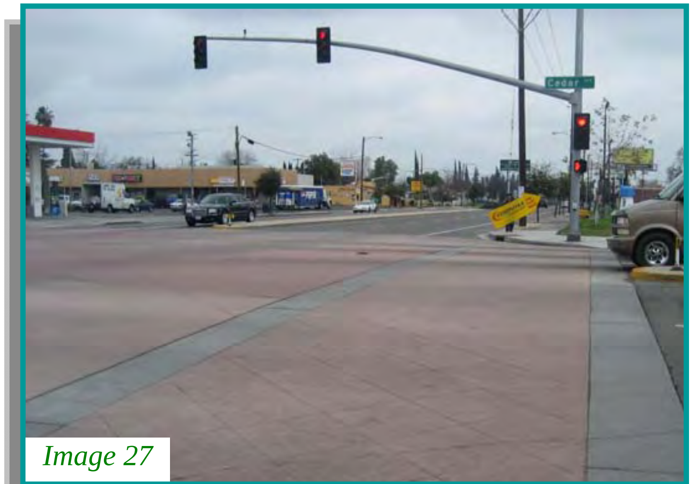


Image 27

Duncan Polytechnic High School is located on the east side of Cedar Avenue between Dayton and Garland Avenues in the Cedar Avenue Corridor study area. School crossing signage is currently in place at the following locations:

- Dayton Avenue, east of Cedar Avenue
- Garland Avenue, east of Cedar Avenue
- Barton Avenue, north of Fountain Way.

Image 28 shows the school crossing signage located along Garland Avenue.

Image 28

Recommended Area Pedestrian Facility Improvements:

The following area pedestrian facility improvements are recommended:

- Installation of sidewalk facilities along both sides of Andrews Avenue from Fountain Way to Barton Avenue

Even though areas along the south side of Fountain Way between Andrews Avenue and Barton Avenue, along the south side Robinson Avenue east of 9th Street, and along northbound Barton Avenue are lacking sidewalk facilities or have limited walking space, sidewalk facilities currently exist on the opposite side of the roadway allowing connectivity within the Cedar Avenue Corridor study area. Therefore, installation of sidewalks at these locations is not required to provide connectivity within the Cedar Avenue Corridor study area. All area pedestrian facility improvements should be consistent with the City of Fresno design standard policies.

4.4. Bus Rapid Transit Facilities

No bus rapid transit lines are proposed within the Cedar Study Area.

4.5. Healthy Community Assessment

A Healthy Community Assessment (Assessment) was prepared for the Cedar Avenue Corridor study area. The Assessment is a tool to help facilitate the thought processes necessary to plan and design sustainable communities and includes topics related to the streetscape, land uses, walkability and bikeability of an area. The Assessment is divided into two (2) parts: tours conducted on foot and tours conducted on a bicycle. The Cedar Avenue Corridor study area Assessment results are based on the walking tour. All components of the walking tour Assessment each received a rating of 4, “Good”. The overall rating of the Cedar Avenue Corridor study area based on the walking tour Assessment was 16, “Okay, but needs work”. The complete Assessment is included in Appendix C.

5. BLACKSTONE AVENUE CORRIDOR ANALYSIS

The field survey for the Blackstone Avenue Corridor was completed on Thursday, January 28, 2010. The Blackstone Avenue Corridor study area, shown in *Image 29*, included a quarter mile radius area generally bounded by Floradora Avenue (south), Weldon Avenue (north), San Pablo Avenue (west) and Clark Street (east). A field walk was conducted and all pedestrian, bicycle, and transit facilities, or lack of, were noted. A Healthy Community Assessment was also prepared for the Blackstone Avenue Corridor study area and is included in Appendix D.

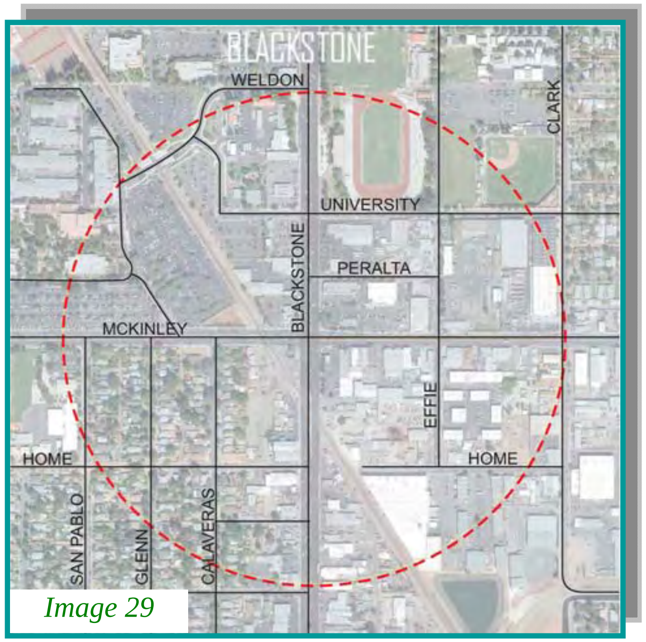


Image 29

5.1. Transit Facilities

Existing Area Transit Amenities:

Fresno Area Express (FAX) serves nine (9) transit stop locations in the Blackstone Avenue Corridor study area. Amenities at these transit stop locations ranged from route signage only to shelters, benches and trash facilities. Lighting at the transit stop facilities is provided by the nearest streetlight located along the roadways. Two (2) stop locations along FAX Route 20 consist of only route signage. These transit facilities are located as follows:

- Blackstone Avenue south of Home Avenue – southbound stop
- Blackstone Avenue north of Home Avenue – northbound stop

The transit facilities at the southbound stop along Blackstone Avenue, south of Home Avenue are shown in *Image 30*.

Image 30

Two (2) transit stops serving FAX Route 20 consist of route signage, a bench and trash facilities. These transit facilities are located as follows:

- Blackstone Avenue south of McKinley Avenue – southbound stop
- McKinley Avenue west of Blackstone Avenue – westbound stop

Image 31 shows the FAX Route 20 stop located along Blackstone, south of McKinley.

Image 31

One (1) transit stop serving FAX Route 30 is equipped with route signage, bench and trash facilities. This transit facility is located as follows:

- Blackstone Avenue north of Weldon Avenue – northbound stop
  All remaining transit stop locations within or adjacent to the Blackstone Avenue Corridor study area are equipped with route signage, shelters, benches and trash facilities similar to the FAX Route 20 transit stop along northbound Blackstone Avenue, north of McKinley Avenue as shown in *Image 32*.


Image 32

Recommended Area Transit Amenity Improvements:

The following possible improvements to the existing area transit facility amenities are as follows:

- Installation of route maps and schedule information, bench, trash and shelter facilities at two (2) FAX Route 20 locations along Blackstone Avenue southbound Blackstone, south of Home Avenue, and northbound Blackstone Avenue, north of Home Avenue)
- Installation of route maps and schedule information and shelter facilities at two (2) FAX Route 20 locations along southbound Blackstone Avenue, south of McKinley Avenue and along westbound McKinley Avenue, west of Blackstone Avenue and one (1) location on northbound Blackstone Avenue, north of Weldon Avenue, serving FAX Route 30

All area transit amenity improvements should be consistent with ADA standards, City of Fresno design standard policies, as well as Fresno Area Express' bus stop standards.

5.2. Bicycle Facilities

Existing Area Bicycle Facilities:

Currently, there are no designated bicycle facilities in Blackstone Avenue Corridor study area.

Recommended Area Bicycle Facility Improvements:

The following area bicycle facility improvements are proposed as part of the City of Fresno's Bicycle Master Plan update:

- Installation of Class II bike lanes along Blackstone Avenue, north and south of McKinley Avenue
- Installation of Class II bike lanes along McKinley Avenue, east and west of Blackstone Avenue

All area bicycle facility improvements should provide connectivity with bicycle facilities located outside of the Blackstone Avenue Corridor study area and should be consistent with the City of Fresno design standard policies and the Fresno Bicycle Master Plan.

5.3. Pedestrian Facilities

Existing Area Pedestrian Facilities:

Pedestrian facilities such as sidewalks, ramp curbs, striped pedestrian crosswalks, and pedestrian push buttons at signalized intersections currently exist in the Blackstone Avenue Corridor study area providing connectivity between most neighborhoods, retail areas, transit facilities, and schools.

Sidewalks connect most areas within the Blackstone Avenue Corridor study area. Areas lacking sidewalk facilities or that have non-standard sidewalk facilities include the following:

- Blackstone Avenue – east side, Weldon Avenue to University Avenue (in front of Ratcliffe Stadium)

- Blackstone Avenue – west and east sides from University Avenue to Peralta Way
- Blackstone Avenue – east side, approximately 290 feet south of McKinley Avenue to Floradora Avenue
- Effie Street – west side from University Avenue to Home Avenue
- Clark Street – west and east sides from south of McKinley Avenue to Home Avenue
- University Avenue – north side from Blackstone Avenue to Clark Street
- Peralta Way – north side from Blackstone Avenue to Effie Street
- Home Avenue – south side, east of San Pablo Avenue
- Home Avenue – north and south sides approximately 280 feet west of Blackstone Avenue
- Home Avenue – north side from west of Effie Street to Clark Street
- Home Avenue – south side from Effie Street to Clark Street

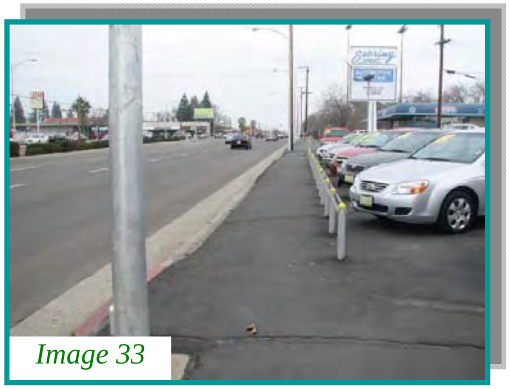


Image 33

The area lacking sidewalk facilities along the east side of Blackstone Avenue near Peralta Way is shown in *Image 33* and the area along the east side of Blackstone Avenue south of McKinley Avenue is shown in *Image 34*.

Image 34

Sidewalks in the Blackstone Avenue Corridor study area and adjacent areas are generally wide enough for one (1) or two (2) pedestrians to walk abreast. *Image 35* shows the sidewalk facility located along the west side of Blackstone Avenue, north of University Avenue.

Image 35

Curb ramps provide for the mobility of users of all abilities. Curb ramps are currently lacking at the following intersections in the Blackstone Avenue Corridor study area:

- Blackstone Avenue at University Avenue – southwest corner
- Blackstone Avenue at Peralta Way – northeast corner
- Blackstone Avenue at Pine Avenue – northwest corner
- Blackstone Avenue at Floradora Avenue – northwest corner
- Clark Street at Home Avenue – northwest and southwest corners
- Effie Street at Home Avenue – northwest and northeast corners

Image 36

Image 36 shows the curb ramp facilities located on the southeast corner of the Blackstone Avenue at McKinley Avenue intersection.

Striped pedestrian crosswalks and pedestrian push buttons currently exist at the following locations:

- San Pablo Avenue at McKinley Avenue (west and south legs): striped crosswalks
- San Pablo Avenue at Home Avenue: striped crosswalks
- Blackstone Avenue at Weldon Avenue (west and south legs): striped crosswalk and pedestrian push buttons
- Blackstone Avenue at University Avenue (west and east legs): striped crosswalk
- Blackstone Avenue at McKinley Avenue: striped crosswalks and pedestrian push buttons
- Blackstone Avenue at Clark Street: striped crosswalks and pedestrian push buttons

The striped pedestrian crosswalk facilities located at the intersection of Blackstone Avenue at McKinley Avenue are shown in *Image 37*.

Image 37

School crossing signage is currently in place on McKinley Avenue and San Pablo Avenue near the Heaton Elementary School. *Image 38 shows* the school crossing signage located along McKinley Avenue.

Image 38

Recommended Area Pedestrian Facility Improvements:

To improve the connectivity of the Blackstone Avenue Corridor study area and provide access to the proposed BRT stop locations, the following area pedestrian facility improvements are recommended:

- Installation of sidewalk facilities along the east side of Blackstone Avenue from Weldon Avenue to University Avenue (in front of Ratcliffe Stadium)
- Installation of sidewalk facilities along both sides of Blackstone Avenue from University Avenue to Peralta Way
- Installation of sidewalk facilities along Blackstone Avenue from south of McKinley Avenue to Floradora Avenue
- Installation of sidewalk facilities along both sides of Clark Street from south of McKinley Avenue to Home Avenue
- Installation of sidewalk facilities along the north side of University Avenue from Blackstone Avenue to Clark Street
- Installation of sidewalk facilities along both sides of Home Avenue west of Blackstone Avenue
- Installation of sidewalk facilities along both sides of Home Avenue from Effie Street to Clark Street

Even though areas along the west sides of Effie Street between University Avenue to Home Avenue, along the north side of Peralta Way between Blackstone Avenue and Effie Street, and along the south side of Home Avenue east of San Pablo Avenue are lacking sidewalk facilities or have limited walking space, sidewalk facilities currently exist on the opposite side of the roadway allowing connectivity within the Blackstone Avenue Corridor study area. Therefore, installation of sidewalks at these locations is not required to provide connectivity within the Blackstone Avenue Corridor study area. All area sidewalk facility improvements should be consistent with the City of Fresno design standard policies.

The installation of curb ramps on all intersection corners provides users of all abilities the facilities to be able to navigate easily throughout the Blackstone Avenue Corridor study area. All Blackstone Avenue Corridor study area curb ramp improvements should be consistent with the City of Fresno design standard policies. The installation of curb ramp facilities is recommended at the following locations:

- Blackstone Avenue at University Avenue –southwest corner
- Blackstone Avenue at Peralta Way – northeast corner
- Blackstone Avenue at Pine Street - northwest corner
- Blackstone Avenue at Floradora Avenue - northwest corner
- Effie Street at Home Avenue – northwest and northeast corners
- Clark Street at Home Avenue – northwest and southwest corners

Striped crosswalk facilities provide a designated area for pedestrians to cross a roadway, visible to both the pedestrian and motorist. In order to increase the visibility of pedestrians crossing the roadways in the Blackstone Avenue Corridor study area, installation of striped crosswalk facilities are recommend at the following locations:

- Blackstone Avenue at Floradora Avenue – west leg
- Blackstone Avenue at Pine Avenue – west leg
- Blackstone Avenue at Home Avenue – west leg
- Blackstone Avenue at Peralta Way – east leg
- McKinley Avenue at Glenn Avenue – south leg
- McKinley Avenue at Calaveras Street – south leg
- McKinley Avenue at Effie Street – north and south legs

All crosswalk facilities should be consistent with the City of Fresno design standard policies.

5.4. Bus Rapid Transit Facilities

Bus Rapid Transit (BRT) major station facilities are proposed at the following two (2) locations within the Blackstone Avenue Corridor study area:

- Blackstone Avenue at McKinley Avenue – Station 15
- Blackstone Avenue at Weldon Avenue – Station 14

These BRT station facilities will be located along the proposed Blackstone/Kings Canyon BRT Route and will consist of amenities such as a shelter, benches, route maps and schedules, and trash facilities. The existing transit stop locations and existing pedestrian facilities provide connectivity and access to the proposed BRT facilities. Installation of the proposed Blackstone Avenue Corridor study area bicycle facilities would provide connectivity for the bicyclists and the BRT facilities.

5.5. Healthy Community Assessment

A Healthy Community Assessment (Assessment) was prepared for the Blackstone Avenue Corridor study area. The Assessment is a tool to help facilitate the thought processes necessary to plan and design sustainable communities and includes topics related to the streetscape, land uses, walkability and bikeability of an area. The Assessment is divided into two (2) parts: tours conducted on foot and tours conducted on a bicycle. The Blackstone Avenue Corridor study area Assessment results are based on the walking tour. The streetscape, land use and transit components of the Assessment each received a rating of 4, “Good”. The walkability component received a rating of 3, “some problems” with problems such “scary” people and being uncomfortable walking through the area noted. The overall rating of the Blackstone Avenue Corridor study area based on the walking tour Assessment was 15, “Okay, but needs work”. The complete Assessment is included in Appendix D.

6. DOWNTOWN CLOVIS ANALYSIS

The field survey for the Downtown Clovis study area was completed on Tuesday, February 16, 2010. The study area, shown in *Image 39*, included a quarter mile radius area generally bounded by 8th Street (south), 2nd Street (north), Harvard Avenue (west) and Baron Avenue (east). A field walk was conducted and all pedestrian, bicycle, and transit facilities, or lack of, were noted. A Healthy Community Assessment was also prepared for the Downtown Clovis study area and is included in Appendix E..

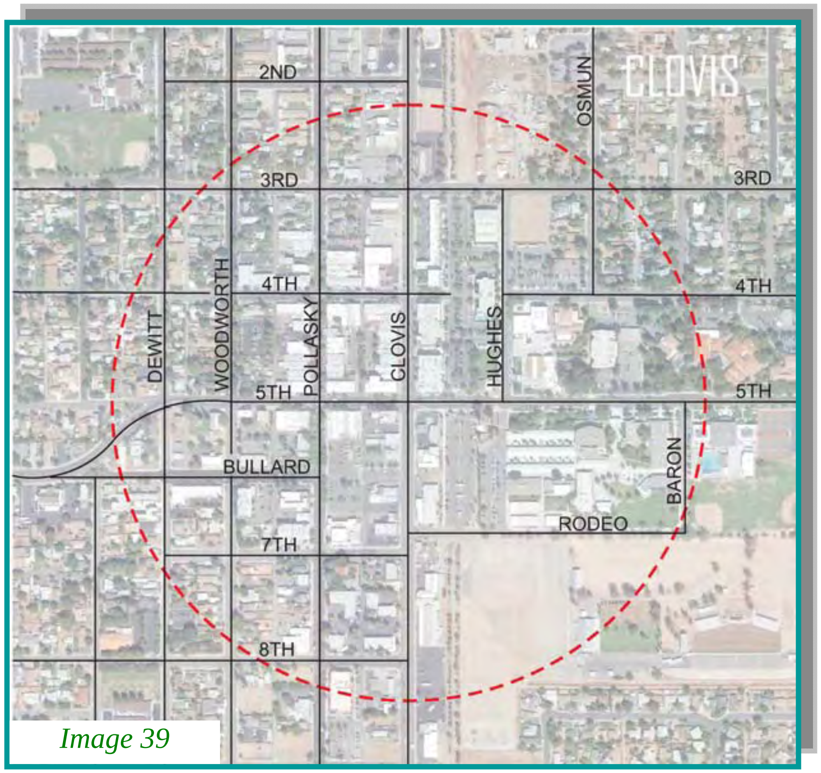


Image 39

6.1. Transit Facilities

Existing Area Transit Amenities:

Stageline transit stop amenities in the Downtown Clovis study area ranged from bus stop signage only to shelters, benches and trash facilities. Lighting at the transit stop facilities is provided by the nearest streetlight located along the roadways. All eleven (11) transit stops within or adjacent to the Downtown Clovis study area consisted of a minimum of bus stop signage. Seven (7) stop locations along Stageline Routes 10 and 50 consist of only bus stop signage. These transit facilities are located as follows:

- 4th Street at Osmun Avenue – eastbound stop
- 5th Street at Harvard – eastbound and westbound stops
- 5th Street at Woodworth Avenue – eastbound stop
- 5th Street at Hughes Avenue – eastbound stop
- Pollasky Avenue at 9th Street – northbound and southbound stops

Three (3) transit stops serving Stageline Routes 10 and 50 include bus stop signage and schedule information. These transit facilities are located as follows:

- Pollasky Avenue near Bullard Avenue – northbound and southbound stops
- 5th Street near Clark Intermediate School – eastbound

One (1) transit stop serving Stageline Routes 10 and 50 along westbound 5th Street, north of Clark Intermediate School includes bus stop signage, schedule information, shelter, bench, and trash facilities. *Image 40* shows the bus route signage for the northbound stop on Pollasky Avenue, near 9th Street while *Image 41* shows the Stageline transit stop facility Pollasky Avenue near Bullard Avenue.

Image 40

Image 41

Recommended Area Transit Amenity Improvements:

The following possible improvements to the existing area transit facility amenities are as follows:

- Installation of schedule information, bench, trash and shelter facilities at the seven (7) Stageline Route 10 and 50 locations along 4th Street, 5th Street, and Pollasky Avenue currently consisting of only bus stop signage
- Installation of shelter, bench, and trash facilities at three (3) Stageline Routes 10 and 50 locations along Pollasky Avenue and 5th Street

All area transit amenity improvements should be consistent with ADA standards and City of Clovis design standard policies as well as Stageline's bus stop standards.

6.2. Bicycle Facilities

Existing Area Bicycle Facilities:

Currently, signed and striped Class II bike lanes exist along Hughes Avenue, both northbound and southbound from 5th Street north to 3rd Street. *Image 42* shows the Class II bike route signage located on Hughes Avenue, north of 5th Street.

In addition to the Class II bike lanes located along Hughes Avenue, the Clovis Old Town Trail runs northbound and southbound, east of Clovis Avenue through the Downtown Clovis study area. The Clovis Old Town Trail provides connectivity for pedestrian and bicyclists traveling northbound and southbound from south of Ashlan Avenue to Willow Avenue with direct connections to the current and proposed Dry Creek and Greenbelt Trails and to the proposed County Trails.

Image 42

Recommended Area Bicycle Facility Improvements:

According to the Clovis Bicycle Transportation Plan, the following bicycle facility improvements are planned for the Downtown Clovis study area:

- Installation of Class III bike route along 3rd Street from Hughes Avenue to Sunnyside Avenue

In addition, Class II bike lanes are proposed along Bullard Avenue, providing connectivity to areas outside of the Downtown Clovis study area.

All area bicycle facility improvements should provide connectivity with bicycle facilities located outside of the Downtown Clovis study area and should be consistent with the City of Clovis design standard policies.

6.3. Pedestrian Facilities

Existing Area Pedestrian Facilities:

Pedestrian facilities such as sidewalks, ramp curbs, striped pedestrian crosswalks, and pedestrian push buttons at signalized intersections currently exist in the Downtown Clovis study area providing connectivity between most neighborhoods, retail areas, transit facilities, and schools.

Sidewalks connect most areas within the Downtown Clovis study area. Areas lacking sidewalk facilities or that have non-standard sidewalk facilities include the following:

- Dewitt Avenue – west side, north of 4th Street
- Dewitt Avenue – east side, midblock between 5th Street and 4th Street
- Dewitt Avenue – east side, south of 5th Street
- Dewitt Avenue – west side, north of 5th Street
- Woodworth Avenue – east side, midblock between 3rd Street and 4th Street
- Woodworth Avenue – west side, south of 5th Street
- Woodworth Avenue – west side, north of 7th Street
- Pollasky Avenue – west side, south of 8th Street
- Clovis Avenue – east side, north of Rodeo Drive
- Clovis Avenue – west side, midblock between 8th Street and 9th Street
- Clovis Avenue – west side, north of 9th Street
- Osmun Avenue – west and east sides, south of 3rd Street
- Baron Avenue – east side, north and south of 3rd Street
- 2nd Street – south side, west of Woodworth Avenue
- 3rd Street – north side, east of Dewitt Avenue
- 3rd Street – north side, between Clovis Avenue and Osmun Avenue
- 3rd Street – south side, between Hughes Avenue and Osmun Avenue
- 3rd Street – north side, east of Baron Avenue
- 4th Street – north side, west of Dewitt Avenue
- 5th Street – north side, west of Dewitt Avenue

- 5th Street – south side, east of Dewitt Avenue
- 6th Street – north and south sides, midblock between Harvard and Dewitt Avenues
- 7th Street – south side, east of Dewitt Avenue
- 7th Street – north side, west of Woodworth Avenue
- 7th Street – south side, west of Pollasky Avenue
- 7th Street – south side, east of Pollasky Avenue
- 8th Street – south side, west of Pollasky Avenue
- 9th Street – north and south sides between Woodworth and Pollasky Avenues
- 9th Street – north side, west of Clovis Avenue

Image 43 shows the area along Pollasky Avenue south of 8th Street with no sidewalk facilities.


Image 43

Sidewalks in the Downtown Clovis study area and adjacent areas are generally wide enough for one (1) or two (2) pedestrians to walk abreast. *Images 44* (north side of 3rd Street east of Clovis Avenue) and *45* (north side of 5th Street between Woodworth and Pollasky Avenues) show an example of the sidewalk facilities located in the Downtown Clovis study area.

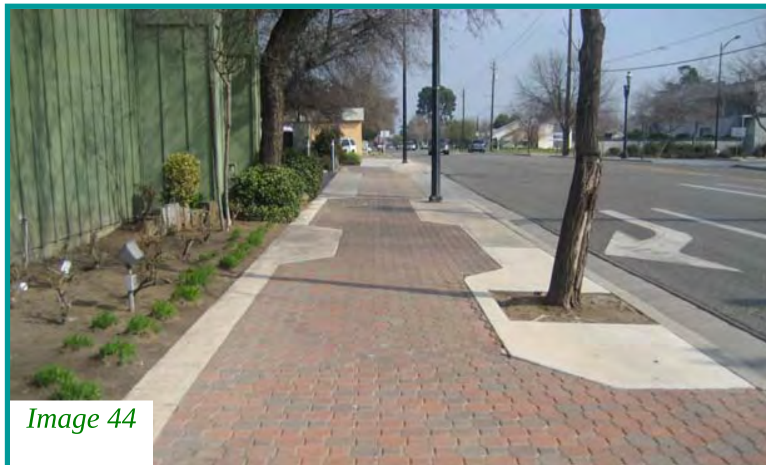


Image 44

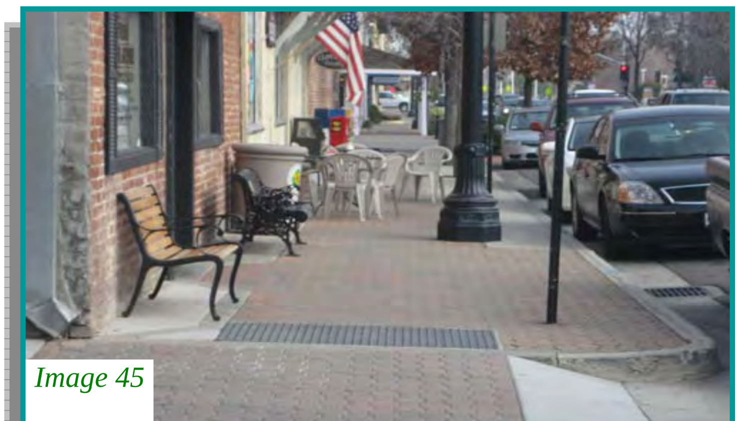


Image 45

Curb ramps provide for the mobility of users of all abilities. *Image 46* shows the curb ramp facility at the intersection of 5th Street at Clovis Avenue. Curb ramps are currently lacking at the following intersections in the Downtown Clovis study area:

- 3rd Street at Osmun Avenue – southwest corner
- 4th Street at Dewitt Avenue – northwest corner
- 5th Street at Dewitt Avenue – northeast corner

Image 46

Image 47

Striped pedestrian crosswalks currently exist at most intersections within the Downtown Clovis study area. The crosswalk facility located on 5th Street at Hughes Avenue is shown in *Image 47*. The following locations are lacking striped pedestrian crosswalks:

- 6th Street at Dewitt Avenue: striped crosswalks
- 7th Street at Dewitt Avenue: striped crosswalks
- 7th Street at Woodworth Avenue: striped crosswalks
- 8th Street at Dewitt Avenue: striped crosswalks
- 8th Street at Woodworth Avenue: striped crosswalks

Pedestrian push buttons are located at all signalized intersections in the Downtown Clovis study area. A pedestrian activated crosswalk also exists along 5th Street at the Clark Intermediate School, between Hughes and Baron Avenues shown in *Image 48*.


Image 48

School crossing signage and/or pavement markings are currently in place on 5th Street near Clark Intermediate School and on 2nd and 3rd Street near Woodworth Avenue near the Weldon Elementary School. *Image 49* shows the school crossing locations at the intersection of 3rd Street at Woodworth Avenue near the Weldon Elementary School.

Recommended Area Pedestrian Facility Improvements:

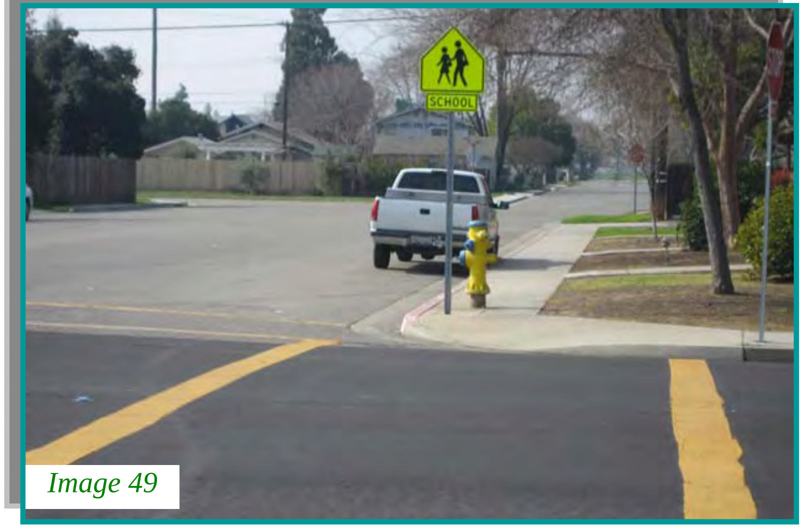


Image 49

To improve the connectivity of the Downtown Clovis study area, the following area pedestrian facility improvements are recommended:

- Installation of sidewalk facilities along the west side of Dewitt Avenue, north of 4th Street
- Installation of sidewalk facilities along the east side of Dewitt Avenue, midblock between 5th Street and 4th Street
- Installation of sidewalk facilities along the east side of Dewitt Avenue, south of 5th Street
- Installation of sidewalk facilities along the west side of Dewitt Avenue, north of 5th Street
- Installation of sidewalk facilities along the east side of Woodworth Avenue, midblock between 3rd Street and 4th Street

- Installation of sidewalk facilities along the west side of Woodworth Avenue, south of 5th Street
- Installation of sidewalk facilities along the west side of Woodworth Avenue, north of 7th Street
- Installation of sidewalk facilities along the west side of Pollasky Avenue, south of 8th Street
- Installation of sidewalk facilities along the east side of Clovis Avenue, north of Rodeo Drive
- Installation of sidewalk facilities along the west side of Clovis Avenue, midblock between 8th Street and 9th Street
- Installation of sidewalk facilities along the west side of Clovis Avenue, north of 9th Street
- Installation of sidewalk facilities along the west and east sides of Osmun Avenue, south of 3rd Street
- Installation of sidewalk facilities along the east side of Baron Avenue, north and south of 3rd Street
- Installation of sidewalk facilities along the south side of 2nd Street, west of Woodworth Avenue
- Installation of sidewalk facilities along the north side of 3rd Street, east of Dewitt Avenue
- Installation of sidewalk facilities along the north side of 3rd Street, between Clovis Avenue and Osmun Avenue
- Installation of sidewalk facilities along the south side of 3rd Street, between Hughes Avenue and Osmun Avenue
- Installation of sidewalk facilities along the north side of 3rd Street, east of Baron Avenue
- Installation of sidewalk facilities along the north side of 4th Street, west of Dewitt Avenue
- Installation of sidewalk facilities along the north side of 5th Street, west of Dewitt Avenue
- Installation of sidewalk facilities along the south side of 5th Street, east of Dewitt Avenue
- Installation of sidewalk facilities along the north and south sides of 6th Street, midblock between Harvard and Dewitt Avenues
- Installation of sidewalk facilities along the south side of 7th Street, east of Dewitt Avenue
- Installation of sidewalk facilities along the north side of 7th Street, west of Woodworth Avenue
- Installation of sidewalk facilities along the south side of 7th Street, west of Pollasky Avenue
- Installation of sidewalk facilities along the south side of 7th Street, east of Pollasky Avenue
- Installation of sidewalk facilities along the south side of 8th Street, west of Pollasky Avenue
- Installation of sidewalk facilities along the north and south sides of 9th Street, between Woodworth and Pollasky Avenues
- Installation of sidewalk facilities along the north side of 9th Street, west of Clovis Avenue

Even though the majority of the above areas are lacking sidewalk facilities or have limited walking space, sidewalk facilities currently exist on the opposite side of the roadway allowing connectivity within the Downtown Clovis study area. Therefore, installation of sidewalks at these locations is not necessarily required to provide connectivity within the Downtown Clovis study area. The following locations are lacking sidewalk facilities in areas along both sides of the roadways limiting the connectivity within the Downtown Clovis study area:

- Along the west and east sides of Osmun Avenue, south of 3rd Street
- Along the north side of 3rd Street, between Clovis Avenue and Osmun Avenue
- Along the south side of 3rd Street, between Hughes Avenue and Osmun Avenue
- Along the north and south sides of 6th Street, midblock between Harvard and Dewitt Avenues
- Along the north and south sides of 9th Street, between Woodworth and Pollasky Avenues

All area sidewalk facility improvements should be consistent with the City of Clovis design standard policies.

The installation of curb ramps on all intersection corners provides users of all abilities the facilities to be able to navigate easily throughout the Downtown Clovis study area. All Downtown Clovis study area curb ramp improvements should be consistent with the City of Clovis design standard policies. The installation of curb ramp facilities is recommended at the following locations:

- 3rd Street at Osmun Avenue – southwest corner
- 4th Street at Dewitt Avenue – northwest corner
- 5th Street at Dewitt Avenue – northeast corner

Striped crosswalk facilities provide a designated area for pedestrians to cross a roadway, visible to both the pedestrian and motorist. In order to increase the visibility of pedestrians crossing the roadways in the Downtown Clovis study area, installation of striped crosswalk facilities are recommend at the following locations:

- 6th Street at Dewitt Avenue – all legs
- 7th Street at Dewitt Avenue – all legs
- 7th Street at Woodworth Avenue – all legs
- 8th Street at Dewitt Avenue – all legs
- 8th Street at Woodworth Avenue – all legs

All crosswalk facilities should be consistent with the City of Clovis design standard policies.

6.4. Bus Rapid Transit Facilities

No bus rapid transit lines are proposed within the Clovis Downtown Area.

6.5. Healthy Community Assessment

A Healthy Community Assessment (Assessment) was prepared for the Downtown Clovis study area. The Assessment is a tool to help facilitate the thought processes necessary to plan and design sustainable communities and includes topics related to the streetscape, land uses, walkability and bikeability of an area. The Assessment is divided into two (2) parts: tours conducted on foot and tours conducted on a bicycle. The Downtown Clovis study area Assessment results are based on the walking tour. The streetscape, land use and walkability components of the walking tour Assessment each received a rating of 5, “Very Good” while the transit component received a rating of 4, “Good”. The overall rating of the Downtown Clovis study area based on the walking tour Assessment was 19, “Celebrate a little. Your neighborhood is pretty good.” The complete Assessment is included in Appendix E.

7. DOWNTOWN SELMA ANALYSIS

The field survey for the Downtown Selma study area was completed on Wednesday, March 31, 2010. The Downtown Selma study area, shown in *Image 50*, was generally bounded by 3rd Street (south), Arrants Street (north), Front Street (west) and Keith Street (east). A field walk was conducted and all pedestrian, bicycle, and transit facilities, or lack of, were noted. A Healthy Community Assessment (Assessment) was prepared and a walking tour was conducted for the Downtown Selma study area on April 20. Results of the Assessment are included in Appendix F.

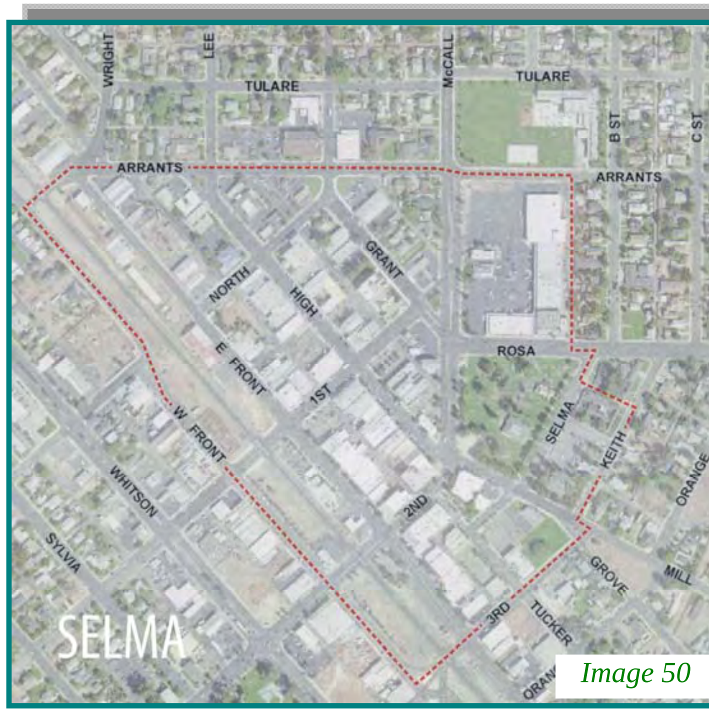


Image 50

7.1. Transit Facilities

Existing Area Transit Amenities:

Selma Transit serves three (3) transit stop locations within the Downtown Selma study area. Transit stop amenities in the Downtown Selma study area ranged from route signage with scheduling information and bench facilities to shade trees at the stop locations. Lighting at the transit stop facilities is provided by the nearest streetlight located along the roadways Two (2) transit stop locations in the Downtown Selma study area consisted of route signage with scheduling information and bench facilities. These transit facilities are located as follows:

- High Street northwest of North Street – northwest-bound stop
- McCall Avenue north of Rose Avenue – northbound stop

The Selma Transit stop location located on High Street, southeast of 1st Street includes the route signage and schedule information, bench facilities and shade trees providing shelter from the sun. *Images 51* and *52* show the transit stop facilities located on High Street, southeast of 1st Street and on McCall Avenue north of Rose Avenue, respectively.

Area Transit Amenity Improvements

Image 51

The following possible improvements to the existing area transit facility amenities are as follows:

- Installation of trash and shelter facilities at all three (3) Selma Transit stop locations
- Installation of shade trees at the two (2) Selma Transit stops currently consisting of only route signage, scheduling information and bench facilities

All area transit amenity improvements should be consistent with ADA standards, the City of Selma design standard policies and Fresno County Rural Transit Agency standards.

Image 52

7.2. Bicycle Facilities

Existing Area Bicycle Facilities:

Currently, there are no designated bicycle facilities in Downtown Selma study area.

Recommended Area Bicycle Facility Improvements:

The following area bicycle facility improvements presented for consideration are as follows:

- Installation of Class II bike lanes along McCall Avenue, north of Mill Street and south of Arrants Street within the Downtown Selma study area
- Installation of Class II bike lanes along Arrants Street between Front and B Streets in the Downtown Selma study area
- Installation of Class II bike lanes along Rose Avenue east of McCall Avenue in the Downtown Selma study area

Image 53

All area bicycle facility improvements should provide connectivity with bicycle facilities located outside of the Downtown Selma study area and should be consistent with the City of Selma design standard policies. *Image 53* shows an example of a Class II bike facility.

7.3. Pedestrian Facilities

Existing Area Pedestrian Facilities:

Pedestrian facilities such as sidewalks, ramp curbs, striped pedestrian crosswalks, and pedestrian push buttons at signalized intersections currently exist in the Downtown Selma study area providing connectivity throughout the downtown area.

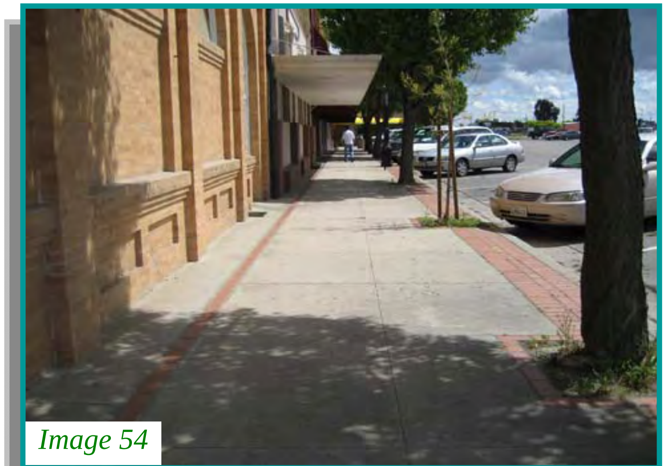


Image 54

Sidewalks connect most areas within the Downtown Selma study area. Areas lacking sidewalk facilities or that have non-standard sidewalk facilities include the following:

- Front Street – southwest side between Arrants and 1st Streets
- Front Street – southwest side beginning midblock between 1st and 2nd Streets
- Front Street – southwest side beginning midblock between 2nd and 3rd Streets

Sidewalks in the Downtown Selma study area and adjacent areas are generally wide enough for at least two (2) pedestrians to walk abreast. *Image 54* shows the sidewalk facility located along the east side of Front

Street, south of 2nd Street. The sidewalk facilities along the north side of 2nd Street, north of Tucker and along the east side of High Street, north of North Street are shown in *Images 55* and *56*.

Curb ramps provide for the mobility of users of all abilities. Curb ramps currently exist at all sidewalk corner locations in the Downtown Selma study area. *Image 57* shows the curb ramp facilities located on the northeast and northwest corners of the 3rd Street at Tucker Street intersection.

Image 55

Striped and/or decorative pedestrian crosswalks currently exist at most intersections within the Downtown Selma study area. The following locations are lacking striped pedestrian crosswalks:

- Front Street at North Street – northwest, southwest, and southeast legs
- Front Street at 3rd Street – northeast, southwest, and southeast legs
- Tucker Street at Selma Street – all legs
- Tucker Street at 3rd Street – northeast and southwest legs
- Cross Street at Selma Street – all legs
- Cross Street at Keith Street – all legs
- Mill Street at Keith Street – northeast leg

Image 56

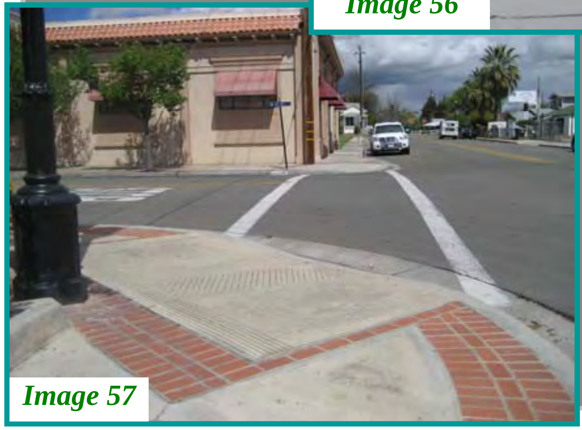


Image 57

Image 58

Image 58 shows the pedestrian crosswalk facilities located at the intersection of Front Street at 1st Street while *Image 59* shows the facilities located at the Selma Street at Mill Street intersection.

In addition to the intersection pedestrian facilities, midblock pedestrian facilities currently exist at the following locations:

- Front Street between 1st and 2nd Streets
- High Street between 1st and 2nd Streets

Image 59

The midblock pedestrian crossing located on Front Street between 1st and 2nd Streets is shown in *Image 60.*

Pedestrian push buttons are located at the two (2) signalized intersections located within the Downtown Selma study area. Traffic signals are located at the intersections of McCall Avenue at Rose Avenue/Grant Street and McCall Avenue/2nd Street at High Street/Mill Street.

Image 60

Recommended Area Pedestrian Facility Improvements:

To improve the connectivity of the Downtown Selma study area, the following area pedestrian facility improvements are recommended:

- Installation of sidewalk facilities along the southwest side of Front Street between Arrants and 1st Streets
- Installation of sidewalk facilities along the southwest side of Front Street extending the existing sidewalk facilities beginning midblock between 1st and 2nd Streets
- Installation of sidewalk facilities along the southwest side of Front Street extending the existing sidewalk facilities beginning midblock between 2nd and 3rd Streets

All area sidewalk facility improvements should be consistent with the City of Selma design standard policies.

Curb ramps on all intersection corners provide users of all abilities the facilities to be able to navigate easily throughout the Downtown Selma study area. As stated previously, curb ramps currently exist at all intersection locations. Any improvements to the existing Downtown Selma study area curb ramps should be consistent with the City of Selma design standard policies.

Striped crosswalk facilities provide a designated area for pedestrians to cross a roadway, visible to both the pedestrian and motorist. In order to increase the visibility of pedestrians crossing the roadways in the Downtown Selma study area, installation of striped crosswalk facilities are recommend at the following locations:

- Front Street at North Street – northwest, southwest, and southeast legs
- Front Street at 3rd Street – northeast, southwest, and southeast legs
- Tucker Street at Selma Street – all legs
- Tucker Street at 3rd Street – northeast and southwest legs
- Cross Street at Selma Street – all legs
- Cross Street at Keith Street – all legs
- Mill Street at Keith Street – northeast leg

All crosswalk facilities should be consistent with the City of Selma design standard policies.

7.4. Bus Rapid Transit Facilities

No bus rapid transit lines are proposed within the Selma Study Area.

7.5. Healthy Community Assessment

A Healthy Community Assessment (Assessment) was prepared and a walking tour was conducted for the Downtown Selma study area. Seven (7) past and current City of Selma officials participated in the walking tour conducted on April 20, 2010

The Assessment is a tool to help facilitate the thought processes necessary to plan and design sustainable communities and includes topics related to the streetscape, land uses, walkability and bikeability of an area. Participants in the walking tour were given the Assessment and guided along a route through the Downtown Selma study area. The walking tour highlighted areas in the Downtown Selma study area that area included components of the Assessment. A copy of the route map and highlighted Healthy Community Assessment components is included in Appendix F. Assessment components already in place were identified as well as areas sustainable design opportunities. *Image 61* shows participants of the walking tour observing a streetscape component of the Assessment.


Image 61

The Downtown Selma study area Assessment results are based on the walking tour and the Assessments completed by the participants. Ratings given by each participant were used to determine the average rating for each component. Based on the Assessment results, participants rated each of the Assessment components in the Downtown Selma study area as "Good." The following average participant ratings were given to each component:

- Streetscape – 4.7
- Land Use – 4.4
- Transit – 4.1
- Walkability – 4.9

The overall average rating of the Downtown Selma study area based on the walking tour Assessment was 18.1, "Celebrate a little. Your neighborhood is pretty good." The complete Assessment results are included in Appendix F.

Appendix A

Healthy Community Assessment

Healthy Community Assessment

The Healthy Community Assessment was created to serve as a tool to begin the critical thought processes necessary to planning and designing more livable and sustainable communities. In an environment where walking or riding a bicycle becomes a mode of choice because it feels safe, there are no obstructions, and the journey is pleasant, people will naturally choose to walk or bicycle for short trips in their neighborhoods. And, as more people choose to walk and bicycle, their health benefits and so does the health of their community. People who are out walking on the street create safer streets through natural surveillance. People who are out walking and riding their bikes begin to meet their neighbors and choose to socialize with them. Healthy communities encourage physical activity, safer streets, and create cleaner and friendlier neighborhoods for people to live, work and play in.

*Note that this is not an ADA assessment, which requires much more detail and measurement to meet legal requirements.

<u>Instructions:</u>

1. Define a study area of an appropriate size to include in the assessment and map your route in advance. Familiarize yourself with the checklist before starting. There are separate sets of questions that can be answered by walking and by bicycle. It is fun to do both assessments. Consider completing the assessment during daylight, evening and peak travel time periods to compare the experiences at different times of the day.

2. Be sure to bring a measuring tape or wheel, a clipboard, a pencil and a camera to measure and record your findings. A sun visor and a bottle of water are good to bring on very sunny days. Include an elderly person, a child, and someone in a wheelchair in your tour to improve your understanding of their mobility needs. Get your neighborhood involved in doing the tours together.

3. Answer all applicable questions and give each section a rating. At completion, add up the scores for each section to rate the entire study area. The rating system is purely subjective, but when the group's ratings and comments are combined, a pretty good picture develops to explain how people feel about their environment. From the assessment, a list of projects and code modifications can be developed to address the problem areas. The photographs can be added to the assessment report to document the problem areas found.

<u>References:</u>

"Designing Walkable Urban Thoroughfares: A Context Sensitive Approach" PR-036A approved as a recommended practice of the Institute of Transportation Engineers (ITE).

Acknowledgement and thanks to Dan Burden for his pioneering work in conducting walkability assessments. See the Walkable Communities website by Dan Burden and Associates at: www.walkable.org/ for more ideas on walking tours.

FOR A TOUR THAT IS CONDUCTED ON FOOT:

STREETSCAPE

YES	NO	
☐	☐	Do all corners within the study area have ADA accessible ramps?
☐	☐	Are trees planted to provide shade along the walkways (every 15–30 feet recommended)?
☐	☐	Do curbs, swales, curb extensions, or other designs keep cars parked in correct locations (no rollover curbs)?
☐	☐	Is there a trail system for walking or biking in the study area?
☐	☐	Are pedestrian scale streetlights provided along pedestrian pathways?
☐	☐	Are there sidewalks/pathways connecting the streets and parking lots to the buildings?
☐	☐	Does the study area contain design elements to calm traffic such as narrow street lanes, curb extensions, mini-circles, parking chicanes, roundabouts, medians, raised street crossings or similar features? If YES please list: ____________________
☐	☐	Are there pedestrian crossing signals and/or mid-block crossing islands on arterial streets in the study area?
☐	☐	Does the study area contain pedestrian buffers, such as wide sidewalks, parkways or curb-side landscaping? If YES please list: ____________________
☐	☐	Was signage posted on all approaches to warn of school zones?

Overall “Streetscape” Rating: (circle one)

1	2	3	4	5	6
awful	**many problems**	**some problems**	**good**	**very good**	**excellent**

LAND USE

YES	NO	
☐	☐	Are there public places for people to interact within the study area (for example, plazas, parks or sidewalk cafes?) If YES please list: ______
☐	☐	Are there pedestrian links or pathway connections between developments?
☐	☐	Is there a variety of housing choices (apartments and single family at different price points?)
☐	☐	Are there locations for non-residential land uses that are integrated with and support the residential uses?
☐	☐	Are buildings and windows oriented to the pedestrian pathway?
☐	☐	Can children walk safely and comfortably to the school(s) without crossing busy intersections?
☐	☐	Does there seem to be too many large, mostly empty parking lots?
☐	☐	Are most parking lots public?

Comments: ______

Overall "Land Use" Rating: (circle one)

1	2	3	4	5	6
awful	many problems	some problems	good	very good	excellent

TRANSIT

YES	NO	
☐	☐	Is public transportation available in the study area?
☐	☐	Does the nearest bus/train stop have a shelter?
☐	☐	Does the nearest bus/train stop have a bench and litter can?
☐	☐	Does the nearest bus/train stop have a posted transit map and schedule?
☐	☐	Are there signs indicating the bus route numbers?
☐	☐	Are the stops well lit?
☐	☐	Are the bus stops well maintained and free of vandalism?

Comments: ______

Overall "Transit" Rating: (circle one)

1	2	3	4	5	6
awful	many problems	some problems	good	very good	excellent

WALKABILITY

Did you have room to walk?

☐ Yes ☐ Some problems:

- ☐ Sidewalks are too narrow. Sidewalk width: ____________
- ☐ Sidewalks or paths started and stopped
- ☐ Sidewalks were broken or cracked
- ☐ Sidewalks were blocked with poles, signs, shrubbery, dumpsters, etc.
- ☐ No sidewalks, paths, or shoulders
- ☐ Bicycle riders on sidewalks
- ☐ Other problems: ____

Location of problems: ____

____

Was it easy to cross streets?

☐ Yes ☐ Some problems:

- ☐ Road was too wide. Road width: ____________
- ☐ Traffic signals made us wait too long or did not give us enough time to cross
- ☐ Needed striped crosswalks or traffic signals
- ☐ Could not cross the street in all directions
- ☐ Parked cars blocked our view of traffic/blocked traffic being able to see us
- ☐ Trees or plants blocked our view of traffic
- ☐ Needed curb ramps or ramps needed repair
- ☐ Other problems: ____

Location of problems: ____

____

Did drivers behave well?

☐ Yes ☐ Some problems: Drivers…

- ☐ Backed out of driveways without looking
- ☐ Did not yield to people crossing the street
- ☐ Turned into people crossing the street
- ☐ Drove too fast
- ☐ Sped up to make it through traffic lights or drove through traffic lights
- ☐ Other problems: ____

Location of problems: ____

____

Was your walk pleasant?

☐ Yes ☐ Some unpleasant things:

- ☐ Needed more grass, flowers or shade trees
- ☐ "Scary" dogs
- ☐ "Scary" people
- ☐ Not well lit
- ☐ Dirty, lots of litter or trash
- ☐ Dirty air due to automobile exhaust
- ☐ No benches to sit and rest
- ☐ Other problems: ______________________________

Location of problems: ______________________________

____

Overall "Walkability" Rating: (circle one)

1	2	3	4	5	6
awful	**many problems**	**some problems**	**good**	**very good**	**excellent**

How does your neighborhood stack up?

Add up your ratings and decide.

1.	________	21 – 24	Celebrate! You have a great neighborhood.
2.	________	17 – 20	Celebrate a little. Your neighborhood is pretty good.
3.	________	13 – 16	Okay, but it needs work.
4.	________	9 – 12	It needs a lot of work. You deserve better than that.
5.	________	4 – 8	It's a disaster!

Total: ___________

FOR A TOUR THAT IS CONDUCTED BY BICYCLE:

Are there designated bicycle facilities on the roadways in the study area?

☐ Yes ☐ Some problems (please note locations):

- ☐ No bike lanes
- ☐ No space for bicyclists to ride
- ☐ Bicycle lane or paved shoulder disappeared
- ☐ Heavy and/or fast-moving traffic
- ☐ Too many trucks or buses
- ☐ Poorly lighted roadways
- ☐ Too much on-street parking
- ☐ Other problems: ______________________

Location of problems: ______________________

____

Is there access to an off-road path or trail, where motor vehicles were not allowed?

☐ Yes ☐ Some problems:

- ☐ No path
- ☐ Path ended abruptly
- ☐ Path didn't go where I wanted to go
- ☐ Path intersected with roads that were difficult to cross
- ☐ Path was crowded
- ☐ Path was unsafe because of sharp turns or dangerous downhills
- ☐ Path was uncomfortable because of too many hills
- ☐ Path was poorly lighted
- ☐ Trailhead had no parking
- ☐ Trailhead was not well lit
- ☐ Trailhead/path had no amenities (benches, trash cans, restrooms, etc.)
- ☐ Other problems: ______________________

Location of problems: ______________________

____

How was the surface that you rode on?

☐ Good ☐ Some problems, the road or path had:

- ☐ Potholes, cracked or broken pavement
- ☐ Debris (e.g., broken glass, sand, gravel, litter, etc.)
- ☐ Dangerous drain grates, utility covers, or metal plates
- ☐ Uneven surface or gaps
- ☐ Slippery surfaces when wet (e.g., bridge decks, construction plates, road markings)
- ☐ Bumpy or angled railroad tracks
- ☐ Rumble strips in the bike lane or bikeable shoulder
- ☐ Other problems: ______________________

Location of problems: ______________________

____

How were the intersections you rode through?

☐ Good ☐ Some problems:

- ☐ Had to wait too long to cross intersection
- ☐ Couldn't see crossing traffic
- ☐ Signal didn't give me enough time to cross the road
- ☐ Signal didn't change for a bicycle
- ☐ Unsure where or how to ride through intersection
- ☐ Traffic couldn't see me
- ☐ Other problems: ______________________________

Location of problems: ______________________________

____

Looking at the need for traffic calming or driver education…did drivers behave well?

☐ Yes ☐ Some problems, drivers:

- ☐ Drove too fast
- ☐ Passed me too close
- ☐ Did not signal
- ☐ Harassed me
- ☐ Cut me off
- ☐ Ran red lights or stop sign
- ☐ Other problems: ______________________________

Location of problems: ______________________________

____

Was it easy for you to use your bike?

☐ Yes ☐ Some problems:

- ☐ No maps, signs, or road markings to help me find my way
- ☐ No safe or secure place to leave my bicycle at my destination
- ☐ No way to take my bicycle with me on the bus or train
- ☐ Scary dogs
- ☐ Hard to find a direct route I liked
- ☐ Route was too hilly
- ☐ Other problems: ______________________________

Location of problems: ______________________________

____

What is your overall bikeability rating of the study area?

Overall "Bikeability" Rating: (circle one)					
1	2	3	4	5	6
awful	many problems	some problems	good	very good	excellent

E. Public Outreach

E. Public Outreach

Public Involvement Summary

Public Education and Outreach

The outreach component of this significant study began with the development of the brand in January 2009. It is anticipated that the study will be complete in the spring of 2011, wrapping up with final public events and a final newsletter.

Over the course of 28 months, the outreach efforts have included:

- 8 public workshops
- 3 open house-format events
- 5 displays at public events
- 1 on-site walkability tour
- 2 sets of stakeholder interviews

With the exception of the one-on-one stakeholder interviews, each of these outreach events was supported by a multi-media campaign, utilizing such tools as:

- A telephone survey of over 900 residents
- Fact sheets in English, Spanish and Hmong
- Mailers in English, Spanish and Hmong
- Twitter and Facebook
- Online advertising through fresnobee.com
- Print advertising in the Fresno Bee
- Radio commercials, utilizing the top two English radio stations in the market as well as the top Spanish-language station and the Hmong radio station
- News releases to print and electronic media countywide, both English and Spanish
- A total of 5 newsletters sent to a mailing list of nearly 2,000
- A special streetcar edition of the newsletter
- More than 20 individual e-blasts to a distribution list of nearly 2,400
- Hand-distributed fliers and posters to major social services, government and educational centers

- FAX on-board distribution of 1,000 fliers
- Direct phone calls
- A total of nearly 16,000 mailed meeting notifications to targeted neighborhoods
- Participation in four public events (including Cinco de Mayo on Fulton Mall and Vintage Days at CSUF) which generated over 800 votes on streetcar routes and transit-oriented design choices
- Participation in the Asian Water Festival through the sponsoring radio station
- News coverage on local television stations.

This diversity of tools made it possible for the outreach effort to reach people of all ages, ethnicities and areas of residence, who communicate and gather information through a wide variety of media.

A rough summary of the number of Fresno County residents reached via quantifiable activities, such as meetings, eblasts and mailers, exceeds 64,000. This number excludes those who saw ads online or in print, saw a newspaper article, heard about the study on television or heard a radio commercial.

Because the PTIS is complex, it was important to focus on lay terms, helps residents understand the goal and why the study is important and learn how the outcomes could affect their lives.

By utilizing a variety of outreach tools and types of events, the outreach effort succeeded in crossing barriers of age, language and educational levels.

Branding of the study

Because of the lengthy title of the official study, Kimley-Horn and outreach consultant The Lockwood Agency chose to develop a new name and tagline for the Public Transportation and Infrastructure Study.

Several options were presented for the name of the study, as well as optional graphic elements to accompany and illustrate the name.

FastTrack
Fresno County
Planning our future

Fresno COG board and staff chose FastTrack Fresno County, and selected a contemporary mark with fresh blues and greens as the color scheme. This branding was carried throughout all aspects of the study to create consistency and awareness.

Market research

A 12- to 14-minute telephone survey was conducted by AIS Market Research of Fresno in mid-June 2009 as the first step in public outreach for the Public Transportation Infrastructure Study (PTIS). A total of 909 surveys was completed: 404 residents from Clovis/Fresno; 401 participants in other incorporated cities within Fresno County; and 104 residents from unincorporated areas.

FINDINGS

Issues and awareness

- The top two cited issues were “Economy/Jobs/Unemployment” and “Water Shortage,” across sampling regions and a number of demographic groups. Other issues pertinent to PTIS, including transit, traffic congestion, growth/development and air pollution, were not frequently cited.
- Residents in unincorporated areas were less convinced than their cohorts in Clovis/Fresno that improvements in transit will reduce traffic congestion in Fresno County. This could be attributed to less congestion, and the lack of transit in participants’ rural, unincorporated residential areas. Residents from unincorporated areas are most likely to have three or more vehicles/autos.
- Renters, compared to homeowners, were more convinced of the potential benefits of improving transit and are more likely than homeowners to be users of transit.

Land use

- Renters, Hispanics, and households without a vehicle/auto favored more multi-family units in existing neighborhoods. The same proposed idea applied to Downtown Fresno garnered much more favorable support among Clovis/Fresno residents.
- Compared to the multi-family unit idea, a diverse mix of housing types in Fresno County received stronger support. Additional findings suggest that residents’ strong support would wane if a mix of housing types was proposed for their own neighborhoods.

- Lower-income groups expressed greater interest in living in a community with a diverse mix of housing types, while higher income groups were more reluctant. Residents from unincorporated areas were least likely to choose to live in such a community. Perhaps, they see land restrictions for farming, or the loss of open space.

- Support for a diverse mix of housing types within Downtown Fresno was very similar to that proposed for Fresno County.

- Approximately 57 percent strongly favored a mix of land uses with walkable neighborhoods.

- As anticipated, renters exhibited stronger support for mixed land use than homeowners. A stronger support for a mix of land uses in Downtown Fresno was found among Clovis/Fresno residents than among residents in other incorporated cities within Fresno County.

- Almost a third of the sample strongly supports higher density developments (commercial and residential) along planned transit routes in Fresno County. An overwhelming 81 percent of respondents strongly support preservation of farmland.

Willingness to use transit

- When asked what would encourage them to try transit, almost a third of the sample responded “Nothing would.”

- When asked what would cause them to take transit over their vehicle, survey participants noted the cost of gasoline.

- Fifty six percent of residents without a vehicle/auto in the household are regular users of public transportation within Fresno County.

- Only four to five percent of households with one or more vehicle(s) use public transportation regularly.

- Over a third of households without a vehicle are occasional users.

- 79 percent of households without a vehicle/auto indicated they were “Very Likely” to choose to live within walking distance to transit. Clovis/Fresno residents were most receptive to living near transit while residents of unincorporated areas were least receptive.

Bus Rapid Transit

The first public outreach effort of the PTIS was focused on Bus Rapid Transit. A series of public scoping meetings was held in April 2009, to gather input on the concept and potential routes for Bus Rapid Transit (BRT) improvements. Each meeting provided informative displays, simulations and a Frequently Asked Questions handout in lay terms.

The meeting schedule was:

Wednesday, April 1, 5:30 to 7:30 p.m.
Caltrans Yosemite Meeting room
Manchester Mall

The Manchester Mall is located on Kings Canyon, one of the proposed BRT routes, in an area recognized as having a multicultural, transit-dependent population. The mall is also located near a heavily used transfer station, which made it convenient for transit users to participate in the meeting. The meeting was timed to allow for working residents to participate after hours, in an open-house setting. A translator was available for Spanish-speaking residents.

This open house-style meeting featured a display of graphics, with FAX staff and consultants answering questions of attendees. A simulation of BRT systems was on a continual loop, providing a visual backdrop for the one-on-one discussions.

Attendees were primarily transit users, and included disabled riders. A property owner also attended, and asked questions specific to how the improvements might impact his property. Approximately 15 people attended throughout the evening.

Questions asked included:

- How does the queue jump work?
- How does the transit lane work? How would that affect traffic flow?
- Which routes will be included in the new system?
- How might these changes affect businesses along the corridor?
- Will the new system affect fares?
- Can a park and ride area be created at Manchester Mall?
- If on-street parking is eliminated, how will those parking spaces be replaced?
- Can the buses be made easier to use, especially for seniors?
- Will the facilities be upgraded too?

FAX manager John Downs gave a PowerPoint presentation, also summarized in a handout.

The presentation addressed topics such as:

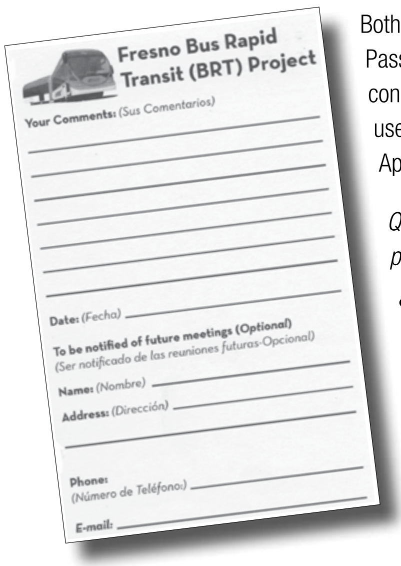
- The environmental justice component of BRT. Without access to transportation, residents cannot engage in their community.
- The air quality component. More efficient bus transportation will contribute to efforts to clean the air.
- The ag component. More efficient transportation, combined with a rethinking of land use policies, can help preserve ag land and slow the loss of ag land to development. The result will be the opportunity to conserve ag land for future generations.
- BRT has been 10 years in the works in Fresno County. The corridors included in this process were identified as the best places to begin because the routes are heavily used and the corridors are lined with transit users. (7,400 riders per day on route 28 alone.)
- These corridors were also chosen because this is a growth focus area for Fresno.
- The BRT study currently identifies three options; project limits and exact alignments need to be determined.
- BRT improvements will increase the frequency of buses to every 7 minutes.
- The grant application to fund the improvements will be submitted to the FTA in August; $50 million max, $10 million required from the local community.
- The goal is to have the improvements in place and the system running by 2012.

Thursday, April 2

11:30 a.m. to 1:30 p.m.	5:30 to 7:00 p.m.
Outside Fresno City Hall	Inside City Hall

The earlier meeting was designed to capture the many employees of the downtown district and to catch passersby during their lunch hour. The large displays and tables of literature were set up outside a main entrance to City Hall and served as attention-getters. This set-up was very informal, with Kimley-Horn consultants able to provide one-on-one education and answer questions. A translator was available for Spanish-speaking residents. Dozens of passersby stopped to study displays and ask questions.

The evening presentation benefitted from the events and meetings in City Hall that evening, as well as its location near a major transit station and the downtown restaurants and businesses. This session was also very informal, allowing for a high level of engagement between the consultants and interested residents. Dozens



Fresno Bus Rapid Transit (BRT) Project

Your Comments: (Sus Comentarios)

Date: (Fecha)

To be notified of future meetings (Optional)
(Ser notificado de las reuniones futuras-Opcional)

Name: (Nombre)

Address: (Dirección)

Phone: (Número de Teléfono:)

E-mail:

Both were open-house style gatherings with graphics and looped simulation. Passersby were given the opportunity to talk one-on-one with FAX staff and consultants. Participants included current transit users, potential transit users, interested city employees, and others simply interested in the plans. Approximately 20 people participated in the open house.

Questions were similar to those posed by attendees of the Manchester meeting, plus:

- When will the improvements be in place?
- How will the improvements be paid for?
- Will there be more buses and more frequent service?
- What are the chances these improvements will really happen?
- What are the limits on the project? Can it be extended to Shaw Avenue?
- Will the buses be environmentally cleaner?

Wednesday, April 8
5:30 to 7:30 p.m.
Sunnyside High School Cafeteria

This location was chosen because this high school is located in a heavily transit-dependent neighborhood. The population has a large Southeast Asian population, and a translator was on hand to ensure their understanding of the information provided.

At each gathering, Kimley-Horn staff provided large maps showing current routes and possible Bus Rapid Transit routes and provided photos of BRT buses and stations. Presentations educated attendees on the advantages of BRT and input was gathered regarding which routes would be most desirable as BRT routes. Light refreshments were served.

Support for the improvements was very strong, with great interest from transit riders in being able to have an express service, to reduce wait times, and to generally speed transit through these busy corridors.

Attendees included current transit riders, seniors and handicapped, downtown employees, government employees and neighbors of varying ages and ethnicities.

Turn out for this meeting was low, with approximately 10 people attending, a reflection of the timing during Easter vacation for schools.

However, the meeting did attract neighbors and representatives of the Hmong community, which is prevalent in this neighborhood. A Hmong-language translator was available, secured through the Hmong radio station. Paid advertisements were also placed on this station to welcome the Southeast Asian residents.

At all meetings, participants were given the opportunity to vote on one of the three options presented.

Promotion of BRT meetings

These meetings were promoted through a multi-media outreach effort:

- Targeted direct mail. Working with the GIS department of the City of Fresno, a mailing list was developed for the three meetings, targeting businesses and residences in the vicinity. Over 4,000 addresses received a Spanish-English invitation, encouraging participation in the workshops and also offering phone, fax and email as options for communication.
- On-board flier distribution. With assistance from FAX staff, transit riders had access to the fliers on the key affected routes (28 and 30).
- Mailed newsletter. The project newsletter was developed and mailed to the entire PTIS database.
- News media. A news release was developed and provided to print and electronic English, Spanish and Southeast Asian media. The meetings were posted on online calendars and the Greater Fresno Chamber of Commerce was asked to provide information to members.
- Direct mail of fliers. The mailer/flier was direct mailed to identified social service agencies, business organizations and agencies that work directly with likely transit-dependent populations, such as seniors, low-income and disabled residents. Fliers were also provided to tribal organizations.
- The mailer/flier was also posted on websites such as fresnocog.org and FAX.com.
- The flier was provided to each of the venues for on-site posting.
- Because the meetings were scoping meetings, legal notices were also published.

Public Workshops – January 2010

A series of five workshops was held in January, with locations strategically chosen along key corridors.

The hands-on workshops allowed participants to help determine what growth will look like, how transportation improvements should be integrated into the community, what areas should be protected and the pros and cons of different options.

Participants were gathered around tables, provided with large maps of the corridor, and given markers and 'chips' identifying the types of development and desired areas of growth. After an introduction, participants were allowed to work as a team to plan their future.

For planning the Downtown Fresno area:

Tuesday, Jan. 19
Fresno Convention Center

This workshop drew the largest audience of any in this series, approximately 40 people, perhaps because of the convenient location in a familiar venue. Participants included transit users, seniors, interested planners and representatives of government agencies. Heavy refreshments were served.

Overall comments included:

- Implement Rails to Trails
- Preserve historic buildings and blend with new
- Landscape the streets to create more shade
- Add bike lanes and focus on walkability
- Expand cultural opportunities, restaurants, nightclubs, libraries and retail to attract more people, along with ideas of a farmers market and an ag museum
- Focus development around the high-speed rail station

For planning the Blackstone corridor:

Wednesday, Jan. 20
Lowell Elementary School

This site was chosen because of its location along a key transit corridor, but also because the school in a highly ethnic, lower income neighborhood such as this, is generally a "safe zone" where residents feel comfortable.

The workshop was a success in terms of the ethnic diversity, and in terms of its age range – seniors and children participated.

Sandwiches were served, which helped draw and keep families; however, the cold weather the week of the workshops impacted attendance for all.

Those in attendance, approximately 25 people, engaged in the hands-on activities and enjoyed the process.

Overall comments included:

- Preserve single-family residential neighborhoods to support mixed-use commercial along Blackstone
- Streetscaping on Blackstone including bike lanes, street trees, and sidewalks
- Make Blackstone a transit corridor
- Add parks to the neighborhoods
- Provide transit for college and neighborhood
- Some support for mixed-use along the corridor

For planning the Clovis area:

Wednesday, Jan 20
Clovis Veterans Memorial Building

The Memorial Building was chosen as a site because it is well-used by the community for a variety of events and is centrally located.

The workshop drew about 30 professionals such as engineers and planners as well as local residents and city staff. The participants were engaged and worked together to map out their future city during the hands-on workshop. Sandwiches were served to encourage participants to remain for the entire workshop.

Overall comments included:

• Preserve central business district

• Add Bus Rapid Transit and connect to downtown Fresno

• Maintain and enhance bike trails

• Support for mixed-use along major corridors

For planning the West Shaw corridor:

Thursday, Jan. 21
Piccadilly Inn

This meeting drew approximately 20 people, a mix of community residents, a member of the Board of Supervisors and city staff who demonstrated a cooperative and engaged spirit. The residents expressed gratitude for being invited to participate in the process.

Overall comments included:

• Integrate open spaces in new development

• Build new bike trails

• Create multi-use trails along waterways and canals

• Develop express bus routes

For planning the Cedar corridor:

Thursday, Jan. 21
McLane High School

This workshop was held in an older neighborhood featuring both single-family homes and a large commercial area. The event drew neighborhood residents, transit users and interested City of Fresno employees. For both the McLane and Clovis Veterans meetings, the very cold, windy and rainy weather was not conducive to attendance. However, the eight people in attendance were engaged and enjoyed having a hands-on impact on the future of transit and development.

Overall comments included:

• Create multi-use trails along canals and waterways

• Preserve stable single-family neighborhoods

• Encourage biking by building bike lanes

- Find businesses that are compatible with students to locate near the schools
- Redevelop older, large commercial sites with mixed-use or padded buildings

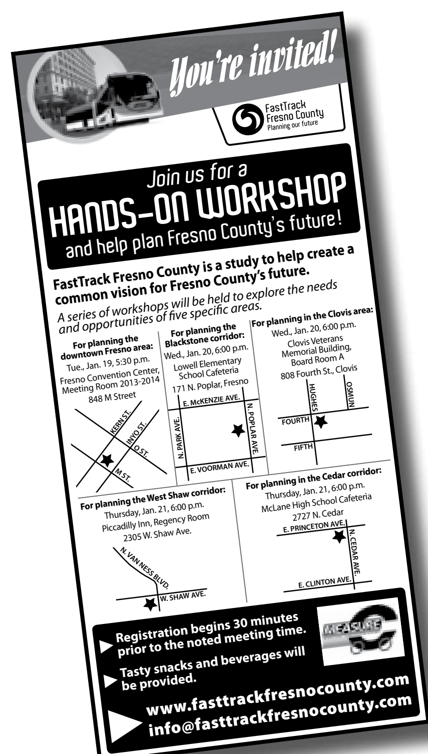
Promotion of January workshops

- Direct mail. A flier was developed promoting all workshops and direct mailed to homes and businesses within a one-quarter radius of the sites.

- E-blasts. An early e-blast was distributed to the full PTIS email database, with a follow-up reminder eblast just days before the events. An e-blast was also issued as a call for volunteers to help during the workshops.
- Paid advertising. Advertising was placed in the Fresno Bee; on fresnobee.com and on English-, Asian- and Spanish-language radio.
- Media relations. A news release was developed and distributed to local media and an interview coordinated with the regional news talk radio station. Calendar notices were sent to newspaper, radio, television and community websites, including regional ethnic media.
- Poster/flier distribution.

The invitation was rendered into a poster and a flier and distributed in person and/or by mail to locations such as:

- Fresno County main library branch
- Fresno Unified School District
- Clovis Unified School District
- California State University, Fresno
- Office of Community and Economic Development
- Fresno City College
- Clovis and Fresno chambers of commerce
- FAX
- City of Clovis Stageline/Roundup
- Fresno County RTA
- City of Fresno Parks and Recreation
- Fresno County PIO
- Workforce Investment Board
- Employment Development Department
- Fashion Fair and Sierra Vista malls
- Area Agency on Aging



- Center for Independent Living
- Lao Family Community
- Measure C agency
- Center for New Americans
- Fresno County Office of Education
- United Hmong International
- Association for Retarded Citizens
- Fresno County EOC Senior Program

PTIS "Fasttrack Fresno County" Project - Stakeholder Interviews

MONDAY (FEBRUARY 15)	TUESDAY (FEBRUARY 16)	WEDNESDAY (FEBRUARY 17)
	8:00 Al Smith, President, Fresno Chamber of Commerce (2331 Fresno St.) 495-4816	**7:30** Steve Geil, Fr. Econ Dev. Corp. (906 N St.) 233-2564
	8:30 CALL, MOVE FROM 9:00 John Hernandez, Ex. Dir., Hispanic Chamber (2331 Fresno) (Thelma) 495-4817	**8:30** Harry Armstrong, Chair, Fr County Transp Auth/Clovis Council (COG 2035 Tulare St, Ste 201) (Jackie) 233-4148
	9:45 - 10:15 Ashley Swearingen, Mayor (2600 Fresno St.) (Cheryl) 621-8000	**9:15** Ryan Jacobson, Ex. Dir., Fresno County Farm Bureau (1274 W. Hedges Ave.) 237-0263
	(Purposely open to allow time w/ Mayor)	**10:30** Judy Case, Chair, Board of Sups (2281 Tulare St. #300) (Dea) 488-3529
	11:15 Jeff Webster, Ex. Dir., FCRTA (2035 Tulare St., Ste 201) 233-6789	**11:15** John Dugan, City of Fresno Plng (2600 Fresno St., Rm 3065) (Tri Her) 621-8277
LUNCH		LUNCH
	1:00 Brian Speece, Assoc. Vice-Chancellor, State Ctr Comty College (1525 E. Weldon Ave.) (Jan, Dori) 244-5901; 5902	**1:30** Alan Weaver/Lynn Gorman, Dir, County Pub Wks & Plng Dept. (2220 Tulare St., 6th Fl) (Linda) 262-4078
2:00 Jeff Roberts, Rep, Granville Homes (1396 W. Herndon Ave., Ste 101) 436-0900 (Laura)	**2:00** Deborah Nankivell, Ex. Dir, Fr. Business Council (5250 N. Palm, Ste 24) 226-5600 X106	**2:45** Ed Kashian, Lance-Kashian & Co. (8365 N. Fresno St., Ste 150) (Gode) 437-4820; 438-4800
	3:15 Dr. John Welty, President, FSU (Library 4th Fl) (Summer) 278-5003	
	4:45 David Fey, Dir, Clovis Plng Dept. (1033 Fifth St., Clovis) (Tina 324-2340) 324-2338	

"Community Perspectives on the Future of Public Transportation in Fresno County"

By Ellen Moy, Moy & Associates and
Julie Eldridge, Kimley-Horn & Associates

How do you envision public transit services in Fresno County in the year 2050? Sounds like an easy question to answer--but not when you consider that Fresno County's population is projected to double from 950,000 today to 1.9 million by 2050. How will this growth impact our community landscape? Where will people live and work? How will people access jobs, schools, and commercial, retail, and industrial businesses? Can we proactively plan for inevitable changes that come with growth or will we react? And if public transit is part of the transportation solution, what form will it take, and how will it be funded?

These questions aren't easy to answer without a crystal ball, but those challenging questions and many others were posed to key community leaders in Fresno County this past month as part of the Council of Fresno County Government's (COFCG) "FastTrack" Public Transit Infrastructure Study (PTIS). Kimley-Horn and Associates was retained by the COFCG to explore how residents in the Fresno region can address their future travel needs and how future transit options can help contribute to the region's economic vitality. The findings from the study ultimately will identify the most attractive transit option that maximizes access between housing and jobs and will provide guidelines and policy recommendations for transit-supportive developments and infrastructure, bicycling, and walking.

An important objective of the study is to gauge the current pulse of the community and elicit invaluable input from key stakeholders to understand their unique perspectives of the future of public transportation and the diverse needs and desires of their constituents. A cross-segment of leaders in the community was interviewed, including representatives from the Cities of Fresno and Clovis and Fresno County; Fresno Chamber of Commerce; Hispanic Chamber of Commerce; public transportation providers; Fresno Farm Bureau; California State University-Fresno; Fresno City College; Fresno Business Council; and local developers. While the interviews reflected many different viewpoints, many common themes evolved.

Transit Perceptions, Needs, and Acceptability

The majority of stakeholders support public transit. They understand that it plays a vital role in the community and serves as a lifeline for many, particularly for transit dependent residents. Many feel, however, that Fresno is still a "car town" and traffic congestion and fuel prices are not high enough to motivate a switch to regular transit usage.

They believe that more residents would use public transit services if it offered faster travel times, extended hours of operation, express bus service, and more flexible routing. There is a desire for more seamless connections, particularly between the Cities of Fresno and Clovis. Some commented that regional transportation should be expanded with improved connectivity from rural to urban areas. Others felt that the value and perception of transit in the community could be raised by providing buses to more special events. The concept of consolidating transit services was raised as a means of increasing transit efficiencies.

Some stakeholders feel that Fresno is "transit unaware" and that more positive and powerful public education is needed to promote its environmental benefits and to help attract more riders. The overall perception is that public transit's role will become increasingly more important. Stakeholders generally are receptive to introducing new transit concepts and technologies in the future, particularly when supported by transit-friendly land uses, such as transit-oriented developments (TODs). Stakeholders generally recognize that rural transit needs are very different. A comment was made that transit is a "sleeper" and that high speed rail will open more people's minds to its possibilities.

Best Transit Corridors

Stakeholders were asked to identify transportation corridors they perceive to be most feasible for transit. The top Fresno-Clovis Metropolitan Area corridors mentioned were Blackstone, Cedar, and Shaw Avenues, and Ventura/Kings Canyon Boulevard. Herndon, Clovis, Shepherd, and Ashlan Avenues, and Tulare Street also were mentioned as important thoroughfares. Connectivity beyond the metropolitan area on Highways 99, 168 and 180 was important to many stakeholders and their constituents.

Some stakeholders were aware of the proposed Bus Rapid Transit (BRT) project being pursued by Fresno Area Express. They support its proposed initial installation on Kings Canyon Boulevard extending to Blackstone Avenue.

Supportive Transit Land Uses

There is a strong consensus that the key to successful transit in the future is higher-density land use patterns. Land-uses supportive of transit need greater concentrations of population balanced with housing and jobs.

The City of Fresno recognizes the desire to preserve farmland and to integrate higher densities that promote transit in its land use model. The City recently completed its 2008 Fresno Southeast Growth Area (SEGA) Specific Plan in cooperation with Calthorpe Associates. SEGA represents an area of 7,500 acres planned for balanced housing, jobs, and open-space development within strict urban growth boundaries with a focus on supportive transit land uses. A successful SEGA model will certainly bode well for transit if duplicated in Fresno and other communities in the future.

Development and Economic Issues

There is general consensus that transit is an important element in economic and growth issues. Many stakeholders feel that transit follows development and that its success can be accelerated with public/private transit partnerships. They acknowledge that government agencies cannot be solely responsible. While the current economic climate presents unprecedented and daunting obstacles to introducing new untried transit initiatives and concepts in the Fresno region, over the long term, they should be considered. There must be a "proof of concept" to incentivize the private sector.

Sound land use planning tools and public buy-in will be needed to implement innovative transit-oriented developments. Developers want a more user-friendly process to initiate their projects; and public agencies want to promote projects to help stimulate economic development.

There is general agreement that reducing or eliminating unnecessary institutional barriers will lead to a healthier climate for development. The City of Fresno specifically is addressing development barriers by streamlining its process and simplifying its zoning ordinance and development code.

Financing Mechanisms and Political Support

A key to future successful transit service improvements is a steady, reliable source of funding. Stakeholders understand the value of public/private partnerships and overwhelmingly favor promoting this approach for transit projects. There also is strong support for extending Measure C, a half-cent sales tax passed by voters in 2006 that designates funds for transit.

Many stakeholders stated that they could support developer impact fees and tax assessment districts while others were either opposed or viewed these as options of last resort. There was unanimous opposition to an additional dedicated transit sales tax.

Current Creative Transit Plans

There is a clear mandate from Fresno County residents to improve transportation in the region. Fresno voters clearly voiced their support to improve transportation through the year 2027 with the passage of Measure C, including public transportation and alternative transit options such as vanpooling. New transit approaches are already on the horizon and are being considered.

The City of Fresno, with the help of Measure C and other funding, plans to introduce BRT technology along the Kings Canyon Boulevard corridor in Southeast Fresno in the near term. The feasibility of introducing streetcars in Downtown Fresno also is being evaluated to help bolster retail and commercial businesses and transport employees and residents, and ultimately to help stimulate development and planned growth.

The Kings County Area Public Transit Agency (KCAPTA) operates a unique and successful multi-county vanpool program for the general public and agricultural farmworkers and is supported in part by the Measure C Commuter Vanpool Program. These vanpools are operated in Fresno County and throughout the San Joaquin Valley. A new entity, CalVans, is being formed to consolidate this multi-jurisdictional vanpool program for greater efficiencies.

Conclusion

Stakeholders agree that key leaders must be engaged in promoting public transit and its value to residents. Public/private partnerships must be used to help drive transit improvements. The planning process must be an open one that allows the community to weigh in on what it thinks is important.

Fresno County's public transportation services will evolve with projected population growth and inevitable demand. Whether they evolve with thoughtful planning or merely respond to this demand will be the challenge. Ultimately, the community must collectively determine whether transit is a "top-of-the-mind" priority and carefully plan for its future. Accomplishing this will take leadership, focus, and keen direction. The quality of life for all Fresno County residents is at stake.

Streetcar Interviews – March 2-5

A study of streetcars for downtown Fresno was undertaken in 2010, beginning with a series of personal interviews with stakeholders.

The individuals contacted for an interview included property owners, merchants, builders and association representatives (such as Downtown Fresno Association). Also included in the list of potential interviewees were elected officials and representatives of special interest organizations such as historic preservation, community redevelopment, transit, health care and the environment.

The calls resulted in 19 scheduled interviews, which were held Tuesday through Friday, March 2 through 5. The feedback gained was critically important in further analysis of the feasibility of streetcars downtown, and the particular routes that would be most effective and generate the greatest support.

Leading the interviews were …(Vic? Ellen? Jim?)

Each of the individuals was given an 8-page newsletter dedicated to the history and the future of downtown streetcars for their information and to contribute to the dialogue.

	Tues. March 2	Wed. March 3	Thurs. March 4	Friday, March 5
9:00 AM	Brent Weiner Proctor's Jewelers 1201 Fulton Mall	Deborah Nankivell Fresno Business Council	Dan Doyle, Central Valley Com Bank, Tulare & N Street SE Corner- dan.doyle@cvcb.com 268-6806	Jeff Roberts, Granville Homes (Ash Room COG) jroberts@gvhomes.com 288-0688
10:00 AM	Downtown Association - Jan Minami, 490-9966, 845 Fulton Mall		Cliff Tutelian, Tutelian and Co. 1401 Fulton St. Ste 210, 266-8000	
11:00 AM	Elliott Balch- DT Revitalization Manager, Association Board member, 621-8350 Manager	Morgan Doizaki Fr. Discount Mall fresnofish.com 237-2040	Jim Koch 1445 Tuolumne Hall and F, jhkoch21@msn.com	
1:00 PM		Craig Scharton Fresno Downtown and Comm. Revit. 2nd floor city hall 621-8350	Reza Assemi 1625 Broadway rezaassemi@hotmail.com	
2:00 PM	Fresno EOC Assoc. E.D. Paul McLain Lugowski 1920 Mariposa Mall, Ste. 399	Mike Prandini BIA mtg. at FCOG, Ash Room 261-9344	Steve Geil, Fresno EDC, 906 N St. in Galleria sgeil@fresnoedc.com	
3:00 PM	Karana Hattersley 3rd floor City Hall 2600 Fresno Street, south end of bldg. 621-8520	Kyle Kirkland Club One Casino in COG building 497-3000	EdKashian@lancekashian.com 8365 N. Fresno St.	
4:00 PM	FCASH 1401 Fulton St, #904	Marlene Murphey crystal.cooper@fresno.gov 2344 Tulare St.		

Downtown Fresno Streetcar Stakeholder Interviews

Date: ______________________________ Time: ______________________________

Location: ____

Stakeholder:____

Interviewer(s): ____

Introduction: Hello, my name is "_____ ", and I represent the Fresno Council of Governments and the Kimley-Horn team. Thank you for your willingness to be interviewed about the Streetcar Project.

"The City of Fresno is exploring the idea of implementing a fixed rail streetcar system for the downtown. In cities that have implemented new streetcar lines, private sector development has occurred within 1000 feet or so of the tracks. This has resulted in the addition a significant amount of housing development along with complementary retail services to support the new residents.

As one of Fresno's leaders keenly interested in the success of downtown, your opinion about the proposed streetcar project is highly valued. We have ten questions, which should take about 20 minutes of your time, OK?"

1. Do you think higher density and mixed use development needs to happen downtown before a streetcar project would work downtown?

   Yes ______ No ______ Undecided _______

2. Or, do you think a streetcar system in the downtown area would lead to significant redevelopment and investment in Fresno?

   Yes ______ No ______ Undecided _______

3. What kinds of development in particular do you think are needed to create a more vibrant Downtown? What do we need more of?

   ____

   ____

4. One of the goals of the study is to identify "opportunity sites" for redevelopment which might be stimulated by introduction of streetcar service. Are you aware of any areas or parcels in particular where a streetcar could be the catalyst for new investment by the private sector?

5. As a developer, what kinds of incentives would you like to see to redevelop parcels downtown?

6. What key destinations downtown do you think should be served by the streetcar? (see the map for this discussion)

7. What do you think the hours of operation and frequency of the streetcar service should be? (see the map for this discussion)

8. There are several ways the operating costs for the streetcar can be funded. Do you like or dislike any of the following suggestions?

- Business Improvement Districts (BID) fees ______
- A Tourism Tax (adds to hotel charges) ______
- Streetcar fares ______

• Raise on-street parking rates or specify capture area to dedicate proceeds to Streetcar operations ____________

• Dedicate a percentage from publicly owned parking garages downtown ____________________________

• Tax privately owned garages on a per stall or gross receipts basis? ______________________________

• Switch out operating revenues for the existing downtown circulator (and then eliminate it) ______________

• Increase fines for parking violations and dedicate that percentage to streetcars__________________________

• Private sponsorship of stops and vehicles ____

9. Do you have any other ideas that would help make the streetcar project a success? ____________________

____

10. In order for projects like the Downtown Streetcar to become a reality, they need a champion. This is someone who would be willing to attend occasional meetings about the project and promote it amongst their peers in the business community.

Would you be interested in becoming a champion for transit improvements in the Fresno area?

Yes _______ No ________ Maybe __________

How would you like to be contacted?

e-mail address: ____

phone number: ____

best time/days to contact you: ____

Thank you so much for your time!

Streetcar Open House – March 2

Kicking off the week of interviews was an Open House at the Greater Fresno Chamber of Commerce on Tuesday, March 2.

The event featured the special streetcar newsletter and handouts and display boards with information comparing historic and modern streetcars, information on potential routes and a video of various streetcars in urban settings. Presentations offered insight into how streetcars can stimulate economic development and how Fresno could benefit.

Refreshments were provided, and XXX people including business owners, organizations and property owners attended.

Participants had the chance to indicate on a map where they would


Old meets new . . .

Modern Streetcars vs Vintage Trolley: How do they compare?

Type	Modern Streetcar	Vintage Trolley
Maneuverability	Has a driver cab at both ends, easy to reverse directions.	Most are one-way only, need a loop or turnstile to turn around.
Level boarding for faster service	Yes	Steps up
Accessible to the Disabled	Yes	No, but can add special lifts at stations or on vehicles
Passenger Capacity of Trainset	130	70 – 90 (with standees)
Typical Cost	$3,000,000	$900,000
Operates in Mixed Traffic	Yes	Yes
Maintenance Cost	Lower	Higher
Comfort		
Air Conditioning	Yes	Possible to retrofit
Noise	Quiet	Can be loud
Ride Quality	Good	Can be harsh
Safety	Safest	Safe
Seating Capacity	29	46 – 54

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like to see streetcar stops located, questions were encouraged and documented.

Promotion of the open house

- Media relations. A news release was developed and provided to print, radio, television and online calendars for use. The information was picked up by a local transit enthusiast and included in his blog on examiner.com, and included in the "This Week At Fresno COG" e-newsletter.
- Eblasts. A series of three eblasts was issued to encourage attendance. In addition, the Downtown Fresno Association and the Fresno Chamber of Commerce agreed to do e-blasts.
- Website. The information was included in the official project web site.

Selma Walkability Tour – April 20

A walkability tour of downtown Selma was held on April 20, with representatives of Kimley-Horn and subconsultant TPG Consulting. The tour was designed to explore how well the city's downtown accommodates non-motorized travel.

The one-mile guided tour allowed participants to observe signage, sidewalks, bike lanes and wheelchair ramps and other features that can help, or impede, walkability. Participants then scored the adequacy of walking and biking accommodations. Responses are being used to refine the assessment and become a tool for all communities to use in the future when seeking funding to improve non-motorized transportation accommodations.

Approximately 15 people participated in the tour, including the mayor of Selma, a council member and a reporter from the Selma Enterprise newspaper.

Overall comments included:

- Walkability was rated "better than pretty good."
- Positives included ramps at street corners to accommodate the handicapped.
- Transit benches with schedules posted support walkability.
- Lack of shelters over transit benches.
- Lack of bike lanes.

Promotion of Selma tour

- Direct phone calls and personal emails. Calls were made to Selma and Fowler city council, staff, transit staff and planning commissioners, as well as Chamber

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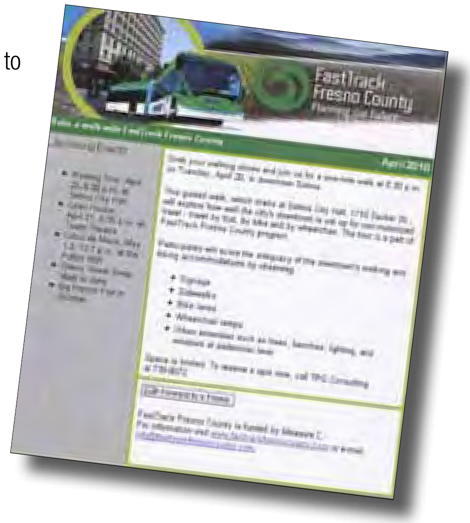
representatives, business owners, transit advocates and Selma Beautification Committee members. Emails were also sent to follow up to phone messages and confirm attendance.



- Media relations. A news release was provided to local media, and calendar notices were sent to radio, television and community online calendars. Follow-up calls were placed to encourage local media to cover the event.
- E-blast. An e-blast encouraging participation was sent to the entire PTIS database.

Tower Theater – April 21

In the time since the January workshops, Fregonese created concept plans for each of the five workshop areas. The Open House was an opportunity to unveil this work as well as the work Kimley-Horn has completed on the PTIS project.

An Open House was held in downtown Fresno's Tower Theater on April 21, for the unveiling of a movie montage of futuristic transit technologies such as high-speed rail, Bus Rapid Transit and Personal Rapid Transit.

The event also featured the opportunity to see displays on BRT, PRT and streetcars and learn about the results of the land use visioning workshops held in January.

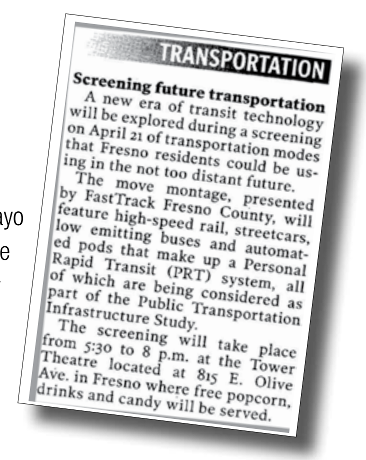
Over several sessions, participants heard a presentation by Fregonese offering a summary of the progress of the PTIS and the input gathered at the January workshops. Participants were then given the chance to vote on streetcar routes and vote on what type of transit-oriented development they would like to see in Fresno's future, using live polling technology.

The event was well attended by a cross-section of the area, including seniors, students, professionals, transit advocates, business owners and history enthusiasts.

See the attached summary for input and voting results.

Promotion of Open House

- Media relations. A news release was developed and distributed, promoting the Open House and the booth displays at the upcoming Vintage Days, Cinco de Mayo and Cherry Street Auction. The release was picked up by the Fresno Bee and the Business Journal, as well as added to calendars of several civic and community organizations, including Fresno Transportation Examiner, an online feature. A local cycling advocate submitted the news release to the Fresno County Bicycling Coalition and social media outlets such as Facebook and Twitter were used to help generate attendance.



TRANSPORTATION

Screening future transportation

A new era of transit technology will be explored during a screening on April 21 of transportation modes that Fresno residents could be using in the not too distant future.

The move montage, presented by FastTrack Fresno County, will feature high-speed rail, streetcars, low emitting buses and automated pods that make up a Personal Rapid Transit (PRT) system, all of which are being considered as part of the Public Transportation Infrastructure Study.

The screening will take place from 5:30 to 8 p.m. at the Tower Theatre located at 815 E. Olive Ave. in Fresno where free popcorn, drinks and candy will be served.

• Paid advertising. Advertising was placed on the top news and music stations in the area, and included a remote at the theater; an online ad was placed at fresnobee.com and yahoo.com, using geographic targeting; and the music station provided a live remote and pre-recorded "call-in" interviews to draw attendance and attention.

• Eblasts. An early eblast and a reminder eblast were sent out to the full database, promoting the Tower event and other upcoming public involvement opportunities.

• School outreach. High schools in Fresno County were contacted directly regarding the educational opportunity of the Tower Theater Open House. Instructors, learning directors, campus culture directors and public information officers were reached to get the word out and encourage student involvement. Some high schools used the news release information in their bulletins or emailed the information to other instructors or student advisory boards. The following schools were contacted, and several students attended, particularly those from Duncan.

The schools contacted were:

- San Joaquin Memorial
- Fresno City College
- Bullard High School
- Hoover High School
- CART Center For Research and Technology
- Roosevelt High School
- Duncan Polytechnical High School
- Clovis High School
- Clovis North High School
- CSU, Fresno
- Fresno High School
- Edison High School
- McLane High School
- Design Science
- Sunnyside High School
- Buchanan High School
- Clovis East High School
- Clovis West High School


CALENDAR

Vintage Days, CSUF – April 17-18

FastTrack reserved a double exhibit space at this event in order to broaden the scope of involvement and participation. The event is held on campus, but drew an audience of current students, families and seniors, and a wide range of ethnicities. The display drew a high level of attention, particularly to the concept of streetcars and improvements downtown.

Promotion of the Vintage Days booth:

• Paid advertising. As part of the booth reservation, PTIS earned spots on Y101, which is an adult contemporary format radio station.

- Eblasts. The Vintage Days booth was promoted along with Cinco de Mayo in a series of eblasts to media and the full PTIS database.

- Vintage Days as an event was heavily promoted on the radio station with the highest listenership in the Valley.

A key task for the display was to collect feedback on the four types of transit-oriented housing, using the display boards showing "typical" types of TOD. During the two days the booth was staffed, 263 people voted for their preferred type of TOD. The most popular was Option D, the highest density of any of the options presented.

Cinco de Mayo – May 1-2

This is a hugely popular event, held at the Fulton Mall, and provided an opportunity to reach out to the Hispanic community and gain its involvement and feedback.

FastTrack Fresno County set up a booth with display boards on BRT, streetcars and transit-oriented development options. Nearly 200 people took the time to vote on their choice of TOD options, and many more stopped to learn about streetcars and improvements to transit. The historic images of streetcars drew a great deal of attention, serving to initiate a conversation about improvements. A translator helped staff the booth and effectively engaged residents in their language.

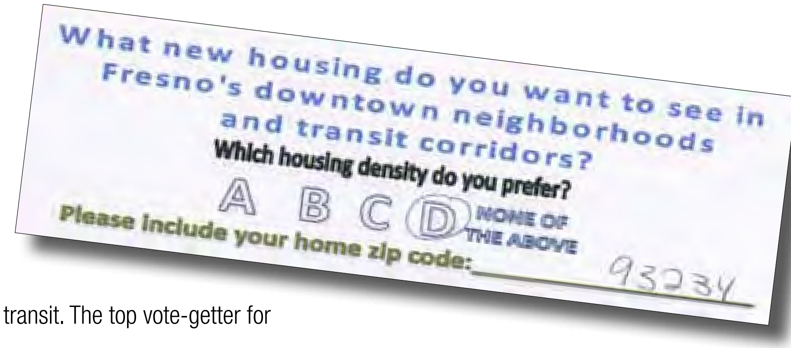
Attendees were of all ages and a wide variety of ethnicities, including those who spoke only Spanish.

Promotion of the Cinco de Mayo display

- Paid advertising. To support awareness of the display, advertisements were run on the Spanish-language radio station that sponsors the event.

- Eblasts were sent to the entire PTIS database, promoting upcoming displays at Vintage Days, Fulton Mall and Cherry Street Auction.

- The event itself was heavily promoted by the sponsoring station.

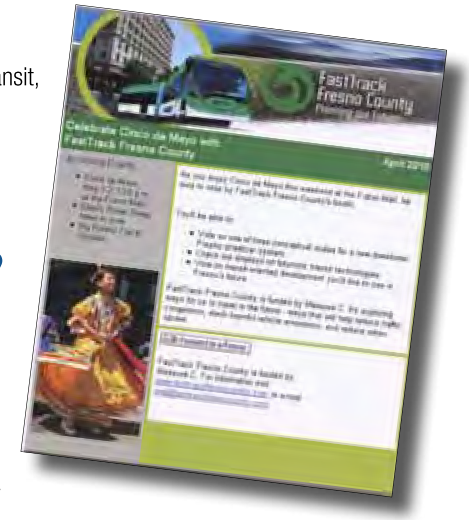


Overall comments:

- Nearly 450 people took the time to vote on their choice of TOD options, and many more stopped to learn about streetcars and improvements to transit. The top vote-getter for

TOD was again option D, the highest-density of the options offered.

Attendees were excited about new housing downtown and improved transit, though many also asked what the housing costs would be. Cost was definitely a concern.



Cherry Street Auction – June 19

The PTIS display was presented at the Cherry Street Auction, staffed with a Spanish-speaking translator. This auction, held twice a week, draws an estimated 25,000 people per week. Traffic through the display was diverse in age and ethnicity, but was slightly more heavily Hispanic. While the numbers were not as high as at the Cinco de Mayo event, attendees were open to the idea of voting and excited about new housing opportunities downtown.

Overall public comment

- The graphic displays of TOD options drew interest and 98 people took the time to study the options and vote. Again, option D garnered the most votes, with 34 offering support of the highest-density design; but option A, the lowest density of those presented, drew 24 votes. Attendees were also intrigued by the historic streetcar photos and enthusiastic about streetcars returning to the downtown.

Tower Theater presentation – Aug. 2

The Tower Theater was chosen as the venue for the second time because of the success of the April Open House. The August event featured a multi-media presentation and gave attendees the chance to vote on their preferred routes for streetcars and historic vs modern design for the downtown streetcars.

Attendees watched a video of possible future transportation types including PRT and BRT and learned how development and density patterns could change the way Fresno residents travel in the future.

Promotion of the Tower Theater presentation

- Paid advertising. Advertising was placed on the two highest-listenership stations in the county, and a remote was provided by the music station, along with call-in interviews.
- Media relations. A news release was prepared and distributed to print, radio, television and online mediums, as well as calendars of events.
- Eblasts. A series of eblasts was developed and distributed to the full PTIS database.
- Newsletter. A printed newsletter promoting the event was mailed to the database.

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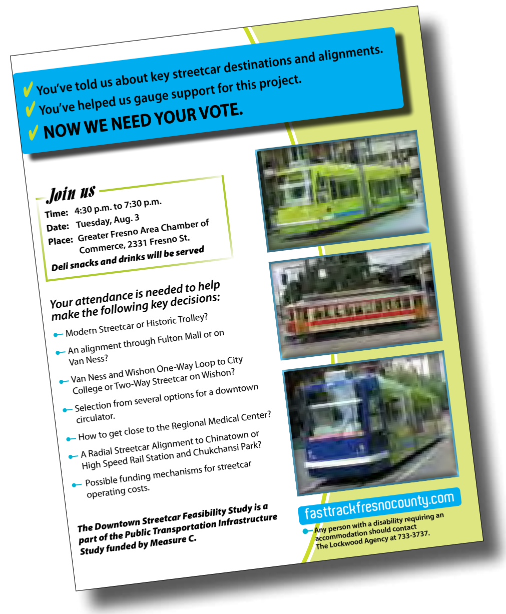
Streetcar Study meeting – Aug. 3

This was a targeted informational and voting meeting for downtown merchants, property owners and key stakeholders. The purpose was to inform attendees of progress on the study and to allow them to vote on their preferred route.

The meeting, held at the Chamber of Commerce, was well attended by 30 people and participants engaged in the dialogue about the future of downtown.



Promotion of the Streetcar Study vote

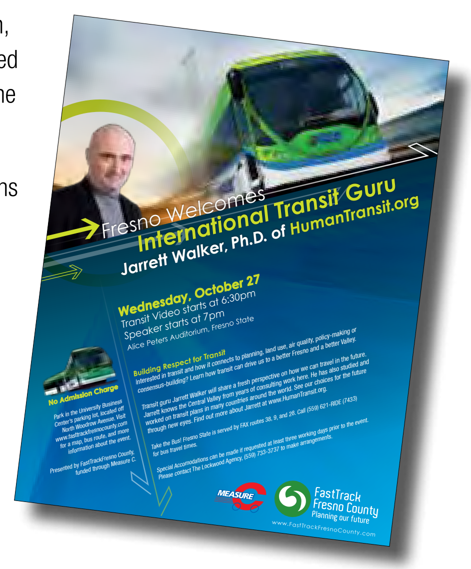
- Eblasts. Targeted blasts were sent to the "streetcar specific" email list, inviting and reminding recipients to attend.
- Personal phone calls. Calls were made to the Downtown Fresno Association and the Fulton Mall businesses encouraging participation; follow-up reminder calls were then made.
- Direct mail. A flier was mailed to the streetcar database promoting and encouraging attendance.
- E-vite. A Pingg account was set up to invite, remind and thank attendees of the streetcar vote meeting.

Building Respect for Transit – Oct. 27

'International Transit Guru' Jarrett Walker offered his perspective on transit during a presentation held on the California State University, Fresno, campus. The presentation was promoted to the general population, students, planners and transit professionals in Tulare, Kings and Fresno counties.

Promotion of the "Building Respect for Transit"

- Direct mail. A Save the Date card was mailed to the project database and transit professionals.
- Mailed newsletter. The project newsletter focused on the presentation, and provided updates on the study overall. Readers were also informed of other upcoming opportunities to hear updates and be involved in the study.
- Radio. Radio ads were placed on the top two English-language stations and one of the highest-listenership Spanish-language stations.
- Online advertising. A web ad was created for fresnobee.com along with a special landing page, which also linked to the project web site.
- Print advertising. Ads were placed in the print version of the Fresno Bee.
- Media relations. Interviews were scheduled with the speaker on local affiliate television and the information was provided to the official Fresno State Twitter feed with 1,724 followers, and the official Collegian Online Twitter feed of 227 followers.



The Jarrett Walker (humantransit.org) presentation was held at the Alice Peters Auditorium on campus at California State University, Fresno.

Approximately 40 people attended, including students, transit users and transit professionals. The presentation was informative and provided attendees with new ideas of how transit can be adapted to the needs of individual communities, with a focus on working together to most effectively and efficiently meet the common goal of mobility.

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F. Modeling Assumptions Documentation

PTIS Study Modeling Assumptions Documentation

The Fresno County Travel Model maintained by the Council of Fresno County Governments (Fresno COG) has been modified to support travel forecasts for the Fresno Public Transportation and Infrastructure Study (PTIS).

Summary

The travel forecasts for the Fresno PTIS are based on the current Fresno County travel demand model maintained by Fresno COG. The model has been modified to ensure that it is sensitive to the range of land use and transit alternatives being studied in the PTIS.

The current travel model was calibrated and validated to replicate observed 2003 traffic and transit volumes. It has been used for travel forecasts for various years up to 2035.

The modifications for the PTIS include:

- Separate coding and attractiveness adjustments for Bus Rapid Transit
- Future increases in gas prices for all trips and increases in parking costs relative to increased land use density
- Shortened walk distances for areas designated as Transit Oriented Development (TOD) to represent effects of increased density, mixed uses and proximity to transit
- Adjustments to account for California High Speed Rail service

The PTIS model modifications result in higher proportions of trips using transit, walk or bicycle modes, particularly to and from designated TOD areas, than the proportions that would be estimated by the current Fresno County model.

Current Travel Model

The Fresno County travel model which is used as the basis for PTIS forecasts is the version completed in September, 2009. This version has been used for air quality conformity. The most recent documentation of the travel model is a draft report dated March 1, 2010.

The Fresno County travel model is a standard "four step" travel demand model:

- **Trip Generation:** How many person trips by trip purpose (work, shopping, etc…) occur in each TAZ based on the land uses in the TAZ
- **Trip Distribution:** How many person trips by trip purpose travel to each other TAZ
- **Mode Choice:** How many person trips by trip purpose between each pair of TAZs choose one of seven travel modes:
  - Drive Alone
  - Shared Ride 2 Person
  - Shared Ride 3+ Person
  - Transit, Walk Access
  - Transit, Drive Access
  - Bicycle
  - Walk
- **Trip Assignment:** Which roads or transit routes are used between each pair of TAZs; the traffic assignment spreads traffic among alternate routes to balance congestion

The Fresno County travel model is implemented using the Cube/TP+ software by Citilabs.
Model Calibration and Validation
The Fresno County travel model was calibrated (setting equations and parameters) based on the following basic information:

2003 land use database representing population, housing, employment, median income and vehicle ownership in each TAZ
Travel behavior characteristics from household travel diaries reported in the 2000/2001 California Statewide Travel Survey
Traffic counts representing 2003 traffic volumes
Transit ridership counts from 2003

Once the equations and parameters were set, the travel model was validated by inputting the land use and network information for the 2003 base year, and comparing the model outputs to the observed 2003 traffic and transit counts. The 2003 model validation met basic standards for replication of traffic volumes by facility type and on selected screenlines, and replicated overall transit ridership volumes.

Model Adjustments for SB 375 Target Setting

Fresno COG added several features to the travel model for the purpose of evaluating land use and transportation scenarios in preparation for proposing air quality targets for compliance with Senate Bill 375 (SB 375). These features focused on reducing the estimates of vehicle trips, and did not provide for improved estimates of transit ridership based on changes in transit service. Therefore, these features were NOT used as a basis for the PTIS model refinements.

Vehicle Trip Adjustments Based on “D” Factors

A process was added to the Fresno County model to estimate changes (decreases or increases) in vehicle trips to and from each transportation analysis zone (TAZ) based on sensitivity to land use and urban design features. The features include Density (housing units and/or employment per square mile), Diversity (mix of uses in each TAZ), Design (elements such as sidewalk completeness) and Destinations, and are typically referred to as the “D factors” or “4 D’s.”

The “D” factors and corresponding vehicle trip adjustments are calculated relative to a base scenario, which assumes no special land use and urban design features. Fresno COG used the land use forecast from the currently approved Regional Transportation Plan (RTP) as the base scenario. Alternative land use scenarios were developed, and the changes in “D” factors for each TAZ were input to the travel model. The “D’s” processor then estimated the changes in vehicle trips based on the changes in “D” factors in each TAZ.

Vehicle Trip Adjustments Based on Rule 9410

The San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) has implemented Rule 9410, which requires employers with more than 100 employees to implement trip reduction strategies. The SJVUAPCD estimated that the proposed trip reduction strategies would result in an average vehicle occupancy (AVO) of 1.3 to 1.4 for commute trips, with an AVO of 1.35 used as a midpoint for calculations. (INSERT FOOTNOTE)

A set of user input adjustment factors were added to the Fresno County model to test the effectiveness of Rule 9410. The factors allow the person trips using a particular mode for a particular trip purpose to be adjusted above or below the values estimated by the mode choice model.

The Fresno County mode choice model estimated an AVO of 1.08 for Home-Work trips. Fresno COG estimated that 41 percent of employees in Fresno County work at employment sites with more than 100 employees (based on the detailed employment inventory prepared for the 2003 model calibration). If the AVO for 41 percent of the work trips were to be increased from 1.08 to 1.35, the resulting overall AVO for all work trips would be 1.18. A factor of 2.00 applied to Home-Work shared ride 2 person and 3+ person trips results in the target AVO and represents implementation of Rule 9410.

The adjustments implemented to represent Rule 9410 are appropriate to represent estimated vehicle trip reductions, but are not sensitive to diversions to various alternative modes such as transit, bicycle or walk based on land use and transit service inputs. Therefore, the Rule 9410 adjustments have not been used for the PTIS travel forecasts.

Model Adjustments for PTIS

The PTIS requires travel forecasts that are sensitive to the range of transportation, land use and policy alternatives being considered in the study. The following changes were made to the model procedures:

Transit Network

Separate speed estimates for coding of Bus Rapid Transit (BRT) in exclusive bus lanes
Timed transfers for designated transfer centers and ends of loop routes

High Speed Rail

Added trips to and from proposed Fresno High Speed Rail station
Reduced corresponding long-distance auto trips on State Route 99

Travel Costs

Assumed increases in gas prices and total auto operating costs
Implemented parking cost increase model based on employment density

Land Use Sensitivity

Shortened walk distances and times for designated mixed-use and transit-oriented development (TOD) areas, including shortened intrazonal times
Shortened transit access distances for designated TOD areas

Rapid Transit Adjustments

Mode choice model includes increased attractiveness of BRT or Light Rail Transit (LRT) modes to account for factors other than travel time and costs

Performance Measures

Separate calculation of system performance measures for designated TOD areas and Central Business District (CBD)
These modifications are described in greater detail in the following sections.

Transit Network

The modifications to the transit network include separate coding for Bus Rapid Transit and timed transfer centers.

Bus Rapid Transit

Bus Rapid Transit (BRT) is coded similar to other bus lines, by designating a series of nodes along the road network. The standard Fresno County model uses “transit mode” designations of 11 for FAX service, 12 for Clovis fixed-route service, and 13 for rural transit services. Additional transit mode designations have been added for BRT (14) and for light rail transit (15). The travel times on BRT and LRT are tracked separately so they can be used for attractiveness adjustments during the mode choice step.

Bus travel times in the Fresno County model are estimated based on factors which relate the average bus travel time to the average congested auto time on each road segment. The following factors were calibrated based on 2003 auto travel times and published bus schedules:

- Local streets................................ 2.1 x congested auto travel time
- CBD... 2.7 x congested auto travel time
- Freeway, highway, rural roads....... 1.4 x congested auto travel time

Bus rapid transit has several attributes which allow if to travel faster than conventional bus service. The BRT can travel in separate lanes. Whether the BRT is in its own lane or in a shared lane, signal priority is provided at many intersections. Bus stops are spaced further apart, so there are fewer delays for stops. Therefore, new time factors were developed for BRT:

- BRT in exclusive lane .... 0.7 x congested auto travel time
- BRT in shared lane....................... 1.2 x congested auto travel time

For exclusive bus lanes, the 0.7 factor applied to estimated future congested travel speeds provides overall BRT travel speeds slightly slower than speed limits. For shared lanes, the 1.2 factor provides bus travel times consistent with existing BRT service in shared lanes such as the AC Transit rapid bus service in the Oakland/Berkeley area.

Timed Transfers

The PTIS transit scenarios can include one or more transfer centers. At the transfer centers, bus schedules would be coordinated to minimize wait times for passengers transferring between routes.

The standard travel model calculation of wait times assumes that the average passenger wait time for a bus will be one-half of the scheduled headway (frequency). For a bus route that operates every 30 minutes, the average wait time to board at the initial stop or at a transfer location would be 15 minutes. At transfer centers, the travel model has been adjusted so that the total time between buses is 5 minutes.

Because buses sometimes have to wait at transfer centers to allow other buses to arrive, a 5 minute delay has been added to bus routes that serve transfer centers. The net result is a significant improvement in total travel times for passengers who transfer at the transfer centers, but slightly longer travel times for passengers traveling through the transfer center on the same route.

High Speed Rail

High speed rail adjustments include additional trips at the proposed Fresno station and adjustments to long-distance auto trips on State Route (SR) 99.

California High Speed Rail Ridership

Ridership forecasts for the proposed California High Speed Rail service were obtained from the January 20, 2010 presentation for the Public Information Meeting Open House, California High-Speed Train Project Through Fresno, Fresno to Bakersfield Project EIR/EIS. The presentation presented results of the rail corridor analysis for the full system estimate for the year 2035. The service levels would include 20 through trains per hour with 12 stopping trains per hour during peak hours, and 14 through trains per hour with 8 stopping trains per hour during off-peak hours.

At the Fresno station, the 2035 forecast is for 13,300 average total daily boardings and alightings.

Fresno High Speed Rail Station

The Fresno high speed rail station would be located in TAZ 1324 in downtown Fresno. The rail passenger trips cannot be easily represented using the standard travel model inputs of housing or employment. Therefore, the trips are input as a special generator. A total of 13,300 daily person trips were added to TAZ 1324 as a special generator, split equally between home-end (production) trips and non-home-end (attraction) trips.

Based on other information provided by the California High Speed Rail ridership estimates, 20 percent of the weekday trips were assumed to be work commute (home-work) trips and 80 percent were assumed to be non-work (home-other trip purpose).

The rail passenger trips were input to the travel model as generated person trips, not as trips to and from certain areas or using certain modes. The standard travel model processes are used to estimate the distribution of the rail passenger trips within Fresno County and the travel modes they would use based on attributes such as available transit service.

High Speed Rail Vehicle Reductions

The passenger trips added to the downtown Fresno high speed rail station are assumed to replace other trips by non-rail modes. For the purposes of the PTIS study, the replaced trips are assumed to be auto trips on the State Route 99 corridor which parallels the proposed rail alignment.

The 2035 Fresno travel model includes estimates of "gateway" trips at the county line that would interact with land uses in Fresno County (internal-external and external-internal trips, sometimes referred to as IX/XI or IE/EI). The estimates of IX/XI vehicle trips for 2035 are 73,000 at SR 99 north (Madera County line) and 51,400 at SR 99 south (Tulare County line). Using an average vehicle occupancy (from surveys) of 1.45, these vehicle volumes correspond to 180,300 daily person trips entering or leaving Fresno County via SR 99 in 2035.

The daily high speed rail forecast of 13,300 daily trips at the Fresno station would represent 7.4 percent of the daily trips to and from Fresno via SR 99. Therefore, the gateway trips were assumed to be reduced by 7.4 percent with high speed rail service.

The high speed rail system would also reduce auto trips through Fresno, on Interstate 5 as well as on SR 99. The published documents do not provide specific information on reductions in traffic through Fresno on specific routes. Therefore, the 7.4 percent reduction obtained from the Fresno station analysis was assumed to also apply to through trips on SR 99.

Travel Costs

Travel cost adjustments include gas and auto operating costs, and parking cost changes.

Auto Operating Cost

The mode choice model considers travel times and costs for all modes. The costs for auto travel include perceived auto operating cost and parking costs at the destination.

The auto operating costs include gas cost, as well as the perceived amount of other costs such as maintenance and insurance. The auto operating cost is estimated as a cost per mile multiplied by the trip distance.

For many years, the real (adjusted for inflation) cost of fuel remained relatively constant including the effects of increased vehicle fleet mileage. Therefore, most travel models did not assume increases in auto operating cost in constant year dollars. The Fresno County travel model has previously assumed a constant calibrated auto operating cost per mile for all forecast years.

Since around 2005, gas prices have increased faster than standard measures of inflation such as the Consumer Price Index (CPI). Therefore, the travel forecasts for the PTIS assume increases in gas price and average auto operating costs. The assumptions were based on the analysis done by the San Francisco Bay Area Metropolitan Transportation Commission (MTC) in support of their 2009 Regional Transportation Plan (RTP). The operating cost assumptions also include changes in average vehicle fuel efficiency (Table 1).

Year	CPI	Gas Price p/Gallon	Gas Price (2000 Dollars)	Average Fleet MPG	Gas Cost p/ Mile (2000¢)	Non Gas Cost (2/3 of Gas)	Total Auto Cost (cents p/mile)
2000	180.2	$1.83	$1.83	19.40	9,43	6.29	15.72
2003	196.4	$1.93	$1.77	19.55	9.05	6.04	15.09
2005	202.7	$2.52	$2.24	19.76	11.34	7.56	18.90
2010	235.3	$4.77	$3.65	20.27	18.01	12.00	30.01
2020	313.2	$7.76	$4.46	25.08	17.78	11.86	29.64
2035	480.9	$16.17	$6.06	32.15	18.85	12.57	31.42

The Fresno County model was calibrated to replicate 2003 mode choice characteristics using an average auto operating cost of 15.09 cents per mile. For 2035 travel forecasts, the average auto operating cost will be assumed to increase to 31.42 cents per mile.

Parking Costs

The mode choice model considers auto parking costs at the destination as part of the calculation of the attractiveness of the auto mode versus transit or non-motorized travel. Average parking cost is not necessarily the posted parking rate at a destination. It is intended to represent the average parking cost paid by persons traveling to that destination. Therefore, the average should include those who have parking spaces provided for free as well as those who park further away where parking is lower cost or free.

Existing Parking Costs

The base parking costs in 2000 dollars were based on information on monthly parking rates provided by COG staff. The resulting base parking rates for the 2003 base model validation year are $3.00 per day in the Central Business District (approximately $90 per month in 2010 dollars) and $0.70 at the colleges (approximately $20 per month in 2010 dollars).

Future Parking Costs

Without any changes in parking policies, parking costs tend to increase as employment areas increase in density. A consistent trend can be observed comparing the central business districts of various cities.

A parking cost model has been adapted from the Puget Sound Regional Council (PSRC) to estimate the changes in parking cost which would occur without policy changes for each future land use scenario. The PSRC parking cost model was based on a detailed statistical analysis of employment densities and average parking costs.

In the Fresno PTIS modeling, in order to provide a more accurate picture of the entire area affecting parking conditions, employment densities are not calculated for individual TAZs. All TAZs within a ten minute walk are included in the calculation. For each TAZ, the other TAZs (including the subject TAZ) within a ten minute walk are identified, and the total employment in those TAZs is divided by the total land area of those TAZs.

The estimates of future parking cost are based on the following:

- If a TAZ had a parking cost in the 2003 base year, the additional future parking cost is estimated as the increment in employees per square mile times $0.0000831. For example, TAZ 1338 had a density of 16,910 employees per square mile in 2003 and was projected to increase to 64,951 in 2035. The increase in density would be 48,041 and the parking cost would increase by $3.99 for a total of approximately $7.00.
- If a TAZ did not have a parking cost in the 2003 base year, but the employment density is projected to increase to a value greater than 20,000 employees per square mile (the approximate threshold for actual parking costs in the 2003 base year), the new parking cost is estimated as $1.50 plus the increment (from 20,000) in employees per square mile times $0.0000831.

The parking costs are recalculated for each land use scenario and input to the travel model prior to the full model run.

Land Use Sensitivity

The Fresno County travel model was calibrated based on typical existing urban forms. Alternative types of development use higher density and non-auto-oriented design to encourage greater use of non-auto travel modes. The alternative "urban forms" put complementary land uses closer to each other and closer to transit stops. Since the travel model calibration was not based on these urban forms, additional adjustments are necessary to identify the different types of development and account for their effect on travel behavior.

The "Urban Form Adjustments" included in the PTIS version of the model include adjustments for increased density and proximity of mixed uses, and additional adjustments for Transit Oriented Development (TOD).

Urban Form Adjustments

The PTIS version of the model allows for the identification of TAZs which contain urban forms different from the existing typical Fresno County patterns. These urban forms may include denser single-family or multi-family housing, employment or retail sites that front directly on the street rather than behind large parking lots, mixed uses with housing over commercial, and/or development with improved pedestrian and bicycle connectivity.

The TAZs with non-standard urban forms are given a ranking (or level) between 1 and 3, with a "1" representing the highest level ranking. The subjective ranking is based on the approximate percentage of the TAZ with development encouraging alternative modes, and the intensity of the uses. A TAZ with full redevelopment to mixed-use three-story buildings with ground floor retail and two levels of residential, connected with pedestrian and bike paths to a townhome community would receive a level of 1. A TAZ with standard development in most areas but a mixed-use development in a large corner parcel may receive a level of 3. Most TAZs with no significant changes in urban form would stay at a level of zero.

It is also important to identify groups of TAZs which will have an urban form that encourages non-motorized travel between the TAZs. For example, a dense residential development may be across the street from a pedestrian-oriented shopping center in a different travel model TAZ. If mixed uses are only identified within individual TAZs, the synergy between these two uses would not be recognized. The PTIS model revisions allow TAZs to be grouped into improved urban form districts.

The urban form levels are used to adjust the assumed walk distances within an individual TAZ (intrazonal distance) as follows:

- Urban Form Level 1: Maximum internal walk distance 0.25 miles (5 minutes)
- Urban Form Level 2: Maximum internal walk distance 0.33 miles (7 minutes)
- Urban Form Level 1: Maximum internal walk distance 0.50 miles (10 minutes)

If a TAZ is designated with an Urban Form Level and also an Urban Form District, then the walk distance between the TAZs in each district is set to be no greater than the direct straight line distance between the TAZ centroids. This represents the concept that the improved urban form in these districts will provide direct pedestrian and bicycle connections and not require circuitous connections using the street system.

The shortened walk distances within urban form TAZs and districts affects the model calculations in two places:

- The trip distribution for the urban form areas is based on an average of the shortened walk time and auto time (if the walk time is shorter) rather than just the auto time. This encourages more trips within urban form TAZs and districts compared to conventional modeling, and represents the principal travel behavior benefits of increased densities and mixed uses.
- The mode choice calculations use the shortened walk and bicycle distances when comparing non-motorized travel with other travel modes. The result is higher percentages of walk and bicycle trips within urban form TAZs and districts compared to conventional modeling.

Transit Oriented Development

The PTIS version of the model also allows for the identification of TAZs which are particularly oriented towards improved access to transit, or Transit Oriented Development. As with the Urban Form Levels, the TOD Levels of 1 to 3 are assigned based on the percentage of the TAZ affected and the quality of the transit access improvements.

The TOD Levels are used to adjust the calculated walk distances between a TOD TAZ and transit stops as follows:

- TOD Level 1: Maximum transit walk access time 3 minutes
- TOD Level 2: Maximum transit walk access time 5 minutes
- TOD Level 3: Maximum transit walk access time 7 minutes

The shortened walk access times are used in the mode choice calculations when comparing transit modes to auto and other travel modes. The mode choice model considers walk time to transit to be perceived as twice the equivalent time in a vehicle (a 10 minute walk to a stop or wait for a bus is perceived to be equivalent to 20 minutes riding in a bus or auto). Therefore, reductions in the walk access time can significantly increase the relative attractiveness of the transit mode.

Rapid Transit Adjustments

Higher quality transit services such as Bus Rapid Transit (BRT) or rail transit are known to have attributes that make them relatively more attractive than what would be accounted for by improved travel times. These attributes may include improved reliability (due to exclusive lanes, traffic signal priority and/or fewer stops), amenities such as designated stations and specially designed vehicles, and very frequent service.

Most travel models such as the Fresno County model can only measure time and cost attributes of travel modes, and cannot inherently model the additional attractiveness of premium transit modes (unless these modes are in operation in the calibration year and parameters are calibrated to represent them). Therefore, adjustments in the attractiveness of the proposed BRT service are used to represent the additional ridership that may use these services.

The source for the adjustment process is the publication TCRP Report 118, Bus Rapid Transit Practitioner's Guide (Transportation Research Board, Transit Cooperative Research Program, 2007). The research of existing BRT operations indicates that BRT service can attract up to 25 percent higher ridership than what would be estimated based only on travel time and cost measures. The 25 percent ridership increase only applies to BRT will a full set of amenities, including bus travel lanes that are completely separate from auto travel. A scoring system is used to estimate what share of the maximum 25 percent increase can be assumed for a given BRT system (Figure 1).

The proposed BRT system in Fresno would not have fully grade-separated bus lanes. However, it can be assumed that BRT in Fresno could implement many of the other amenities, including special vehicles and stations. Therefore, a 20 percent ridership increase can be assumed.

The BRT ridership adjustment is implemented within the mode choice model. Once transit paths between origins and destinations are determined, the portion of each transit path on BRT is calculated (from 0 to 100 percent of the transit trip in BRT service). The 20 percent attractiveness increase is applied to the proportion of the transit trip on BRT, and the result is used to compare to the attractiveness of other modes within the mode choice model. A transit trip which only uses BRT would get the full 20 percent increase in attractiveness. A transit trip using BRT for 15 out of the total 30 minutes and a transfer to another non-BRT bus route for 15 minutes would receive a 10 percent increase in attractiveness.

During testing, the attractiveness adjustment was found to increase the estimates of BRT ridership by about nine percent compared to running the travel model without the BRT adjustment.

Figure 1 : Scoring System for BRT Ridership Increases

	Component	Percentage
1	Running Ways (not additive)	20
	Grade-separated busways (special right-of-way)	(20)
	At-grade busways (special)	(15)
	Median arterial busways (special)	(10)
	All-day bus lanes (specially delineated)	(5)
	Peak-hour bus lanes	-
	Mixed traffic	-
2	Stations (additive)	15
	Conventional shelter	-
	Unique/attractively designed shelter	2
	Illumination	2
	Telephones/security phones	3
	Climate-controlled waiting area	3
	Passenger amenities	3
	Passenger services	2
3	Vehicles (additive)	15
	Conventional vehicles	-
	Uniquely designed vehicles (external)	5
	Air conditioning	-
	Wide multi-door configuration	5
	Level boarding (low-floor or hight platform)	5
4	Service Patterns (additive)	15
	All-day service span	4
	High-frequency service (10 min or less)	4
	Clear, simple, service pattern	4
	Off-vehicle fare collection	3
5	ITS Applications (selective additive)	10
	Passenger information at stops	7
	Passenger information on vehicles	3
6	BRT Branding (additive)	10
	Vehicles & stations	7
	Brochures/schedules	3
Subtotal (Maximum of 85)		85
7	Synergy (applies only to at least 60 points)	15
Total		100

Source: TCRP Report 118, Bus Rapid Transit Practitioner's Guide, 2007, page 3–22

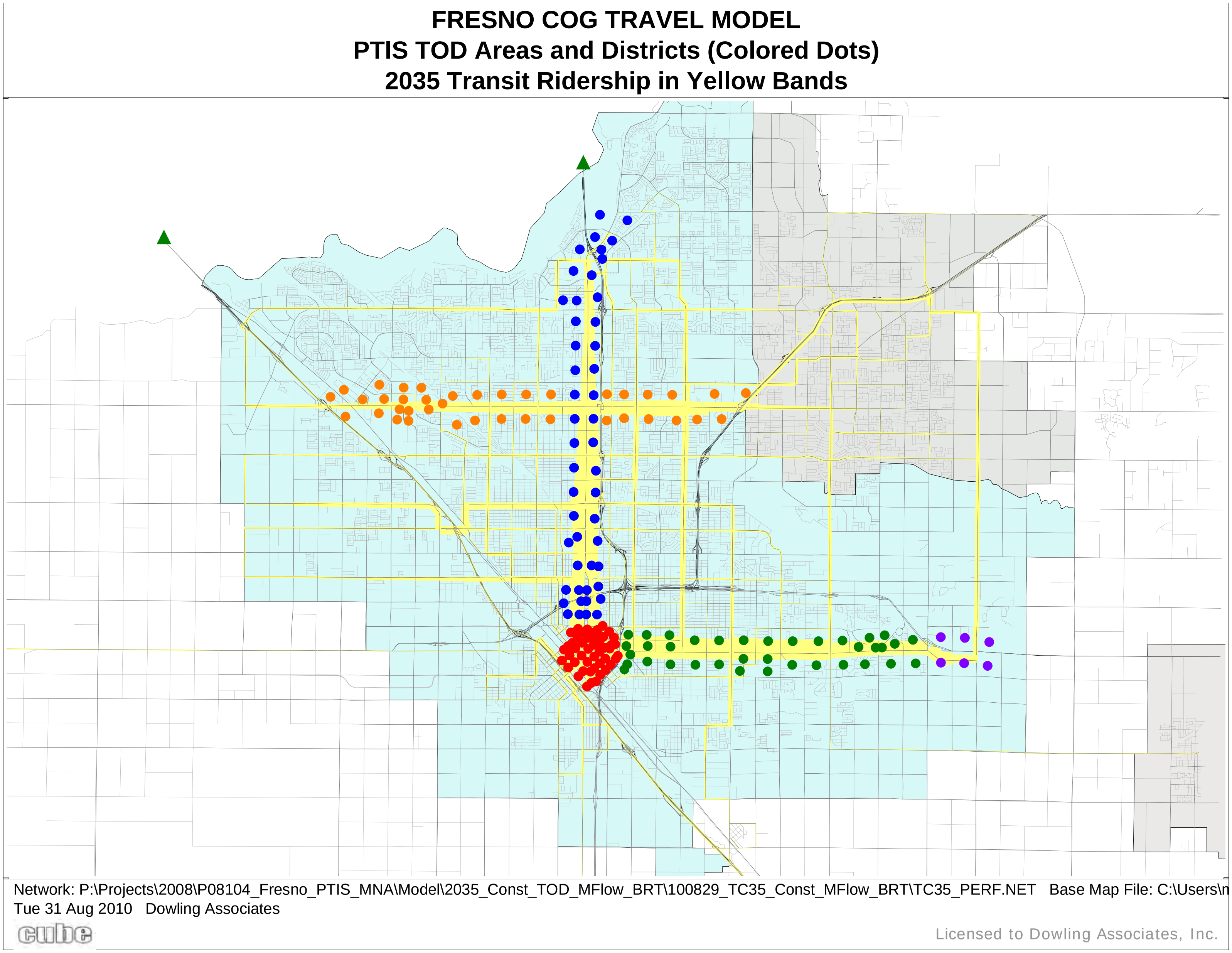
Performance Measures

A set of systemwide transportation performance measures that could be obtained from the Fresno County model were established during the Blueprint studies:

- Performance Measures based on Transportation Networks
- Vehicle-Miles of Travel
- Vehicle-Miles of Travel in Congestion (volume/capacity > 0.90)
- Percent Vehicle-Miles of Travel in Congestion
- Person-Miles of Travel in Private Vehicles
- Person-Miles of Travel in Transit
- Vehicle-Hours of Travel
- Person-Hours of Travel in Private Vehicles
- Person-Hours of Travel in Transit
- Vehicle-Hours of Delay
- Person-Hours of Delay in Private Vehicles
- Person-Hours of Delay in Transit
- Average Speed in Private Vehicles
- Average Speed in Transit
- Performance Measures based on Trips
- Work Auto Trips (number and percent)
- Work Transit Trips (number and percent)
- Work Bike/Walk Trips (number and percent)
- Work Total Trips (number and percent)
- Non-Work Auto Trips (number and percent)
- Non-Work Transit Trips (number and percent)
- Non-Work Bike/Walk Trips (number and percent)
- Non-Work Total Trips (number and percent)
- Total Auto Trips (number and percent)
- Total Transit Trips (number and percent)
- Total Bike/Walk Trips (number and percent)
- Total Total Trips (number and percent)

These performance measures are calculated for the entire Fresno County area. For the PTIS study, the trip-based measures can also be reported for the TOD areas (Figure 2), the Fresno/Clovis urban area and/or the CBD.

Figure 2 : Fresno County PTIS Model TOD Dsitricts



G. Technical Data Tables

Table G1: Fresno Area Express Ridership Summary

Route	Ridership		Adjusted Model			
	2003 Estimated Weekday(Count)	2003 Model	2010 Adjusted	2035 No Build Adjusted	2035 TSM Adjusted	2035 TSM Revised Adjusted
FRESNO AREA EXPRESS						
Bus Rapid Transit	0	0	0	16,755	17,931	18,454
4	0	0	126	150	65	140
9	1969	3976	5,098	10,065	12,363	11,932
12(2003 only)	87	373	0	0	0	0
18	68	16	18	30	34	34
20	2823	3568	1,802	1,153	1,205	933
22	2616	2317	1,993	1,161	688	3,462
Combined 22,35	0	0	0	0	1,679	0
26	3329	3910	2,560	1,983	1,614	1,449
28	4716	5329	8,297	3,165	5,096	4,873
30	3997	5598	4,801	632	762	327
32	3683	1658	518	2,264	3,421	2,510
33	1472	489	239	153	178	164
34	2782	3240	3,748	2,856	2,790	2,867
35 (combined under TSM)	0	0	817	919	0	0
Combined 35,39	0	0	0	0	3,889	4,193
38	3833	2514	8,605	8,530	6,283	6,166
39	1110	2166	1,811	1,536	539	0
41	2927	3162	2,021	4,137	4,881	6,842
45	890	1360	1,291	1,911	4,549	2,968
58	17	308	262	409	470	461
58E	0	0	19	15	37	5
Downtown Circulator	0	0	0	24	29	24
SW Area Circulator	0	0	0	0	0	1,454
Fresno–Clovis New(NS–Clovis Av)	0	0	0	0	2,511	2,208
Fresno–Clovis New(Hwy 168)	0	0	0	0	1,826	4,056
Fresno–Clovis New(De Wolf)	0	0	0	0	1,788	2,236
SUBTOTAL FAX	**36,317**	**39,984**	**44,027**	**57,847**	**74,627**	**77,759**

Model run date: April 14, 2010

Table G2: Clovis and FCRTA Ridership Summary

Clovis Transit Route	2003 Estimated Weekday(Count)	2003 Model	2010 Adjusted	2035 No Build Adjusted	2035 TSM Adjusted	2035 TSM Revised Adjusted
10	181	1,193	599	739	576	512
50	57	703	118	152	126	97
60	88	12	71	80	206	130
65	44	172	133	162	149	46
70	0	0	44	50	39	6
Demand Responsive	119	0	0	0	0	0
SUBTOTAL CLOVIS	**489**	**2,080**	**965**	**1,183**	**1,096**	**792**
FCRTA						
Coalinga–Fresno	44	36	19	238	354	353
Coalinga–Avenal–Huron	0	0	5	12	12	12
I–5 Express	74	62	6	13	13	13
Orange Cove	85	299	219	213	213	215
Sanger						
Fixed Route	36	20	12	14	14	14
Demand Responsive	62	0	0	0	0	0
TOTAL	98	20	12	14	14	14
Selma						
Fixed Route	52	193	126	102	86	98
Demand Responsive	251	0	0	0	0	0
TOTAL	303	193	126	102	86	98
Southeast	28	178	121	142	119	86
Westside	32	180	121	138	147	151
Express 01(SR 99–Madera)	0	0	0	0	56	116
Express 02(SR 99–Kingsburg)	0	0	0	0	62	136
Express 03(SR99–Fowler)	0	0	0	0	0	135
Express 04(SR41–Madera)	0	0	0	0	0	105
SUBTOTAL FCRTA	**664**	**968**	**629**	**871**	**1,075**	**1,434**
TOTAL	**37,470**	**43,032**	**45,621**	**59,901**	**76,797**	**79,984**

Source: Dowling Associates, Inc. and Fresno COG Travel Model

Table G3: Daily Performance Measures (from the trip tables)
April 15, 2010

Performance Measure		2003	2010	2035 No Build	2035 TSM	Percent Change: No Build to TSM
Work Auto Trips	Persons Daily	407,375	496,903	790,755	787,617	-0.40%
Work Transit Trips	Persons Daily	9,667	11,251	13,782	17,406	26.30%
Work Walk/Bike Trips	Persons Daily	8,845	10,202	16,371	15,832	-3.29%
Work Total Trips	Persons Daily	425,887	518,356	820,909	820,854	-0.01%
Non-Work Auto Trips	Persons Daily	3,065,471	3,769,338	6,070,415	6,063,454	-0.11%
Non-Work Transit Trips	Persons Daily	22,880	27,899	36,478	46,491	27.45%
Non-Work Walk/Bike Trips	Persons Daily	287,384	342,810	536,618	533,255	-0.63%
Non-Work Total Trips	Persons Daily	3,375,735	4,140,047	6,643,512	6,643,200	0.00%
Total Auto Trips	Persons Daily	3,472,847	4,266,241	6,861,170	6,851,071	-0.15%
Total Transit Trips	Persons Daily	32,546	39,150	50,261	63,896	27.13%
Total Walk/Bike Trips	Persons Daily	296,229	353,012	552,990	549,087	-0.71%
Total Trips	Persons Daily	3,801,622	4,658,403	7,464,420	7,464,054	0.00%
% Work Auto Trips	Percent Daily	95.65%	95.86%	96.33%	95.95%	-0.39%
% Work Transit Trips	Percent Daily	2.27%	2.17%	1.68%	2.12%	26.19%
% Work Walk/Bike Trips	Percent Daily	2.08%	1.97%	1.99%	1.93%	-3.02%
% Non-Work Auto Trips	Percent Daily	90.81%	91.05%	91.37%	91.27%	-0.11%
% Non-Work Transit Trips	Percent Daily	0.68%	0.67%	0.55%	0.70%	27.27%
% Non-Work Walk/Bike Trips	Percent Daily	8.51%	8.28%	8.08%	8.03%	-0.62%
% Total Auto Trips	Percent Daily	91.35%	91.58%	91.92%	91.79%	-0.14%
% Total Transit Trips	Percent Daily	0.86%	0.84%	0.67%	0.86%	28.36%
% Total Walk/Bike Trips	Percent Daily	7.79%	7.58%	7.41%	7.36%	-0.67%

Source: Dowling Associates, Inc. and Fresno COG Travel Model

Table G4: Fresno County Land Use Forecasts Summary
July 14, 2010

Scenario	Population	SF Detached 0 Auto	SF Detached 1 Auto	SF Detached 2+ Auto	MF Attached 0 Auto	MF Attached 1 Auto	MF Attached 2+ Auto	Retail	Services	Gov't	Education	Other	TOTAL	TOTAL
	Persons	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Dwelling Units	Employees	Employees	Employees	Employees	Employees	Housing Units	Employees
Fresno County 2003	830,721	8,516	48,461	125,977	15,762	38,546	23,956	34,656	107,484	30,852	36,886	121,399	261,218	331,277
Fresno County 2035, FC35	1,519,325	19,358	86,667	235,981	24,371	83,792	53,453	67,506	217,302	67,428	75,149	191,298	503,622	618,682
Build Scenario	1,468,265	16,119	77,642	213,822	24,892	95,032	61,345	65,340	215,420	57,131	59,997	182,857	488,852	580,745
Full Buildout TOD	1,488,849	14,223	69,902	187,607	31,608	121,997	78,398	83,878	248,069	65,901	63,541	156,441	503,735	617,830
Constrained TOD	1,503,960	18,187	78,611	212,855	27,341	101,657	64,875	81,520	240,405	65,904	64,657	166,553	503,526	619,040
Percent Difference														
FC35 to Build	-3%	-17%	-10%	-9%	2%	13%	15%	-3%	-1%	-15%	-20%	-4%	-3%	-6%
FC35 to Full Buildout TOD	-2%	-27%	-19%	-20%	30%	46%	47%	24%	14%	-2%	-15%	-18%	0%	0%
FC35 to Constrained TOD	-1%	-6%	-9%	-10%	12%	21%	21%	21%	11%	-2%	-14%	-13%	0%	0%

Source: Fregonese and Associates and Dowling Associates

Dowling Associates

FRESNO PTIS

TRAVEL TIMES ON SELECTED ORIGINS AND DESTINATIONS
A.M. Peak Period Travel Times in Minutes

		2035 No Build		2035 TSM		2035 Build		2035 Constrained TOD, BRT on MF Lanes		2035 Constrained TOD, BRT on Exclusive Lanes		2035 Full Build TOD, BRT on Exclusive Lanes	
Origin	**Destination**	**Auto**	**Transit**	**Auto**	**Transit**	**Auto**	**Transit**	**Auto**	**Transit**	**Auto**	**Transit**	**Auto**	**Transit**
Riverpark Transit Center	Downtown Fresno Transit Center	19.8	40.1	18.7	39.4	19.8	33.4	21.1	35.3	19.6	30.3	22.6	30.5
SEGA Transit Center	Downtown Fresno Transit Center	—	—	20.1	55.8	20.1	37.4	21.6	38.4	21.9	33.9	—	—
Walmart (5125 Kings Canyon)	Downtown Fresno Transit Center	14.5	38.2	14.5	40.1	14.5	34.3	14.8	34.9	15.0	32.7	15.1	32.9
Manchester Transit Center	Downtown Fresno Transit Center	13.4	31.6	13.5	30.9	13.4	25.1	14.3	26.5	14.3	24.5	14.7	24.4
Shaw Avenue at SR 99	CSU Fresno	20.8	47.7	21.0	53.1	21.3	35.4	20.1	33.9	21.0	27.7	21.7	28.1

Auto times include walk to and from vehicle.
Transit times include walk at origin and destination, average wait and transfer times.

FRESNO PTIS PERFORMANCE MEASURES - Countywide

Table G5: DAILY PERFORMANCE MEASURES FROM NETWORK

Performance Measure	Mode	2035 Build 9/1/10	2035 Constrained TOD, BRT Mixed Flow 9/2/10	2035 Constrained TOD, BRT Exc Lane 9/2/10	2035 Full Buildout TOD 9/2/10	2035 Full TOD LRT on Blackstone, Kings Canyon BRT to Downtown TC 11/3/10	2035 Full TOD LRT on Blackstone & Kings Canyon 11/04/10	Percent Change: No Build to TSM	Percent Change: No Build to Constrained TOD BRT Mixed	Percent Change: No Build to Constrained TOD BRT Exclus	Percent Change: No Build to Full TOD	Percent Change: No Build to Full TOD LRT on Blackstone	Percent Change: No Build to Full TOD LRT on Blackstone & Kings Canyon
Vehicle-Miles of Travel	Vehicles	36,049,522	35,152,332	35,152,689	34,009,973	34,023,838	34,001,559	-0.13%	-2.64%	-2.64%	-5.81%	-5.77%	-5.83%
Vehicle-Miles of Travel in Congestion	Vehicles	2,110,679	2,356,060	2,457,628	2,422,893	2,434,416	2,379,910	-0.75%	12.63%	17.49%	15.82%	16.38%	13.77%
Percent VMT in Congestion	Vehicles	5.85%	6.70%	6.99%	7.12%	7.16%	7.00%	-0.52%	15.72%	20.73%	22.97%	23.66%	20.90%
Person-Miles of Travel	Vehicles	59,994,067	58,621,730	58,616,916	57,008,478	57,033,133	56,993,642	-0.13%	-2.45%	-2.45%	-5.13%	-5.09%	-5.16%
Person-Miles of Travel	Transit	229,914	294,356	305,774	334,492	311,505	336,798	45.75%	102.95%	110.82%	130.63%	114.78%	132.22%
Vehicle-Hours of Travel	Vehicles	844,117	819,506	824,617	802,111	801,096	799,633	-0.40%	-3.04%	-2.44%	-5.10%	-5.22%	-5.39%
Person-Hours of Travel	Vehicles	1,409,498	1,370,925	1,379,329	1,347,415	1,345,662	1,343,152	-0.40%	-2.86%	-2.26%	-4.53%	-4.65%	-4.83%
Person-Hours of Travel	Transit	13,983	18,120	18,809	20,832	19,181	20,986	45.88%	98.47%	106.01%	128.17%	110.09%	129.86%
Vehicle-Hours of Delay	Vehicles	51,862	49,004	53,814	56,468	55,072	54,174	-3.87%	-4.64%	4.72%	9.89%	7.17%	5.42%
Person-Hours of Delay	Vehicles	86,694	81,743	89,776	94,338	91,933	90,403	-3.91%	-4.79%	4.56%	9.88%	7.08%	5.29%
Person-Hours of Delay	Transit	482	628	909	1,089	1,019	1,094	56.54%	121.91%	221.20%	284.81%	260.07%	286.57%
Average Speed	Vehicles	42.56	42.76	42.50	42.31	42.38	42.43	0.26%	0.42%	-0.19%	-0.63%	-0.47%	-0.35%
Average Speed	Transit	16.44	16.25	16.26	16.06	16.24	16.05	-0.13%	2.27%	2.33%	1.07%	2.20%	1.01%

Table G6: FRESNO PTIS PERFORMANCE MEASURES - Countywide
DAILY PERFORMANCE MEASURES FROM TRIP TABLES

Performance Measure	Mode	2035 Build 9/1/10	2035 Constrained TOD, BRT Mixed Flow 9/2/10	2035 Constrained TOD, BRT Exc Lane 9/2/10	2035 Full Buildout TOD 9/2/10	2035 Full TOD LRT on Blackstone,Kings Canyon BRT to Downtown TC 11/3/10	2035 Full TOD LRT on Blackstone & Kings Canyon 11/04/10	Percent Change: No Build to TSM	Percent Change: No Build to Cnstrnd TOD BRT Mixed	Percent Change: No Build to Cnstrnd TOD BRT Exclus	Percent Change: No Build to Full TOD	Percent Change: No Build to Full TOD LRT on Blackstone	Percent Change: No Build to Full TOD LRT on Blackstone & Kings Canyon
Work Auto Trips	Persons Daily	767,951	747,991	747,719	729,581	730,260	729,468	-0.56%	-3.21%	-3.25%	-5.59%	-5.51%	-5.61%
Work Transit Trips	Persons Daily	20,742	27,285	27,597	33,527	32,670	33,693	37.12%	87.40%	89.54%	130.27%	124.38%	131.41%
Work Walk/Bike Trips	Persons Daily	22,787	24,966	24,962	27,677	27,846	27,626	-4.34%	4.09%	4.07%	15.39%	16.10%	15.18%
Work Total Trips	Persons Daily	811,480	800,242	800,278	790,785	790,776	790,787	0.01%	-1.37%	-1.37%	-2.54%	-2.54%	-2.53%
Non-Work Auto Trips	Persons Daily	6,009,813	5,916,539	5,914,646	5,824,580	5,826,517	5,824,116	-0.14%	-1.71%	-1.75%	-3.24%	-3.21%	-3.25%
Non-Work Transit Trips	Persons Daily	48,381	61,496	62,499	72,383	69,745	72,992	37.72%	81.68%	84.65%	113.85%	106.05%	115.65%
Non-Work Walk/Bike Trips	Persons Daily	549,238	580,341	581,058	617,326	618,073	617,171	-0.80%	4.72%	4.85%	11.39%	11.53%	11.37%
Non-Work Total Trips	Persons Daily	6,607,432	6,558,377	6,558,203	6,514,289	6,514,336	6,514,278	0.00%	-0.75%	-0.75%	-1.41%	-1.41%	-1.41%
Total Auto Trips	Persons Daily	6,777,764	6,664,530	6,662,365	6,554,160	6,556,777	6,553,584	-0.19%	-1.88%	-1.92%	-3.51%	-3.47%	-3.52%
Total Transit Trips	Persons Daily	69,123	88,782	90,096	105,910	102,415	106,685	37.54%	83.40%	86.12%	118.79%	111.57%	120.39%
Total Walk/Bike Trips	Persons Daily	572,025	605,307	606,021	645,003	645,919	644,797	-0.95%	4.69%	4.82%	11.56%	11.72%	11.52%
Total Trips	Persons Daily	7,418,911	7,358,619	7,358,481	7,305,074	7,305,112	7,305,065	0.00%	-0.82%	-0.82%	-1.54%	-1.54%	-1.54%
% Work Auto Trips	Percent Daily	94.64%	93.47%	93.43%	92.26%	92.35%	92.25%	-0.57%	-1.87%	-1.91%	-3.14%	-3.04%	-3.15%
% Work Transit Trips	Percent Daily	2.56%	3.41%	3.45%	4.24%	4.13%	4.26%	37.43%	90.50%	92.74%	136.87%	130.73%	137.99%
% Work Walk/Bike Trips	Percent Daily	2.81%	3.12%	3.12%	3.50%	3.52%	3.49%	-4.39%	5.41%	5.41%	18.24%	18.92%	17.91%
% Non-Work Auto Trips	Percent Daily	90.96%	90.21%	90.19%	89.41%	89.44%	89.41%	-0.14%	-0.98%	-1.00%	-1.86%	-1.82%	-1.86%
% Non-Work Transit Trips	Percent Daily	0.73%	0.94%	0.95%	1.11%	1.07%	1.12%	39.22%	84.31%	86.27%	117.65%	109.80%	119.61%
% Non-Work Walk/Bike Trips	Percent Daily	8.31%	8.85%	8.86%	9.48%	9.49%	9.47%	-0.83%	5.48%	5.60%	12.99%	13.11%	12.87%
% Total Auto Trips	Percent Daily	91.36%	90.57%	90.54%	89.72%	89.76%	89.71%	-0.19%	-1.07%	-1.10%	-2.00%	-1.96%	-2.01%
% Total Transit Trips	Percent Daily	0.93%	1.21%	1.22%	1.45%	1.40%	1.46%	38.46%	86.15%	87.69%	123.08%	115.38%	124.62%
% Total Walk/Bike Trips	Percent Daily	7.71%	8.23%	8.24%	8.83%	8.84%	8.83%	-0.90%	5.65%	5.78%	13.35%	13.48%	13.35%