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.
- The San Joaquin Valley Air District was fined a $29M penalty last year for failing to meet ozone standards.
- Over 90% of Measure “C” funds are committed to paring roads on the fringe, encouraging more urban sprawl.

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

²Data from 2004-2006

Fast Track Fresno County | Executive Summary

Fresno COG
The Cities of Fresno and Clovis are not major destinations for any given rural city or place. While nearly 60 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.

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 Trends” 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) 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 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

<table>
<thead>
<tr>
<th></th>
<th>COG Trends</th>
<th>Constrained TOD</th>
<th>Aggressive TOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of new growth moved to transit corridors</td>
<td>38%</td>
<td>42%</td>
<td>52%</td>
</tr>
<tr>
<td>Density in 1 mile of transit corridors</td>
<td>10.6 du/ac</td>
<td>12.3 du/ac</td>
<td>14.9 du/ac</td>
</tr>
<tr>
<td>Transit Mode Share of all trips for region</td>
<td>.93%</td>
<td>1.22%</td>
<td>1.46%</td>
</tr>
<tr>
<td>Transit Mode Share for all trips within 1 mile of corridors</td>
<td>1.7%</td>
<td>2.3%</td>
<td>2.5%</td>
</tr>
<tr>
<td>Transit Share to work in BRT Corridors</td>
<td>5.65%</td>
<td>7.64%</td>
<td>8.51%</td>
</tr>
<tr>
<td>GHG Reductions</td>
<td>0.4%</td>
<td>6%</td>
<td>8%</td>
</tr>
</tbody>
</table>
Overview of the BRT Peer Exchange

Why BRT?
As described in the previous section, the high-capacity, high-performance qualities of BRT make it an attractive option for public transportation agencies throughout the world, including in the City of Fresno (Fresno). Fresno’s 2007 Downtown Transportation and Infrastructure Study (DTIS) (http://www.fresno.gov/NR/rdonlyres/46E037A5-7C80-4A5A-935D-DCE67B77A230/0/FresnoBRTMasterPlan20080617.pdf) identified transit, particularly BRT, as an increasingly important mode for accessing Downtown Fresno. Fresno recognized BRT as a key strategy for:

- Supporting transit-oriented development (TOD) and sustainable communities;
- Enhancing accessibility and connectivity of Downtown Fresno;
- Accomplishing Federal, State, and local objectives for congestion management; and
- Achieving Federal and State air quality standards.

As an active member of the Fresno County Council of Governments (COG), Fresno participated in the 2008 Public Transportation Infrastructure Study (PTIS) to identify transportation and land use strategies to reduce vehicle miles traveled (VMT) and to improve mobility choices for greater Fresno County residents. The PTIS (http://www.kimley-horn.com/Projects/fasttrackfresnocounty/) and component BRT feasibility study identified three potential BRT corridors within the City of Fresno; based on the Fresno City Council’s selection of a locally preferred alternative (LPA) that included all three corridors, the study recommended that Fresno pursue funding for the Blackstone Avenue and Ventura Avenue/Kings Canyon Road BRT corridors, which merged into the Blackstone/Ventura/Kings Canyon corridor.

Figure 1 provides a map of the Blackstone/Kings Canyon corridor(s).

Why a BRT Peer Exchange?
In December 2010, Fresno received a $48 million Very Small Starts grant from the Federal Transit Administration (FTA) for the Blackstone/Ventura/Kings Canyon BRT project. Fresno Area Express (FAX), the transit provider for the City of Fresno’s Department of Public Transportation, is the Blackstone/Ventura/Kings Canyon BRT project lead. Given the potential for BRT to catalyze economic development and land use changes, Fresno requested a peer exchange to provide guidance to FAX in managing the project and to assist staff across the city’s departments in understanding:

- Challenges of developing, integrating, and implementing BRT;
- Best practices in designing and operating BRT;
- Long-term financial sustainability of BRT; and

TPCB Peer Exchange on Bus Rapid Transit (2013)
- Performance measures for BRT.

Who were the peers?
Representatives from four public transportation agencies served as peers in the BRT peer exchange. The Federal Transit Administration, the City of Fresno, NBRTI, and the Volpe Center collaborated to identify relevant peer agencies based on the peer agencies’ ability to discuss the following topics:

- BRT system design and operation;
- Regulatory and funding environment;
- Population and area characteristics of BRT service area(s);
- Travel behavior within BRT service area(s);
- Economics of BRT service area(s); and
- Community characteristics (e.g., housing market) of BRT service area(s).

Four geographically diverse agencies were selected as peers for their experiences implementing BRT, their ability to address key BRT issues of interest to Fresno, and challenges and opportunities at various stages of service implementation. At the time of the peer exchange, OmniTrans had completed approximately 70 percent of construction for its BRT service, sbX, which is scheduled to begin operations in 2014. In contrast, the other peer agencies already had a history of BRT operation. Table 1 below lists the agencies, their dates of revenue service and the peers from each respective agency:

Table 1: Peer Agency Characteristics

<table>
<thead>
<tr>
<th>Agency</th>
<th>Location</th>
<th>BRT Service</th>
<th>BRT Operation Start Date</th>
<th>Peer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community Transit</td>
<td>Everett, WA</td>
<td>Swift</td>
<td>2009</td>
<td>June DeVoll, Manager of Strategic Planning &amp; Grants</td>
</tr>
<tr>
<td>Greater Cleveland Regional Transit Agency</td>
<td>Cleveland, OH</td>
<td>HealthLine</td>
<td>2008</td>
<td>Michael York, Deputy General Manager of Operations</td>
</tr>
<tr>
<td>Lane Transit District</td>
<td>Eugene, OR</td>
<td>EmX</td>
<td>2007</td>
<td>Tom Schwetz, Planning &amp; Development Director</td>
</tr>
<tr>
<td>OmniTrans</td>
<td>San Bernardino, CA</td>
<td>sbX</td>
<td>2014</td>
<td>Milind Joshi, sbX Program Manager</td>
</tr>
</tbody>
</table>
Key Recommendations, Lessons Learned, and Best Practices

During the Fresno BRT Peer Exchange, the peers delivered presentations and led discussions about their relevant experiences and lessons learned in planning, delivering, and operating BRT systems. Appendix B of this report details the agenda and specific discussion topics. In accordance with the agenda and the exchange proceedings, the key recommendations, lessons learned, and best practices fit into the following five categories:

1. Planning & Implementation;
2. Planning & Project Delivery;
3. Integrating Planning & Operations;
4. Integrating Land Use; and
5. Financial Planning.

Planning & Implementation

Engage, update, and educate internal and external audiences early and continuously
In discussing public outreach and communications, the peers stressed the importance of developing and sending a concise and consistent message in response to “why BRT?” All four peer agencies designated a single spokesperson (either a staff person or consultant) to handle all media relations, including social media, to ensure consistency and accuracy of any public messages. Each peer agency invited its public relations and/or marketing team to regular design and construction meetings to maintain an accurate and current message. Even if there was no status update, the spokesperson could communicate that fact. One peer strongly advised Fresno, “don’t go dark” with public outreach, even if there is no new information.

Based on the peers’ experiences, it is equally important to engage internal and external stakeholders, including State Department of Transportation (DOT) partners, elected officials, local business owners, and agency staff. The peers recommended that Fresno document all stakeholder meetings so that there is a record of what each partner, agency, or staff person agrees, decides, or commits to do. The peers also recommended targeted outreach strategies for business owners along the BRT corridor, such as conducting door-to-door visits before construction activities begin so that the business owners are aware of potential construction impacts; patronizing affected businesses during construction; and assisting the businesses to develop new marketing strategies for BRT passengers. For effective internal coordination and information sharing, the peers recommended regular interdisciplinary meetings and agency-wide briefings. Agency staff can be effective advocates, or “ambassadors,” for BRT projects, but they must first understand the project and “why BRT?”

Figure 2: Yellow rub rails, formerly known as “curb bumpers,” facilitate precision docking at a Swift BRT station. Photo courtesy of Community Transit.
When engaging internal and external stakeholders, agencies must be aware of any potential language barriers as well as be sensitive to any potential misinterpretations. For example, Community Transit designed its Swift stations to include rub rails for precision docking. The rub rails were initially named "curb bumpers," but the agency renamed the station features because the bus operators associated "bump" with collisions and poor driving.

Finally, a key strategy to promote a new BRT system is to showcase the vehicle and station prototypes to internal and external stakeholders as tangible evidence that "BRT is coming to town!"

*Consider long-term operations and maintenance requirements when designing vehicles*

Greater Cleveland Regional Transit Agency and Community Transit encouraged Fresno to think strategically and to work with the bus manufacturers when considering design innovations. Greater Cleveland Regional Transit Agency (GCRTA) worked closely with the bus manufacturer New Flyer to develop an innovative, rail-like Rapid Transit Vehicle (RTV) that has served as a model for other BRT systems across the country. Among several other features, GCRTA designed a special docking arm based on in-service vehicles in Germany, England, and Australia, but the manufacturer only agreed to produce the docking arm if GCRTA assumed full liability for the front axle to which the docking arm is attached. Two of the other peer agencies, OmniTrans and Community Transit, modeled their vehicles on GCRTA’s RTV with slight modifications to fit the operations and maintenance requirements of their own systems; Table 2 below compares the peer agencies’ vehicles.

In addition to determining the appropriate length, capacity, fuel type, and number of doors, it is necessary for an agency to also specify the type of doors, location of doors, use of the articulated joint area (e.g., for seating, standing, or storing bicycles), boarding height, precision docking elements, on-board cameras, and on-board fare collection. It is important to solicit input early in the process from operations and maintenance personnel in determining the vehicle specifications, as it may be necessary to modify the maintenance, fueling, washing, and parking facilities to accommodate the new vehicles. OmniTrans emphasized the importance of ensuring ongoing operation and maintenance activities of existing facilities while the agency makes modifications to those facilities. OmniTrans also recommended including any design staff or contractors in discussions regarding the vehicle to ensure compatibility between the on-board transit signal priority (TSP) transponder and the TSP system, for example.

*Figure 3: Rear-facing wheelchair positions on GCRTA’s Rapid Transit Vehicles. Photo courtesy of Greater Cleveland Regional Transit Agency.*
Table 2: Peer Agencies’ BRT Vehicle Features

<table>
<thead>
<tr>
<th>Agency</th>
<th>Length</th>
<th>Capacity</th>
<th>Fuel</th>
<th>Boarding</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community Transit</td>
<td>62'</td>
<td>43 seats 60 standees 3 - 5 bicycles</td>
<td>Diesel-electric</td>
<td>3 doors</td>
<td>Passive restraints for wheelchairs enable disabled passengers to load/unload in 28 seconds, handholds in articulated joint area accommodate standing passengers, and on-board bicycle racks hold 3 bikes with room for 2 additional bikes.</td>
</tr>
<tr>
<td>GCRTA</td>
<td>63'</td>
<td>47 seats 53 standees 2 bicycles</td>
<td>Diesel-electric</td>
<td>5 doors</td>
<td>Bridge plate at each door meets the level boarding requirements of the Americans with Disabilities Act (ADA) of 1990; rear-facing wheelchair positions enable disabled passengers to back in; docking arm connected to front axle allows for precision docking; and DriveCam and/or SmartDrive technology records 9 to 12 seconds of video before and after an abrupt change in speed or direction to document incidents.</td>
</tr>
<tr>
<td>LTD</td>
<td>63'</td>
<td>47 seats 53 standees 3 bicycles</td>
<td>Diesel-electric</td>
<td>4 doors</td>
<td>Bridge plate at each door meets the level boarding requirements of the Americans with Disabilities Act (ADA) of 1990; rear-facing wheelchair positions enable disabled passengers to back in; and docking arm assists precision docking.</td>
</tr>
<tr>
<td>OmniTrans</td>
<td>60'</td>
<td>41 seats 65 standees 4 bicycles</td>
<td>Compressed Natural Gas (CNG)</td>
<td>5 doors</td>
<td></td>
</tr>
</tbody>
</table>

Consider implications of warranty periods
Agencies should carefully consider the warranty periods in establishing contract terms with contractors and manufacturers for their BRT vehicles, stations, and station components such as the ticket vending machines and real-time monitors, particularly if there is a gap between delivery and operation. For GCRTA, the warranty on its vehicle began at the time of delivery, though OmniTrans was able to negotiate with New Flyer to begin the warranty period (except for the engines) at the same time as revenue operation. Community Transit was able to negotiate with the ticket vending machine vendor to store the machines until ready for installation, with the warranty period beginning...
at the time of installation. The peers agreed that such negotiations would be advantageous for an agency.

Planning & Project Delivery

*Maintain an appropriate level of oversight throughout the project*

The peers noted that the initial selection of project contractors is extremely critical, as is the need to maintain strong management oversight by agency staff. OmniTrans cautioned that hiring a big-name firm does not guarantee a quality product or a smooth process. Even with strong contractors, there is no substitute for the agency's project managers having an appropriate level of oversight, particularly during the design, ROW acquisition, and construction phases. GCRTA stressed the importance of contract management oversight.

*Compile a risk register and revisit it often to mitigate risks and to adjust cost estimates*

OmniTrans shared its best practices for conducting a project risk assessment. At the beginning of the sbX project, OmniTrans created a risk register, or a spreadsheet categorizing various potential risks, such as ROW acquisition, utility relocation, contractual issues, etc. Staff from across the agency brainstormed the range of potential risks. For example, OmniTrans' human resources division considered the issue, "what if the agency project manager left halfway through the project?" Staff then considered the worst-case scenario outcomes of those risks occurring (i.e., the potential cost impact) and the probability of those risks occurring. OmniTrans categorized those risks with a probability of 90 percent or higher as "potential costs" and those risks with a probability less than 90 percent for monitoring. For each risk, OmniTrans had the option of transferring it to the contractor (and consequently paying a higher bid price); avoiding/eliminating it (such as through design); reducing/mitigating it; or accepting the potential costs of it occurring. Even though an agency may identify or realize new risks every day, it is not efficient to analyze those risks on a daily basis. Instead, OmniTrans convenes a one-hour risk assessment meeting every month to reassess risks with a probability of 90 percent or higher; if a particular risk is realized, then OmniTrans re-categorizes it as a change order request or as a contingency. OmniTrans recommended that Fresno establish and follow a change order process to avoid any delay costs.

Integrating Planning & Operations

*Demonstrate financial viability of BRT*

Despite the economic environment in which the peer agencies first implemented and operated BRT services (GCRTA began BRT operations in October 2008 and Community Transit began BRT operations in November 2009), the peers cited financial statistics and survey results in support of either maintaining or expanding their BRT service(s). Table 3 below highlights the differences between two peer agencies' BRT and conventional bus services, according to a few key metrics.

TPCB Peer Exchange on Bus Rapid Transit (2013)
Table 3: Comparison of BRT and Conventional Bus Performance

<table>
<thead>
<tr>
<th>Metric</th>
<th>LTD</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bus</td>
<td>BRT</td>
<td>Savings</td>
<td>Bus</td>
<td>BRT</td>
<td>Savings</td>
</tr>
<tr>
<td>Cost per vehicle mile</td>
<td>$9.99</td>
<td>$13.21</td>
<td>($3.22)</td>
<td>$9.72</td>
<td>$11.82</td>
<td>($2.10)</td>
</tr>
<tr>
<td>Cost per passenger mile</td>
<td>$0.78</td>
<td>$0.73</td>
<td>$0.05</td>
<td>$0.97</td>
<td>$0.71</td>
<td>$0.26</td>
</tr>
<tr>
<td>Cost per unlinked passenger trip</td>
<td>$3.19</td>
<td>$1.91</td>
<td>$1.28</td>
<td>$4.14</td>
<td>$1.81</td>
<td>$2.33</td>
</tr>
<tr>
<td>Cost per revenue hour</td>
<td>$130.27</td>
<td>$155.42</td>
<td>($25.15)</td>
<td>$122.41</td>
<td>$83.18</td>
<td>$39.23</td>
</tr>
<tr>
<td>Passengers per revenue hour</td>
<td>40.85</td>
<td>81.26</td>
<td></td>
<td>32.68</td>
<td>62.64</td>
<td></td>
</tr>
</tbody>
</table>

Source: 2011 National Transit Database (for LTD) and 2012 National Transit Database Annual Report Submittal (for GCRTA)

In 2011, Lane Transit District (LTD)’s BRT system, EmX, cost $25.15 more to operate per revenue hour than LTD’s regular bus service, but EmX carried nearly twice as many passengers per revenue hour. An on-board survey revealed that EmX choice riders were using the service for a variety of trip purposes, such as errands during lunch, which they previously had made via car. Because EmX is LTD’s most productive service, it was easy to justify a BRT system expansion through the addition of a third EmX route. Lane Transit District’s annual transit investments are governed by a service policy that requires the agency to invest 75 percent in productive services (e.g., BRT), 20 percent in coverage services (e.g., rural routes), and 5 percent at the discretion of the Board of Directors.

Similar to LTD’s survey results, Community Transit found that 14 percent of Swift passengers did not previously make the trip that they made via Swift. Like EmX, Swift represents Community Transit’s most productive service. In 2012, Swift had the highest ridership of Community Transit’s 48 routes and the lowest cost per passenger excluding commuter routes.

The Greater Cleveland Regional Transit Agency’s BRT system, the HealthLine, allowed the agency to improve bus service along the Euclid Avenue corridor at a lower cost than traditional bus service. Prior to the HealthLine, GCRTA operated the #6 bus on the Euclid Avenue corridor. The #6 was the agency’s highest ridership route and by converting from regular to BRT service, GCRTA reduced the number of buses in the corridor from 23 to 16 because of greater service efficiency. Greater Cleveland Regional Transit Agency’s overall operating expenses decreased despite the BRT vehicles’ higher per-mile operating cost reflected in Table 3. In addition to reducing operating expenses, implementation of HealthLine increased the bus mode share:

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1 The number of passengers who board public transportation vehicles. Passengers are counted each time they board a vehicle no matter how many vehicles they use to travel from their origin to their destination (i.e., transfer).
48 percent of HealthLine passengers previously used other GCRTA bus services, including the original #6 bus service (and of those riders, nearly half of them used the HealthLine more frequently than they had used the #6 bus);
- 16 percent shifted from driving alone;
- 13 percent shifted from riding rail;
- 8 percent would not have made the trip previously;
- 6 percent previously made the trip via miscellaneous means; and
- 9 percent did not indicate how they made the trip prior to the HealthLine’s implementation.

HealthLine’s implementation was consistent with GCRTA’s TransitStat goals of reducing agency costs, increasing service quality, and improving overall management.

*Develop appropriate security measures and fare collection and enforcement policies*

Off-board fare collection is popular for BRT systems because it aids in maintaining short dwell times; however, off-board fare collection introduces new operational challenges including fare enforcement, maintaining off-board (and often exposure to inclement weather) ticket vending machines, and collecting payments from ticket vending machines. To maintain shorter dwell times, Community Transit opted to rely exclusively on off-board fare collection following a cost-benefit analysis that revealed the agency would otherwise need to operate two additional Swift buses to maintain its stated goal of 10-minute headways. Additionally, Community Transit had a goal of 10-second dwell times, which would not be possible to achieve with on-board fare collection. Community Transit and LTD installed the same machines, modeled after electronic parking meters.

Community Transit employs a two-person maintenance team for the Swift stations that performs all maintenance, including proper operation of the ticket vending machines. If one of the two vending machines at a station is out of service, then the maintenance personnel repair it the next time they visit that particular station, but if both vending machines are out of service at any given station, they repair those machines immediately and check for potentially larger, system-wide issues.

Greater Cleveland Regional Transit Agency approached fare collection differently, relying on off-board fare collection from 6:00 a.m. to 10:00 p.m. (pictured in Figure 5) and on-board fare collection from 10:00 p.m. to 6:00 a.m. During the 6:00 a.m. to 10:00 p.m. operating hours, GCRTA has 30 full-time equivalent (FTE) fare enforcement officers who monitor proof of payment. Based on the costs of training, uniforms, etc. for the fare enforcement officers, GCRTA recommended offering full-time positions to increase employee retention and to avoid the costs of frequent turn-over of staff. GCRTA also recommended consulting the courts and legislature in determining appropriate fare enforcement policies and methods, as State statutes may vary in permitting the issuance of a citation versus a ticket.
Conventional buses with on-board fare collection typically empty their fare boxes at the end of each day when they return to the bus garage, so agencies have a regular schedule and central location for collecting fares. With off-board fare collection, agencies must retrieve the fares from each station along the route. Ticket vending machine technology may assist agencies in tracking the amounts collected at each station and in establishing collection schedules, though the peer agencies said they revised their collection schedules based on actual accumulation. Community Transit originally planned to collect the fare from each Swift station daily, but found that a weekly collection is sufficient for most stations, except at the two termini stations, which require collection every other day. In 3.5 years of service, Community Transit has not had any incidents of theft from or vandalism of ticket vending machines, though in anticipation of both, OmniTrans has required that its general contractor maintain liability of each station and its components, including the ticket vending machines, prior to project completion, when all stations are turned over to the agency simultaneously.

Integrating Land Use

Identify corridors with high ridership potential
As demonstrated in Figure 4 below, BRT and Transit Oriented Development (TOD) are complementary, if not interconnected planning strategies: BRT supports the ‘T’ in ‘TOD’ by serving high-capacity transit corridors. For some agencies that operate BRT systems, their sole purpose is to provide public transportation services. For example, Community Transit is exclusively a transit agency and the Swift project was motivated by transportation needs and goals, not by land use or economic revitalization goals. Regardless, the five municipalities in which Swift operates exercised their land use authority and independently initiated major planning studies of the BRT corridor to change the land use, densities, and incentives around each Swift station within their jurisdiction.

In contrast to Community Transit’s experience, GCRTA, as a member of the Northeast Ohio Areawide Coordinating Agency (NOACA), which is the local metropolitan planning organization (MPO), partnered with six local community development organizations to deliver the HealthLine project, which was motivated both by public transportation goals and by urban renewal goals. Of the total $200 million project cost, approximately half was dedicated to “building face-to-face” reconstruction, including streets, street lights, sidewalks, and utilities. To accommodate BRT and to encourage private development, the cities included the HealthLine in their Master Plan documents and adopted new zoning ordinances consistent with BRT as well as offered tax abatements and no-interest loans to projects.
Financial Planning

Create value in establishing new connections
Since completion of the $200 million HealthLine project, GCRTA has witnessed over $5 billion of investment in the corridor through residential, commercial, and medical redevelopment and infill development. According to a study by the National Bus Rapid Transit Institute (NBRTI) released in September 2012, the economic multiplier effect of BRT is not unique to Cleveland. In Cleveland, Pittsburgh, and Boston, NBRTI found that proximity to BRT stations in those cities had a positive effect on residential property values and sales prices (http://otrec.us/images/uploads/OTS2012_Perk.pdf). Based on Cleveland’s experience, OmniTrans projected the economic potential of its sbX system as 1:10, where each dollar invested in BRT is expected to generate $10 of economic activity in the community.

The potential for positive economic impacts of BRT is not surprising. Lane Transit District discussed the significant value of transportation in providing access to land use. When compared to other transportation modes, such as costlier light rail services, BRT has a stronger market power because of its speed and reliability; its permanent infrastructure; and concentrated consumer and labor access, which increases ridership.
Next Steps

Following the peer exchange, the City of Fresno identified the following action items for the Blackstone/Ventura/Kings Canyon BRT project:

1. Revise the project communication plan to reach a broader segment of the community and to improve the volume and timeliness of the information disseminated to both internal and external stakeholders;
2. Enhance the BRT Project Team, originally established by the City Manager’s Office in early 2013, to include another engineer and a procurement specialist;
3. Establish the Project Manager as the single point of contact responsible for overseeing construction;
4. Provide dedicated phone lines (in English and in Spanish) for public comments;
5. Contact business owners along the corridor on a regular basis throughout the project;
6. Determine BRT vehicle specifications and issue a procurement bid for the vehicle manufacturer;
7. Evaluate options for ticket vending machines, emergency call boxes, and security cameras;
8. Evaluate the maintenance requirements of station construction materials and finishes;
9. Implement a Service Implementation Team composed of drivers, mechanics, and support staff to participate in reviewing policies and practices, training exercises, and outreach activities;
10. Continue sharing lessons learned with peer agencies.
About the Transportation Planning Capacity Building Program

The Transportation Planning Capacity Building (TPCB) Program is a joint venture of the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) that delivers products and services to provide information, training, and technical assistance to the transportation professionals responsible for planning for the capital, operating, and maintenance needs of our nation's surface transportation system. The TPCB Program website (www.planning.dot.gov) serves as a one-stop clearinghouse for state-of-the-practice transportation planning information and resources. This includes over 70 peer exchange reports covering a wide range of transportation planning topics.

The TPCB Peer Program advances the state of the practice in multimodal transportation planning nationwide by organizing, facilitating, and documenting peer events to share noteworthy practices among state DOTs, MPOs, transit agencies, and local and Tribal transportation planning agencies. During peer events, transportation planning staff interact with one another to share information, accomplishments, and lessons learned from the field and help one another overcome shared transportation planning challenges. More information about the Peer Program, including the application, is accessible at the TPCB Peer Program website (www.planning.dot.gov/peer_app.asp).
Appendices

Appendix A: Acronyms

The following acronyms appear in the body and appendices of this report:

ADA  Americans with Disabilities Act of 1990
BRT  Bus rapid transit
CNG  Compressed Natural Gas
COG  Council of Governments
DOT  Department of Transportation
DTIS  Downtown Transportation and Infrastructure Study
FAX  Fresno Area Express
FHWA  Federal Highway Administration
FTA  Federal Transit Administration
FTE  Full-time equivalent
GCRTA  Greater Cleveland Regional Transit Agency
ITS  Intelligent Transportation System(s)
LPA  Locally Preferred Alternative
LTD  Lane Transit District
MOA  Memorandum of Agreement
MOU  Memorandum of Understanding
MPO  Metropolitan Planning Organization
NOACA  Northeast Ohio Areawide Coordinating Agency
NBRTI  National Bus Rapid Transit Institute
PTIS  Public Transportation Infrastructure Study
ROW  Right-of-Way
RTV  Rapid Transit Vehicle
TOD  Transit-Oriented Development
TPCB  Transportation Planning Capacity Building
TSP  Transit Signal Priority
VMT  Vehicle Miles Traveled
Appendix B: Agenda

TRANSPORTATION PLANNING
CAPACITY BUILDING PROGRAM (TPCB)

Federal Transit Administration (FTA)
Federal Highway Administration (FHWA)

Agenda for the City of Fresno Bus Rapid Transit (BRT) System Peer Exchange

Location: Fresno COG, Sequoia Room, 2035 Tulare St., Fresno
Date: May 21, 2013 – May 22, 2013
Length of peer exchange: two days with a pre-event webinar preceding the exchange
Times: Proposed times for on-site peer exchange are in Pacific Daylight Time (EDT is three hours later)
Host Agency: City of Fresno
Topics of Focus: BRT Planning and Project Delivery, Operations, and Land Use and BRT
Dress Code: Business casual
Facilitator: Terry Regan, Volpe Center
Peers:
- June Devoll, Manager of Strategic Planning & Grants for Community Transit;
- Tom Schwetz, Planning & Development Director for Lane Transit District;
- Michael York, Deputy General Manager of Operations for Cleveland RTA;
- Milind Joshi, sbX Program Manager for OmniTrans

FTA Representative: Eric Eidlin
FHWA Representative: Jermaine Hannon

Pre-Exchange Corridor Tour: Monday, May 20 (tentative)

<table>
<thead>
<tr>
<th>Time (PST)</th>
<th>Topic</th>
<th>Lead Presenter</th>
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<tbody>
<tr>
<td>5:00 p.m.</td>
<td>Guided Bus Tour of Fresno’s Blackstone/Kings County BRT Corridor</td>
<td>FAX (Ken Hamm and John Downs)</td>
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<td></td>
<td>Meet in lobby of Holiday Inn, 1055 Van Ness Avenue</td>
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Day 1: Tuesday, May 21 at Fresno Council of Governments

<table>
<thead>
<tr>
<th>Time (PST)</th>
<th>Topic</th>
<th>Lead Presenter</th>
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<tbody>
<tr>
<td>8:30 a.m.</td>
<td>Welcome and Overview</td>
<td>FTA, FHWA and Facilitator</td>
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<td></td>
<td>FTA and FHWA staff welcomes attendees, review the agenda, describe documentation/follow-up, and establish ground rules for discussions.</td>
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<tr>
<td>8:40 a.m.</td>
<td>City of Fresno Welcome and Goals</td>
<td>Host (Bruce Rudd)</td>
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<td></td>
<td>Fresno welcomes participants and opens the exchange. Provides context</td>
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<td>Time (PST)</td>
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<td>Lead Presenter</td>
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<tr>
<td>8:50 a.m.</td>
<td>Peer Agency Introduction and Goals</td>
<td>Peers</td>
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<td></td>
<td>Brief summary (less than 5 minute) of their respective BRT system.</td>
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<tr>
<td>9:15 a.m.</td>
<td>Session 1: Planning &amp; Implementation for Bus Rapid Transit (Overview)</td>
<td>Peers (led by Milind Joshi)</td>
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<tr>
<td></td>
<td>What are the steps and efforts an agency must take during the planning process for a bus rapid transit system?</td>
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<tr>
<td></td>
<td>• Coordination among public and private agencies (MOUs)</td>
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<td></td>
<td>• Public outreach and communications</td>
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<td>• Organizational Structure</td>
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<td></td>
<td>• Establishment of performance management plan</td>
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<td>• Personnel Training</td>
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<td>• Realistic Ridership expectations (shifts from existing service)</td>
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<td>• Facility Needs</td>
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<td>• Fare Structures</td>
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<td></td>
<td>• Operational plans/Issues</td>
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<td>• BRT Vehicle experiences/suggestion</td>
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<td>11:00 a.m.</td>
<td>Fresno Council of Governments</td>
<td>MPO (Kristine Cai)</td>
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<td></td>
<td>Fresno COG discusses the MPO’s transportation plan as it relates to its transit oriented development (TOD) program, policies and guidelines</td>
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<td>11:10 a.m.</td>
<td>Break</td>
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<tr>
<td>11:20 a.m.</td>
<td>Session 2: Planning and Project Delivery</td>
<td>Host, peers (led by Tom Schwetz), and MPO</td>
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<td>What are the steps and efforts an agency must take as a BRT project moves from planning through environmental review, design, and procurement? What are specific lessons learned?</td>
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<td></td>
<td>• Commissioning public artwork and integrating into the project development process</td>
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<td></td>
<td>Question and Answer Session (15 minutes)</td>
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<td>Time (PST)</td>
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<tr>
<td>12:15 p.m.</td>
<td>Lunch</td>
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<tr>
<td>1:15 p.m.</td>
<td>Session 3: Integrating Planning and Operations for BRT</td>
<td>Host, peers (led by Michael York and June Devoll), and MPO</td>
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<td></td>
<td><em>What was the impact of BRT on ridership and local services? Has BRT helped reduce the demand on the corridor in general? What are the lessons learned? Key elements of the discussion fall in two categories:</em></td>
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<td></td>
<td><strong>Technical Considerations</strong></td>
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<td></td>
<td>- Scheduling</td>
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<td></td>
<td>- Transfer service</td>
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<td></td>
<td>- Mode split</td>
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<td></td>
<td>- Coordination with traffic operations</td>
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<td></td>
<td>- Coordination with existing transit services</td>
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<td>- Identification of possible modifications needed</td>
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<td>- How are ITS technologies integrated into the system to improve planning and operations?</td>
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<td>- Fare collection/enforcement</td>
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<td>- BRT vehicle and station safety/security</td>
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<td><strong>Process Issues</strong></td>
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<td></td>
<td>- Developing a Corridor Management Strategy</td>
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<td>- Long-term financial viability</td>
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<td>- Integration into regional concept for transportation operations</td>
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<td>- Identifying opportunities for linkage between regional operations collaboration and regional planning</td>
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<td>- Responding to labor union concerns</td>
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<td></td>
<td><strong>Question and Answer Session (15 minutes)</strong></td>
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<td></td>
<td><strong>Highlights and Lessons Learned (5 minutes)</strong></td>
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<td>2:30 p.m.</td>
<td>Break</td>
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<td>2:45 p.m.</td>
<td>Small Group Discussions</td>
<td>Peers and Facilitator</td>
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<td>Audience divided into groups depending on areas of focus:</td>
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<td>1. <em>Communications/public outreach with June Devoll</em></td>
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<td>2. <em>Operations and Maintenance with Mike York</em></td>
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<td>3. <em>Financial Planning and Fiscal Constraint with Milind Joshi</em></td>
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<tr>
<td>Time (PST)</td>
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<td>4:15 p.m.</td>
<td>Wrap-up and charge for day 2</td>
<td>Terry Regan</td>
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<td>5:00 – 5:45 p.m.</td>
<td>Walking tour of:</td>
<td>Host (Elliott Balch)</td>
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<td></td>
<td>1. Downtown BRT stop at Mariposa and Van Ness</td>
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<td>2. High speed rail station location</td>
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**Day 2: Wednesday, May 22 at Fresno Council of Governments**

<table>
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<tr>
<th>Time (PST)</th>
<th>Topic</th>
<th>Lead Presenter</th>
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<tbody>
<tr>
<td>8:30 a.m.</td>
<td>Welcome, Review of Day 1 and Charge for Day 2</td>
<td>FTA and Facilitator</td>
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<tr>
<td></td>
<td>Welcome, review of agenda, and recap of previous day discussion</td>
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</tr>
<tr>
<td>8:45 a.m.</td>
<td>Session 4: Land Use and Bus Rapid Transit</td>
<td>Host (led by Elliott Balch and Keith Bergthold), peers (led by Tom Schwetz and Michael York), and MPO</td>
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<td></td>
<td>Where or how has BRT been integrated into development? What zoning changes or incentives were created to change the landscape along the corridor to boost ridership? How did you use the BRT investment to leverage development along the corridor?</td>
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<tr>
<td></td>
<td>• City of Fresno overview of land use efforts (zoning changes, etc.)</td>
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<td></td>
<td>• Citywide or targeted zoning changes (peer perspective)</td>
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<td>• Incentivizing Transit Oriented Development</td>
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<td>• BRT attractiveness to choice riders</td>
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<td></td>
<td>• Economic impacts of BRT (on land values and employment)</td>
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<td></td>
<td>Question and Answer Session (15 minutes)</td>
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<td></td>
<td>Highlights and Lessons Learned (5 minutes)</td>
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<tr>
<td>10:15 a.m.</td>
<td>Break</td>
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<tr>
<td>10:30 a.m.</td>
<td>Session 5: Financial Planning and Fiscal Constraint</td>
<td>Host, peers (led by Milind Joshi), and MPO (Kathleen)</td>
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<td>Ensuring that the capital needs for the project as well as future needs fit</td>
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<td>within a financially constrained plan and TIP. Distinction between capital funding and operations funding. Identifying operating costs and funding needs as part of the annual budget process.</td>
<td>Healy)</td>
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<td>Question and Answer Session (15 minutes) Highlights and Lessons Learned (5 minutes)</td>
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<tr>
<td>12:00 p.m.</td>
<td>Lunch</td>
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</table>
| 1:00 p.m. | Session 6: How to Measure Success  
How are you measuring the impacts of BRT investment on the corridor?  
What types of measures should be used to determine progress in implementation and operations of the BRT program?  
How should the BRT program be integrated into a regional system?  
What regional initiatives have been undertaken to move to a performance based planning process? | Terry Regan    |
|           | Question and Answer Session (15 minutes) Highlights and Lessons Learned (5 minutes)                                                                                                                    |                |
| 2:00 p.m. | Open Discussion on Key Topics                                                                                                                                                                         | Terry Regan    |
| 3:15 p.m. | Wrap-up & Follow-up Actions (45 minutes)                                                                                                                                                               | Terry Regan    |
Appendix C: Contacts

June Devoll
Manager of Strategic Planning & Grants
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sbX Program Manager
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www.volpe.dot.gov

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Government Affairs Manager
Office of Mayor Ashley Swearengin
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Fresno, CA 93721
(559) 621-7910
katie.stevens@fresno.gov
http://www.fresno.gov/Government/MayorsOffice/default.htm
Appendix D: Resources

General Resources
National Bus Rapid Transit Institute: http://www.nbtti.org/


Applicable ADA Requirements: http://www.fta.dot.gov/civilrights/12325.html

National Transit Database: http://www.ntdprogram.gov/ntdprogram/

Case Studies and Best Practices


Land Use Impacts of BRT

Fresno BRT Resources
Fresno County PTIS: http://www.kimley-horn.com/Projects/fasttrackfresnocounty/


FastTrack Fresno County: http://www.kimley-horn.com/Projects/fasttrackfresnocounty/index.asp


TPCB Peer Exchange on Bus Rapid Transit (2013)