Fresno COG

PTIS

Case Study Report

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1 Executive Summary

Fresno is at a crossroads: facing continued population growth, suburban sprawl and poor air quality, the region is seeking to invest in its transit infrastructure development now to support greater use of public transit in the future. While the transportation challenges Fresno must grapple with are great, the region is not alone in tackling these issues. Other cities in the US have experienced similar problems and taken steps to create viable transit systems to address regional transportation needs. Reviewing the experiences of other regions can provide Fresno with important insight and lessons as it embarks on transforming its transportation infrastructure.

The purpose of this report is to highlight innovative strategies that could provide ideas, lessons and inspiration to the Fresno region for development of its regional transportation system with a particular emphasis on the integration of transportation and land use planning. The report presents case studies on three areas: Portland, Sacramento and San Diego. The case studies were prepared through an iterative process that began with a broad overview of how different regions have developed transit systems, and have integrated transportation and land use planning. These case studies allow stakeholders in Fresno to identify strategies from other regions that are most appropriate for their local context. They also enable the study team and stakeholders to learn from example, and understand from the implementation mistakes or successes of others.

The strategies reviewed as part of this report include:

- Increasing access to transit network and strengthening reach of transportation system to outlying areas
- Focusing on community transportation needs and turning transit systems into convenience substitutes for driving
- Coordinating transit development with land use planning
- Creating transit-oriented communities

The case study cities offer not only innovative approaches to transportation and land use, but they also exhibit robust or growing pedestrian and bicycle networks. These networks are equally important to a transit strategy. Every transit trip begins and ends with a walking or bicycle trip. The feet and the pedal are the easiest distribution mode to serve at the end of a transit trip. Thus, design features that protect the pedestrian realm need to be incorporated into regional transportation strategies.

If there is one lesson to be learned from the case studies, it is that change is difficult and requires a long-term vision and commitment to the future. The problems Fresno is facing are not new. Finding examples in the US where regions successfully shifted travelers from one mode to another, or attracted more people to alternative transportation, will offer valuable lessons for the Fresno region as it moves forward with new approaches to transportation planning.

1.1 The Structure of This Report

This report is structured as follows.

Integrating Transportation and Land Use – A brief discussion of the interplay between the form of development and land use and their relationship to transit ridership

The Case Study Selection Process – how the PTIS Steering Committee arrived at the three case studies profiled.

The Three Case Studies – Portland, Sacramento and San Diego are each described in brief along with transit and transportation strategies that hold promise for deployment in Fresno County.

Lessons Learned from Other Cities – General lessons learned from other cities not explored in depth.

Conclusions – Thoughts to help guide the PTIS Steering Committee through its deliberations.

Appendix A – Appendix A contains the matrix of other case study cities that were considered as a part of this process.

2 Integrating Transportation and Land Use

As cities grow and mature, their transit systems become structured in a hierarchical fashion as each network is layered on top of and supports the next network. In Portland, Sacramento, and San Diego, rail and/or express bus networks bring people from great distances into downtown. Once there, they can ride a streetcar, local bus, or shuttle for a short distance from the rail system to their destination and then walk or bicycle to the building they wish to reach. These systems go from a large-scale, long-distance service to smaller-scale local services, to the short walking trip to the final destination. In some cases, like Fresno County, there is a limited bus system with hopes of a more robust transit system with some high capacity transit service in a few key corridors. Over time as the regional transit systems mature, we would expect to see a layering of other transit and pedestrian services to help with circulation when people arrive in central areas.

Some transit systems have been developed in tandem with emphasizing a more compact, efficient land use patterns. Land use patterns are one the primary determinants of how people choose to travel. Transit works best when land uses are of a higher density and where development is clustered around nodes or corridors. The more convenient it is to walk or bicycle to high capacity transit services, the more likely people are to choose to ride transit for their daily needs. In most regions surveyed as a part of this process, the downtown was a key activity center. Downtowns typically have more limited parking supply, higher levels of congestion, and concentrations of activity that make transit an attractive commute option. When regions enjoy clusters of development along their transit spines and networks, again, more people are likely to choose the transit mode. This is due to land use patterns that are compact and where transit helps “extend the feet” of residents and workers allowing them to move easily throughout the region. In many cases, cities made a strategic decision to link transit and land use policies, as was the case in Portland, Toronto, Zurich, and Munich. These decisions resulted in land use patterns that are easily served by public transportation. Unless transit is easily accessed from adjacent neighborhoods and employment centers, it is difficult for transit to compete with the convenience of the automobile. The policy decisions made in the regions noted above manifest themselves over a twenty- to thirty-year time horizon as land uses evolve and change. Decisions and plans today will affect the transportation and development environment for decades to come.

Any regional mobility plan must be coupled with a larger regional vision where centers are linked together through a network of transit villages and services. For example, the San Francisco Bay Area enjoys a network of transit villages linked by high frequency rail and bus services. Local governments are working to concentrate development activities along the rail and bus system to allow for easy transport between different activity nodes by public transit.

In Fresno, it is recognized that transit can only succeed where land uses are designed to support the transit choice. Employment, residential and shopping areas need to be more compact in their design, and support a walking and bicycling environment. Transit, in turn, must serve these compact areas with frequent and reliable service in order to diminish reliance on the automobile.

By making a commitment to better integration of these disciplines and thinking with the end in mind, Fresno will enjoy similar benefits enjoyed by other regions that made similar commitments twenty years ago. The results from these commitments can be seen in the case studies to follow – land uses are more compact, it is easier to walk in these cities, and more people ride public transit for their everyday travel needs.

3 Case Study Selection Process

Through an iterative process, three transit strategy examples were selected, researched, and presented. Altogether, this was a six-step process:

Step 1: Identify a broad list of candidate regions and obtain general information about relevant transit strategies.

Step 2: Review recommended candidate examples with the Fresno PTIS Steering Committee.

Step 3: Seek Fresno PTIS Steering Committee and COG guidance to winnow the list to three examples.

Step 4: Develop three case study examples.

Step 5: Present final case studies to Fresno COG.

Step 6: Prepare Case Study Report.

3.1 Initial Case Study List

Many cities had one or more transit strategies warranting consideration. In some cases, a city or region, while offering an innovative or meritorious strategy, was not placed on the initial list. This decision was based upon a feasibility scan. For example, Curitiba, Brazil has the most developed Bus Rapid Transit (BRT) system in the world today. It was not identified for consideration, as implementation of a Curitiba-style bus network would require a complete overhaul of the regional roadway network and huge changes in regional land use planning.

The team developed an initial list of cities to consider, including:

US Examples	International Examples
Baltimore, MD	Adelaide, Australia
Denver, CO	Auckland, New Zealand
Minneapolis, MN	Calgary, Canada
Phoenix, AZ	Copenhagen, Denmark
Pittsburgh, PA	Ottawa, Canada
Portland, OR	Perth, Australia
Sacramento, CA	Vancouver, Canada
Salt Lake City, UT	Zurich, Switzerland
Saint Louis, MO	
San Diego, CA	
Seattle, WA	

3.1.1 Characteristics Considered

At the beginning of the project, the study team looked for cities with system characteristics that could be applied to Fresno. Some of the initial questions asked included:

What purpose is addressed by the transit strategy?

Transit strategies are employed to address different needs in an area. The elevated Loop in Chicago was constructed to remove rail vehicles from road congestion so they could operate efficiently and on time. The O-Bahn in Adelaide was developed to provide a rapid and reliable service at a low cost.

What infrastructure is needed to support the strategy?

Some strategies require major infrastructure investments such as elevating or undergrounding a transit service. Other strategies require little infrastructure (bus lanes) or only require adjustments in service or marketing (fare free zones). For each strategy presented in the case studies, a brief description of the supporting infrastructure is provided.

Is the city similar in context to Fresno?

Different approaches may be more appropriate for Fresno than others. While a rail-based circulator may be the most attractive mode from an economic development standpoint, the development of a funding mechanism for the circulator would be a challenge. Street space would be another issue. Demographics, such as regional population size and employment, geographic area, and density, are also listed for comparison. Applicability to Fresno is discussed.

3.2 Selection of Three Case Studies

Information about each of the cities in the initial list was presented to Fresno COG for review. A comparison matrix was developed to help inform the deliberations. Eight possible examples were developed in greater detail and presented to the Fresno PTIS Steering Committee for consideration in May. Based on feedback received at the May meeting, three case study examples-- Portland, Sacramento and San Diego-- were recommended to and approved by the PTIS Steering Committee in June.

Narrowing down the initial list to three case studies involved some thinking and discussion at a qualitative level about which approaches are a good fit for the Fresno environment. Any transit strategy must fit into the overall work plan for Fresno COG and make sense from a physical, financial, and operating standpoint. The recommended list of factors that were considered includes:

- Applicability to the Fresno context
- Supportive land uses
- Capital and operating costs – orders of magnitude
- Capacity
- System connectivity
- Consistency with local and regional planning efforts

3.3 Development of Case Studies

Following Fresno COG's approval of the selection of the three case studies, the Arup Team conducted further research, including literature review, project review, and consultation with key agency staff from each of the three regions.

The case studies are provided in the sections that follow. Each includes an overview of the transportation system and transportation statistics for the region and the following information:

- **corridor development strategies** - projects and programs that expand access to transit or increase demand for transit within a corridor or region. These may be done prior to the transit investment or after the transit investment is made to build more ridership for the system.
- **transportation system planning strategies -** policies or components that are designed to meet local area transportation needs, advance regional mobility, or improve access to the regional transit network.

4 Portland

Portland, OR is a large metropolitan region covering a three-county area, with major commutes into downtown Portland. In the 1970's, Portland faced circumstances similar to Fresno's today with worsening air quality, increasing congestion, and sprawling development patterns. The policy choices made in the 1970s are showing results today. It is important to note it took a period of 30 years to realize the impact of these choices.

Downtown Portland features a regional high-capacity transit service, a downtown fare-free zone, a transit mall with a pair of dedicated streets to transit, and a downtown circulator known as the Portland Streetcar. The transit mall provides direct connections to light rail (MAX), which extends to the other counties in the region. Through regional and local planning initiatives, the light rail system in Portland connects downtown Portland with other areas of clustered development including the Beaverton Transit Center, Sunset Transit Center, the Convention Center, Orenco Village, etc.

Figure 1. Portland Streetcar and Light Rail

Portland enjoys a high level of transit use, and is widely recognized as the national leader in growth management. The region has a growth boundary, focuses growth on central Portland and several other regional population centers, utilizes planning tools to encourage infill and transit oriented development, provides street design guidelines, and has a network of bicycle and pedestrian facilities connecting local communities to the transit system and to each other.

The case study focuses on the following successful strategies used in Portland:

- **Corridor Development Strategies**: Portland has supportive regional transportation policies that seek to create transit access within areas identified under its 2040 Growth Concept; and it has undertaken extensions of its light rail, the MAX.
- **Transportation System Planning Strategies**: Portland's Commuter Choice offers discounted transit passes to businesses to encourage ridership among employees. Another important component of Portland's transportation system is its street car, which has helped to revitalize downtown.

Regional Statistics	Portland	Fresno
Regional Population	2,265,200	922,500
Total Area (sq mi)	3,740	5,970
Population in Urban Areas	1,583,100	554,900
Urban Area (sq mi)	474	139
Employment	1,021,100	347,800
Urban Population/Acre	5.22	6.24
Unemployment Rate (%)	7.2	13.0
Annual Transit Trips (millions)	98.5	11.3
Annual Transit Trips Per Capita	43	12

Sources: US Census 2000, US Census 1990 (for Urban Area only), US Bureau of Labor Statistics (2004), National Transit Database (2003)

Transportation Statistics	Portland	Fresno
Primary Transit Agency	Tri-County Metropolitan Transportation District of Oregon (TriMet)	Fresno Area Express (FAX), Fresno County Rural Transit Agency (FCRTA)
Regional Mode Split*	Auto: 67% Auto (HOV): 6% Bus & Light Rail: 19% Walk: 2% Bike: 3%	Auto: 90% Bus: 2% Walk: 7% Bike: 1%
Transit Farebox Recovery Rate	Bus: 7% Light Rail: 63% Overall: 21%	Bus: 30% Demand Response (FAX): 3% Overall (FAX): 27% Overall (FCRTA): 13%
Operating Cost Per Passenger Mile	Bus: $0.72 Light Rail: $0.33	Bus: $0.68 Demand Response (FAX): $2.95 Bus and Demand Response (FCRTA): $3.87
Operating cost Per Vehicle Mile	Bus: $7.21 Light Rail: $9.49	Bus: $6.25 Demand Response (FAX): $3.28 Bus and Demand Response (FCRTA): $3.85

Source: National Transit Database, 2003; TriMet Attitude and Awareness Survey (2004); Caltrans 2000-2001 Statewide Travel Survey (2003) (Fresno mode split); FCRTA data (2004)

* for Regional Mode Split, Portland data applies to TriMet 3-county service area

4.1 Corridor Development Strategies

Key components of Portland's corridor development strategies that have helped to expand access to transit around certain corridors, as well as increase demand for transit include:

- Supportive regional transportation policy
- Westside MAX – Blue Line extension

4.1.1 Regional Transportation Policy

The Regional Transportation Policy calls for a fast and frequent transit system designed to connect the major regional activity centers plus industrial areas and intermodal facilities such as the Portland International Airport. Investment in transit infrastructure, facilities, and services is focused on the major growth areas, where the benefit of the investment can best be realized. Clustering of development along light rail and bus transit corridors has resulted in Portland being the 13th largest transit market while only being the 29th largest population center.[1]

Figure 2. Frequent Service Network

2040 Growth Concept

The regional transit network is a fast and frequent transit system designed to serve the primary land use components identified in the 2040 Growth Concept, including central city, regional centers, industrial areas and intermodal facilities such as the Portland International Airport. This system serves as the framework for consistency among plans of local jurisdictions and Tri-Met and consists of six major transit modes that operate at frequencies of 15 minutes or less all day. The six primary transit modes included in this plan are light rail transit, commuter rail, rapid bus, streetcar, frequent bus and regional bus service. Any transit trip between two points located in a primary or secondary 2040 Growth Concept land-use component could be completed on the regional transit network. This includes the central city, regional centers, town centers, main streets, station areas or corridors.

One of the elements of the growth concept is the development Transit Oriented Development guidelines at the local level. Several cities in the region are adopting guidelines to shape development around the transit system. These guidelines maximize the attractiveness and convenience of transit by ensuring compact development patters connected with a web of pedestrian, bicycle and transit allowing for easy connections from the local community to the transit system. For example, in Portland, Oregon, Floor Area Ratios (FAR) minimums in transit areas are now established. Auto oriented uses are not allowed, parking requirements are reduced, and the siting of parking lots and garages is closely regulated creating a more attractive and inviting context for people walking from the transit stop to their final destination.

[1] National Transit Database, 2003

4.1.2 Westside MAX—Blue Line Extension

The 18-mile, 20-station Westside MAX extension opened in September 1998, built on time and on budget. The extension connects the western suburbs of Beaverton and Hillsboro with downtown Portland. Construction of the extension started in 1993 following completion of another light rail line. A 3-mile tunnel accounted for a large portion of the project cost of $963 million (1998 dollars). Daily ridership on the Westside MAX averages 31,400 trips, 37 percent of daily MAX ridership throughout the system. The ridership figure already surpasses TriMet's 2008 projections.[2]

There are three elements that make the Westside MAX extension noteworthy:

- Increased peak direction ridership in the corridor;
- Increased reverse direction ridership in the corridor; and
- A high amount of transit-oriented development that has taken place along the corridor.

Building the Transit Market

In anticipation of the MAX extension, TriMet initiated express bus routes along the transit corridor in 1993, which is roughly parallel to U.S. Highway 26, the Sunset Highway. Planning studies identified a need to serve the growing communities in this corridor since 1979. When it was finally constructed, the Westside MAX line contributed to a 46 percent increase in transit service on the west side of Portland.[3]

Figure 5. Westside MAX Corridor

[2] TriMet Westside MAX fact sheet, 2004
[3] TriMet Westside Corridor Study, 1999

The following table illustrates the increases in ridership growth over time:

Westside MAX Corridor Statistics	1993	1999	2004
Transit Passengers, Morning Peak Direction		74% increase over 1993, 30% over 1997	
Transit Passengers, Afternoon Peak Direction		77% increase over 1993, 36% over 1997	
Mode Share, Major Roads, Afternoon Peak Direction	Transit: 11%	Transit: 16%	
Mode Share, Sunset Hwy, Afternoon Peak Direction	Transit: 13% Auto: 60%	Transit: 20% Auto: 55%	Transit: 26%
Mode Share, Sunset Hwy, Afternoon Reverse Direction	Transit: 4% (1997)	Transit: 14%	
Daily Weekday Ridership			Westside: 31,400 All MAX: 83,800 Bus: 208,400
Annual Ridership		8,080,000 (2000)	8,660,000

Sources: TriMet Westside MAX fact sheet (2004), TriMet Westside Corridor Study (1999), TriMet System fact sheet (2004)

Since transit service was increased in 1993, ridership has grown with both the express buses and the light rail extension. The share of transit passengers particularly on the Sunset Highway corridor has risen steadily, while the percentage of auto drivers has declined. Also notable is the increase of the transit share in the reverse commute, which more than tripled from 1997 to 1999.[4]

MAX Spurs Development

Finally, Transit-Oriented Development (TOD) has been successful along the Westside MAX corridor. The entire MAX system is credited as having spurred over $3 billion in transit-oriented investment. Approximately $825 million of that has been attributed to residential and commercial development in the Westside MAX corridor, including 8,500 housing units launched within walking distance of the rail line. A formerly abandoned company town called Orenco has been redeveloped into a model TOD community built in concert with the light rail station.[5] The Beaverton Transit Center is a Regional center with development guidelines similar to that of Portland, Oregon with an emphasis on transit compatible land uses in the area.

[4] TriMet Westside Corridor Study, 1999
[5] TriMet Westside MAX fact sheet, 2004

4.2 Transportation System Planning Strategies

Two important components of Portland's successful system are its downtown streetcar and its creation of a commuter choice program designed to reach out directly to employers to encourage the distribution of transit passes and to increase ridership levels.

4.2.1 Portland Streetcar

Figure 7. Portland Streetcar

The Portland Streetcar opened for service in 2001 and helps circulate people through the downtown Portland area. In the mid-1980s, it became clear that a new service was needed to stimulate the city center by increasing jobs and housing in the downtown core while reducing traffic to less dense adjacent neighborhoods. A transit circulator was proposed to augment bus and light rail service downtown and to link emerging activity centers to the regional transit system. It was also recognized that the central city area lacked needed state and federal transportation funds to make the project happen. Thus, the $57 million (2001) streetcar system was built entirely with local funds, allowing some unique opportunities for cost savings and project streamlining. Principal funding sources included revenues from city-owned parking facilities, a local improvement district, and tax increment financing. The Portland Streetcar is owned by the City of Portland, managed through a private non-profit corporation, and operated through contract by TriMet.[6]

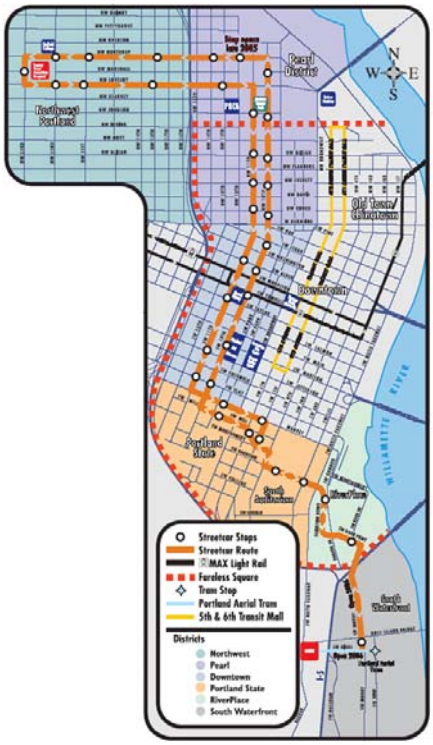


Figure 6. Portland Streetcar Route

The Portland Streetcar was planned with these goals:

- Link neighborhoods with a convenient and attractive transportation alternative
- Fit the scale and traffic patterns of existing neighborhoods
- Provide quality service to attract new transit ridership
- Reduce short inner-city auto trips, parking demand, traffic congestion and air pollution
- Encourage development of more housing & businesses in the Central City

Streetcars traverse downtown on a 6-mile system through several downtown neighborhoods. Because of wide public support for the system, the system was recently extended in 2005 ($15.8 million) and will be extended again in 2006, connecting additional neighborhoods in the core of Portland. The Portland Streetcar is designed to fit the scale and traffic patterns of the neighborhoods through which it travels.

[6] Portland Streetcar website, 2005

Streetcar vehicles are smaller than a typical MAX (TriMet's light rail system) double-car train. The streetcars run in the right lane in mixed traffic and, excepting platform stops, accommodate existing curbside parking and loading. The streetcars run on shallow 12-inch-deep track slabs designed to reduce construction time and costs and utility relocation. Maneuverability of the shorter and narrower Skoda rail vehicles has allowed the 8-foot-wide track slab to be fitted to existing grades, limiting the scope of street and sidewalk reconstruction.[7]

The revitalization of downtown Portland has been attributed to the Portland Streetcar. It has served as a catalyst for more than $1.5 billion in transit-oriented investment, including 5,300 new housing units and more than 3.7 million square feet of office, institutional, retail, and hotel construction, all within a 90-block industrial area that had been experiencing decline.[8]

4.2.2 Commuter Choice

Figure 8. Commuter Choice

Both the City of Portland and TriMet promote transit pass programs to employers in the Portland area through innovative programs. Transit pass programs are one way to help encourage transit ridership because they are convenient (no fumbling for correct change) and represent a good value (usually offered at a discounted rate compared to average weekday use by a commuter). Now, recent changes in federal tax law have increased the incentives available for employees and employers to take advantage of pass programs. Through the federal Commuter Choice program, an employer is able to give the entire annual amount of a TriMet transit pass tax-free to an employee. In doing so, the employer can lower their federal income tax costs, FICA and state taxes. In the Portland area almost 400 employers offer reduced cost transit passes to over 150,000 workers. The program benefits employees as well, since they can obtain discounted or free transit passes.[9]

TriMet offers several employer transit pass programs. With any of the programs, an employer can choose the level of subsidy it offers to employees. TriMet programs include:[10]

- **Passport:** An annual pass program whereby a company can provide free or subsidized transit passes for all employees but pays TriMet only for the cost of those employees actually using transit.
- **Snap Passes:** Annual transit passes purchased by an employer. The company decides how much to subsidize when reselling the passes to employees. Passes are prorated throughout the year, so the company can add employees at any time without financial penalty.
- **In-House Sales:** A monthly pass program whereby passes and tickets can be picked up at work or mailed directly to employees.
- **College Passes:** A 10-month pass that a school buys for all eligible students.
- **Emergency Ride Home:** As an additional incentive to companies and employees, TriMet will provide a free taxi ride or rental car for any employee of a participating company for family emergencies, sickness, or work during unscheduled hours. Employees receive a voucher from their company's transportation coordinator and give it to the taxi driver; TriMet deals directly with the taxi companies.

[7] TriMet Streetcar fact sheet, 2004
[8] Portland Streetcar website, 2005 and TriMet Streetcar fact sheet, 2004
[9] City of Portland website, 2005
[10] TriMet website, 2005

4.3 Applicability to Fresno

There are several key points about Portland's transportation strategy that can provide useful lessons for Fresno.

Regional Transportation Policy
Portland's transportation policy has been successful because it has encouraged clustered development along transit corridors that are experiencing strong growth. The policy is forward looking, and seeks to create transit network connection in priority areas defined in its 2040 Growth Concept. City planners have also established growth boundaries to ensure more compact, dense development within the region.

The development of Transit Oriented Development guidelines provides an important framework for shaping development patters. TOD guidelines help ensure compatible land uses are created adjacent to transit stations. In turn, these development patterns help build ridership for the transit system ensuring maximum utilization.

Westside MAX
There are three elements that make the Westside MAX extension noteworthy:

- Increased peak direction ridership in the corridor;
- Increased reverse direction ridership in the corridor; and
- A high amount of transit-oriented development that has taken place along the corridor.

Portland Streetcar
The Portland Streetcar offers four lessons. First, the streetcar is successful because it accomplished the goals it was intended to meet: the system has attracted significant residential and commercial redevelopment to downtown Portland, revitalizing the downtown core. Second, the system's design and financing allowed it to be built quickly at low cost. Third, it effectively responded to transportation needs in the Central Business District. Fourth, the streetcar was appropriately scaled to adjacent land use.

Commuter Choice
Transit pass programs can be deployed in any metropolitan area with major employers or activity centers such as universities. Employers, through their participation, help encourage employee use of the transit system. The TriMet program is flexible because it offers many ways for employers to get involved. The Passport annual pass and the College Pass programs in particular provide a strong incentive to ride transit because passes are distributed to every employee or student, regardless of whether the employees or students currently ride transit. Any individual who receives a pass under either program stands to gain personally from riding transit, or at the very least, will not lose anything by trying transit. Fresno COG could follow a similar path and seek to develop student pass programs for high school and college students in the region.

5 Sacramento

Sacramento is a large metropolitan region in the Central Valley and is experiencing tremendous growth in the fringes of the region. As shown in the map on page 18, the region covers Placer, Sacramento, Sutter, Yolo, and Yuba counties. This large geographic area is expected to accommodate an increase in population from 1.6 million residents today to 3.8 million residents by 2050, or more than double the current population. Congestion and air quality are worsening and affecting the region's quality of life. Development patterns are typically low density with some concentration in and around downtown.

The Sacramento Regional Transit District (RT) operates 80 bus routes and 27 miles of light rail covering a 418 square-mile service area. The transit network includes 14 free park and ride lots at outlying rail stations, 41 light rail stops or stations, and 21 bus and light rail transfer centers. All buses operate on compressed natural gas (CNG) to reduce the transportation network's contribution to poor air quality in the region. The transit system enables commuters from outlying suburbs and communities to reach downtown for employment and government services (city, county, state). It also provides downtown circulation to inner residential neighborhoods and the university. Annual ridership has steadily increased on both the bus and light rail systems from 14 million passengers in 1987 to more than 27 million passengers in FY 2002.

The region has strived to give greater priority and infrastructure support to transportation by establishing a dedicated street for a downtown transit mall, dedicated right of way for transit, and HOV network on major highways leading to downtown. It is planning on remodeling and expanding the train station downtown to become Sacramento Intermodal Transportation Facility, with access to local bus, light rail, commuter bus, commuter rail, national rail networks.

Planning efforts in Sacramento have highlighted the importance of increasing access to transit and focusing development around transit stations. The Sacramento Area Council of Governments (SACOG) is using discretionary funds to support transportation improvement projects that enhance connections from development projects to transit hubs.

The case study focuses on the following strategies which Sacramento has adopted:

- **Corridor Development Strategies:** Sacramento is striving to better integrate its land use and transportation decisions, having realized that investment in transit expansion works best in conjunction with land use planning.
- **Transportation System Planning Strategies**: A Community Design Program provides local governments with funding for transportation improvements in concert with land development projects.

Regional Statistics	Sacramento	Fresno
Regional Population	1,628,200	922,500
Total Area (sq mi)	5,090	5,970
Population in Urban Areas	1,393,500	554,900
Urban Area (sq mi)	370	140
Employment	929,400	347,800
Urban Population/Acre	5.90	6.24
Unemployment Rate (%)	5.3	13.0
Annual Transit Trips (millions)	28.9	11.3
Annual Transit Trips Per Capita	18	12

Sources: US Census 2000, US Census 1990 (for Urban Area only), US Bureau of Labor Statistics (2004), National Transit Database (2003)

Transportation Statistics	Sacramento	Fresno
Primary Transit Agency	Sacramento Regional Transit District (Sacramento RT)	Fresno Area Express (FAX), Fresno County Rural Transit Agency (FCRTA)
Regional Mode Split	Auto: 90% Bus & Light Rail: 1.2% Walk: 4.3% Bike: 1.6%	Auto: 90% Bus: 2% Walk: 7% Bike: 1%
Transit Farebox Recovery Rate	Bus: 20.3% Light Rail: 27.8%	Bus: 30% Demand Response (FAX): 3% Overall (FAX): 27% Overall (FCRTA): 13%
Operating Cost Per Passenger Mile	Bus: $3.48 Light Rail: $2.75	Bus: $0.68 Demand Response (FAX): $2.95 Bus and Demand Response (FCRTA): $3.87
Operating cost Per Vehicle Mile	Bus: $8.67 Light Rail: $11.23	Bus: $6.25 Demand Response (FAX): $3.28 Bus and Demand Response (FCRTA): $3.85

Source: National Transit Database, 2003; RT data; Caltrans 2000-2001 Statewide Travel Survey (2003) (Fresno mode split); FCRTA data (2004)

5.1 Corridor Development Strategies

This section provides information about the following corridor development strategies used in Sacramento:

- Light rail system planning
- Integrated Transportation/Land Use Study (Sacramento Region Blueprint)
- Livable Communities Program

5.1.1 Light Rail Planning

Sacramento provides some interesting lessons in how *not* to plan a light rail system. The light rail system in Sacramento first opened in 1987. The 27 mile system has weekday ridership levels of 39,000 per day, which represents 30% of total system ridership. While ridership has increased substantially, in comparison, Portland has a population that is 40% larger than Sacramento's, but its light rail usage is 114% higher.

The light rail system is currently being expanded in two areas. The extension to Folsom will be completed in 2005 and is expected to add 6,000 daily passengers to the system. This $230.5 million extension includes 10.9 miles of track, 10 stations and 14 new light rail vehicles. An important component of the project is the 0.55 extension to the downtown Amtrak station, which will provide greater access to regional transportation corridors.

Another light rail extension is planned for the South Sacramento Corridor. The extension will connect with existing light rail lines that travel through the downtown office, retail and convention core and follows the Union Pacific Railroad into South Sacramento. The project is aimed at increasing transit capacity and improving transit service and access in the congested southern portions of Sacramento. The $222 million project is expected to increase systemwide ridership by 15,000 per day. If successful the two projects could increase daily systemwide ridership by 44%.

Sacramento's light rail system has been criticized for being built in underdeveloped areas that are not located where people live or work. One news article has described the light rail as going "nowhere" and described stations located outside of the area as "sterile, barren areas no one would want to visit"[11]. The early strategy for light rail assumed that if transit is developed, riders will come. The region has since realized the importance of integrating land use with the transportation network and supporting development around transit stations. This integration is especially important if one of the goals of transit development is to improve air quality and help people reduce their dependency on automobiles. About 15 years after its light rail opened, Sacramento is finally striving to encourage more compact, mixed-used development around transit stations. Specific strategies used to support transit development and integrated land use planning are discussed in the sections that follow.

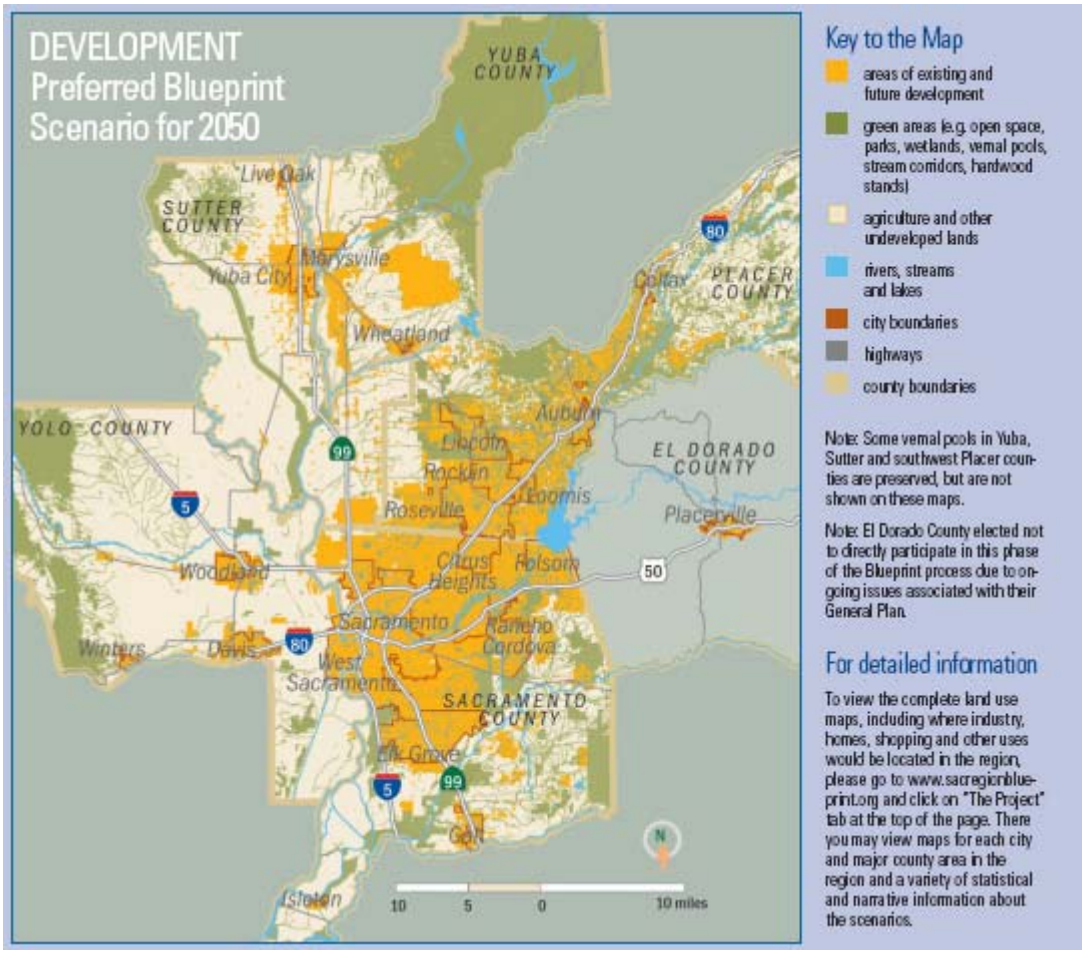
5.1.2 Sacramento Region Blueprint Transportation/Land Use Study[12]

The Sacramento Region Blueprint is a three-year growth visioning study designed to illustrate the effects of land use decisions on the region's transportation network. Faced with increasing congestion and air-quality problems (that led to the region facing the possibility of losing Federal transportation funding), the Sacramento Area Council of Governments (SACOG) and its civic partner Valley Vision embarked upon the Blueprint study, which was built upon a set of seven smart growth principles that were thought to help improve quality of life in the region. The seven principles include:

[11] *Sacramento News & Review*, March 18, 2004
[12] Information for this section gathered from the Blueprint Special Report, January 2005

- Housing Choice and Diversity
- Use of Existing Assets (reinvestment in existing buildings and infrastructure)
- Compact Development
- Natural Resources Conservation
- Design for Quality (design factors influencing the attractiveness of living in a compact development and facilitating bicycle or pedestrian access to neighborhood services)
- Mixed Use Developments
- Provide Transportation Choices

The Blueprint process involved 37 community meetings and two forums held in all parts of the region that brought together residents, community and business leaders, elected officials, environmental groups, and developers. Interactive computer models used at the meetings showed participants what the region might look like in 2050 under four different growth scenarios.



The Blueprint study culminated with the adoption of the Preferred Blueprint Scenario by the SACOG Board of Directors in December 2004. The Preferred Scenario promotes compact, mixed-use development and more transit choices as an alternative to the Base Case scenario, which models current low-density growth patterns. A series of maps and models illustrate how the Preferred Scenario achieves better performance

than the Base Case in all smart growth principles. Chief among them is the effect on transportation. With a shift toward increased transit use, walking, and biking, and more development around transit stations, the Preferred Scenario could result in fewer vehicle miles traveled (per household per day), less air pollution, and shorter travel time than would occur with the Base Case Scenario.

The Preferred Blueprint Scenario will become part of SACOG's Metropolitan Transportation Plan update for 2005, the long-range transportation plan for the six-county region. It also will serve as a framework to guide local government in growth and transportation planning through 2050. Other follow-up activities that SACOG will embark on to support the Preferred Blueprint Scenario include:

- Continue to implement the Community Design Program, which provides incentives for capital and planning projects consistent with the Blueprint;
- Provide technical assistance to local communities and developers;
- Develop model codes, street design guidelines, tutorials for using the modeling software, and other Best Planning and Development Practices; and
- Develop a benchmarking system for tracking the region's growth pattern.

5.1.3 RT Transit for Livable Communities Program[13]

In support of the regional smart growth principles, the Sacramento Regional Transit District (RT) initiated a land use planning project called Transit for Livable Communities (TLC), which includes 21 RT light rail stations in the Folsom, Northeast and South Sacramento Corridors.

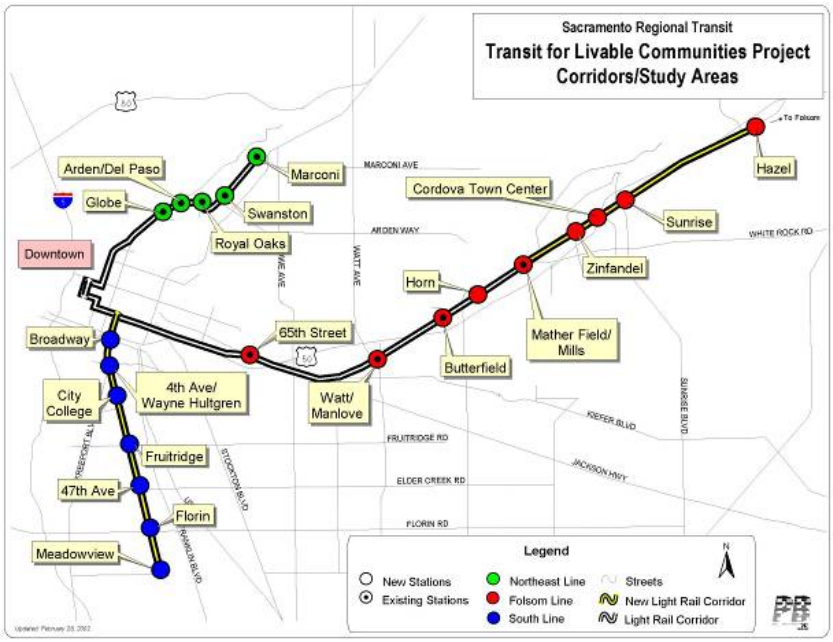


Figure 11. RT Transit for Livable Communities map

[13] Information for this section gathered from the RT Transit for Livable Communities website, 2005

The project objectives were to:

- Devise land use recommendations for the 21 stations;
- Capitalize on the hundreds of millions invested in the existing and future light rail system;
- Develop informed and enthusiastic public support for Transit Oriented Development (TOD); and
- Identify ways for getting TOD built around light rail stations.

Figure 12. Mather Fields/Mills Station Land Use Plan

RT developed a land use plan and an economic profile for each of the 21 stations. The land use plans emphasize walkable designs, higher intensity development, and a mixture of residential, retail and office land uses, all designed to support and create unique, thriving communities at each station while encouraging transit use. The plans cover approximately a one-quarter mile radius around each light rail station.

For six of the stations, RT also developed a conceptual development plan, which provided a more comprehensive preview of how a station area might look when developed with the types of uses envisioned in the land use plan.

The final recommendations of the TLC project, including station area land use plans and implementation measures, were unanimously approved by the RT Board of Directors in August 2002. The project has begun to move into the implementation phase. For example, the Swanston Station has received SACOG Community Design Program funding for more in-depth follow-up studies.

5.2 Transportation System Planning Strategies

Sacramento has developed an innovative Community Design program, described below, which provides funds to implement transportation improvements related to land use projects.

5.2.1 SACOG Community Design Program[14]

The Blueprint effort, discussed in an earlier section, helped to spur the creation of four new regional transportation funding programs introduced in 2003: Air Quality, Bicycle & Pedestrian, Community Design, and Transportation Demand Management programs. Together, $19.5 million for the programs was made available to local governments between 2003 and 2005, and more than $1 billion will be allocated through 2025. Of the four programs created, the Community Design program element explicitly links the development of transportation and land use policies and it is described below. The other three programs, while not described in detail here, may be of equal interest for other areas of work at Fresno COG and warrant further exploration.

The Community Design Program provides funding support for development projects that support the seven smart growth principles contained in the Blueprint – transportation choices, housing choices, compact development, use of existing assets, mixed land uses, natural resources conservation, and quality design – as an effective way to reduce or shorten vehicle trips, reduce congestion and improve air quality. Between 2003 and 2005, $12 million was allocated to the Community Design Program. The program

[14] Information for this section gathered from the SACOG Community Design website, 2005

provides funding for transportation improvement projects in concert with the land development projects. The money that would otherwise be spent on the transportation project can then be saved and returned to a developer as an incentive, or can be spent to enhance other aspects of the project.

Near-term Program Objectives include:

- Provide transportation infrastructure for specific land development projects or areas with plans or policies that conform to the principles;
- Provide transportation infrastructure for developed areas that conform to the principles but lack the infrastructure;
- Provide planning assistance to modify plans, other guidance, or specific projects; and
- Provide on-the-ground prototypes of the principles throughout the region.

For the first round of funding in 2004, ten capital projects and five planning projects were approved. The projects include the following, which are specifically oriented around transit:

- Cordova City Center – a transit-oriented development built next to an existing light rail station will help build a "city center" with streetscape improvements, a parking structure, and a high-density residential and commercial district.
- Roseville Historic District Revitalization Project – funds will help revitalize Roseville's original commercial district with new pedestrian street crossings, engineering for the Roseville Multi-modal Center Expansion, and improvements to bus shelters and bike trails.
- Sacramento 13th and 16th Street Light Rail Station Connectivity Improvements – involves safety and accessibility improvements in each light rail station area, which will improve pedestrian access, lighting, and signage, which will help connect stations to high-density employment centers, new mixed-use housing projects, and new mixed-use redevelopment areas in midtown Sacramento.
- Folsom Glenn Drive Light Rail Station Transit Oriented Development Master Plan – grant funding will be used to complete a master plan to develop the Glenn Drive light rail station into a transit-oriented development site.
- Sacramento Swanston Station Transit Village Planning – funding for pre-development planning for the Swanston light rail station, which will identify infrastructure improvements necessary to support TOD.
- Yolo County General Plan Update to Support Smart Growth in Rural Communities – although not focused specifically on transit, this project to integrate smart growth principles into the Yolo County General Plan is notable because particular emphasis will be placed on creating higher density mixed-use development within pedestrian- and bicycle-oriented neighborhoods in rural small towns. This is expected to reduce future vehicle demand and protect agricultural and habitat resources in the county.

5.3 Applicability to Fresno

Sacramento's approach to transportation planning has gone through significant transformation. As highlighted below, the region provides some interesting lessons for avoiding transit pitfalls and taking land use issues into consideration early on.

Light Rail Planning

Planning in Sacramento has shifted from system planning and design towards a more integrated approach with transit needs being developed in conjunction with supportive land use planning. Sacramento built its light rail without building up nearby development, and is now tackling this problem head on. Building a

transit system, like light rail, is an expensive, huge undertaking. Fresno can learn from Sacramento that returns from investment in transit infrastructure will be much greater if coupled with land use planning initiatives at the regional and local level along with transit-oriented development. Downtown Sacramento is poised for new development and developers are proposing major land use intensification around the future Downtown Intermodal Transportation Facility along with new developments planning along the light rail system.

Sacramento Region Blueprint Transportation/Land Use Study

The Blueprint study brought together a multitude of different stakeholders and engaged them at all levels, which in itself is a huge undertaking and has garnered many state and national awards. The common regional goal they helped define involves a change in attitudes toward growth. Current low-density growth patterns in the Sacramento region are not sustainable and will result in increased traffic congestion, air quality problems, and a decline in the regional quality of life. The Sacramento region has decided to pursue a scenario emphasizing smart growth principles that it believes will reduce congestion, help produce cleaner air, and allow people to spend less time traveling. Two programs have been developed as an outcome of the Blueprint process, the SACOG Community Design Program and the RT Transit for Livable Communities Program.

SACOG Community Design Program

The Community Design Program provides financial support for projects that adhere to the regional smart growth principles. The projects not only gain funding, they also serve as physical examples that can help shape thinking about higher-density, transit-supportive development in the future.

RT Transit for Livable Communities Program

The Transit for Livable Communities Program is an example of a focused transportation-land use approach initiated by a public agency. The program will rely on private investment to implement the land use recommendations, similar to the land use plans of local communities. RT, which does not have any control over local land use, will also depend on local governments to apply compatible land use controls to allow the recommended land use plans to come to fruition. More importantly, however, the program provides a policy platform from which RT can help direct development around its stations and leverage the significant public investment in its transit system.

6 San Diego

San Diego is a large metropolitan region with geographic constraints separating suburban communities from each other and central San Diego. Air quality is a major concern, particularly in the eastern portion of San Diego County. The San Diego region is a one-county region with 18 cities. San Diego is the largest city with 1.2 million residents. San Diego has a large and diverse population, including a large Spanish-speaking population. With its proximity to the Mexican border, large numbers of workers use the San Diego Trolley to commute from border towns into San Diego each day with corresponding travel demand south to the border with Mexico for tourists and workers alike. Recent San Diego Association of Governments (SANDAG) projections indicate that San Diego's population could grow by up to 284,000 people between 2000 and 2020. However, less than 10% of the City's land is undeveloped.[15]

San Diego has a network of high capacity transit services that are designed to serve different types of communities throughout the region. For example, light rail provides connections from the border to downtown San Diego while regional express bus services operating on High Occupant Vehicle (HOV) lanes connect outlying communities to downtown. Most recently, with the Transit Works program, San Diego is embarking on the implementation of Bus Rapid Transit services around the county.

Figure 13. San Diego Trolley

Land use and transportation planning functions are integrated into one coordinating agency – the San Diego Association of Governments (SANDAG). This consolidation was made to allow for a stronger connection between transportation and land use planning. The region has begun planning for a network of transit villages, which consists of communities that are developed around transit stations and feature a high degree of connectivity and transportation choice.

The case study focuses on the following strategies which San Diego has adopted:

- **Corridor Development Strategies:** San Diego has integrated transportation and land use planning into one agency, and has adopted a strategy to encourage TOD “villages”.
- **Transportation System Planning Strategies**: San Diego has undertaken several measures to improve transportation access and traffic flow along its Interstate 15 Corridor, including creating express lanes that are open to HOVs or toll-paying single occupant vehicles and establishing express bus service to serve areas with low population densities. San Diego has also established community shuttle programs to serve outlying communities and implemented “Transit First” programs to help make transit a more attractive alternative to driving.

[15] SANDAG website, 2005

Regional Statistics	San Diego	Fresno
Regional Population	2,813,800	922,500
Total Area (sq mi)	4,210	5,970
Population in Urban Areas	2,674,000	554,900
Urban Area (sq mi)	780	140
Employment	1,445,200	347,800
Urban Population/Acre	5.35	6.24
Unemployment Rate (%)	3.9	13.0
Annual Transit Trips (millions)	87.3	11.3
Annual Transit Trips Per Capita	31	12

Sources: US Census 2000, US Census 1990 (for Urban Area only), US Bureau of Labor Statistics (2004), National Transit Database (2003)

Transportation Statistics	San Diego	Fresno Comparison
Primary Transit Agency	San Diego Association of Governments (SANDAG), via several operating agencies (SDTC, SDT, MTS, NCTD)	Fresno Area Express (FAX), Fresno County Rural Transit Agency (FCRTA)
Regional Mode Split	Auto: 78% Auto (HOV): 12% Bus & Light Rail: 5% Walk & Bike: 5%	Auto: 90% Bus: 2% Walk: 7% Bike: 1%
Transit Farebox Recovery Rate	Bus (MTS): 34% Bus (NCTD): 20% Light Rail (SDT): 57% Demand Response (MTS): 16% Demand Response (NCTD): 7% Overall: 44.9%	Bus: 30% Demand Response (FAX): 3% Overall (FAX): 27% Overall (FCRTA): 13%
Operating Cost Per Passenger Mile	Bus (MTS): $0.55 Bus (NCTD): $0.68 Light Rail (SDT): $0.24 Demand Response (MTS): $2.18 Demand Response (NCTD): $2.23	Bus: $0.68 Demand Response (FAX): $2.95 Bus and Demand Response (FCRTA): $3.87
Operating Cost Per Vehicle Mile	Bus (MTS): $6.40 Bus (NCTD): $5.45 Light Rail (SDT): $5.63 Demand Response (MTS): $2.58 Demand Response (NCTD): $3.14	Bus: $6.25 Demand Response (FAX): $3.28 Bus and Demand Response (FCRTA): $3.85

Source: National Transit Database, 2003; SANDAG data; Caltrans 2000-2001 Statewide Travel Survey (2003) (Fresno mode split); FCRTA data (2004)

6.1 Corridor Development Strategies

Two corridor development strategies that San Diego has implemented are:

- Creating a unified transportation and land use planning agency
- Encouraging the development of a "City of Villages"

6.1.1 Creating a Unified Transportation and Land Use Planning Agency[16]

Figure 14. San Diego Regional Transportation Network

The San Diego region, like much of California, experienced rapid growth in the 1990's. Congestion and air quality problems accompanied this growth. To respond to these problems more effectively, a desire emerged to strengthen the relationship between transportation and land use. It was believed that a merger of several agencies that had operated separately before would introduce greater efficiency in transit planning, land development, transit operations, and provide a stronger, more responsive voice to regional affairs. Local political and policy leaders began working together to think about organizational streamlining and creating an agency equipped to address transportation and land use issues together.

State legislation enacted in September 2002 required the consolidation of SANDAG (the regional land use planning agency), the MTDB (the regional transit planning agency, also in charge of operating most bus and trolley service in San Diego), and the NCTD (a major North San Diego County transit operator). The goals of the new agency include, among others, "reducing traffic congestion, limiting sprawl, and improving the quality of life for San Diegans."

The new model makes a clearer distinction between regional, strategic planning responsibilities and more localized operating responsibilities; it implies closer collaboration and more timely decision making between elected officials in the county; and it promises closer integration of transit-related functions and services. The integration and combination of responsibilities has resulted in more complete and comprehensive integration in several dimensions:

- Integration of services at the boundaries of service areas;
- Integration between transportation modes, including modes of transit and highways; and
- Integration of transportation decision making with land use, development, and economic development decisions.

Figure 14. The Metropolitan Transit System (MTS) and NCTD are now operating agencies under SANDAG.

[16] Information for this section gathered from the Transit Cooperative Research Program (TCRP) Report 97, Emerging Paradigms, 2003

6.1.2 Transit Villages – City of San Diego

Figure 16. Concept drawing of Mi Pueblo Pilot Village

San Diego's City of Villages strategy, adopted in 2002, addresses growth and improvement of existing communities by combining housing, commercial, employment centers, schools and civic uses together in areas where a high level of activity already exists. The strategy is focused on creating lively and walkable communities, and is can help revitalize older areas and create gathering places in newer communities. One element of the City of Villages strategy is to connect villages with improved transit service, such as SANDAG's Transit First initiative. The City of San Diego initiated the Pilot Village program as a means to demonstrate the City of Villages Strategy. Five Pilot Village projects were approved in February 2004. The projects are dispersed throughout the city and represent a variety of approaches and styles. The projects are moving to the implementation and building phase. The goal is to complete construction within three to five years, with the exception of North Park, which is expected to be completed in five to ten years.[17]

The five Pilot Village projects are:

- The Paseo
- MCTIP (Mid-City Transit Interchanges Project)
- North Park
- Village Center at Euclid and Market
- Mi Pueblo

Figure 17. Concept drawing of The Paseo Pilot Village

Pilot Village projects are eligible for an array of incentives assembled by the City of San Diego to support the City of Villages Strategy. Depending on project-specific circumstances, Pilot Village projects may be eligible for the following:[18]

- **Priorities on infrastructure upgrades or replacements:** Revision of current sewer and water line replacement and upgrade schedules to accommodate the development of the selected Pilot Village sites (only if in compliance with state water and sewer schedules)
- **Deferral on collection of fees:** Deferral of impact and capacity fees until prior to final inspection. This would allow applicants to finance a smaller portion of the project with a construction loan, which typically carries a higher interest rate.

[17] City of San Diego General Plan City of Villages website, 2005
[18] City of San Diego Pilot Village Manager's Report, 2003

- **Affordable housing subsidy:** A fee subsidy for those Pilot Villages that provide more than 20 percent of the project as affordable housing. The subsidy which would cover the cost of building permits and impact fees for all of the affordable units over the 20 percent threshold.
- **Business industry incentives:** Priority status for San Diego's Business Industry Incentive program. The program offers financial or other assistance for major revenue and job-generating projects. The City modified its Community and Economic Development Strategy to include business incentives for mixed-use projects, infill projects, and reuse projects in locations identified in the City of Villages Plan.
- **Streamlined permitting process:** Priority status for San Diego's Affordable/In-fill Housing and Sustainable Buildings Expedite Program. Pilot Villages that provide affordable housing receive top priority for this program, which allows projects to be processed twice as fast as the standard process.
- **More flexible zoning:** Zoning code updates are prioritized in the citywide schedule to facilitate Pilot Village development and processing. Urban Village Overlay Zones would be established to allow for a greater variety of uses, flexibility in site planning and development regulations, and intensity of land uses than are generally permitted in other citywide zones.
- **Assistance with securing funding sources:** A variety of methods for securing additional funds are available, which include:
  - > Handicapped access funds to ensure compliance access design requirements and standards;
  - > Partial property tax rebates for significant job creation projects;
  - > For eligible projects, staff assistance for application to the San Diego Regional Revolving Loan Fund, a $3M fund targeted to four cities in the County
  - > Staff assistance for other grants and opportunities in relation to universal design, green building technology, and storm water management practices.
- **Prioritization of city projects:** Pilot Villages are prioritized for utility undergrounding and other capital improvement projects, affordable housing, and Community Development Block Grants.

6.2 Transportation System Planning Strategies

San Diego has implemented several measures to enable its transportation system to flow more smoothly, reach outlying areas and attract more riders. These strategies include:

- Transportation development approach for Interstate 15 Corridor
- Community shuttle programs
- Transit First program

6.2.1 Interstate 15 Corridor Transportation Development

Interstate 15 is a major highway connecting North San Diego County to downtown San Diego and north to Los Angeles. A high amount of residential growth has occurred particularly in northern San Diego County ("North County"). Because of the mountainous topography of the region, North County has been developed primarily with large, suburban subdivision communities, separated from each other and downtown San Diego by semi-rural development. Most residents living in North County commute to downtown San Diego. I-15 and State Route 163, which branches off from I-15 south towards downtown,

are the major routes to reach downtown. Consequently, commuters experience significant congestion on both I-15 and SR 163.

I-15 Express Lanes

To help ease congestion in the I-15 corridor, the I-15 Express Lanes were opened in 1988 at a cost of $31.5 million. The I-15 Express Lanes consist of two eight-mile-long lanes in the median of I-15 separated from regular traffic. They are restricted to High Occupancy Vehicles (HOVs) such as buses, vanpools, and carpools, which all travel for free in the Express Lanes. One uncommon and innovative feature of the Express Lanes is that they are also open to single-occupant vehicle (SOV) drivers willing to pay a toll. Thus the Express Lanes are called High Occupancy/Toll (HOT) lanes. There is growing interest in this concept around the United States because of the success of the program in San Diego, which was one of the first regions to implement the concept.

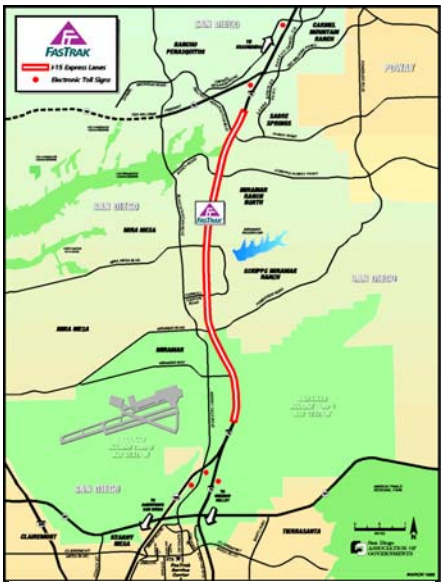


Figure 15. I-15 Express Lanes

The lanes are opened to southbound traffic during the morning commute and are then reversed in the afternoon for northbound traffic. Tolling is dynand prices change throughout the day in response to varrying levels of congestion. The toll amount is low when there is light traffic on the regular lanes, and can go up to a maximum limit (currently $4.00) when congestion is high and commuters can save up to 15 minutes of travel time by using the Express Lanes.

Tolls are collected from single occupant vehicles electronically through the FasTrak system, which involves use of a small device called a transponder. The toll amount is deducted automatically from a driver's account when a car passes underneath a FasTrak transponder reader located at the entrance and exit of the Express Lanes.[19]

Figure 19. FasTrak Toll System

Express Buses

San Diego also has a network of express buses to help ease congestion. Express bus service is employed in areas of the region with lower population densities. Express buses are limited-stop, long-distance services. Seven express bus routes connect the suburban North County communities to downtown San Diego via the I-15/SR 163 corridor. Some express routes operate during peak commute hours only, whereas others operate all day. One express bus service is funded by the SOV toll revenues

[19] Caltrans Interstate 15 Express Lanes fact sheet, 2002

from the I-15 Express Lanes. This service is called the Inland Breeze (Route 980/990), and it provides peak service from 5:00 a.m. - 10:00 a.m. and from 2:00 p.m. - 7:00 p.m.[20]

Figure 20. Typical Commuter Express Bus

Figure 21. Inland Breeze Express Bus

Transportation Improvements

San Diego's most recent Regional Transportation Plan, called Mobility 2030, calls for an expanded Managed/HOV network. A new segment of the I-15 Express Lanes would be extended north by 12 miles and would be wider, having four lanes. The $758 million project includes "managed" lanes, in that a movable median barrier would be employed, providing more flexibility by allowing up to three lanes to serve commute direction traffic while still allowing for a lane in the reverse direction. Exits with automatic toll-collecting equipment would be provided along the route. Additionally, new Bus Rapid Transit stations are included in the project.[21]

Figure 16. San Diego's Future HOV Network

San Diego's Regional Transportation plan identifies new regional and corridor transit services that would ultimately take advantage of the Managed/HOV network. However, for the newer transit services that are moving ahead of the completion of Managed/HOV facilities, testing is being coordinated between

[20] I-15 FasTrak website, 2005
[21] SANDAG I-15 Managed Lanes project fact sheet, 2005

SANDAG and Caltrans to demonstrate the use of freeway shoulder lanes by transit buses on a limited basis during congested periods. Limited use of freeway shoulder lanes would allow transit services to bypass traffic "pinch points" and provide competitive travel times.

One demonstration project is on State Route 52 and Interstate 805, two heavily-congested highway segments near SR 163 and between downtown San Diego and North County.[22]

6.2.2 Community Shuttle Program[23]

The MTS (Metropolitan Transit System), SANDAG's transit operations agency, coordinates several shuttle programs that serve outlying communities. The shuttles are typically employed in areas of the region with the lowest population levels and densities and with few, if any, activity centers. Commuters from semi-rural and exurban communities can use these services to connect to longer, fixed-route bus services without driving - the shuttles provide door-to-door transportation within their service areas, and bring passengers to a fixed-route transfer point. Travelers call a toll-free number to schedule a trip between 1 and 48 hours in advance. Trips are scheduled by a dispatcher. This type of service differs from paratransit in that it is not limited to seniors or people with disabilities. A description of the FAST, DART and FLEX shuttle programs is provided below.

FAST and DART

In the area served by the North Coast Transit District (NTCD), the flex service is called FAST (Fast and Simple Transportation). There are four shuttle service areas. Within each area there are one or more fixed transfer points to fixed-route service; otherwise, shuttles pick up passengers anywhere within the service area. The fare structure is the same as regular NCTD bus routes. Shuttles do not run on Sundays or holidays. Monday through Friday, shuttles run from approximately 5:00 a.m. to 8:00 p.m., and on Saturdays, 9 a.m. to 6 p.m.

Rancho Bernardo DART and Scripps Ranch DART are flex-route shuttles similar to the NCTD FAST shuttles, but are operated in a separate area of San Diego County. DART (Direct Access to Regional Transit) is operated by the San Diego Transit Corporation (SDTC), which serves downtown San Diego and communities along the I-15 corridor. DART shuttles connect a pre-defined service area to a fixed transfer point served by commuter express buses. Priority service is given to passengers transferring to and from bus routes. Reservations must be made at least two hours in advance and may

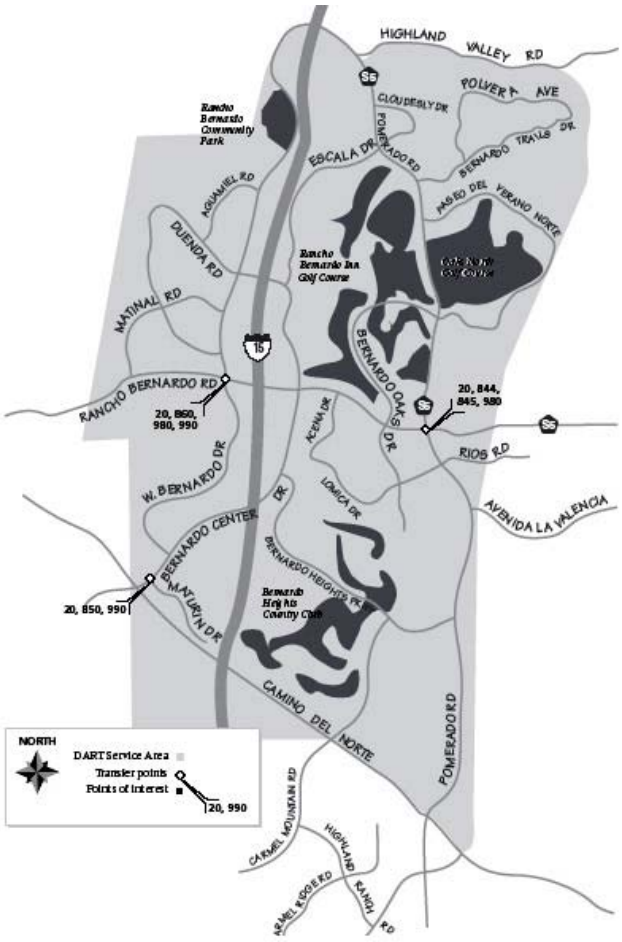


Figure 17. Rancho Bernardo DART Service Area.

[22] SANDAG Transportation Projects website, 2005
[23] Information for this section gathered from SANDAG/MTS/NCTD websites, 2005

be made up to 48 hours in advance. The Scripps Ranch DART runs on weekdays during commute hours only. Rancho Bernardo DART service is provided on weekdays from 9:00 a.m. to 5:00 p.m. The fare structure for DART is higher than the regular structure; on average, a $.50 surcharge is added.

Mira Mesa FLEX

SDTC also operates one community shuttle called Mira Mesa FLEX. Mira Mesa FLEX consists of two fixed routes (clockwise and counter-clockwise) with posted stops along the routes. However, the shuttle will travel up to one-quarter of a mile on either side of the route if reserved at least two hours in advance. Reservations are not required to board or get off the bus at one of the posted stops. Mira Mesa FLEX serves several schools in the area, a shopping mall, and other community facilities such as parks and the post office. At the primary transfer point, the FLEX also connects with another DART route and the I-15 Inland Breeze commuter express bus. Mira Mesa FLEX operates on weekdays only and does not operate on holidays. The service runs from 6:00 a.m. to 7:30 p.m.

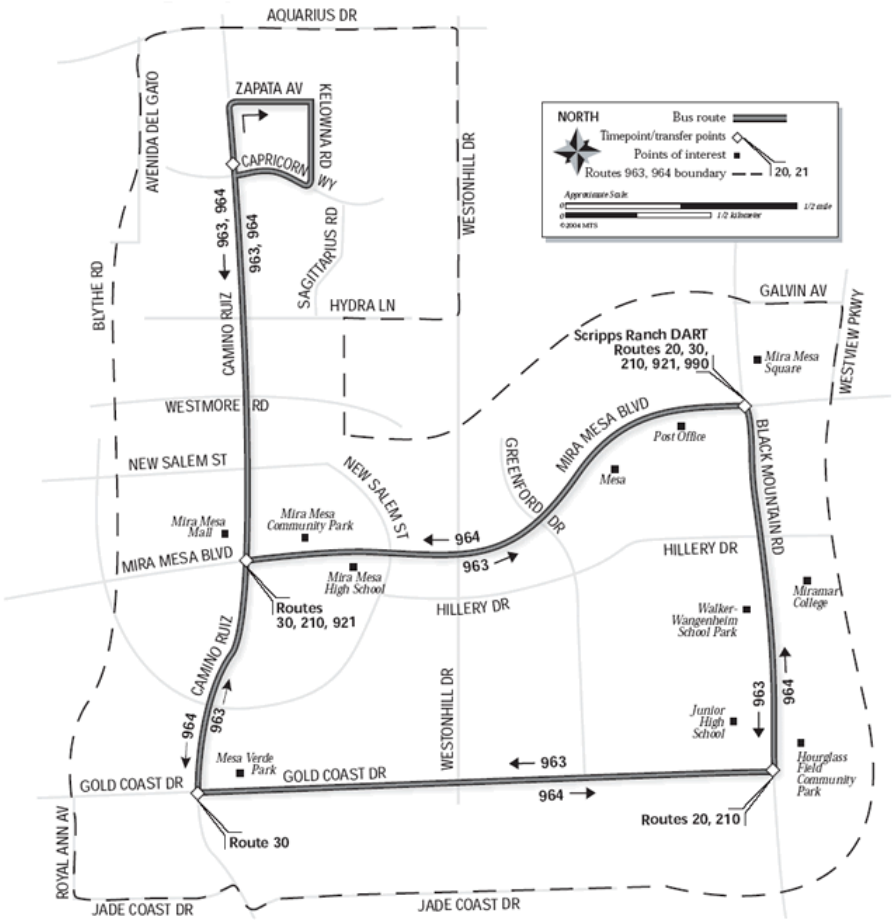


Figure 18. Mira Mesa FLEX Route

6.2.3 Transit First Policy Implementation

As part of the regional effort to reduce congestion, SANDAG adopted a policy called "Transit First" to offer transit as an attractive alternative to driving alone. The policy calls for a system of fast and frequent transit service connecting neighborhood centers in the region. Attractively-designed vehicles and transit shelters, real-time bus arrival signs, automated ticket machines and/or "smart" fare cards would enhance the passenger experience. Travel times would be faster and service would be more reliable through the use of "transit priority" lanes, fewer stops, and traffic signal improvements.[24]

Figure 19. A future Transit Priority Lane on El Cajon Blvd. as part of the SDSU Showcase Project

San Diego State University to Downtown Showcase Project

Implementation of the Transit First policy is currently focused on seven "early action" Transit First project corridors. One project is the San Diego State University (SDSU) to Downtown Transit First Showcase Project, which is a 10-mile bus rapid transit (BRT) line primarily serving students of the university and residents of the communities along the line. The project will incorporate many of the technologies listed above to make the service attractive. Major activity centers that will be served include offices in downtown, major shopping and recreational districts, Balboa Park (the City's main city park), the San Diego Zoo, the Mid City communities, and SDSU. The service will also offer connections to San Diego Blue and Orange line trolleys, existing Mid-City Transit Plazas, and a new transit plaza under construction at SDSU. A total of sixteen stations will be built.[25]

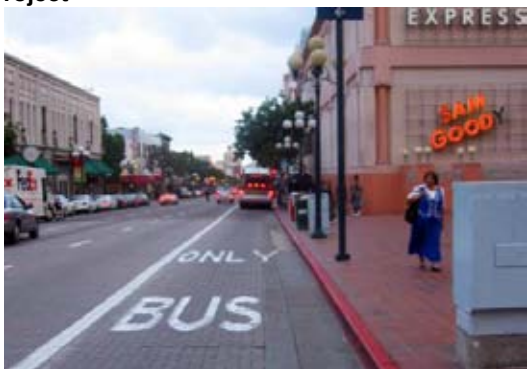


Figure 20. An existing Transit Priority Lane in downtown San Diego

Figure 21. Sixty-foot long articulated buses provide higher capacity on busy arterial routes

[24] SANDAG Transit First website, 2005
[25] SANDAG Transit First Implementation and SDSU to Downtown fact sheets, 2005

6.3 Applicability to Fresno

San Diego's approach to transportation planning has focused on more integrated land use/transportation planning, improving transit accessibility and transportation flow.

Creating a Unified Transportation and Land Use Planning Agency

The merger of the major planning agencies in San Diego underscores the importance of having a strong regional voice in coordinating transportation and land use decisions. Although San Diego had already been well-regarded for its previous governance structure, local leaders still felt a need for the merger in order to more effectively respond to the region's growth problems.

Interstate 15 Corridor

The regional approaches to managing the I-15 corridor are innovative in several respects. First, the provision of the Express Lanes (carpool lanes) encourages use of transit and carpooling by offering reduced travel times. Second, the dynamic toll system for SOVs (single-occupant vehicles) provides an opportunity for solo drivers to pay for faster commute times, and the toll revenues in turn are used to support increased transit service on the corridor. Next, the express bus system is valuable because it offers a commute option for outlying communities that cannot support rail transit. Finally, an innovative effort is underway to take advantage of existing highway infrastructure and to use it to improve transit travel times at very low cost.

Community Shuttle Program

Community shuttles fill an important transit service role in the outlying North County communities. They operate more flexibly than fixed-route buses within the neighborhoods, providing door-to-door service to connect commuters to the commuter express buses that run along the I-15 corridor. Once downtown, commuters can use the extensive local bus service or walk to their workplace. This model of seamless home-to-work transit service is low-cost, flexible, and convenient for residents of outlying communities. It could be employed in outlying areas of Fresno County to provide point-to-point transportation and link isolated communities to higher-capacity transit services.

Transit First Policy Implementation

Bus Rapid Transit (BRT) is a method of providing service similar to light rail transit but using rubber-tired vehicles on pavement. All other aspects remain the same, including high-quality and attractive vehicles and stations, reliable and frequent service, and the flexibility of using existing roadways, which has the potential to result in lower project costs. BRT could be employed along arterials or highways in the denser parts of Fresno County, and could build the market for higher capacity transit service. Compared to the express bus network, BRT handles a higher volume of passengers, runs more frequently on shorter routes, has more stops, and is fed by a combination of local bus service, bicyclists, and pedestrians, not just dedicated shuttles or park-and-ride lots. Because of the urban environment in which it is provided, BRT service also works well with supportive land uses such as higher-density housing and offices, and neighborhood retail/commercial centers within walking distance of BRT stations.

Transit Villages – City of San Diego

The City of Villages Strategy demonstrates the City of San Diego's leadership in the region. It is the city's program for correlating land use with transit. The anticipated benefit is more walkable, less-congested, revitalized neighborhoods with cleaner air and improved quality of life, and which take advantage of existing infrastructure. One important aspect of the Pilot Village implementation program is the strong package of incentives to support development projects. The wide range and depth of incentives, from revising City capital infrastructure project schedules, to business and affordable housing subsidies, to staff

assistance for other grant programs, demonstrates the commitment the City has made towards making each Pilot Village project successful. In addition, two of the five Pilot Village projects lie on two of SANDAG's Transit First showcase corridors. These Pilot Village projects are located adjacent to proposed BRT stations and will benefit from improved transit service featuring increased frequency, better reliability, and faster service.

7 Lessons Learned from Other Cities

Although this report focused on specific transit strategies from three regions, the other regions that were initially considered also offer a number of significant lessons. As background information for each region was gathered, these lessons often emerged as themes common to several regions. The lessons we have found are listed below.

Clustered development patterns at stations and along rapid transit lines create a strong transit market.

In Perth, Auckland, and Calgary, transit infrastructure is built where there are higher concentrations of housing and population. In Seattle, Portland, and Vancouver, the regional growth strategy of each region ties transportation, housing, and economic development together. Jobs growth, as well as transportation investments, is focused on urban centers and industrial/manufacturing centers. This results in higher levels of ridership not only during peak commute hours, but all day ridership in peak and off peak directions.

Figure 22. An example of transit investments focused within growth areas

Coordinated, regional planning can help create land forms complementing transit system development.

In Adelaide, Seattle, Minneapolis, Ottawa, and Perth, regional planning organizations work closely with transit operators and local jurisdictions to develop land use strategies that complement regional investments in high capacity transit services. Collaborations between regional and local government along with the transit operator and yield optimal results with more people living and working within close proximity to high capacity transit service. In some cases, such as Sacramento or Denver, regions are revisiting their land use plans to ensure they complement the original transit investment.

Intermodal transfer stations can serve as focal points in downtown or in outlying communities.

The Britomart transit center is not only a transportation hub in Auckland tying together commuter rail, suburban, regional, and local buses, and ferries, but is also the site of a new redevelopment project including a 12,000 seat arena. In Phoenix, Seattle, and Ottawa, bus transfer centers in outlying communities also serve as central transfer points between community shuttles and express buses. They are often sited in the employment or activity centers of the region.

Transit capital funding can be leveraged to stimulate neighborhoods and revitalize downtowns.

The Denver 16th Street Mall was a $90 million makeover of downtown Denver along 16th Street that stimulated a significant amount of investment along the corridor. The mall consists of a city street converted to foot traffic and served by a free downtown shuttle, is nationally recognized for its impact on downtown economic activity. The Portland Streetcar is also a well-known example for stimulating more than $1.5 billion in redevelopment throughout downtown. Other regions where economic development is a

strong component of transit projects include Minneapolis, which has a reduced-fare transit and pedestrian mall; Baltimore, Phoenix, and Perth, which have free shuttles; Seattle, with a fare-free zone. Pedestrian malls, streetscapes, and art in transit can be packaged together to make the transit investment a complement, if not a catalyst, for other revitalization activities in neighborhood transit zones and downtown areas.

Design guidelines matter.

Proximity to transit isn't enough to ensure people can quickly and easily access the transit system from the adjacent community. Examples abound of transit stations that are difficult to reach which result in a predominance of auto driving to transit stations or a lack of transit ridership at the station all together. In recognizing the important role urban design plays in providing access to transit systems and the important role design plays in travelers choice to walk or bike to the transit station, many regions are now employing urban design and best practice guidelines. Portland and Seattle both have urban design programs to help define growth patterns for regional and subregional centers. These design guidelines are complementing by grant programs that help provide necessary capital dollars to stimulate their implementation. In the case of Phoenix, the Maicopa COG has developed best practice guidelines to guide development patterns once the transit system is in place.

Better transit service does not necessarily require fixed guideway systems.

The Denver region enjoys a network of Park and Ride lots coupled with express bus services to feed downtown. This system takes advantage of the regions highway and HOV network. Regional trips are fed into the downtown intermodal centers where passengers are distributed downtown via foot or the 16th Street Mall shuttle. Pittsburgh and Seattle are two other North American cities with robust networks of transit centers linked together by high frequency, long distance express bus services.

Layered networks of transit services provide comprehensive, and complementary, coverage.

In Baltimore, heavy rail and light rail bring commuters to downtown. These services are complemented by lower intensity transit services feeding them in outlying areas and distributing passengers in the downtown core. Water taxi provides an attractive and direct link between various waterfront tourist destinations, while DASH shuttle buses resolve parking and congestion issues for downtown workers. Other notable examples of an integrated network include Minneapolis, Phoenix, Salt Lake City, and Zurich, which all have high-frequency bus grids throughout downtown complementing line haul, long distance high capacity transit services.

Dedicated transit infrastructure can allow for higher-frequency, higher-capacity service.

Many regions have invested in fixed guideways, such as tracks for Light Rail Transit or dedicated busways for Bus Rapid Transit. Adelaide was the international leader in installing the O-Bahn guided busway. Several hundred buses per hour in each direction pass through certain bus stations in Ottawa. In the United States, Pittsburgh has three separate busways feeding the downtown core. Freeways and highways, however, can also serve as a transit way with greater flexibility than fixed guideway systems. HOV facilities can be built at a lower capital cost than a guideway and can offers time savings to cars carrying two or more people.

Universal fare payment systems and other technology can make transit friendlier and easier to use.

Transperth manages Perth's public transport system which is fully integrated across all bus, train and ferry services. This means that all modes represent and carry the Transperth brand, and accept the same ticket irrespective of the service used. Adelaide, Auckland, Ottawa, Denver, Saint Louis, Salt Lake City, and San Diego are other examples where one regional agency coordinates all transit operations.

Technology can be used to improve the efficiency, reliability, and perception of transit.

Transit systems can take advantage of recent technological developments to provide enhanced service. In Zurich, buses are able to actuate traffic signals to allow them passage through an intersection with minimal delay. Salt Lake City employs transit signal priority on the light rail serving downtown.

Figure 23. Vancouver B-Line Real-Time Information

Vancouver, BC utilizes NextBus transit technology to tell passengers when to anticipate the next BRT bus and is beginning to roll out signal priority technology along key transit corridors. Technology can also be used to help transit passengers plan their trips. Real-time information systems such as NextBus can now be provided at transit stops and stations, letting people know when their bus or train is scheduled to depart. Not only does this help waiting passengers to set their expectations, it also allows people to plan other activities while they are waiting for their bus to arrive.

8 Conclusions

The case study report is intended to stimulate the imagination and thinking of those involved with developing transit solutions for the greater Fresno area. These examples are illustrative of how coordinated planning and integrated solutions can deliver effective, efficient, and well used transit services. Fresno is at an important crossroads. With careful planning and decision making now, Fresno can grow in a fashion that allows transit to work effectively in key transit corridors throughout the county. It is clear that, at some point, regions begin to shift towards a more integrated approach to transportation and land use planning. Like Fresno, Phoenix, Salt Lake City, St. Louis and others began growing with a primary emphasis on auto mobility and low density land use forms. Over time, this became an unsustainable direction and these regions are now embracing integrated planning, transit investments, and doing more to integrate land use and transportation planning disciplines. Other areas offer a different lesson. Regions such as Seattle, Portland and Vancouver, followed a different planning paradigm leading to the creation of centers and corridors linked by high capacity, high frequency transit services resulting in higher levels of transit ridership.

Fixed-route, fixed-guideway services do not necessarily need to form the core or bulk of the transit service in Fresno. It is clear that flexible and demand responsive services may be more appropriate in the Fresno context. Further, feeding whatever high-capacity, long-distance transit service is planned with shuttles and walk and bike systems is critical if ridership is a desired outcome on the transit line. Network based thinking can shape a more expansive or more attractive transit program for the county.

Transit based transportation solutions are often a package of activities from transit system development to integrated pass programs, transit technology enhancements, guidelines, and incentives to name a few. This package of measures ensures, over time, that more people will take advantage of the transit option. It is clear that careful planning can lead to transit ridership in key corridors. In Portland, the Westside MAX carries 30% of the travel demand during peak hours. Similarly, in San Diego, the Light Rail network must lengthen train consists to accommodate growing transit demand.

In the end, the Fresno PTIS Steering Committee and the Fresno Council of Governments must build a vision for the role transit plays within the county. The vision must rest on both the desired transit investment along with the desired land use form that meets the needs and aspiration of those who call the county home. There is no right answer but there are clues as to what will work and what will not based on the context and setting in which the transit system or services operate. A long term perspective and a long term commitment to the vision charted by the PTIS will yield the greatest return. It is often said the success the Portland region enjoys today in terms of the integrated approach to planning, the ridership realized on the transit network, and the ability to leverage transit investment with gains in land use values and land investments is rooted in planning decisions made in the 1970's. It takes many years for planning choices to yield results. Alternatively, it is also clear that transit investments made without supporting thought and consideration to access to the transit system, adjacent land use development patterns, and supporting programs to encourage transit ridership often result in poor performance of the transit line. From Sacramento to Phoenix to San Jose, regions where transit investments were made without a broader view to the need to building the transit market and considering the local context, the regions are going back to rethink the areas around the transit system in an attempt to create the context in which transit can be a meaningful choice for people in the area and provide an alternative to sitting in traffic each day. As Fresno undertakes its long term transportation planning and gets ready to increase its investment in transit infrastructure, the region can look to the experience of others in facing the challenge and the opportunity to create a transit system that can effectively serve the needs of its diverse residents.