ISSUE PAPER: INNOVATIVE FUNDING STRATEGIES

INTRODUCTION

This section describes existing funding sources for transportation in Alameda County and discusses a number of potential new sources. Key conclusions include:

- Given current and projected needs, current funding is inadequate.
- Many funding sources are unreliable, either because of political challenges to renewal or because they are tied to economic cycles.
- Many sources do not allow for flexibility in their allocation to respond to need.
- Public investments generate private value that is not "captured" for the public good.
- Relatively few revenue sources are based on use of transportation facilities and services.
- Funding sources generally do not directly support policy goals, and sometimes contradict them.
- Options for increasing funding are limited, primarily due to political opposition.
- Many potential new revenue sources cannot be implemented directly by Alameda CTC without legislative or regional or district collaboration.
- New revenue sources requiring contributions from private parties or system users may be impractical or controversial.
- In developing a revenue strategy, Alameda CTC must first set priorities; these might include equity, alignment with policy goals, sustainability, alignment with need, and "buy-in" from stakeholders.

Funding Context and Issues

Finding funding for transportation construction, maintenance, operations and programs in Alameda County has become increasingly more difficult as traditional federal, state, and local funding sources have decreased. While the recession has been responsible for part of this decline, there are structural issues that predate this most recent cycle.

Historically, state and federal funding, such as gas tax revenues, accounted for a majority of transportation funding in Alameda County. At this point, however, outside sources account for less than 40 percent of the Bay Area's regional transportation revenues. Alameda County is a "self-help" county under California law, with its own dedicated sales tax for transportation. The current Measure B sales tax revenue is a primary source of funding; however, like all sales taxes, it is dependent on a growing and stable economy. Receipts declined as a result of the recession from approximately $100 million annually to about $90 million, and have now rebounded as the economy has improved, illustrating how economic volatility can affect this revenue stream . Originally projected to earn close to $2.9 billion between 2002 and 2022, the program is now expected to generate only about $2.1 billion, a nearly 30% decline. (It should be noted that revenues from Measure B are also used as matching funds to leverage other

sources of funding such as federal capital grants, and when these matching sources themselves decline or are eliminated, the problem is exacerbated.) In 2010, Alameda County voters approved another local transportation funding source, Measure F, a $10 increase in the annual vehicle registration fee. This fee, however, constitutes a comparatively minor source of funding, as it is anticipated to generate approximately $110 million over 10 years.

Transportation funding structures in Alameda County are relatively complex, as financing is derived from a wide range of sources. However, sources can typically be assigned to a few categories, and there are a few common and key characteristics that should be highlighted:

- **While most funding sources are ongoing, in recent years there has been a heavy reliance on one-time infusions.** Over the past decade, programs including the state's 2000 Traffic Congestion Relief Program, the Corridor Mobility Improvement Account created as a result of 2006's statewide Proposition 1B, and the more recent federal American Recovery and Reinvestment Act stimulus funds have been used to supplement existing sources of funding. However, such temporary sources, while of course welcome, are by their nature not sustainable.
- **Many "regular" sources of funding are not reliable or sustainable.** Even some sources of funding that are regularly renewed cannot necessarily be counted upon, for reasons of politics, the economy, or both. The recent debate in the U.S. Congress over reauthorization of the SAFETEA-LU funding act has provided a vivid illustration of such. State Transit Assistance (STA) funding for operations, which amounted to $4.4 billion as recently as 2001, was zeroed out by the end of the decade in a budget-cutting maneuver. Measure B, meanwhile, will require two-thirds approval from voters if it is to be renewed. Moreover, Measure B is a sales tax, and revenues from sales tax are dependent on consumer spending and fluctuate along with economic cycles. Similarly, property taxes are tied to assessed home values (with the notable exception that in California, under Property 13, rates for many properties cannot be increased to reflect rising values).
- **Many primary sources of funding are not flexible.** Funding agencies including the Alameda CTC generally have limited discretion to allocate transportation funds according to need, as many major funding sources carry strict restrictions. For example, federal transit funding is generally available only for capital expansions, not operations, while revenue from the state's gasoline excise tax may only be used for road or fixed-guideway transit projects. Relatively few sources of funding are available for transit operations; as a result, transit agencies tend to rely heavily on local sales and property taxes to fund operations.
- **Direct return on investment is limited.** In the early 20th century, transit projects in the United States typically were privately funded: housing developers would build streetcar lines to ensure access to their developments, the so-called "streetcar suburbs." In Japan, a similar model is still in use, as private companies construct rail lines as "loss leaders" improving access to department stores they then build adjacent to stations. (There are examples of this in America today such as the Washington Metropolitan Area Transit Authority which participates in joint development.) Yet in modern America, "value capture" of private profits made possible by public investments is rare. To be fair, indirect value capture in the form of increased sales and property or parcel taxes is a primary source of transportation funding. Yet more direct linkages in the form of tax-increment financing or business improvement districts remain relatively rare.
- **Funding sources are generally not linked to use.** There are three major forms of transportation user fees in Alameda County: gas taxes, tolls for roads and bridges, and fares for transit users. However, these account for a relatively modest share of all funding: the average farebox recovery ratio (or share of transit operating costs covered by fares) at the Bay Area's seven largest transit operators is less than 40 percent; the federal gas tax has not been increased since 1993; and only $1 of each $4 to $6 toll collected on state-owned bridges is available to transportation projects through Regional Measure 2. There have been some moves recently toward a more direct transportation funding model, as exemplified by the new High Occupancy Toll (HOT) lane on Interstate 680 within Alameda County, the first among several such lanes planned by MTC.

However, taxes and tolls, while clearly more equitable than fees levied on non-users, remain highly controversial among the general public and elected officials.

- **Funding sources are not always aligned with policy goals**. User fees can be an attractive source of transportation funding in part for reasons of equity, and partly because revenue generation can in some cases be linked directly to policy goals. However, in the current system, even where user fees exist they are sometimes not well aligned with such goals. Transit fares, while a major source of funding for operations, actually run counter to goals of reduced vehicle miles traveled (VMT) and carbon emissions, as charging a fare depresses transit usage. Gas taxes are subject to diminishing returns as fuel efficiency is improved, and tolls that are "flat," rather than demand-based, cannot be used to manage congestion.
- **While funding is declining, both need and cost are increasing.** Recent years have seen two major trends that do not bode well for the future of transportation funding in Alameda County. First, overall travel demand has been increasing. This is especially true for transit demand, a trend that is likely to only accelerate as a larger share of the population reaches retirement and as climate change concerns continue to increase. Second, transit operating costs have for some time been growing faster than inflation, a trend described in detail in the Transit Sustainability and Integration issue paper**.**
- **In general, options for increasing funding are limited.** As described above, the current system of transportation funding is constrained in terms of available revenues and restrictions on use of funds. In terms of options for increased funding, politics may prove to be the greatest constraint, both in terms of the legal barriers to raising revenues (including the two-thirds requirement for tax increases in California, a requirement expanded by the recently approved Proposition 26, which redefines as "taxes" many "fees" that have previously required only majority approval at the state level, and no public vote at the local level) as well as a national political environment that is currently focused on deficit reduction in general, and reduced "discretionary" spending. The budget recently approved by the U.S. House of Representatives would significantly reduce funding for the Federal Transit Administration's New Starts program, a key source of funding for transit capital projects. It would also reduce transportation funding in other areas, including funding for non-motorized projects.

That said, opportunities appear to exist for new "creative" sources of funding, as described in the following pages.

GOALS AND AVAILABLE STRATEGIES

One might think of revenue-related goals in the simplest terms: more money is clearly needed.

However, it is not just *increased* revenue that is necessary; it is a funding structure that is:

- More stable, reliable and thus sustainable, that is, less exposed to political and economic cycles;
- More flexible and able to respond to changing needs;
- More equitable, both in terms of the relationship between fees and benefits and impacts, as well as in a social justice context;
- More closely linked to and supportive of policy goals such as reduced VMT and greenhouse gas emissions; and
- More easily scalable to increasing demand.

Among the strategies that might be available to achieve these goals are:

- **Increased use of public/private partnerships.** Such arrangements have become more common in recent years, partly out of necessity, but also as a means of building support for investments by engaging stakeholders in a collaborative process. Private parties, of course, may be reluctant to

enter into such arrangements; however, due to the benefits that transportation investments can deliver, "win-win" scenarios often exist where both the public good and private interests can be served simultaneously. Some members of the public may be opposed to any mechanism whereby private profits are generated using public funds, even if a clear public benefit is involved. Public/private partnerships may consist of direct funding contributions to capital and operating expenses, or they may be sponsorships.

- **Increased use of value capture strategies.** In lieu of voluntary public/private partnerships, fees may be levied on private entities that stand to benefit from improved access, either in terms of increased land values or increased business. This form of funding has proven especially popular for planners of streetcar lines, which have been shown to have a significant impact on land values and development opportunities. However, it is rarely used for other types of rail projects, or bus rapid transit projects that might have a similar effect. Moreover, under Proposition 26, a two-thirds vote of the public is now required to enact fees.
- **Increased use of impact fees.** Another mechanism for ensuring that private parties who benefit from public investments in transportation infrastructure contribute to those investments is developer impact fees. So-called "nexus" fees linked to demands placed upon transportation systems by development have become relatively common in California, and there are existing fee programs in Alameda County, including the Alameda County Cumulative Traffic Impact Mitigation Fee and the Tri-Valley Transportation Development Fee. The latter applies to all new development in the "sub-region," which includes five cities and unincorporated parts of both Alameda and Contra Costa Counties, and currently ranges as high as $2,170 for a single family home and $3.89 per square foot for office space (significantly less than the San Francisco fee described under Case Studies). Enacted in 1998, it is dedicated to road projects. A new Strategic Expenditure Plan is currently in development.
- **Increased use of innovative funding mechanisms, such as loans backed by tax revenues.** A built-in problem of using tax revenues to fund construction is that the necessary revenue may not be available for some time, delaying implementation and delaying project benefits including increased revenues from related development. Some transportation agencies, of course, are able to exercise bonding authority. One alternative approach is to procure a loan or issue bonds for capital projects backed by tax revenues, allowing project timelines and benefits to be accelerated. A proposed example (Los Angeles County's 30/10 Initiative) is described under the Case Studies.
- **Increased use of revenue sources that are supportive of policy goals.** Some sources of funding can simultaneously serve as means to achieve policy ends. Most obvious are roadway user fees: congestion pricing serving to reduce peak congestion while raising revenue for investments in transportation alternatives; more typical "flat" tolls which can also raise revenues and discourage driving; taxes on vehicle miles traveled, as an alternative to traditional gas taxes; or gas taxes (although these are becoming less effective over time as technological advancements in fuel efficiency reduce the disincentive to drive). Parking fees can have the same effect. All such user fees, however, can be highly contentious and politically challenging to implement.

CASE STUDIES

Private Funding

Private funding for shuttle operations is relatively common; within Alameda County are examples including the Emery Go Round, which is funded by fees assessed through a Transportation Management Association, and Oakland's "B" Line, which is partly funded by contributions from private business organizations. However, other means exist to capture some of the value that public investment creates for private entities –ways to capture a share of the additional profits they would not have been generated otherwise.

Portland/Seattle Streetcars

The Portland Streetcar is a classic example of using nontraditional funding sources for construction of public transit. To date, construction has cost $103.15 million, of which $69.5 million, or more than two-thirds of the total funding, had come from three sources:

- $28.6 million in bonds backed by revenues from a small (20 cents an hour) short-term parking rate increase in city-owned garages;
- $21.5 million in Tax-Increment Financing (TIF); and
- $19.4 million from a Local Improvement District (LID) assessment on owners of non-owner-occupied homes near the alignment (a LID is essentially what is known in California as a Business Improvement District)

The Portland Streetcar is operated by a nonprofit organization, Portland Streetcar Inc., which derives about 5 percent of its funding ($250,000 per year) from vehicle and shop sponsorships. Sponsor packages include signs, names on brochures, and announcements on-board vehicles. Almost all sponsors are locally owned businesses, merchant groups or institutions.

For Seattle's South Lake Union Streetcar, the share of capital costs contributed by adjacent property owners through a LID was even greater: $25.7 million, or roughly half of construction costs. Reportedly, just 12 of the property owners to be assessed, or 1.5 percent, filed formal protests, well below the 60 percent required to block the assessments. The South Lake Union Streetcar similarly relies in part on sponsorships. It earned $387,000 in 2009.

Lessons Learned

- **Value capture using an improvement district can account for a significant portion of a capital project's budget, and may prove relatively uncontroversial if there is a clear, direct benefit for property owners**
- **Another innovative means of obtaining financing from private sources is to build on existing advertising models by offering sponsorships of infrastructure**

Cleveland HealthLine

While the Portland and South Lake Union Streetcars described above have been able to raise several hundred thousand dollars per year toward operating expenses by using a limited sponsorship strategy, the Greater Cleveland Regional Transit Authority (RTA), has pursued a more aggressive course, one akin to that used by major-league sports owners: it has sold naming rights to a major transit line.

RTA sold naming rights to the bus rapid transit line for a one-time fee of $12 million. The project, originally called the "Euclid Corridor" was finally named the "HealthLine" by the sponsors, the Cleveland Clinic and University Hospital, two major institutions located along the line. Fortunately, the name is geographically and logically related to the line, thus reducing any potential for confusion. (It is not clear how long the naming-rights agreement will last and such an arrangement raises an obvious question: if the name were to be changed at some point, what might the impact be on ridership?)

The fact that RTA was able to *successfully* sell naming rights for this fairly substantial sum of money may come as something of a surprise; however, it is more understandable in light of the fact that advertising already serves as a major source of revenue for many transit agencies, as transit vehicles are both highly visible and highly mobile.

Lessons Learned

- **Sponsorships may even extend to an entire transit service, and depending on the visibility of that service, may prove relatively lucrative**
- **In selling naming rights to a transit service or infrastructure , the risk of confusion for users, and attendant ridership and fare revenue impacts should be taken into account**

Loans and Bonds

America Fast Forward / 30/10 Initiative (Los Angeles)

In 2008, Los Angeles County voters approved Measure R, a 30-year, half-cent sales tax increase to fund a package of transportation improvements, including many major transit projects. Measure R received 67.2 percent of the vote in 2009 (?), surpassing the required two-thirds majority and demonstrating a broad mandate. Sixty-five percent of Measure R revenues are dedicated to transit capital and operations, and the remaining 15 percent are reserved for cities, some of which will go to transit.

Measure R is expected to generate $40 billion over 30 years. Construction, however, cannot get underway until funding is actually available. So, in order to deliver project benefits sooner, the Los Angeles County Metropolitan Transportation Authority (Metro) and Los Angeles Mayor Antonio Villaraigosa have advanced the 30/10 Initiative and America Fast Forward, companion proposals to front-load construction of a dozen key transit projects by having the federal government provide loans and bonds backed by local sales tax revenues, and to implement such a program nationwide. Completion dates for all 12 Los Angeles-area projects could be moved up from as late as 2039 to no later than 2019.

The economic and environmental logic is compelling: While a substantial initial investment would be required of the federal government, taxpayers (outside of Los Angeles County, at least) would be largely reimbursed. In exchange, Metro estimates that:

- 160,000 jobs would be created in construction, operations and maintenance
- 521,000 fewer pounds of mobile source emissions would be generated annually
- 10.3 million fewer gallons of gasoline would be used annually
- there would be an additional 77 million annual transit boardings
- annual VMT would be reduced by 191 million miles

Additionally, the Los Angeles Economic Development Corporation has estimated that Measure R projects with a total cost of $34.7 billion would generate significant benefits for the regional economy, including $68.8 billion in private section revenues and over a half-million jobs. An additional $9.3 billion in tax revenue would be generated, including $6.6 billion for the federal government.

According to program descriptions available on Metro's website, the federal government would incur limited costs. The 30/10 Initiative calls for both Transportation Improvement Bonds (TIBs) requiring a federal subsidy to cover the interest, as well as Transportation Infrastructure Finance and Innovation Act (TIFIA) Direct Loans that would require a subsidy of $200 million on a $2.3 billion loan. Congressional approval would be required. A fact sheet for the America Fast Forward program further notes that tax code incentives could reduce borrowing costs for bonds. As the fact sheet states:

> *The federal government has four types of broad policy tools it can use to stimulate infrastructure investment: grants, regulatory streamlining, credit assistance and tax code incentives. Grant funding has been the traditional federal tool (but) the magnitude of the nation's transportation investment needs far exceeds available resources. .. (C)redit assistance and tax code incentives, when used as innovative project finance tools, promote two important federal policy objectives: a) stimulating investment through leveraging pledged state and local revenue streams or user charges; and b) limiting budgetary costs.*

The concept underlying the 30/10 Initiative and America Fast Forward is reflected in President Obama's proposal for a National Infrastructure Bank that could provide such assistance to other regions, including the Bay Area. However, given current Congressional priorities, the likelihood of such a program being enacted prior to the 2012 elections would appear to be limited. Nonetheless, the Fast Forward program has reportedly received the support of the U.S. Chamber of Commerce, the AFL-CIO, and more than 60 mayors.

Lessons Learned

- **Issuing bonds or obtaining loans backed by approved sales tax revenues can accelerate project benefits at relatively little cost**
- **Such a program can serve to reward "self-help" communities, and to encourage others to make similar investments**
- **Significant political barriers exist to implementation of such a program on the federal level**

User Fees

Replacement of gas taxes with Vehicle Miles Traveled, or VMT fees is an idea that has been long discussed in transportation circles in California. Following is a description of a pilot program conducted in Oregon. The primary source for this case study is the 2007 project report, "Oregon's Mileage Fee Concept and Road User Fee Pilot Program."

Mileage Fee Concept and Road User Fee Pilot Program (Oregon)

Program Background. In 2001, the State of Oregon passed legislation which created the Road User Fee Task Force. Responding to the challenges presented by the existing transportation funding system – ever-diminishing revenue that can no longer support existing and proposed infrastructure due to stagnant gas tax rates and increasingly fuel-efficient vehicles – the Task Force was asked to develop concepts for a new, long-term, and stable revenue source for Oregon's transportation system.

The Oregon Mileage Fee Concept was designed by the Task Force and a partnership of the Oregon DOT, Oregon State University, and Portland State University. The fee program was ultimately tested on a pilot basis, known as the Road User Fee Pilot Program, which sought to study the feasibility of both a mileage-based fee and congestion pricing. The program was funded by a $2.1 million grant from FHWA and $771,000 in matching funds from the state.

Pilot Overview. The pilot program began in March 2006 and ran for one year. In the study, there were 299 motorists (with 285 vehicles) from 221 households within the greater Portland area. Program participants were offered $300 per vehicle for their participation, with compensation provided after completion of certain project milestones. In each vehicle an "on-vehicle" device was installed, which used GPS technology to count the number of miles driven within a given zone.[1] Study participants were instructed to refuel their vehicles at two gas stations that had been outfitted with wireless readers to download mileage data and calculate the cost of the gasoline, including the mileage fee.

The first five months of the study were the control period, in which participant mileage was recorded, but drivers continued to pay the existing gas tax. In short, the control period was used to establish a baseline of travel behavior for the participants. Beginning in month six, the participants were broken into two groups: a "VMT" group, which ceased to pay the gas tax and instead paid a 1.2 cents per mile fee; and a "rush-hour" group, which also no longer paid the gas tax and instead paid 10 cents per mile from 7-9 AM and 4-6 PM and .43 cents per mile at all other times. It is important to note that the per-mile fees for the pilot program were explicitly set to be *revenue-neutral.* In other words, they were set to generate as much revenue as the existing 24-cent per gallon gas tax.[2] As described below, the per-mile rate is one of the key policy questions related to mileage-based fees.

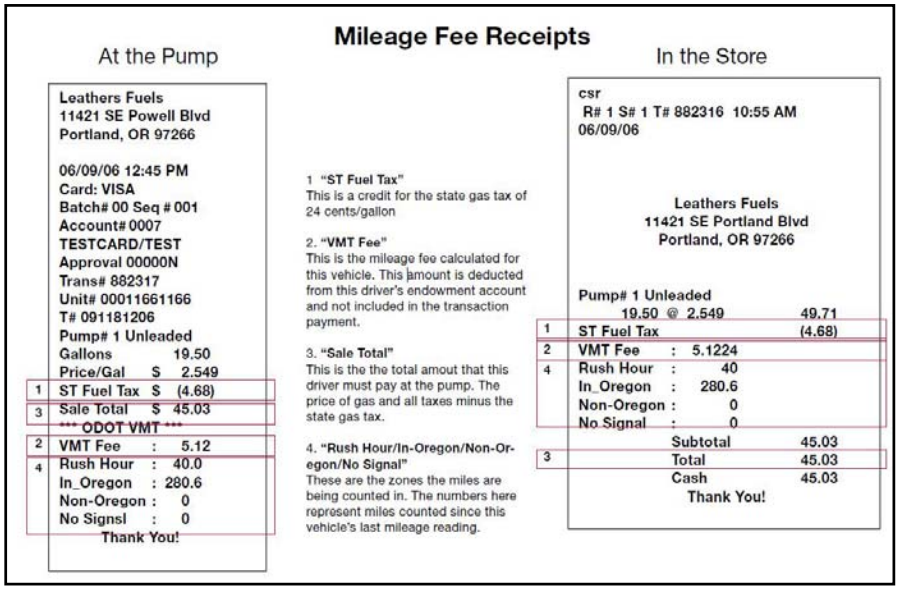
Pilot Program Evaluation and Key Findings. A number of key findings emerged from the pilot program related to program design, implementation, effects on participant travel behavior, and participant experience. These are briefly outlined below:

[1] Only miles driven within Oregon were recorded.

[2] For example, the 1.2 cents per mile fee was determined by dividing the existing gas tax by the average fuel efficiency (in 2004). 24 cents per gallon / 20 miles per gallon = 1.2 cents per gallon.

- **Transparency of fee/ Ease of use:** The program was largely successful in ensuring transparency of the fees and making payment as easy as possible. First, the on-vehicle dash display shows the zone in which a vehicle is traveling and miles traveled. Second, the payment process was designed to be as simple and as familiar as possible for users. The participants would refuel at one of two stations that had been outfitted with wireless readers,[3] which would access the on-board equipment and calculate the number of miles driven since the last fueling. At payment the number of miles traveled per zone and the total mileage fee was itemized on the receipt, and shown in comparison to the cost of the gas tax (see Figure 1).

Figure 1 Sample Receipts for Mileage Fee Fuel Purchase[4]



- **High accuracy and easily integrated:** The mileage system accurately calculated the mileage traveled and accurately completed the needed financial transactions. Furthermore, the technology was easily integrated with existing systems, allowing non-test vehicles to also fuel at the pumps.
- **Privacy protection:** One of the highest priorities for the pilot program was to ensure participant privacy, and pilot program showed that this goal is easily achievable. First, the program technology did not allow for the transmission of vehicle location and no location points were stored within the GPS equipment. Second, the transmitters were only short-range and, therefore, did not allow "tracking." Finally, under the proposed, full-scale program, ODOT would not install, maintain, or physically access the equipment within in each vehicle, as this would be done by the vehicle manufacturers themselves. The only data that ODOT would collect at the pump would be a vehicle ID number, miles traveled in each zone, amount of fuel purchased, and location of fuel purchase.
- **Ease of enforcement and minimal fee evasion:** As designed, the program is easy to enforce and hard to evade. First, payment at the pump is an enforcement mechanism in and of itself because a motorist must pay the fee in order to fuel their vehicle. Second, hacking of on-vehicle and pump

[3] The wireless readers at the fueling stations were designed to continue to allow non-study participants to continue fueling and pay the existing gas tax.

[4] Whitty, J. M. (2007). *Oregon's Mileage Fee Concept and Road User Fee Pilot Program.* Salem: Oregon Department of Transportation.

equipment can be mitigated through design and encryption. Third, tampering of equipment of abnormal mileage readings could be detected and flagged for auditing. Furthermore, the mileage fee system offers little incentive to evade the mileage fee because the per-mile fees are comparable to the existing gas tax. Finally, any effort to drive to another state to avoid the tax would likely prove to be not only cost-neutral, but also impractical.

- **Ease of collection and administration:** In Oregon taxes on fuel are paid to the state "up front" by a limited number of distributers before gasoline ever reaches a gas station. Those fees are passed on and recouped by the distributers through the gas retailers, and, ultimately, the motorist. This process would continue under the mileage-based fee system with periodic accounting checks to ensure accurate payments.
- **Program costs:** In 2003, estimated capital costs were $33 million. It is unclear what setup costs would be at this time, but ongoing improvements in GPS and wireless technology have likely resulted in significant per unit cost reductions. Annual operating costs (in 2003) were $1.6 million, which represents less than 3 percent of projected mileage fee revenue collected at the pump.
- **Phasing:** As designed, the Oregon mileage-based fee would be phased in over time as only "vehicles equipped with appropriate technology installed prior to first sale…would pay the mileage fee." Retrofitting existing vehicles was determined to be cost-prohibitive. As a result, many motorists would continue to pay the gas tax. It is estimated that it would take approximately 20 years before all Oregon vehicles were equipped with the proper technology and paying a mileage-based fee.
- **Adaptability to congestion pricing:** The pilot program proved to be highly adaptable to congestion pricing schemes. The technology was able to calculate fees based on specific zones and times of day, yet additional technology and system improvements are likely required before it could be used to implement a comprehensive congestion pricing scheme.
- **Travel behavior:** The mileage and congestion-based fees had some specific impacts on the travel behavior of participants.
    - The "VMT" group showed a 12% reduction in total miles traveled per day, despite the fact that the mileage fee was equivalent to the existing gas tax. The study showed that enhanced information about travel behavior alone led to voluntary changes in travel behavior.
    - Relative to the "VMT" group, the "rush-hour" group had a 22% reduction in peak-period travel.
    - Households within four blocks of transit reduced their rush-hour miles by an additional .742 miles per day.
- **Participant Experience:** In all, program participants reported a positive experience with the mileage-based system. Approximately 91% of program participants indicated that they would have been willing to continue with the mileage-based system. The primary complaints with the system, such as having to purchase fuel at one of two stations, were program-specific and not applicable with a fully scaled and improved program.

By numerous measures, Oregon's experience with a mileage-based fee proved to be a success. The pilot program clearly indicates that a mileage-based fee is a viable alternative to the gas tax. However, the Oregon experience also demonstrates that there a number of remaining issues that must be resolved before the program can be expanded. These lessons are important to highlight as Alameda County and the Bay Area grapple with the region's own transportation funding challenges.

First, the Oregon pilot program was the result of more than a decade of effort to address the gasoline tax. The study of the mileage-based fee and implementation of the pilot program required strong leadership from both the Governor and the State Legislature. State legislation was required to establish the Road User Fee Task Force and move forward with the mileage-based fee. It is clear that any

implementation of a similar program in the Bay Area will require strong leadership from local, regional, and state officials to overcome likely political opposition and resistance to change.

Second, despite evidence to the contrary, privacy concerns continue to be the primary criticism of any mileage-based fee. The increasing ubiquity of smartphones and other GPS-enabled technology would seemingly mitigate any such criticisms, but it is clear that privacy concerns must be addressed if the public is to accept a mileage-based fee. Any effort in the Bay Area to adopt such a funding structure should prioritize effective and clear messaging around this issue. The Oregon experience demonstrates that if the technology and concept is understood, public concerns can be alleviated.

In addition, the Oregon pilot program was explicitly designed to be revenue neutral and the program set per-mile rates equal to that of the existing gas tax. Clearly, the rate structure is one of the most crucial policy questions surrounding mileage-based system. If the Bay Area moves forward with such a funding concept, it will have to evaluate rate structures that respond to the region's numerous transportation goals: revenue generation and fiscal sustainability, congestion reduction, VMT reduction, mitigation of climate change, and equity and fairness.

The Oregon program also demonstrates that a mileage-based fee system is not a "quick fix." The Oregon Task Force determined that the retrofitting of existing vehicles with a mileage-based technology was cost-prohibitive. Instead, any statewide program would be phased in over time, an estimated 20 years, as only new vehicles with pre-installed GPS technology would pay the mileage fee. In short, Alameda County and the Bay Area should not view such a funding scheme as a quick solution to the region's funding challenges as any significant amount of revenue generated from a mileage-based fee is likely many years away.

Lessons Learned

- **A mileage-based fee appears to be a viable alternative to existing gas taxes.**
- **However, there would be significant political obstacles to implementation.**
- **Public concerns about invasions of privacy, even if unwarranted, would have to be addressed.**
- **It may prove much easier to adopt such a program if it is revenue-neutral; however, it would then serve only as a means to achieve policy objectives (reduced VMT), and not as a tool for raising revenues.**
- **In order not to be cost-prohibitive, such a program would have to be phased in over a long period, as new cars are outfitted with the necessary technology.**

SFpark (San Francisco) and Old Town Pasadena Parking Benefit District

Like the Oregon Mileage Fee, San Francisco's SFpark Parking Demand Management (PDM) program has been designed to be revenue-neutral. The program will set prices for metered parking spaces based on demand, and with a maximum price of $6 per hour, it is projected that revenue from meters will increase. However, in addition to reducing vehicle miles traveled, peak period congestion and conflicts with other users of the street (as the need for motorists to "circle" looking for parking would be reduced), one of the program's core objectives is to make it *easier* to find parking and avoid tickets. This would be done in part by increasing availability of legal spaces, but also by providing real-time information on availability, relaxing time limits, and providing more payment options, including credit and debit cards as well as prepaid parking cards. This is expected to reduce revenues from meter, loading zone, double-parking and other violations.

For this reason, market-based pricing of parking may not result in additional revenues. However, market-based pricing programs in other cities such as Pasadena have been used to generate additional revenues which were then reinvested in the surrounding area. In the Old Pasadena Parking Meter Zone, meter revenues have been used to fund a range of streetscape improvements, enhanced maintenance, security and marketing. The program generates about $80,000 per block annually, and the area's resurgence since the program's implementation in 1993 has been widely documented: sales tax revenues increased

roughly 250 percent within six years, while revenue at a nearby mall with free parking declined. Such a "parking benefit district" or PBD may also be used to fund other types of transportation improvements.

It should be noted that market-based parking pricing programs provide an excellent example of a revenue source that is both equitable and aligned with policy goals. Market-based pricing is not only a user fee; it is a user fee that is set according to demand, and not arbitrarily. Moreover, prices can vary not just by location, but by time of day – meaning that market-based pricing can serve as a form of congestion pricing reducing peak demand on the system. Indeed, SFpark prices will vary by time of day, with a goal of achieving 20 percent availability in all locations at all times during which meters are in operation, thereby reducing the amount of "circling" by motorists attempting to find a space.

Lessons Learned

- **Market-based pricing of public parking can serve as a mean to improve convenience for motorists, while reducing VMT, peak congestion and conflicts with other users.**
- **Market-based pricing can also be used as a means to raise revenues; however, this may be more politically palatable if revenues are reinvested in the immediate area.**
- **As a demand-based program of user fees, market-based pricing is both an equitable strategy and one that is well aligned with policy objectives.**

Impact Fees

San Francisco Municipal Transportation Agency (SFMTA) Revenue Generation Tools

Like transit agencies across the country and in Alameda County, including AC Transit, the SFMTA has struggled to overcome significant budget deficits in recent years. The origins and causes of the financial challenges facing SFMTA are complicated and varied, yet generally involve familiar factors: a combination of declining tax revenues due to the poor economy; increasing labor, operating, and capital costs; and state operating funds being diverted to California's general fund. As a result, the SFMTA has had to close its budget deficits through several fare increases and service reductions. In addition to the immediate impacts of reduced service and higher fares on riders, the ongoing budget deficits have prevented the SFMTA from completing capital projects and implementing the recommendations of its first comprehensive service evaluation in decades, the Transit Effectiveness Project (TEP). While the SFMTA has an approved budget through June of 2012, it still faces systemic budget challenges. In fact, the latest budget outlook estimates that SFMTA faces a $1.6 billion shortfall over the next 20 years. Moving forward, SFMTA must generate an additional $50 million in revenue and reduce costs by an additional $30 million each year to balance its budget.

In response to these long-term budget deficits, the SFMTA has begun to explore and/or refine specific revenue-generation concepts as a means to systemically address its funding shortfalls.[5] This case study highlights the most applicable of these funding concepts, yet it is important to emphasize that Alameda County will need to thoroughly evaluate these measures in the context of its own transit and regulatory environment. Nevertheless, these concepts offer additional "food for thought" as the Alameda CTC moves forward with developing a transportation plan that seeks to ensure a financially sustainable transit system in Alameda County.

Transportation Impact Mitigation Fee (TIMF). The California Environmental Quality Act (CEQA) requires that public agencies determine if a proposed project will have a "significant" impact on the environment. A project's environmental impact must be evaluated in a number of different areas, including transportation impacts, with "significance" determined by a number of predetermined thresholds. CEQA allows local jurisdictions to establish their own metrics and significance thresholds. However, with regards to transportation, most jurisdictions use well-established Level of Service (LOS)

[5] In addition, SFMTA is also evaluating a number of cost savings measures, such as bus-stop consolidation and labor savings through ongoing negotiations with unions. For the purposes of this case study, however, the primary focus is on the specific revenue generation concepts.

thresholds. Level of Service is a measure of the amount of delay (calculated in seconds) for a vehicle at an intersection, with a "grade" assigned (A through F) based on the length of delay. For example, an intersection with an A "grade" has less than ten seconds of delay per vehicle, while an intersection with an F "grade" has greater than 80 seconds of delay. Typically, when an intersection reaches a D "grade," measures are employed to "mitigate" that delay, such as roadway widening or adjusting signal timing.

San Francisco has begun to realize the deficiencies of using LOS as the only metric for evaluating a project's transportation and environmental impacts. For example, the application of LOS is imperfect in dense, urban environments given the variety of modes and limited mitigations available (widening roadways in San Francisco has very restricted applicability). In addition, LOS measurements have the potential to prioritize better "performing" projects over others that have additional environmental benefits. For example, a mitigation measure or project that adds a lane of traffic would likely improve an intersection's LOS. However, adding that travel lane could actually induce additional vehicle travel and emissions, while increasing vehicle speeds, which would negatively impact the safety of bicycles and pedestrians.

Furthermore, LOS thresholds are inconsistent with the city's *Transit First Policy* because LOS prioritizes vehicle travel over other modes; and LOS measurements provide a very narrow representation of environmental impacts and ignore the full impacts of additional vehicle trips. As such, the city has begun to explore an alternative way in which to more holistically and equitably assess transportation impacts under CEQA.

What has emerged is a new approach that replaces the LOS threshold with a new impact measure: automobile trips generated (ATG). Under this approach, projects would no longer be evaluated under CEQA for LOS and intersection delay, but rather for how many new vehicle trips will be generated by the project. Using ATG resolves many of the issues created by LOS thresholds because ATG is a more equitable indicator of environmental impact. By calculating ATG, a project's impact on not only congestion, but also air quality, GHG emissions, the overall efficiency of the city's transportation network, traffic safety and collisions, noise, water quality, and the sociological impacts of traffic can be measured. The methodologies to determine ATG are rooted in current transportation planning processes and can be readily adapted to estimate ATG based on certain project characteristics.

Projects that do not generate any automobile trips or even reduce "automobility," and have no potential impacts in other areas, would be eligible for a negative declaration under CEQA. Projects that are shown to have a significant ATG would have to mitigate the impacts from those automobile trips by paying a per-trip impact fee, known as a Transportation Impact Mitigation Fee (TIMF). The per-trip fee would be based on the monetary costs imposed by the new trip onto the transportation network.

Revenue generated by the TIMF would be used to fund a variety of transportation projects and programs to offset the impacts of the new trips, such as site-specific improvements (signal timing, bicycle and pedestrian infrastructure, restriping, parking infrastructure, etc.). In addition, revenue could also be allocated to specifically fund SFMTA transit projects and operations as a means to reduce additional trips.

The ATG approach is currently being evaluated in San Francisco and will require an additional nexus study, environmental review, public hearings, and a citywide ordinance before the new methodology would be phased in.

Transportation Impact Development Fee (TIDF). The TIDF is a reliable, if relatively modest, source of revenue that takes advantage of the nexus between land-use development and demand for transit to justify an equitable "user fee." In short, it recognizes that transit service adds significant value to development projects and recaptures at least part of that value. It also recognizes that automobile traffic generated by new development has a significant negative impact on the speed and productivity of on-street transit services.

TIDF was originally conceived as a means of providing additional peak capacity for commuter-oriented service to the downtown commercial core. It was limited to office projects with a fee of $5 per square foot. Recognizing that downtown office projects were not the only development projects to require and benefit from additional transit service, San Francisco expanded the program in 2004 to include most non-residential projects citywide and implemented a two-tiered system of fees.

The gap between "justified" and actual fees is a reflection of the program's key limitation: if developers were to pay the full cost of providing additional transit service to their projects, many projects would no longer be economically viable. Unlike most impact fees, administrative costs and outlays have exceeded collections in many years. However, the program maintains a positive balance due to interest earned on the TIDF fund. Finally, as TIDF is limited to non-residential uses, collections decline during development cycles driven by residential projects.

Fees may be used to increase service hours or maintain the ratio between service hours and automobile and transit trips generated by uses subject to the fee, including both operating and capital expenses, as long as there is a reasonable connection to the impacts of development on transit. Expanding the fee beyond downtown office development to non-residential uses citywide allows it to be used for service outside of the peak period. Unlike other types of impact fees, there is no fixed time limit on use of fee receipts; however, the city conducts a five-year review, as required under state law that orders the city to issue "findings" about the program. These findings include certifying that unexpended funds do not exceed the amount needed to make the improvements for which the funds were exacted.

Since its inception in 1981, TIDF has generated about $120 million (including interest). Originally a $5 per square foot fee on office developers, TIDF now includes most non-residential projects citywide. Fees have also been raised and indexed to inflation, and are now $9.07 to $11.34 per square foot depending on land use type.

Additional Fees and Taxes. The SFMTA is also considering a number of other fees and taxes as a means to generate additional transit revenue that may be of some interest to Alameda County. These concepts have recently been "floated" and will likely be evaluated in much greater detail in coming months. Because these items are taxes or fees, they would likely require two-thirds approval by city residents, per Proposition 26. They include an impact fee, as well as two more conventional assessments:

- Vehicle Mitigation Impact Fee. An impact fee of $50 to $150 per registered vehicle, which is estimated to generate $24 million to $72 million a year.
- Transportation Utility Fee. Annual utility fee of $60 to $180 for each single-family household in San Francisco, which would generate an estimated $26 million to $74 million.
- Parcel Tax for Transit Purposes. An increase in the parcel tax of $100 to $200 per parcel for commercial, residential and industrial parcels. Estimated revenue would be $20 million to $39 million. (AC Transit has won passage of two parcel tax increases in recent years, both of $48, in 2004 and 2008. The combined $96 tax will remain in effect through 2019.)

Lessons Learned

- **As an alternative to traditional auto LOS evaluation of transportation impacts for mitigation, a standard of auto trips generated might be used; this would serve to reduce traffic (and generate related benefits) rather than increase capacity, as it typical of existing CEQA mitigations.**
- **As an alternative to mitigations, developments could pay a fee, which could then go into a fund for projects reducing auto trips.**
- **A nexus study and legislation would be required for implementation.**

Emeryville Transportation Impacts Alternative Strategies

As in San Francisco, an alternative approach to traditional auto LOS evaluation of traffic impacts from new development has been proposed for Emeryville. The Vehicle Trip Generation, or VTG, standard would be similar to San Francisco's ATG standard. VTG impacts would be relatively easy to measure using existing tools. Also, because auto trips are among the most significant transportation impacts, VTG could serve as a proxy for evaluating impacts on the larger multimodal system.

As recommended, the threshold for required mitigations would be one net new trip. Developers could pay a Multimodal Transportation Impact Fee, or MTIF. Alternately, they could reduce impacts, for example by implementing transportation demand management (TDM) measures.

As proposed, the MTIF would replace existing transportation impact fees. A nexus study would be necessary to assess appropriate fee levels. Payment of the fee would allow applicants to issue a mitigated negative declaration of impacts under CEQA, or to claim exemption from CEQA review.

Revenue from the MTIF, in turn, could be used to fund projects that do not, as traditional CEQA auto LOS mitigations do, expand roadway capacity. Rather, candidate projects would serve to reduce auto trips. The nexus study would need to establish to what extent projects would have to be in the immediate vicinity of a development, and to what extent they could simply reduce trips over the citywide network.

Lessons Learned

- **In addition to the benefits previously enumerated, an auto (or vehicle) trips generated standard would be simpler to administer, reducing the burden on applicants.**

Austin Transportation User Fee

The city of Austin, Texas assesses a Transportation User Fee, or TUF, as a means to fund road maintenance. The fee is included in utility bills and is relatively modest: it varies slightly depending on land use (which serves as a proxy for number of auto trips generated; for example, each acre of single-family development is assumed to generate approximately 40 trips per day), but generally amounts to about $40 per year. Notably, households can claim an exemption from the fee for either of two reasons: residents are elderly, or the household does not own a car. It is this latter exemption that makes the TUF an especially notable revenue strategy, as it is directly linked to policy objectives.

Lessons Learned

- **A household- or property-based fee for road maintenance could, by exempting car-free households, reduce the maintenance burden while helping to achieve other objectives.**

CHALLENGES

While a number of possible new revenue sources would appear to exist, a number of potential barriers to their implementation might also exist.

- **Action would be required at the local, district, regional, State or Federal level.** Alameda CTC would be unable to implement many new funding measures on its own. Some, such as market-based pricing of parking, might have to be implemented at the local level, and some, such as sponsorships for transit infrastructure or services, might have to be implemented at the district level. Measures such as a Mileage Fee would require legislation at the State level and would likely have to be implemented statewide (although under current law, the region may implement its own gas tax). An Infrastructure Bank or similar program for providing loans backed by local or regional (county, in this case) taxes would be national in scope. However, the transportation funding challenges faced by Alameda County are not unique; other large counties in California face similar issues, and might act as partners in a coordinated effort to develop new funding sources statewide. Alameda CTC could similarly work with and through MTC. Finally, Alameda

CTC could work with localities within the county to develop new revenue sources for transportation projects at the local level.

- **There might be resistance from private parties**. Private entities would likely be unwilling to contribute funding in the absence of a clear benefit or mandate. Experience from other areas does suggest, however, that they will do so if value can be demonstrated – if businesses or property owners can be convinced that they will see returns on their investments.
- **There might be resistance from voters and elected officials.** Some proposed revenue sources may prove to be highly controversial, including those with broad impacts (such as taxes on the general public, or user fees for motorists), those that would price a resource that has previously been free (such as new tolls), and those that would affect interest groups able to exert influence on elected officials. Even measures that require direct voter approval or that would be voluntary in nature, such as sponsorships, could prove controversial. Polling could be used to determine risks before committing resources to pursue new revenue sources; however, potential sources of opposition cannot always be anticipated.

STRATEGIC INVESTMENT OPPORTUNITIES

Transit Cooperative Research Program *Report 129: Local and Regional Funding Mechanisms for Public Transportation* identified the following criteria for evaluation of potential new revenue sources:

- Revenue yield, adequacy, and stability
- Cost efficiency, including administrative cost to agencies, compliance costs to taxpayers, and evasion levels
- Equity with regard to cost burden and benefits accrued across income groups, different vehicle classes, and jurisdictions
- Economic efficiency, with particular emphasis on efficiency in pricing
- Political and popular acceptability
- Technical feasibility

However, before potential new sources of revenue can be identified, Alameda CTC should also identify priorities. Selecting potential new sources of revenue to pursue should be not a simple matter of figuring out how much funding might be available and how difficult it might be to procure it. Rather, a strategy for new funding should reflect consensus values.

Following is a list of possible priorities or principles to use in determining which, if any revenue sources should be pursued. In some cases, potential new sources of revenue might reflect some, but not all priorities. However, sources to be pursued should reflect most of the values shared by stakeholders.

- **Sources should be equitable.** Sources should be equitable in two ways: first, they should be equitable from a social justice perspective; and second, they should be equitable in terms of linking assessments to benefits or impacts.
- **Sources should be linked to policy goals.** Ideally, any new revenue source would also serve to further goals such as VMT and emissions reduction, sustainable development, and social justice for disadvantaged communities.
- **Sources should be sustainable.** Sources should be both permanent and reliable, or stable. Sources that fluctuate can make long-term planning difficult and can add to costs if projects must be delayed.
- **Sources should address those areas with the most serious needs.** Ideally, any new source of funding would be fully flexible in its application, able to be used for any purpose Alameda CTC sees fit. However, if sources are to be linked to specific categories of spending, then those areas with the greatest need, such as transit operations, should be prioritized.

- **Sources should be able to win broad support from stakeholders and partners.** Finally, only those sources that seem likely to be able to achieve "buy-in" and support from those affected and/or potential allies should be pursued. This will be particularly important if the CTC decides to pursue new sources that would have to be implemented regionally or by the State.

Once these priorities have been clarified, Alameda CTC can develop a strategy for pursuing new sources, including a strategy for collaboration with partner agencies such as MTC.

ISSUE PAPER: GOODS MOVEMENT-RELATED ISSUES AND BEST PRACTICES

SUMMARY OF KEY ISSUES AND STRATEGIES

This paper identifies key issues, best practices and recommendations for future investments designed to improve goods movement in Alameda County and to inform the 2011 Alameda Countywide Transportation Plan (CWTP) and future plans. Key conclusions include:

- Goods movement is critical to the economy of Alameda County. Goods movement–related businesses provide thousands of regional jobs and millions of tax dollars to the County. A 2006 report estimated that over 120,000 goods movement related jobs (including manufacturing, wholesale, and construction) were located along the I-880 corridor alone.[1] Goods movement can also have negative side effects on County's communities and natural environment–including safety, noise, congestion, and air quality impacts–that must be minimized.
- A number of regional and local studies have identified key freight infrastructure needs in the County as well as strategies to reduce environmental impacts. Some actions are already being taken to implement these projects and strategies and the County should continue to support these in the CWTP and future countywide plans.
- The key to long-term success in freight system planning is continuous regional collaboration among local jurisdictions and transportation partners such as economic development organizations, air districts, community groups, groups that represent business and industry concerns, and other private sector partners. Alameda CTC can help institutionalize this collaboration to support ongoing improvement to the county and regional freight system.

INTRODUCTION

Why Goods Movement Matters to Alameda County

Goods movement is very important to Alameda County, as the County serves as a key transfer point for goods carried by truck, rail, water and air, and is home to a growing population and thriving industrial base. Many previous studies, including the 2004 MTC Regional Goods Movement Study and the Alameda CTC's 2008 Truck Parking Feasibility and Location Study, have found that goods movement industries play a critical role in the economy, both locally in Alameda County and regionally. Over 37 percent of Bay Area economic output is in manufacturing, freight transportation, and warehouse and distribution businesses. The Port of Oakland in 2005 directly and indirectly supported more than 28,000 jobs, $2 billion in personal income and approximately $208 million in state and local taxes.[2] In addition, a 2006

[1] *Defining Goods Movement Businesses / Industries With Demand for Central Corridor Locations (Report 3A).*The Bay Area Goods Movement / Land Use Project Phase II. MTC, 2007.
[2] Port of Oakland Website: http://www.portofoakland.com/newsroom/pressrel/view.asp?id=34

report[3] estimated that over 120,000 goods movement related jobs (including manufacturing, wholesale, and construction) were located along the I-880 corridor.

Freight movement can also bring negative community and environmental impacts. Growing freight volumes can strain the county's overburdened and often outdated infrastructure[4], and can exacerbate other pressing transportation-related issues in the region like safety, air quality, traffic congestion, and environmental justice. These issues must be addressed as part of goods movement planning.

GOALS AND STRATEGIES: THE IDEAL FREIGHT SYSTEM AND TODAY'S GOODS MOVEMENT SYSTEM DEFICIENCIES

Alameda County's multimodal goods movement system is a key component of the economic engine of the San Francisco Bay Area region. The system includes highway and roadway infrastructure, marine and air ports, rail facilities, long and short-term truck parking facilities, and intermodal connectors. These were all described in the Briefing Book prepared for this study. In summary, the key elements include:

- Interstates I-80, I-580, I-238 and I-880 are all major truck routes, and are supported by a number of local and regional corridors, circulators, and connectors;
- Two Class I railroads serve Alameda County–the Union Pacific (UP) connecting with Roseville and the Burlington Northern Santa Fe (BNSF) to Stockton;
- Intermodal connectors (truck and rail) that provide mobility to Port of Oakland marine and air cargo facilities (such as the Martinez Subdivision).
- The Port of Oakland is the fifth busiest container port in the country, importing goods to distribute throughout the County, State, and Nation, as well as exporting billions of dollars of agricultural product from the San Joaquin Central Valley. In addition, it is home to the largest air cargo facility in Northern California.

The Ideal Freight System

To maximize the potential of these transportation assets, Alameda CTC should ensure each of these modes is able to operate seamlessly and efficiently. Alameda County's ideal freight system would include the following features:

- **Provide international connectivity and serve international markets.** The Bay Area is an important U.S. international gateway for marine and aviation goods movement and Alameda County serves as one of the few ports of entry through the Port of Oakland and the Oakland International Airport. In 2008, $39 billion of merchandise trade passed through the Port of Oakland – or 2 percent of the value of the total U.S. international waterborne trade[5]. In addition, the Oakland air cargo facilities handled almost 500,000 metric tons of air cargo in 2009[6], making it the 12th busiest air cargo airport in the nation. The region currently handles over $30 billion in air cargo exports and $10 billion in marine cargo exports[7], much of this comprised of agricultural products from the San Joaquin Valley to key trading partners in the Pacific Rim and Europe. Air and marine sectors are both anticipated to grow. Even considering the global economic recession

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3 Defining Goods Movement Businesses / Industries With Demand for Central Corridor Locations (Report 3A).The Bay Area Goods Movement / Land Use Project Phase II. MTC, 2007.

[4] In particular, roads and road surfaces that were not built to withstand heavy-duty trucks, this may be used by trucks bypassing congestion or to access areas with businesses and industrial facilities.

[5] America's Freight Transportation Gateways. FHWA Research and Innovative Technology Administration (RITA), 2009.

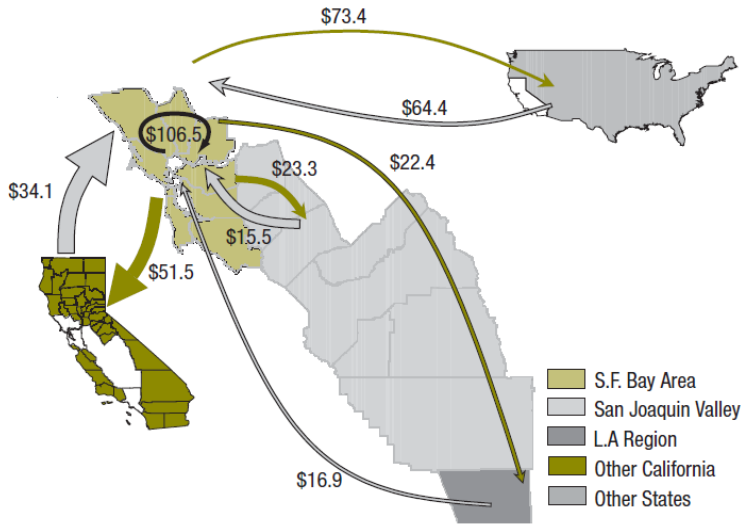
[6] Airport Council International – North America. 2009 North American Final Rankings. http://www.aci-na.org/stats/stats_traffic

[7] Regional Goods Movement Study for the San Francisco Bay Area, MTC (2004)

and declining imports and exports from 2007-2010, the Port of Oakland by 2030 is still anticipated to more than double its current incoming cargo (from 2.3 million Twenty-Foot Equivalent Units (TEU)s in 2010 to 5.1 TEUs in 2030).[8] However, in order to realize these increased freight volumes, critical infrastructure, capacity, and maintenance projects must be completed. These include the Outer Harbor Intermodal Terminal (OHIT) capacity enhancement project, as well as intermodal connector improvements such as the Martinez Subdivision[9] in Oakland.

- **Serve local distribution and domestic markets.** The goods movement system must be designed to serve not only the local distribution market (goods to the consuming public in Alameda County and the Bay Area), but it also serves the larger domestic market in California and states beyond. The 2008 Truck *Parking Facility Feasibility and Location Study* found that Bay Area trucking is dominated by local trips that are 50 miles in length or less. This regional focus is evident in Figure 1, which shows that the vast majority of trade circulates within the Bay Area.

Figure 1 Value of Trade Flows In and Out of the Bay Area (in Billions)[10]



- **Provide intra-regional and inter-regional connectivity.** Intra-regional and inter-regional corridors provide critical trade linkages between Alameda County and the rest of the country, as well as to regional distribution facilities and agricultural industries located in the San Joaquin Valley. These links must be maintained and modernized to provide last-mile connectivity to warehousing/distribution facilities, ports, and industry.
- **Minimize environmental and community impacts**. Transportation investments should support livability and sustainability. Air quality impacts of freight and noise pollution can also be minimized through technology application and policy development, including strategies as recommended in the 2008 *Truck Parking Facility Feasibility and Location Study to* provide electric hook-ups for freight vehicles, and full implementation of the 2010 Clean Trucks program[11]. The County's problems with illegal truck parking must be addressed, potentially

[8] SF Bay Area Containerized Cargo Outlook. The Tioga Group, Inc., 2009
[9] The Martinez Subdivision is a project that would add two additional mainline rail tracks on the Union Pacific rail line between the Port of Oakland rail terminals and the City of Richmond. This section is used by over 60 Amtrak, UP and BNSF trains daily, and can be very congested.
[10] Regional Goods Movement Study for the San Francisco Bay Area, MTC (2004)
[11] The Port of Oakland is implementing clean truck regulations consistent with the California Air Resources Board (CARB) Drayage Truck and Statewide Truck and Bus Regulations. As of January 1, 2010, a Port drayage ban is in

through the accommodation of more truck parking facilities in local land use redevelopment processes. The 2008 *Truck Parking Facility Feasibility and Location Study* recommended several such redevelopment opportunities, including investigating what transportation infrastructure improvements would be needed to accommodate a truck parking facility near the I-880 and Industrial Parkway interchange[12]. In addition, there are ways to integrate goods-movement land uses into the urban fabric in a manner that minimizes the impacts of freights on the community. Some of these "Best Practices" will be highlighted as case studies later in this white paper.

- **Preserve transportation system mobility and safety.** The county's transportation system must serve both freight and passenger users. The point of intersection of these two uses can present challenges to overall system mobility and safety. Parallel arterials in strategic locations to enable alternate routing in the case of congestion or closure will provide system resiliency. The addition of truck-only lanes, managed lanes, truck parking facilities and rail grade separations may also improve operations in congested commuter corridors. One proposed project that would balance these needs is the 7th Street Grade Separation project, which will eliminate conflicts between trucks and trains at a major access intersection to the Port of Oakland, while improving the safety of pedestrian, bicycle and automobile movements[13].
- **Provide multimodal linkages and options.** The county's multimodal transportation system must provide linkages between truck, rail, water and air modes for seamless and efficient transport/transfer of goods. The system must also provide shippers with a variety of cost and time sensitive options that are viable means of transporting goods. These linkages could include a system of designated truck routes that provide connectivity to key regional destinations like international ports, local warehousing/distribution facilities and industry.
- **Provide tools to inform users.** Alameda County already benefits from the use of the 511.org Intelligent Transportation System (ITS) that provides real-time status of road conditions and incident detection. There are other potential uses for ITS systems, for example the ability to communicate with truck drivers the status of supply and demand for truck parking slots when there are a limited number of spaces in a given area. The use of ITS systems should be maintained and expanded in order to help shippers and carriers more effectively plan and manage their trips. Gaps and Needs for the Freight System

Where are the gaps/most salient needs in the locally-serving system?

As highlighted in recent studies by the MTC, Alameda CTC and the Port of Oakland, current infrastructure and operational gaps in the intermodal goods movement system include:

- Limited capacity at the Port of Oakland;
- Intermodal connections to the Port of Oakland;
- Capacity, safety, and bottleneck issues on I-880, I-580, I-238 and I-80;
- Lack of a local truck route system, creating congestion and safety concerns as truck traffic mixes with general traffic and uses neighborhood streets–an initial step could include continued study of the I-580 truck ban and defining connections between local and regional truck routes;
- Lack of sufficient truck parking facilities, leading to illegal truck parking and overnight stops;
- General degradation of some freight facilities, particularly the impacts on pavement from the movement of heavy-duty trucks;
- Safety and congestion issues at rail at-grade crossings;

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effect for all trucks that do not meet the CARB emissions requirements. The requirements will be renewed and updated to reflect new emissions requirements on January 1 2012, 2013, and 2014.

[12] 2008 *Truck Parking Facility Feasibility and Location Study: Final Report,* ACCMA, December 2008.

[13] 2007 TCIF Funding Nomination for the 7th Street Grade Separation and Roadway Improvements, http://www.portofoakland.com/pdf/tcif_01.pdf

- Growing competition between freight and passenger rail in the Capitol Corridor and Altamont Pass; and
- Concerns over the potential impacts of climate change on the County's infrastructure. For example, sea level rise could have significant impacts on the existing and future transportation infrastructure–including rail, road, and air cargo facilities.

These gaps will be exacerbated in the future as freight volumes continue to grow. Truck counts on the three major freeways are projected to increase substantially by 2026,[14] with truck counts reaching 20,000 trucks / day on some segments of I-80, 35,000 trucks / day on some portions of I-580, and almost 40,000 trucks / day on some portions of I-880[15]. Containerized cargo movements through the Port of Oakland are expected to more than double by 2030,[16] and cargo airlines aircraft operations are forecasted to increase by 25% from 2007 to 2035.

What parts of the freight transportation system support national and international trade and where are the gaps/most salient needs in the national and international system?

Seaports and airports are major international gateway facilities, with the local roadways, railways and inter-coastal waterways providing critical last-mile connectivity for international goods movement. The Port of Oakland's marine and air cargo facilities are perhaps the most visible components of Alameda County's international trade infrastructure. There are gaps and needs specific to the national/ international freight system, as highlighted in recent studies by the MTC, Alameda CTC and the Port of Oakland:

- **Dredging.** The Port of Oakland must maintain a 50 foot mean low water depth to ensure it can continue to serve international container traffic. While efforts have been made in previous years to dredge, there remain berths at the port that do not have 50 foot clearance.
- **Port intermodal connectors.** The Port of Oakland relies on efficient rail and truck connections to move its inbound and outbound cargo. Some projects, like the Martinez Rail subdivision project (which would add additional rail capacity between the Port of Oakland rail terminals in West Oakland and extend to the City of Richmond) are anticipated to help grow the capacity of the rail system (which currently handles 30 % of incoming cargo at the Port17).
- **Air cargo facilities.** Air cargo plays a critical role in regional and international goods movement; tonnage is expected to more than triple between 1998 and 2020 and international tonnage is expected to almost quintuple.18 Adequate intermodal connections to air cargo facilities, and sufficient air, highway and rail capacity are necessary to accommodate this growth.
- **Roadway and Railway Chokepoints.** Constraints and bottlenecks on the main truck and rail corridors are impediments to national goods movement. These include physical and operational impediments along the Class I rail lines, rail yards, I-580, I-80/I-880 and I-238.

What other challenges exist with the County's freight system?

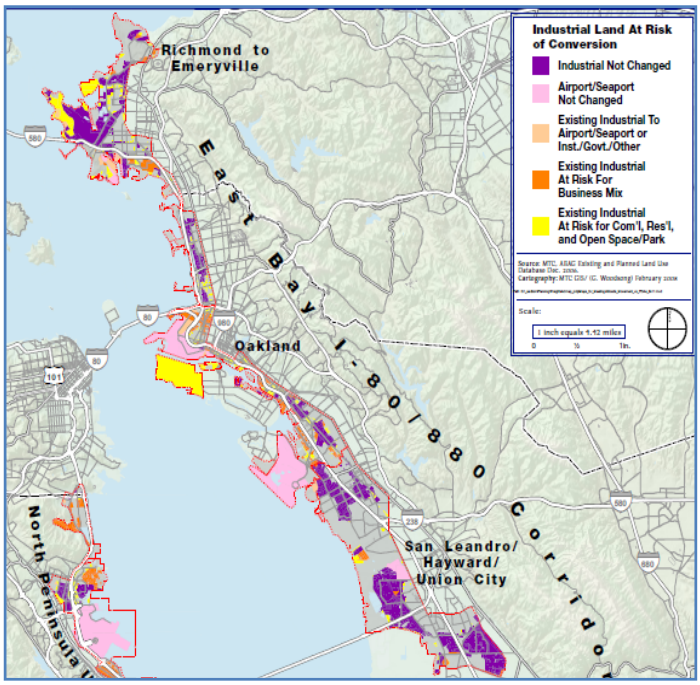
Though not specific to international trade, several other issues affect the County's freight system. As highlighted in recent studies by the MTC and Alameda CTC, these include:

Land Use. Land use and real estate market trends in the Bay Area are reducing the supply of land and building space for goods movement businesses in Alameda County and the region, while the demand for goods movement services continues to grow. Real estate markets are pushing land to higher value uses and competition for centrally-located land can make it difficult for port-related businesses to remain in

[14] MTC, Regional Goods Movement Study for the San Francisco Bay Area, 2004
[15] 2005 Caltrans Truck Counts
[16] MTC, Goods Movement Update, 2009
[17] 2007 TCIF Funding Nomination for the Martinez Subdivision and Rail Improvements
[18] Regional Goods Movement Study for the San Francisco Bay Area, MTC (2004)

proximity to the port. As shown in Figure 2[19], areas of industrial land use are at risk for being converted to higher, more profitable uses like commercial or residential uses, or uses that are not necessarily compatible with industrial uses, like parks or other open space. Additionally, older areas being used for goods movement are in need of modernization and infrastructure improvements to more effectively serve growing industrial demand. For example, many older developments do not include sufficient truck loading areas, leading to trucks occupying bus stops or blocking traffic whenever they must park to load or off load their goods.

Figure 2 Industrial Land Uses at Risk of Conversion Along the I-880 Corridor



Air Quality. Goods movement has a significant impact on the environment, in particular on air quality. This may be attributed to a variety factors including truck idling due to congested roadways or at port entry gates, trucks or train engines that are not using low-emitting, clean engines, or the use of truck transport in cases where lower-emitting rail or water modes could be used. For example, The Port of Oakland and UP provided information on their local operations for a California Air Resource Board (CARB) study to estimate the health risks from diesel exhaust in West Oakland. The results show that the estimated lifetime potential cancer risk for residents of West Oakland from exposure to diesel emissions is about 1,200 excess cancers per million population.[20] Though air quality concerns are a County-wide concern, localized "hot spots" like West Oakland remain a challenge.

Other Community Impacts. Safety concerns, local congestion and noise have disproportionately impacted those communities located near goods movement infrastructure. A key attributing factor to these negative community impacts is the lack of truck parking in the County. When truck parking facilities are not available, and truck drivers need to take required rest, a trend is to park where they are able. This oftentimes includes parking on freeway ramps, city streets or in neighborhoods adjacent to areas of industrial or freight activity. Idling trucks in these situations contribute to air quality concerns (previously noted) and noise pollution.[21] This issue is exacerbated by a lack of truck routes, which can

[19] This figure is a cropped version of one produced by MTC and Hausrath Economics, Inc. Produced for the *Goods Movement / Land Use Project for the San Francisco Bay Area,* MTC (2008).
[20] http://www.arb.ca.gov/ch/communities/ra/westoakland/westoakland.htm
[21] Truck Parking Facility Feasibility and Location Study, Alameda County Congestion Management Agency (2008)

lead to safety and pavement condition concerns when trucks travel through residential areas. Air quality and noise are also issues in areas adjacent to rail and port facility operations.

Responding to climate change and sea level rise. Global sea levels are projected to rise as little as 8 inches and as much as 4 feet by the end of this century[22], with evidence suggesting that 6.5 feet represent an upper bound that is very unlikely to be exceeded. Research performed by the Bay Conservation and Development Commission[23] found that sea level rise could seriously impact existing and future regional transportation infrastructure in Alameda County. Using a timeline of 2040-2060, this report estimated that 58 miles of Alameda County's existing road and rail infrastructure would be at risk from sea level rise, with an additional 40 miles of future (planned) transit and road facilities also at risk[24].

CASE STUDIES: ADDRESSING CRITICAL FREIGHT ISSUES

Alameda CTC and Bay Area stakeholders have already undertaken studies to address a variety of the goods movement impacts and needs identified above. This section presents additional case studies from other regions that have been working to address freight issues similar to those experienced in Alameda County. The case studies focus on integrating freight and land use in an urban setting, and illustrate how careful planning can help to prevent impacts with other non industrial land uses.

Case Study #1: Puget Sound Regional Council – Integrating Freight-Intensive Land Uses with Manufacturing and Industrial Centers (MIC) and Regional Growth Centers

The Puget Sound Regional Council in Seattle, Washington, is committed to preserving freight-intensive land uses–including industrial and manufacturing facilities and distribution facilities–within the regional footprint. Doing so has proven to have regional benefits of economic development, jobs, tax benefits, and easy access to goods to service a rapidly growing regional population. One way that the region is accomplishing this is through the designation of nine Manufacturing and Industrial Centers (MICs) and Regional Growth Centers under VISION 2020, (now VISION 2040) and Countywide Planning Policies.

- The MICs include the majority of land that can be characterized as serving goods-dependent industries. Figure 3 shows the locations of the MICs, which include the region's major freight generating facilities such as the Ports of Seattle and Tacoma, warehousing in the Kent Valley and Boeing's manufacturing plant in Everett. Though not exhaustive of all freight related land use activities, the MICs capture the majority of land that can be characterized as serving goods-dependent industries.
- Regional Growth Centers which represent a large portion of the concentrated demand for freight in terms of local deliveries. The clustering of all of these locations is particularly important since the closer proximity of manufacturing/industrial land uses to their markets means less time and money required to transport goods, as well as associated impacts from freight transportation.

Designating these areas as MICs helps to separate them from other land uses and prevent future conflicts, and keep goods movement related uses closer to their markets as a way to reduce the cost of freight transportation. Residential development within the MICs is intentionally limited to avoid land use conflicts. Population within the MICs is anticipated to grow by roughly 33% by 2040, compared to a regional population growth forecast of 42% between 2006 and 2040. By 2040 (Figure 3), most of the growth will focus on intensification of use within the existing locations.

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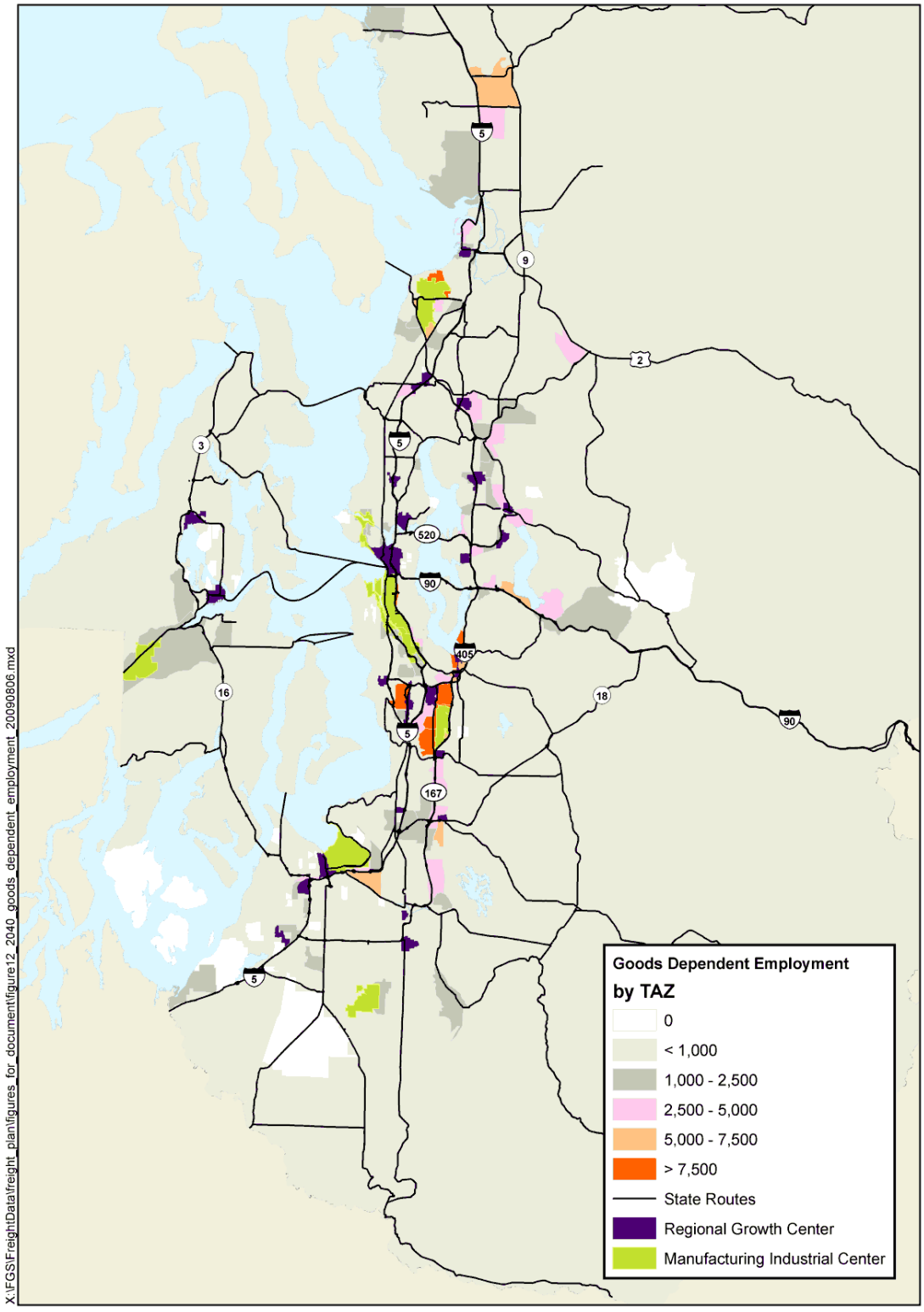
[22] U.S. Global Change Research Program (USGCRP) (2009), *Global Climate Change Impacts in the United States*, T. R. Karl, J. M. Melillo, and T. C. Peterson, (eds.), Cambridge University Press, New York.
[23] *Adapting to Rising Tides* Project. The San Francisco Bay Conservation and Development Commission (BCDC). Ongoing as of March, 2011.
[24] *Shoreline Areas Vulnerable to Sea Level Rise: 2040-2060.* MTC Map of the Month: June 2009. http://www.mtc.ca.gov/maps_and_data/GIS/maps/monthly/Sea_Level_Rise_8x11.pdf

Lessons Learned

Some of the features of the PSRC Manufacturing and Industrial Centers and Regional Growth Centers could offer lessons learned for the Alameda CTC, including:

- The PSRC recognized the importance of locating goods movement industries (MICs) near to the markets that they serve (Regional Growth Centers). This link is already fairly well understood in Alameda County- for example The *2008 Truck Parking Facility Feasibility and Location Study* found that most Bay Area trucking services are dominated by local trips that are 50 miles in length or less. However, recognizing clusters of suppliers and markets would make this link more explicit.
- The PSRC has made it a policy to protect and retain industrial land within urbanized areas. The MICs are the outgrowth of this policy that has been introduced in a series of Regional Transportation Plans and policies.
- The PSRC is taking a 30-year look at potential future land use conflicts. The MICs are intended to minimize future land use conflicts. They create clusters of industrial land development in certain locations where adequate buffers (such as parks, tree stands, or other natural features) can be instituted to shield some of the unwanted impacts of freight facilities (light and noise pollution, etc) from other land uses.

Figure 3 2040 PSRC Region's Manufacturing and Industrial Centers (MICs) with Goods Dependent Employment Concentration Overlay[25]



[25] PSRC- VISION 2040 Freight Strategy

Case Study #2: City of Chicago – Preserving Freight Land Uses

The City of Chicago is facing freight-related land use issues similar to Alameda County and has adopted strategies to link freight and land use. The resurgence of Chicago's residential housing market is putting increasing pressure on much of Chicago's industrial base, especially in close-in areas near downtown. Many prime industrial sites are being converted into expensive residential lofts and condominiums—leading to tension between uses and loss of the city's manufacturing/jobs base.

In response to this problem, the City conducted a study that identified 24 industrial corridors (Figure 4), a designation that commits the City to continue compatible land use and maintain infrastructure that facilitates industrial activity in those corridors. In 10 of these, Planned Manufacturing Districts (PMD) were identified. PMD is a special zoning designation for a defined geographic area that limits the types of development that may occur in the area to industrial activity and other compatible land uses. Industrial tax increment finance (TIF) districts have been established to support transportation improvements, financed by tax revenues from development.

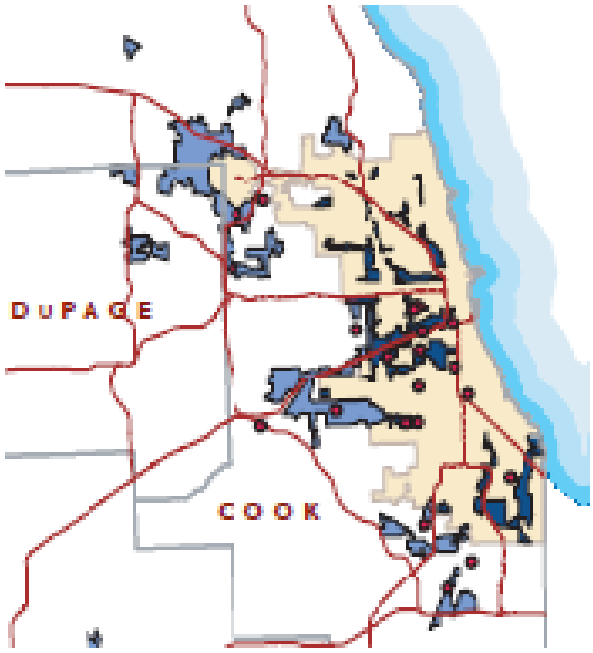
Creating industrial corridors with compatible land uses may help to retain industrial land uses in the urban regions of Alameda County, near the markets and businesses that they serve. It would also be a strategy to guide future mixed-use development in a manner that reduces the negative impacts of freight while maximizes the benefits.

Lessons Learned

Some of the features of the City of Chicago could offer lessons learned for the Alameda CTC, in particular in locations where there are competing land uses. Some lessons include:

- **The City of Chicago designated industrial corridors that recognized existing clusters of goods movement businesses and activities.**
- **The City tied development goals and standards to the industrial corridors. In fact, the designation commits the City to continue compatible land use and maintain infrastructure that facilitates industrial activity in those corridors.**
- **The City developed a new zoning designation limits the types of development that may occur in the area to industrial activity and other compatible land uses.**
- **The City is using innovative finance mechanisms (TIFs) to support transportation improvements in the corridors financed by taxes on new development.**

Figure 4 Existing and Proposed Freight Centers in Chicago and its Suburbs



Source: Chicago Metropolis 2020: The Metropolis 2020 Freight Plan: Delivering the Goods, 2004

CHALLENGES TO ACHIEVING THE IDEAL FREIGHT SYSTEM

A number of challenges must be overcome to improve the County's freight system. Some of these include:

- **Institutional relationships.** Many of the region's freight assets, including railroads and port facilities, are owned and operated by the private sector or quasi-public agencies, including the railroads and port authorities. Municipal governments exert authority over land use, which impacts regional freight demand. Coordination is required between the public and private sectors as well as across different levels of government, including state, regional, county, and municipal. Business representative organizations, such as the East Bay Economic Development Alliance (EDA), the Bay Area Council and the Silicon Valley Leadership Group (SVLG) are other important partners to include in any coordination efforts. Some collaborative efforts have been undertaken to identify key investment priorities and combine public and private funding sources; it is essential that these continue.
- **Limited funding for infrastructure investment.** Major capacity enhancements especially—whether highway, rail, or port—are costly. Freight projects compete against other projects in the County and region for limited transportation dollars and are often not given as a high a priority because of this.
- **Lack of public understanding of what freight is, and how it benefits communities and businesses.** Freight is a derived demand, and exists to carry goods and services to the communities and businesses that need them. Almost everything that people use on a daily basis is carried, at some point, by a truck, railroad, or cargo airplane. However, this link is not always understood by community members. This can lead to public opposition to, or lack of support for, the inclusion of freight in the public planning process.

- **Tradeoffs among different objectives.** Retaining industrial land in an urban region can be challenging. High land prices, competition for land, and perceived and real negative externalities from industrial land uses can often force industrial uses to be pushed to the periphery of urban regions. On the other hand, projects to expand port, highway, or railroad capacity may result in negative impacts on neighborhoods, for example, by leading to more truck or rail traffic, noise and light pollution or requiring land acquisition. The challenge is maintain the capacity for goods movement and distribution without causing harm to the communities that they serve.
- **Uncertainty regarding future needs.** The recent recession has led to declines in container traffic and the Oakland Airport has lost traffic to other airports in the region. While goods and passenger movement are expected to increase again as the economy recovers, this does illustrate the difficulty in accurately predicting future demand and therefore investment needs.

STRATEGIC INVESTMENT OPPORTUNITIES

Strategies and recommendations included in this section include best practices from other regions that could be implemented in Alameda County and elements of existing plans developed by regional and local agencies including the Metropolitan Transportation Commission, Alameda CTC, and the Port of Oakland. The plans include infrastructure investments and policies that can be implemented by Alameda CTC through the Countywide Transportation Plan or in future plans. Some potential opportunities include:

Infrastructure Investments

- **Continue to look for opportunities to implement the Trade Corridors Improvement Fund (TCIF) Program.** The TCIF program identifies near-term projects to address critical freight needs throughout the state, including in the Bay Area[26]. In developing the TCIF program, MTC partnered with other regional planning agencies in the Central Valley and identified two high priority interregional goods movement corridors: 1) I-80, known as the Central Corridor; and 2) I-880/238/580, known as the Altamont Corridor. These two corridors carry the highest volume of goods in the Bay Area, and serve major goods movement and industrial interests in the region. Investment in these corridors together ensures the future viability and growth of the Port of Oakland as a trade gateway for both imports and exports, and also strengthens the economic interconnections of the Sacramento and San Joaquin Valley regions with the Bay Area. MTC and its partner agencies, including Alameda CTC, have focused efforts on developing a comprehensive program of rail and highway projects along these two trade corridors. Figure 5 identifies projects within Alameda County nominated for funding through the Northern California Trade Corridors Coalition application for TCIF funding. The total costs of these projects would be $690 million, with $451 million to be provided through the TCIF program.

[26] Voters approved the Highway, Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006 in November, 2006. Known to most as "Proposition 1B", this program provided for $2 billion to be transferred to the Trade Corridors Improvement Fund (TCIF) for infrastructure improvements along corridors that have a high volume of freight movement. Funds need to be appropriated by the Legislature for allocation by the California Transportation Commission.

Figure 5 TCIF Improvements in Alameda County

Freight System Issue	TCIF Project Solution
Limited capacity at the Port of Oakland	Complete the Outer Harbor Intermodal Terminal (OHIT) extension project
Intermodal connections to the Port of Oakland	Implement the Martinez Subdivision Rail Improvements
I-880 and I-580 Capacity, safety, and bottleneck issues	I-880 Reconstruction, 29th & 23rd Avenues, Oakland I-580 Eastbound Truck Climbing Lane
Safety and congestion issues at rail at-grade crossings	Complete the 7th Street Grade Separation Project

- **Continue to look for opportunities to implement projects identified through other recent efforts,** including the 2008 *Truck Parking Feasibility Study,* the 2008 *Countywide Transportation Plan,* and other County and regional efforts. Numerous efforts have been completed in recent years by the Alameda CTC, the Metropolitan Transportation Commission (MTC) the Port of Oakland, and other regional partners. These efforts include numerous recommendations to increase the safety, capacity and efficiency of the County's multimodal freight system. They also provided the foundation for this white paper. Specific sources containing projects and recommendations include (but are not limited to):
    - *Truck Parking Facility Feasibility and Location Study*, Alameda County Congestion Management Agency (2008)
    - *Countywide Transportation Plan 2008*, Alameda County Congestion Management Agency (2008)
    - *Goods Movement/Land Use Project for the San Francisco Bay Area*, MTC (2008)
    - *Regional Goods Movement Study for the San Francisco Bay Area*, MTC (2004)
    - *Port of Oakland Strategic Plan*, FY 2011–2015 (2010)

- **Support the implementation of operational and capacity enhancements at the Port of Oakland.** Efficiency upgrades to the Port will allow for operational improvements throughout the region, as well as increased benefits including jobs and tax revenue. Several improvements to expand port capacity have already been identified as part of the TCIF discussed above, including the Oakland Global Trade and Industry Center; the Martinez Subdivision; marine terminal facility improvements, and expansion of trade and logistics facilities on more than 100 acres of the former Oakland Army Base adjacent to marine terminals.
- **Recognize the capacity and operational needs of air cargo facilities, and air cargo's important role in the region's freight system**. In 2009, MTC began working with its planning partners on an update to the 2000 Regional Airport System Plan. The implementation of this plan will ensure that the air cargo system is able to efficiently meet this growing demand. Air cargo plays a critical role in regional and international goods movement; tonnage is expected to more than triple between 1998 and 2020 and international tonnage is expected to almost quintuple.27 Alameda CTC can work with MTC to determine how to support the recommendations in this plan.
- **Address the issue of illegal truck parking throughout the County.** Alameda CTC, and its partners, should work to reduce the incidence of trucks parking in illegal locations throughout the County. One way to achieve this is to implement the recommendations from the 2008 *Truck Parking Facility Feasibility and Location Study*, which identified infrastructure improvements and

[27] Regional Goods Movement Study for the San Francisco Bay Area, MTC (2004)

policy recommendations including potential truck parking sites for further study, and ways to accommodate truck parking in local land use development and redevelopment processes.

- **Define a local truck route system.** Currently, the County lacks a local truck route system. This introduces the potential of truck-related incidents on local streets, creates safety concerns when trucks traverse through residential areas, and exacerbates the County's problems with illegal truck parking. Several recent studies, including the 2008 *Truck Parking Facility Feasibility and Location Study* and the *MTC Goods Movement Study* recommended the development of coordinated city/county truck route plans. The Alameda CTC could work to identify such a system as part of this or subsequent countywide transportation plans. Truck route development would have to occur in coordination with Caltrans and the California State Highway Patrol, since there are issues of enforcement and patrolling associated with any restricted system. In addition, it would be useful to consult the best practices of truck route implementation and enforcement prior to any truck route planning. Lessons from other States suggest that there are many issues to consider, including effective truck signage, interagency coordination, outreach and education, and capital improvements[28]. In addition, the different types of truck routes would need to be considered. Some areas (for example around intermodal terminals) will see high volumes of heavy-duty trucks, and will require significantly more robust pavement than other types of truck routes.
- **Increase the capacity, efficiency and safety of the County's key truck and rail facilities, including I-880, I-80,I-580, I-238, and the UP and BNSF Class I rail lines.** These facilities are crucial to support local, regional, national, and international goods movement. With passenger and freight volumes both anticipated to grow significantly, existing issues with safety, bottlenecks, and congestion will grow unless mitigation measures are adopted. Some measures that can be taken include the implementation of the I-880 corridor strategy including capacity improvement, interchange upgrades, chokepoint removal, connectivity to parallel arterials and ITS technologies. Other operational options, such as the potential of restricted truck operation hours on major highways, could also be investigated for their potential congestion reduction benefits. Infrastructure projects including the recommendations from the 2008 *Truck Parking Facility Feasibility and Location Study* should continue to move towards implementation. The Alameda CTC can work to ensure that projects addressing these issues are incorporated into this or subsequent Countywide Transportation Plans. In addition, actions need to be taken to build more capacity or increase the operational capabilities of key goods movement corridors also serving passenger trains, in particular in the Capitol Corridor and Altamont Pass corridors, as well as the Port of Oakland 7th Street Grade Separation Project, Martinez subdivision project, and associated Outer Harbor intermodal Terminal (OHIT) development.

Policy and Institutional Recommendations

Policy and institutional recommendations to support local, regional, national and international goods movement, while supporting livable and sustainable communities, are summarized in the following bullets:

- **Alameda CTC, and the MTC region, could consider implementing a standing roundtable discussion to bring together public and private freight stakeholders on a frequent basis.** A good example of this is the Puget Sound Regional Freight Mobility Roundtable. The roundtable meets once a month and serves as a public-private forum to define freight mobility needs and recommendations in the region. The roundtable includes freight carriers of all modes; major regional shippers; the ports; and state, local, and Federal agencies, and groups that represent business interests in the Puget Sound region. Efforts like the roundtable have shown that the key to long-term success in freight system planning is continuous regional collaboration among local jurisdictions. It provides a forum to ensure that all parties work together to implement

[28] *New Haven Truck Route Study.* South Central Regional Council of Governments, June 2007. http://www.scrcog.org/toc_files/NHTruckStudy_Final.pdf

infrastructure improvements and policy recommendations. Though this type of coordination had occurred many times in the MTC region, it is usually tied to a single project (such as the 2004 Goods Movement Study) or other one-time effort (such as the TCIF program) rather than a sustained, ongoing effort.

- **Continue the collaborative approach to apply for strategic goods movement projects that benefit a number of public and private-sector stakeholders.** This approach was successful during past efforts to apply for State and Federal Funding sources, including TIGER grants and the TCIF program. This would work well in coordination with the recommendation for an ongoing regional freight roundtable or other standing effort to bring together public and private freight stakeholders
- **Create a policy for the preservation and integration of freight-intensive land uses in the urban core.** Many regional partners recognize that goods movement industries bring a wide variety of benefits to Alameda CTC and the entire MTC region. However, there is no coordinated effort to preserve industrial land uses within the urban core. One way to move towards such a strategy may be the opportunities provided by the Sustainable Communities Strategy (SCS) under SB 375- which requires Metropolitan Planning Organizations (MPOs) to designate land uses that will contribute to VMT reduction (generally through densification). If residential and commercial areas are targeted for densification, it may accommodate growth while reducing the pressure on industrial land to relocate or convert to other uses. In addition, the Alameda CTC should work with MTC to implement recommendations from MTC's *Goods Movement / Land Use Project for the San Francisco Bay Area,* including:
    - Work with municipalities to implement recommended land use policies, including preserving industrial lands in key locations and allowing transitions to other uses elsewhere as suitable.
    - Ensure that new warehousing/distribution sites in suburban areas include site layout and street design to reduce conflicts and provide greater efficiency.
    - Take proactive steps to minimize off-site impacts and improve the physical environment in industrial areas that border neighborhoods.

- **Move towards a "green" freight system.** The CTC can ensure the recommendations of existing studies related to greening the freight system are implemented. For example, the Alameda CTC can continue to implement some of the findings from the 2008 *Truck Parking Facility Feasibility and Location Study,* including the recommendation to provide trucks with a means to turn off their engines while waiting or parked so that emissions (from idling) are minimized[29].
    - The Alameda CTC can also continue to support the efforts of other regional partners. For example, the Port of Oakland's Maritime Air Quality Improvement Plan (MAQIP) adopted in 2008, which set a goal of reducing the health risk related to exposure to diesel particulate matter emissions associated with maritime operations by 85% from 2005 to 2020. The Port is also working to implement the 2010 Clean Trucks program, which replaces older, heavily-polluting trucks, is a promising approach and could be expanded in the future. Finally, the Port has begun to institute "cold ironing" on its berths- which essentially provides grid-based electric power to docked vessels, allowing them to turn off their engines while idling. In February 2011, the Port was approved for $5 million from the BAAQMD's Mobile Source Incentive Fund (MSIF) to aid the implementation of this project[30].
    - Other partner agencies include the Bay Area Air Quality Management District, which (among many other programs) works to provide incentive funding for projects that

[29] 2008 *Truck Parking Facility Feasibility and Location Study: Final Report*, ACCMA, December 2008.
[30] Professional Mariner. *Port of Oakland Wins $5 Million in Funding for Dockside Cold Ironing*. February 5, 2011. Retrieved from: http://www.professionalmariner.com.

improve air quality, reduce air quality health impacts, and protect the global climate[31]. One sample project in Alameda County is the Air Districts' work to promote and incentivize commuter alternatives to solo driving.

[31] http://www.baaqmd.gov/Divisions/Strategic-Incentives.aspx

ISSUE PAPER: INTEGRATION OF LAND USE AND TRANSPORTATION

INTRODUCTION

This transportation issue paper focuses on the need to encourage high density land use within areas of Alameda County that are well-served by existing and planned transit, as well as building a walkable and bikable land use pattern that can have the potential to be more effectively served by other transit improvements that may occur in the future. The paper explores some of the key factors that should be taken into consideration as Alameda County addresses the challenges of integrating land use and transportation planning in this update of the Countywide Transportation Plan. Key recommendations of the paper are:

- Identify ways to support the development of existing and new Priority Development Areas (PDAs) and Growth Opportunity Areas (GOAs), and begin now to identify resources to provide incentives for jurisdictions willing to accept higher levels of growth;
- Identify and develop walkable and bikable places beyond the identified PDAs and GOAs to reduce the Vehicle Miles Traveled (VMT) for existing and future residents and workers;
- Fund programs to improve the performance of walkable and bikable places both within and outside PDAs and GOAs, and develop strategies to fill in the funding gaps not covered by other existing and future regional, state or federal funding programs;
- Identify strategies to incentivize the preservation of open space and support local agriculture on remaining farmland within the county in support of broader preservation and economic goals, and to support focusing of future development into infill areas.
- Address CEQA challenges caused by the proximity of many potential infill sites to generators of particulate pollution such as freeways and major arterials, as well as the conflict between local congestion impacts of infill development with the regional benefits of reduced driving; an element of this will include harmonizing regional air quality policies with land use policies with Alameda County.
- Identify impacts of sea level rise and resulting rise in tide levels on location of planned PDAs and other dense urban areas.
- Develop programs, such as an Alameda County Great Avenues and Boulevards Program, to support further change to major roadway corridors in the county that remove barriers to walking and bicycling in PDAs, GOAs, and other potential walkable and bikable places.
- Work towards refining Development Impact Fees and creating Community Benefit Districts to support implementation of utility and transportation infrastructure for PDAs, GOAs, and walkable and bikable places in Alameda County.

The goal of integrating land use and transportation is a key focus of this update of the Alameda Countywide Transportation Plan and development of the new Transportation Expenditure Plan (CWTP-TEP). It is also a major topic of the parallel process to update the Regional Transportation Plan (RTP). Projects, programs and studies identified in these Plans that support this goal will be a primary focus of transportation and other infrastructure investments in Alameda County. There are many reasons to encourage high density land use

within areas that are well served by existing and planned transit, and in those areas that are or can be bikable and walkable. Creating walkable and bikable places that can also support transit investment makes the most of limited financial, land, and other resources. It also provides for better utilization of infrastructure investments; preserves open space, farmland and critical environmental areas; provides greater opportunities to create livable, healthy communities; and, last but not least, it helps to meet the region's goals for reducing greenhouse gas emissions per SB 375 requirements and other goals such as reducing traffic congestion.

In order to meet Alameda County's and the San Francisco Bay Area's goals of reducing traffic congestion, improving air quality, and reducing greenhouse gas emissions, Alameda County will need to shift travel behavior from a reliance on driving alone to increasing use of other travel modes, such as bus, train, biking and walking. One way that Alameda County and the region are working to meet this goal is to encourage land use development around transit hubs and to encourage bikable and walkable communities through the CWTP-TEP and the update of the RTP. These Plans are vehicles for planning and directing investments towards transportation system improvements that support increased land use density around transit hubs and walkable and bikable communities throughout Alameda County.

In addition, the regional planning agency, ABAG, is partnering with the regional transportation agency, MTC, and other regional agencies to plan and implement the "FOCUS" strategy; an important part of their implementation strategy is the Sustainable Communities Strategy (SCS) that is being planned as part of the RTP update (see box on following page). The FOCUS strategy includes ABAG designated areas, called Priority Development Areas (PDAs), which concentrate development and transportation investments to accommodate future population growth in the Bay Area. MTC is anticipated to continue to focus funding in the PDAs throughout the Bay Area, including the 35 currently identified in Alameda County. In addition to the existing PDAs, Alameda County Transportation Commission (Alameda CTC) is committed to supporting development of new PDAs and encouraging using alternative travel modes in Growth Opportunity Areas (GOAs) and other potential walkable and bikable places. Growth Opportunity Areas (GOA) have identified by local jurisdictions during the development of the Initial Vision Scenario by ABAG. These areas may be in the process of becoming PDAs, or have different criteria to pursue sustainability focused on employment or rural characteristics[1]

LAND USE CONTEXT

Given the range of existing land use patterns in Alameda County, some of which are challenging to serve effectively with transit due to their lower intensity and more dispersed rural and suburban patterns, integrated land use and transportation planning needs to focus not just on access to high-quality transit but also on walking and biking. Furthermore, with the need to preserve open space and support the remaining farms and wineries as viable parts of the county's economy, it also is imperative that suburban and rural communities be transformed with a more compact walkable and bikable land use pattern that minimizes the need for further expansion Planning and implementing development that supports increased transit, walking and bicycling, as well as strategies that reduce the number and length of auto trips are key ways to reduce greenhouse gases and vehicle miles traveled (VMT) and create communities with a range of travel choices.

[1] *ABAG, MTC. Bay Area Plan: Initial Vision Scenario for Public Discussion. March 11, 2011. Page 89*

The effort to identify Priority Development Areas (PDAs) under the regional FOCUS program (see box) is an important component in integrating land use and transportation planning efforts by the regional agencies. Similarly, the Sustainable Communities Strategy (SCS), as part of ABAG and MTC's 2013 RTP, being developed in cooperation with local jurisdictions, would also influence how future land use patterns could support more healthy and economically viable communities by reducing greenhouse gases (GHG) and preserving existing open spaces and natural habitats. The issue paper discusses what it means for the jurisdictions in Alameda County to focus future growth in infill areas such as PDAs and GOA and how the Alameda CTC can support the focused growth; the issues that challenge implementation of these land use patterns (e.g. existing policies, standards, and jurisdiction practices; development issues such as property acquisition and infrastructure costs; issues of community support that can impact entitlement; etc.); and what the Alameda CTC can do to encourage implementation of these land use patterns through the CWTP-TEP. It is also important to recognize that high density developments at transit hubs require not only transportation investments, but also utility infrastructure, public open space, and land use investments. These interconnected funding needs presents policy challenges of spending transportation dollars on land use, both for Alameda CTC and for MTC.

Priority Development Areas in the context of Alameda County and The Countywide Transportation Plan

MTC and ABAG are working together as part of the regional "FOCUS" effort to link transportation and land use. ABAG, as the regional land use agency, has reviewed and designated 35 PDAs in Alameda County as of March 2011 as areas to focus future growth. PDAs fall into two categories – planned and potential. Planned PDAs[2] have

FOCUS and the Sustainable Communities Strategy

FOCUS is a regional development and conservation strategy that promotes a more compact land use pattern for the Bay Area. It unites the efforts of four regional agencies (ABAG, MTC, BAAQMD & BCDC) into a single program that links land use and transportation by encouraging the development of complete, livable communities in areas served by transit, and promotes conservation of the region's most significant resource lands[1]. It is a voluntary, incentive-based program, which allows local governments to identify infill sites near transit as Priority Development Areas (PDA), which are them eligible to receive targeted incentives from all four regional agencies for existing and future projects. The PDAs are the primary future urban infill areas in Bay Area communities. Local governments' have estimated that PDAs could accommodate up to 56 percent of the projected population growth by 2035 according to the last Regional Transportation Plan.[1] The effort has resulted in the identification of 120 PDAs by different local agencies in the San Francisco Bay Area, of which 35 are in Alameda County.

The Sustainable Communities Strategy (SCS) as part of the Regional Transportation Plan (RTP) is mandated by Senate Bill (SB) 375 as a means to achieve desired reductions in VMT to in turn reduce GHG emissions. Once those plans and strategies are in place, SB 375 may also influence streamlining CEQA requirements for certain projects that implement the region's Sustainable Communities Strategy. MTC has begun working towards developing a SCS for the Bay Area that will be part of their current RTP 2013 update. The identified FOCUS PDAs are a crucial part in developing the SCS as communities look to reduce VMT by increasing access to transit through intensification of uses and housing density within PDAs. The recently prepared Initial Vision Scenario (IVS) is a land use scenario for the San Francisco Bay Area that identifies locations where future population growth can be accommodated. The scenario indicates that the identified PDAs, with the addition of some further infill and growth opportunity areas (GOAs) that were identified by local jurisdictions in consultation with ABAG and MTC, has the potential to accommodate as much as 70% of the regions' growth by 2035, based on the IVS growth allocation, in 3% of the region's land area.

an approved community plan and are eligible to compete for capital infrastructure funds and technical assistance. Potential PDAs have not yet completed a community plan and are eligible to compete for funding to complete such plans. The 35 Alameda County PDAs are well positioned to compete for funding from the region given the relatively rich level of transit service in these areas.

MTC supports PDAs through the Transportation for Livable Communities (TLC) grant program, Station Area Planning Program and Technical Assistance Program. Together, these grant programs fund plans to develop PDAs, studies to overcome technical challenges at PDAs, and the design and construction of capital improvements. Funded projects in PDAs bring new vibrancy to downtown areas, commercial cores, neighborhoods, and transit corridors, enhancing their amenities and ambiance and making them places where people want to live, work and visit; and therefore help to attract private investment to PDAs.

Grants through MTC's Transportation for Livable Communities (TLC) program, which now will be only granted to projects within PDAs,[3] could fund streetscape projects, as well as non-transportation infrastructure improvements such as sewer upgrades. They may also fund transportation demand management projects, such as carshare and parking management strategies; and density incentives such as direct TOD funding for land banking or site assembly.[4] This continuing focus on funding improvements within PDAs is a key regional strategy. In addition, there are still gains that can be made in reducing VMT and greenhouse gas emissions outside of PDAs in Growth Opportunity Areas and other walkable and bikable places; this is a potential funding opportunity for Alameda CTC.

The regional assistance and funding resources, and Alameda CTC's Transit Oriented Development Technical Assistance Program (TOD TAP), have been extensively utilized in past transit related or transit supportive projects independently, and have included $43 million of TLC funding for transportation capital projects in Alameda County in the past decade.[5] Through their programs, MTC is focusing on providing larger land use planning grants than they funded when the program was initiated in 2005 for transit supportive projects. Furthermore, with the development of the SCS underway, there may be further integration and streamlining of the available regional funding resources, which could result in a more focused funding priority based upon the effectiveness of projects in reducing green house gases.

The prioritization for funding and supporting PDAs by MTC will be subject to an assessment of which PDAs provide the most benefits in achieving the SCS goals, as outlined below. The assessment framework of PDAs under the SCS process provides a glimpse of the potential criteria by which MTC and ABAG may assess PDAs for funding in the future. The assessment process will evaluate PDAs on the basis of the following criteria[6]:

- Location - Transit access, type and frequency, as well as proximity to existing jobs within 30 minutes by transit and auto
- Planned Growth – Change in total housing units, planned housing density, and the share of affordable units planned in the PDA as well as percent of RHNA allocation accommodated in the PDA
- Readiness for Implementation - Adoption of zoning code amendments, Specific Plans, General Plans, Programmatic EIR for primary PDA plan adopted. Ease of entitlements and number of approved and entitled units under pipeline projects
- Creation of Complete Communities – Variety of housing choices and costs compared to earnings of jobs within a 30 minute commute. Walkability and access to parks and schools.

Beyond funding and customized technical assistance[7] programs of the regional FOCUS partnership, PDAs included in the Sustainable Communities Strategy would benefit from a unified approach in establishing CEQA analysis methods and mitigation strategies for these areas that reduce regional air emissions. A

[3] http://www.mtc.ca.gov/planning/smart_growth/tlc/#2
[4] *ibid*
[5] http://www.mtc.ca.gov/planning/smart_growth/tlc/#1
[6] *Adams, Gillian; Kurella, Sailaja; Trivedi, Therese. "PDA Assessment Input into the Sustainable Communities Strategy Vision Scenario". OneBayArea Memorandum to ABAG Regional Planning Committee. November 23, 2010 available at* http://www.abag.org/abag/events/agendas/r120110a-Staff%20Report:%20%20PDA%20Assessment%20-%20SCS%20Vision%20Scenario.pdf
[7] http://www.bayareavision.org/initiatives/technicalassistance.html

streamlined CEQA approach in these areas could make them a more attractive investment opportunity for private real estate development meeting the demand for housing and employment close to transit stations. This could pave the way for a public-private investment in these areas. The county and local jurisdictions could find opportunities to leverage the PDA designations, and the resulting investment interest, to finance infrastructure capacity improvements that would help accommodate higher densities within the PDAs.

It is likely that funding from, or passed through, MTC will be directed to support the PDAs that are assessed as being most effective in meeting the SCS assessment criteria listed above. The Alameda CTC could develop its assistance programs through its transportation plan to help PDAs within the county to become more competitive in the regional evaluation. The Alameda CTC could also help fill funding "gaps" left by these regional and other funding programs to provide robust support for PDAs and other walkable and bikable places in the county.

CHARACTERISTICS OF WALKABLE AND BIKABLE PLACES

The PDAs and on-going SCS process are the result of a commitment to reduce global warming in California as well as to support local economies and protect the environment through a "Smart Growth" approach that focuses on access to transit, or Transit Oriented Development (see box).

PDAs and GOAs are places in the Bay Area that have the potential to become vibrant communities with travel choices. This requires a combination of infill development and revitalization as well as investment in transit service and access to transit stops and stations and in bicycling and pedestrian improvements. Transit-oriented developments (TOD), as well as most of the areas in PDAs, are typically located within a 1/2 mile walking distance to transit. But there is potential for the communities in Alameda County to see even greater VMT reduction by looking at opportunities in addition to PDAs—creating walkable and bikable places.

The actual distance a person will travel is affected by a number of variables, trip purpose, age and health of the person, the quality and convenience of the trip, etc. The extent of areas that can support non-vehicular travel expands even further when bicycling is factored into the discussion. In order to maximize the potential for non-vehicular travel the following characteristics have to be reflected in the land use development pattern:

Safe and Comfortable Street Environment: A network of Complete Streets providing a safe and equitable design for all modes of transportation is essential to encourage walking and biking along corridors, and within neighborhoods and centers. Pedestrian and bicycle supportive infrastructure, such as wide sidewalks; improved crossings; adequate space within the street for bicycles, including well marked bicycle lanes and paths; adequate lighting along pedestrian routes; bicycle parking facilities and benches along pedestrian paths; and traffic calming measures also help increase the safety for bicyclists and pedestrians. A safe and comfortable infrastructure encourages more walking and biking.

A Connected Street Network Providing Multiple and Convenient Routes: A well connected circulation network is essential for pedestrian and bicyclists, and also can make a safer transportation system for vehicles. It allows for variety of routes to destinations within and between centers and neighborhoods to help disperse traffic, and allows for more direct routes between destinations as pedestrians and bicyclists are more sensitive to distance as their maximum speed is relatively low. A well connected network can also provide choices in terms of the quality of environment, for example a bicycle commuter may chose a street with higher traffic volumes if it is more direct and there are fewer unsignalized streets to cross, while lower traffic levels are more important for a child riding a bicycle to school.

Places to Conveniently Walk or Bike To: A multitude of destinations and amenities within a convenient distance. Convenient distances between destinations are enhanced by compact land use patterns and, as previously mentioned, connected street network. Some examples of convenient distances are:

- 10 minutes to a transit stop—1/2 mile walk or a 2 mile bike ride;
- 15 minutes to employment or a transit stop for a commute trip—3/4 mile walk[8] or a 3 mile bike ride;
- 10 to 15 minutes to everyday amenities such as grocery stores, neighborhood retail, parks, libraries and schools—1/2 to 3/4 mile walk or a 2 to 3 mile bike ride.

Residential density, employment intensity, and urban design quality are all ingredients that can increase the distance that one is willing to walk and they are key ingredients for walkable and bikable centers and neighborhoods.[9] [10] Higher densities and mix of uses within a walkable area increase the activity level along public streets, creating a place bustling and exciting to spend time in, and providing customers to businesses.[11] Additionally, this also increases the efficiency of bus and other modes of transit by increasing the number of potential riders within walking distance of stops.

Community Building Concepts of Smart Growth and TOD

Smart Growth envisages a more efficient way to build and maintain towns and cities. It strives to building urban, suburban and rural communities with housing and transportation choices near jobs, shops and schools, creating healthy communities with strong local businesses. This approach supports local economies and protects the environment. Smart Growth strives to achieve efficiencies in building and maintaining towns and cities by:

- Encouraging compact building design;
- Creating a range of housing choices;
- Developing walkable mixed land use neighborhoods with a variety of transportation choices;
- Fostering distinctive, attractive communities with a strong sense of place;
- Making development decisions predictable, fair and cost effective;
- Preserving open space, farmland, and critical environmental areas; and,
- Strengthening and directing development towards existing communities.[1]

As part of Smart Growth strategies to provide compact development with transportation choices, Transit-Oriented Development (TOD) is a specific strategy that strives to create compact mixed use communities within a convenient walking distance (~ one half mile) of transit stations. The Center for Transit-Oriented Development (CTOD) utilizes a performance-based definition, wherein they believe that projects should also:

- Increase "location efficiency" so people can walk and bike and take transit
- Boost transit ridership and minimize traffic
- Provide a rich mix of housing, shopping and transportation choices
- Generate revenue for the public and private sectors and provide value for both new and existing residents
- Create a sense of place

Furthermore, TOD is really about creating attractive, walkable, sustainable communities that allow residents to have housing and transportation choices and to live convenient, affordable, pleasant lives -- with places for kids to play and for parents to grow old comfortably.[1]

[8] *Transit Use at Transit-Oriented Developments in Portland, Oregon, Jennifer Dill; Transportation Research Record: Journal of the Transportation Research Board, No. 2063, Transportation Research Board of the National Academies, Washington, D.C., 2008, pp. 159–167.*
[9] *Transportation Authority of Marin; Marin TPLUS Pedestrian and Transit-Oriented Designed Toolkit. September 2007. County of Marin, California. Page 41.*
[10] *Bursting the Bubble: Determining the Transit-Oriented Development's Walkable Limits, Transportation Research Record: Journal of the Transportation Research Board, No. 1992, Transportation Research Board of the National Academies, Washington, D.C., 2007, pp. 28–34.*
[11] *ibid*

The PDAs, and other growth areas that have been identified in the Initial Vision Scenario of the Bay Area SCS process, are just a portion of development in Alameda County. Even if the majority of future development can be directed to these Smart Growth/TOD places, large areas of existing development outside of the PDAs have the potential to evolve in ways that can also support reduced VMT. Jurisdictions can identify community centers, neighborhoods, districts and corridors outside the PDAs that reflect some of the characteristics listed above. Primarily, they can identify inter-connected circulation networks of older street car neighborhoods, or areas with either a multitude of destinations within walking distance or higher intensities/densities and mix of uses that do not fall within transit corridors or a transit station walkshed[12]. The LEED® ND rating system that integrates the principles of smart growth, urbanism, and green building design provides a comprehensive set of evaluation parameters that could also be utilized as a tool to identify areas with potential to support reduced VMT.

Lessons for Alameda County: Setting priorities of investment in non-PDA, or growth opportunity, areas should focus on the best opportunities in reducing VMT, as well as other factors, such as open space preservation, economic vitality, public health, and other sustainability factors. As mentioned above, the LEED® ND rating system provides evaluation parameters that could be used to help identify appropriate non-PDA opportunities through the communities in Alameda County. Developing well connected compact, sustainable developments that maximizes already existing infrastructure would initially encourage more walking and biking trips, while setting up the area as 'TOD-ready'[13] for future transit expansion projects. These could include investments in centers, neighborhoods or districts that have existing interconnected circulation frameworks or existing circulations systems that could be enhanced to be more interconnected, and provide improved access to a mix of convenient destinations. Investments could focus on improving the quality and safety of the pedestrian and bicycling environment, enhancing the connectivity of the transportation network; providing new commercial, service, and civic destinations; and infill to incrementally increase household and employment density.

LAND USE OBJECTIVES

The Alameda Countywide Transportation Plan and Transportation Expenditure Plan Vision and Goals provide the starting point for a set of more specific objectives regarding the implementation of land use that will reduce VMT and support the transportation goals of the CWTP and TEP. It is the combination of the "premier transportation system" identified in the Alameda CTC Vision Statement with appropriate land uses that will create "a vibrant and livable Alameda County." Appropriate land uses can particularly help in achieving the vision for sustainability, transit operations, public health, and economic opportunity as identified in the Vision Statement.

The land use patterns within Alameda County can support the goals of the Alameda Countywide Transportation Plan. The matrix on the following page outlines some possible land use objectives for the CWTP, and relates each to the goals that have been established for the CWTP.

The Alameda Countywide Transportation Plan and Transportation Expenditure Plan (CWTP-TEP) can be most effective in influencing the creation of land use patterns and a general built environment that achieves the land use objectives described below by complementing and supporting the policies and programs that exist and that are being proposed by regional agencies and the local jurisdictions within the county, and by identifying and filling policy and program gaps. In addition, the Alameda CTC can advocate for new and refined policies and programs, at the local, regional, and state levels, that support the goals and objectives of the CWTP and TEP.

A range of potential strategies are discussed at the conclusion of this issues paper that would support enhancement to the walkable and bikable places in Alameda County, including PDAs and SCS GOAs. Each of these strategies is evaluated for whether it helps achieve these objectives.

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[12] *Walkshed: the area that can be conveniently reached on foot from a geographic point.*

[13] *Transportation Authority of Marin; Marin TPLUS Pedestrian and Transit-Oriented Designed Toolkit. September 2007. County of Marin, California. Page 41*

Table 1: Relationship between Countywide Transportation Plan Goals and Land Use Objectives

Objectives and Goals that are related to each other are highlighted in the adjacent matrix

LAND USE OBJECTIVES	CWTP GOALS: Increase Multimodal Travel	Accessible, Affordable, and Equitable Housing	Transit Investment Integrated with Land Use Patterns and local decision-making	Connected Street Network	Reliable and Efficient Regional Transportation Systems	Creating a Safe Pedestrian Environment	Supportive of a Clean and Healthy Environment
Encourage a land use pattern that provides a variety of destinations within walking and bicycling distance	■						■
Encourage a built environment that provides an interesting and vibrant street environment that provides interest and comfort for pedestrians and bicyclists as well as providing "eyes on the street" for improved safety.[14]	■					■	■
Encourage a pattern of major employment centers and employment in general with convenient transit access and nearby mixed use and residential areas		■	■				
Support walkable residential neighborhoods in proximity to schools.		■	■				■
Support the creation and maintenance of housing, affordable to a range of households, with PDAs and other TOD opportunities		■	■				
Encourage preservation of valuable agricultural lands in the county to provide produce and other agricultural products within proximity of urban development					■		■
Encourage the creation of a connected street network providing multiple and convenient routes for all modes within and between neighborhoods and centers, and the regional transportation system				■	■		■

[14] *"Eyes on the street" is the idea that an active street and a street where people in adjacent buildings are able and willing to watch activity on the street, will be a safer street. The concept was posited by Jane Jacobs in The Life and Death of Great American Cities. For more on this concept, see - http://streetswiki.wikispaces.com/Eyes+On+The+Street*

CASE STUDIES

The following case studies provide examples of land use planning and policy efforts from around the country that have been implemented to achieve Smart Growth goals and objectives. These can provide some ideas that the Alameda CTC could utilize in its identification of strategies

Grand Boulevard Initiative – Corridor-wide Caltrans exceptions for improvements to El Camino Real

Grand Boulevard Initiative (GBI) is a regional collaboration of 19 cities, counties and regional agencies and other public and private parties united in revitalizing and improving the El Camino Real Corridor running from Daly City (where it is named Mission Street) and ending near the Diridon Caltrain Station in central San Jose (where it is named The Alameda). Currently the street environment is not friendly or safe to transit users, pedestrians and bicyclists and the development that lines the corridor is outdated strip commercial development. The initiative's goal is to improve the performance, safety and aesthetics of the Boulevard by rethinking the corridor's potential for housing and development, while balancing the needs of autos with transit, biking and walking. It is a shared vision that links transportation and land use through regional level planning.

Several smart growth principles of the initiative could be useful for potential future ordinances for the Alameda CTC. The first guiding principle is the GBI aims to target housing and job growth in strategic areas along the corridor particularly along transit and to support TOD development around station areas. This growth would be in accordance of city goals and would seek to encourage a greater range of housing affordability and business opportunities. The targeted growth is also planned to be compact mixed-use development and contain high quality architecture and urban design. [15]

There are also strategic principles with regard to the street environment, transportation planning and parking policy. The corridor is envisioned to have pedestrian-oriented environments with a balanced multimodal corridor design. It seeks to strengthen pedestrian and bicycle connectivity along the corridor and to manage parking assets as needed. Street design would also include guidelines for improving transit stops and to implement transit-preferential street treatments such as signal priority and HOV/Bus-only lanes. GBI's is also focused on creating standards that encourage context sensitive design practices when developing projects within the corridor. Currently, the GBI's land use and design review committee is implementing context sensitive design practice and guidelines that it will be the basis for granting of "design exceptions"[16] by Caltrans. [17]

The GBI planning and public participation process and the concept of negotiating a menu of design exceptions that can be applied to multiple improvement projects has great potential for Alameda County, see discussion in Strategic Investment Opportunities Section.

Recommendation for Alameda County: Alameda County includes a number of major urban roadways that are state highways and other major arterials that have been designed to meet or exceed Caltrans' standards, which have the potential for improved transit service and a more pedestrian-friendly environment that could better support infill development. A context-sensitive solutions approach for planning, design, and public participation, similar to the GBI process and the concept of negotiating a menu of design exceptions that can be applied to multiple urban roadways improvement projects could be of great value to Alameda County communities. See discussion in Strategic Investment Opportunities Section.

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[15] *"About Us: Grand Boulevard Initiative." Grand Boulevard Initiative. Web. March 2011. < http://www.grandboulevard.net/about-us/grand-boulevard-initiative.html>.*

[16] *Design Exception by Caltrans pertains to changing highway design standards (primarily lane widths) in context of the Urban setting of the highway, making them more amiable for pedestrian and bicyclists to cross.*

[17] *Belmont Redevelopment Agency. Status Report on "Transforming El Camino Real/Grand Boulevard" Project. Meeting of 1/8/2008.*

State Investment, Maine

There are other such programs in which state and local agencies direct funding in ways that are more related to direct investment by the state or agency in development. In 1999, the Task Force on State Office Building Location, Other State Growth-related Capital Investment and Patterns of Development (referred to as the Task Force) was created in Maine's legislature. The basic duties of the Task Force, were to address sprawl and promote smart growth development. In addition to creating suggested proposals for private development, the Task Force also looked at the role and development of state office buildings. The Task Force required the Bureau of General Services, the state agency that provides oversight to public improvements and construction, to develop site selection criteria to give preference to locate state facilities in downtowns, and or designated growth areas in communities. [18] The task force also recommended the creation of a Downtown Leasehold Improvement Fund that would provide the necessary capital improvements, such as bicycle and/or pedestrian improvements. The initial funding to establish this program was an $800,000 one-time appropriation.

Recommendation for Alameda County: Similarly, Alameda County jurisdictions should support the Smart Growth goals of PDAs by giving preference to building facilities within PDAs, directly focusing the development of government buildings or other commercial developments that maybe financed by local jurisdictions, within these areas. In other words, "practicing what they are preaching". If land use policies support private investment in new businesses, commercial and residential development within PDAs, then governments should focus appropriate facilities investments in PDAs and other locations that support access by transit, walking, and bicycling.

Priority Funding Areas, Maryland

In 1997, the Maryland Department of Planning passed the "Smart Growth and Neighborhood Conservation Acts" which established Priority Funding Areas (PFAs) legislation. The intent of this smart growth legislation was to direct future development into established communities that were supported by existing or planned public services and infrastructure. It also aimed to protect and preserve Maryland's natural resources by reducing development pressure on the areas with the most valued natural resources. Types of growth related funding that was affected by the legislation included State funding for roads, water and sewer plants, economic development and other growth related needs.

There are certain criteria and guidelines that local governments use to determine PFAs. These criteria include previous designation as neighborhood revitalization areas, enterprise zones or existing industrial land. Local governments may also designate a PFA if they meet certain water and sewer infrastructure capacities and zoning. There are also certain levels of residential densities and capacities that must be met for an area to be eligible for PFA designation. The goals of PFAs were more generally focused on compact growth and containing urban sprawl with less focus on transit access compared to the Bay Region's PDA program. Communities that existed prior to 1997 and are served by existing utilities must have average residential densities greater than or equal to 2 units per acres. Areas outside the existing communities, and either have and/or planned utility service, must have average build-out densities greater than or equal to 3.5 units per acre. [19] Areas must also be located inside the Washington Beltway and the Baltimore Beltway, the interstate highway that extends around Baltimore, Maryland and Washington, DC.

[18] *Office of Policy & Legal Analysis, State of Maine. Final Report of the Task Force on State Office Building Location, Other State Growth-related Capital Investment and Patterns of Development. January 2000*

[19] *Maryland Department of Planning. Priority Funding Areas, How to Revise and Update. August 2009.*

Maryland's PFAs have been in existence for more than a decade and despite widespread acclaim, little is actually known about whether PFAs are effective at containing urban growth and have produced their intended effects. In fact, the National Center for Smart Growth Research and Education found that in a review of Maryland's smart growth performance measures such as multifamily housing construction, housing affordability, per capita VMT, and compact development, Maryland has not measurably gained ground over the last decade when compared with the rest of the nation. [20] Researchers from the University of Maryland found similar results in a 2009 article on managing growth in Maryland with PFAs for the Journal of American Planning. Researchers concluded that the PFAs did not produce the results that they were intended for. Some conclusions resulting from this analysis include a modification in the criteria for determining PFAs. The Research suggested that while using criteria such as existing densities, municipal boundaries, and transportation and infrastructure capacities is useful, it creates boundaries that vary across the state and not well suited to manage urban growth. The research also recommended that Maryland should develop and use long-range plans that strategically consider where future growth should occur. Researchers also found a lack of integration of the PFAs into local planning, and finally found that state agencies did not effectively implement their budgetary systems to monitor or guide the spatial allocation [21]of funds.[22] Other specific refinements that have been recommended include:

- Incorporating public participation in the definition of PFAs and how to implement them
- Integrating PFAs more effectively with local plans
- Recognize the limitation that the funds allocated to PFAs may be too small to make a significance difference in market demands for growth type and location.

These reviews do provide useful recommendation for smart growth programs, but it cannot prove that the Maryland PFAs program did not prevent sprawl from getting much worse. In fact real change in smart growth implementation does take time, and a study in 30 years might produce different results.

Recommendation for Alameda County: Several lessons can be taken from the definition of the PFA program and research regarding its implementation and results:

The PDA program is one of the several approaches that need to be taken in order to change the travel behavior of the County's residents. Adequate investments in PDAs alone will not get the County to its GHG reduction goals. The PDA program should be complemented with several other VMT reduction strategies such as:

- Incorporating the actual cost of parking into development costs;
- Creating walkable and bikable places outside PDAs; and,
- Preserving open space and farmland through more compact rural and suburban development.

In addition, the PDA program would benefit from a monitoring program that measures the success of implemented projects in terms changing travel behavior of people living or working within the PDAs over time, providing opportunities to learn and improve future PDA growth. Identifying pilot PDAs with a range of different conditions and investment strategies could be carefully monitored over a period of time, providing the Alameda CTC and MTC with detailed analysis of what approaches are more successful in different conditions.

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[20] Moore, Terry & Sartori, Jason. "Indicators of Smart Growth in Maryland." The National Center for Smart Growth Research and Education at the University of Maryland". January 2011.

[21] Prioritizing PFA funding by location efficiencies or other criteria

[22] Lewis, Rebecca , Knaap, Gerrit-Jan and Sohn, Jungyul (2009) 'Managing Growth With Priority Funding Areas: A Good Idea Whose Time Has Yet to Come', Journal of the American Planning Association, 75: 4, 457 — 47.

CHALLENGES

Impact of Changes to Redevelopment Agencies on Local Jurisdictions Economic Development Goals

Redevelopment agencies can be an important implementation tool for encouraging and supporting infill development and revitalization of places that are already developed but that are underutilized.

The recent development of the State's Governor's recommendation of abolishing all of the state's redevelopment agencies as part of the strategy to balance the state's budget is expected to have significant impacts on economic development goals for communities throughout the state. Older cities, have regularly utilized redevelopment funds to finance community improvement projects that make existing neighborhoods attractive for private investments. Redevelopment projects are often a source of revitalizing local economies not only with construction jobs, but also attracting other businesses into communities, raising the tax base for the community. At least a portion of the funds must also be utilized to provide for affordable housing. The loss of redevelopment agencies will result in communities re-strategizing their approach to encourage infill and revitalization of existing neighborhoods. This possibly would impact the ability of communities to attract investments into PDAs or other infill sites, making it harder for cities to achieve the SCS goals. It may also encourage development in new growth areas where private development may find it easier to invest in new infrastructure without dealing with issues of capacity and other environmental issues related to infill and inner city areas.

Recommendation for Alameda County: Alameda CTC could work with the redevelopment agencies in the county to monitor the situation and decision making process in Sacramento that could eliminate or evolve the powers of redevelopment agencies. Opportunities to support tax increment financing through TOD Benefit Districts or other means may provide an opportunity to continue focusing economic energy on PDAs, GOAs, and other walkable and bikable opportunities in the county even if the powers and financial strength of redevelopment agencies are weakened.

Potential impacts of Rising Sea Levels and CEQA analysis of GHG, particulates, and broader air quality and transportation impact issues to infill and TOD opportunity sites

Rising Sea Levels

The Bay Area is already working to reduce greenhouse gas emissions, but mitigation alone will not be adequate to address impending sea level rise and other climate change impacts. The Bay Area must consider adaptation actions that will reduce the vulnerability of the built and natural environment to the effects of climate change. The bay is rising and this is projected to continue. In fact, today's flood is expected to be the future's high tide. Areas that currently flood every ten to twenty years during extreme weather and tides will begin to flood regularly. These areas are home to over 160,000 residents, critical infrastructure, diverse habitats, and valuable community resources around the region.[23]

The San Francisco Bay Conservation and Development Commission (BCDC) is collaborating with National Oceanic and Atmospheric Administration Coastal Services Center (NOAA CSC) to identify strategies for community-based adaptation planning to address these challenges and develop a process for implanting them.[24] The identification of infill sites and investment within PDAs in Alameda County communities will need to consider how the rising sea levels would impact development, and if intensification in some areas may not be feasible considering the severity of the impact of rising tides levels and potential flooding impacts.

[23] *Adapting to Rising Tides: Bay Area Communities Working Together.* http://risingtides.csc.noaa.gov/
[24] *ibid*

Air Quality and Particulate Emissions

In June 2010, The Bay Area Air Quality Management District (BAAQMD) approved new thresholds of significance for toxic air contaminants and fine particulate matter. These thresholds set very strict, low limits for acceptable exposure to toxic air contaminants (TAC) and fine particulate matter ($PM_{2.5}$) from including both fixed sources (diesel generators, dry cleaners, etc.) and mobile sources (freeways, rail lines, major roads, etc.) –for residents and other users of a new development. For example, a project within 1,000 feet of a freeway would not meet the air quality thresholds due to proximity to air emission from traffic that exceeds 20,000 average daily vehicle trips (ADT). These new thresholds make the development of many PDA locations in Alameda County more challenging [25] due to many transit systems and stations being along or within freeways or surface streets that reach the threshold levels of 20,000 ADT. Challenges can include – triggering the need for full EIRs which increase time, uncertainty, and cost; and the unknown issues that can arise through definition of mitigation measures which can also affect cost and project feasibility. Since the adoption of these new guidelines, significant concerns have been raised by stakeholders regarding the potential impact of these new guidelines on the development of infill and affordable housing, and potential conflict with the regional and statewide efforts to encourage more compact development in already urbanized areas.

The Alameda CTC could work towards developing strategies or approaches that could help resolve these issues by -

- Recommending strategies that incentivize better building technologies, site configurations, and other design and management solutions to minimizing exposure of sensitive populations (i.e.; children, seniors, asthmatic individuals, etc.) to air contaminants within PDAs,
- Advocating for alternatives to the approved thresholds, such as PDA sites be evaluated individually for air quality by the BAAQMD and taking into consideration regional air quality costs and benefits of development within PDAs. Based upon the result, evaluate PDAs for intensity and type of development, and
- Reviewing BAAQMD's on-going efforts to define CEQA analysis methods and environmental mitigation tools to maximize their utility for PDAs and other non-PDA walkable and bike-able projects, in order to support implementation in Alameda County.

STRATEGIC INVESTMENT OPPORTUNITIES

This section includes a number of specific recommendations as to how the Alameda CTC can encourage better integration between land use and transportation.

Create an Alameda County Great Avenues and Boulevards Program

Alameda County includes a number of major urban roadways that are state highways, which have the potential for improved transit service and infill development. Several of these have been identified through the FOCUS and SCS processes as PDAs and Growth Opportunity Areas—the San Pablo Avenue (SR 123) Corridor and the Telegraph Avenue-International Boulevard-Mission Boulevard Corridor (which is partially SRs 77, 185, and 238). Other urban roadways that are state routes and that in many cases create barriers to walkable and bikable communities in Alameda County, include: Ashby Avenue (SR 13), SR 84 in Fremont, and Mission Boulevard in Fremont (SR 262). The creation of a Great Avenues and Boulevard program on these roadways throughout the county could result in communities that promote travel choices. These same design standards and design approaches would be applicable to other high speed and high volume urban arterials that are not state highways.

[25] *"CEQA Thresholds of Significance and Community Risk Reduction Plans." Center for Creative Land Recycling, September 2010*

Develop investment mechanisms to improve pedestrian and bicycling infrastructure

Cities in Alameda County have the benefit of several old streetcar neighborhoods that lend themselves to be walkable and bikable places, and identified PDAs and GOAs only include a portion of these neighborhoods. With PDA's being the focus of regional agencies investment strategies, there is a need for a program that would help finance improvements within these older neighborhoods and other non-PDA areas which would help encourage residents to reduce auto trips. The Alameda CTC could help cover this 'gap' by developing a funding program for non-PDA areas to improve pedestrian and bicycle infrastructure, including both old streetcar neighborhoods and other areas with potential to be successful walkable and bikable places. Funding assistance for non-transportation of infrastructure improvements (increasing utilities and service capacity) in support of desired higher intensity land uses could be incorporated into the Alameda CTC's assistance program. The Alameda CTC could also develop an assistance program that helps refine local Development Impact Fee regulations and helps in the creation of Community Benefit Districts to support the implementation of utility and transportation infrastructure for PDAs and other walkable and bikable places within the County..

Develop a CEQA Mitigation Toolkit

With the BAAQMD approving new thresholds of significance for toxic air contaminants and fine particulate matter, the CEQA requirements for infill development, particularly TOD projects will become more rigorous, adding to the costs of revitalization of existing developments with more lengthy and uncertain environmental review and mitigation measures. The CEQA process could be streamlined to encourage partnership between local jurisdictions and private investors through an environmental mitigation toolkit or menu that would help in guiding infill projects systematically and efficiently through the CEQA process. This program can hopefully be developed by working with BAAQMD, and other agencies and interest groups, to better meet the needs of Alameda County's infill opportunities.

Public-Private Partnerships

Supporting the creation of joint public-private partnerships, partnering with local ULI chapter to expand upon the TOD Marketplace Concept to bring property owners, developers, planners, and financers together to talk about and activate infill development opportunities throughout the county. Consider targeting a portion of Alameda TEP funding to support model public-private partnerships in the implementation of PDAs, GOAs, and other walkable and bikable areas.

Best Practices Clearing House

Provide a "clearing house" for local best practices – this could be similar to TAM's TPLUS Toolkit, but could be a web-based resource of best practices in supporting walkable and bikable places, and overcoming the variety of challenges to implementing Smart Growth practices in Alameda County. This could draw from the experiences of TAWG and CAWG members and be expanded to include other agencies as well as stakeholders. This could also include model street design standards, parking standards, and parking management strategies.

Development Impact Fees and Community Benefit Districts

Support Refinement of Development Impact Fees and Creation of Community Benefit Districts to support implementation of utility and transportation infrastructure for PDAs and walkable and bikable places in Alameda County.

The following matrix shows the potential strategies and the land use objectives that these strategies could help to achieve:

Table 2 Potential Land Use Strategies and the Objectives They Address

Potential Strategies (the matrix below highlights the objectives that are related to each of the potential strategies)	Objective #1 Variety of destinations within walking distance	Objective #2 Safety and comfort for walking and biking	Objective #3 Major Employment with access to transit	Objective #4 Walkable neighborhoods in proximity to schools	Objective #5 Housing affordability in PDAs and other TODs	Objective #6 Multi-modal connected street networks
Fill funding gaps for advanced planning, public involvement, and CEQA clearance	■		■	■	■	■
Work with utilities and other agencies to fund non-transportation infrastructure improvements in support of desired land use	■		■		■	
Fill funding gaps for walking and biking improvements in target land use areas	■	■	■	■		■
Create a toolkit for CEQA analysis and mitigations measures in support of desired land use	■		■			■
Create model street design standards, parking standards, and parking management strategies			■		■	■
Provide a “clearing house” for local best practices	■	■	■	■	■	■
Support refinement of development impact fees and creation of community benefit districts		■			■	■
Identify potential walkable and bikable places (outside of PDAs and SCS Growth Areas)	■		■	■	■	■
Support the creation of joint public-private partnerships to desired land uses and infrastructure	■		■		■	■
Create an Alameda County Great Avenues and Boulevards Program (discussed in more detail elsewhere)	■	■	■	■	■	■

ISSUE PAPER: SUSTAINABILITY PRINCIPLES

INTRODUCTION

This report outlines principles of sustainability and how they could be implemented in Alameda County through the Countywide Transportation Program (CWTP). Key conclusions include:

- A sustainable transportation system is one that meets the needs of the present without compromising the needs of future generations. This can include both an environmental dimension (e.g. ensuring protection of air quality and minimizing climate change impacts) and a financial dimension (ensuring future generations aren't financially burdened by choices made today). Sustainability can also include the concepts of equity and economic health.
- Sustainability is increasingly becoming a fundamental principle by which transportation agencies and local governments guide their operations, policies, and investment decisions. The passage of greenhouse gas legislation in California (AB 32 and SB 375) has created an additional impetus to focus on improving sustainability by reducing greenhouse gas emissions that contribute to climate change and sea level rise.
- The CWTP can support sustainability principles by focusing investments on environmental protection and cost-effective use of transportation resources. Examples of cost-effective strategies include transportation demand management (TDM) and systems management strategies (such as Intelligent Transportation Systems, or ITS) that enhance mobility while reducing environmental impacts and infrastructure costs. New investments should be targeted to support efficient travel patterns, in part by concentrating high capacity services in corridors that can support that type of investment, and focusing regionally on alternatives to increasing auto vehicle miles traveled.
- Sustainability cannot be achieved just through transportation actions, but must be linked with decisions in other sectors, especially land use and environmental planning. "Sustainable communities" include compact, walkable neighborhoods that provide good transportation options and minimize the need for driving.
- The Alameda County Transportation Commission (CTC) can further support sustainability by tracking sustainability metrics over time; ensuring that CWTP investments yield expected outcomes; ensuring the CTC applies sustainability principles to its daily operations; and by creating grant programs that foster innovative approaches to improving sustainability.

The goals of this white paper are to:

- Define sustainability and explain how it applies to transportation;
- Provide examples of how other transportation agencies and their plans have supported sustainability principles; and
- Identify specific ways in which the CWTP can support sustainability principles.

What is Sustainability?

Sustainability means meeting the needs of the present without compromising the ability of future generations to meet their own needs.[1] An expanded definition is based on three sustainability principles – environment, economy, and social systems, which include quality of life and equity (see Figure 1): *"Sustainability means meeting human needs for the present and future, while preserving environmental and ecological systems, improving quality of life, promoting economic development, and ensuring equity between and among population groups and over generations."*[2]

Figure 1 Three Dimensions of Sustainability

Source: Caltrans

Sustainability also commonly includes the notion of fiscal prudence. Sustainable transportation investment decisions are those that avoid disproportionately burdening future generations and endangering the financial health of public agencies.

Although sustainability can be achieved many different ways and through many different types of investments, the role of community design, not just transportation systems, is key. Some define sustainable communities as compact, walkable neighborhoods that provide transportation options and minimize the need for driving. Such communities weave together all the dimensions of sustainability. Sustainable community design maximizes connectivity to jobs and other destinations, supporting the local economy. Communities that support walking and bicycling not only improve air quality and reduce energy use and GHG emissions, but also improve public health through opportunities for "active transportation" and recreation. This in turn supports fiscal sustainability by reducing health care costs. The importance of sustainable transportation and community design is underscored by the involvement of organizations such as the Robert Wood Johnson Foundation, which has documented these linkages in briefs such as "Linking Policies to Prevent Climate Change and Childhood Obesity,"[3] and provides tools and resources to promote healthy communities.

Why Does Sustainability Matter?

Two issues related to sustainability are particularly important in Alameda County: climate change and financial resource limitations. Climate change is of great concern throughout California and in Alameda

[1] World Commission on Environment and Development 1987. *Our Common Future.* Oxford University Press, Oxford, p 41.
[2] Working definition from research in progress for NCHRP Project 8-74, Sustainability Performance Measures for State Departments of Transportation and Other Transportation Agencies.
[3] http://www.leadershipforhealthycommunities.org/

County specifically, not only because it threatens human health and natural ecosystems, but because it endangers infrastructure and communities in low-lying areas such as Oakland Airport and the Port of Oakland that will be affected by sea-level rise. Proactive response to these threats is critical for Alameda County, and is also required by recent greenhouse gas legislation (SB 375) mandating the Bay Area Metropolitan Transportation Commission to work with local governments to demonstrate that the Regional Transportation Plan will meet greenhouse gas reduction targets.

Financial sustainability is another key issue for the CWTP. Due to the economic recession, tax revenues have declined and may continue to do so. Federal funding is uncertain due to the delayed reauthorization of federal transportation legislation (SAFETEA-LU). The CWTP must respond to these challenges by focusing on cost-effective investments that support improved environment, quality of life, and economic health while protecting the future financial stability of Alameda County and its constituent cities.

GOALS & AVAILABLE STRATEGIES

Existing Efforts

Alameda County and its constituent cities are already taking steps towards supporting sustainability for the transportation system and other aspects of public agency operation:

- Environment/Sustainability is identified as one of five priorities in the County's Strategic Vision, adopted by the Board of Supervisors in 2008.
- The County is currently engaged in creating a Community Climate Action Plan, which addresses transportation, land use, building energy, water, waste, and green infrastructure for unincorporated communities.
- In May 2010, the *Alameda County Climate Action Plan for Government Services and Operations* was adopted, with a goal of a 15 percent GHG reduction in County government emissions by 2020. The County also has various initiatives related to ecosystem protection, energy efficiency, green buildings, conservation planning, recycling/waste reduction, and water protection.
- Several cities within Alameda County have undertaken their own Climate Action Plans.

Future Strategies

How can Alameda County and its cities do more to ensure the sustainability of the transportation system? The following general approaches can be followed.

- **Prioritize cost-effective investments in sustainability.** Maximizing sustainability outcomes such as climate change and air pollution reduction within financial constraints requires aggressive pursuit of the most cost effective sustainability strategies. Management and operations strategies including Intelligent Transportation Systems and travel demand management should be undertaken to maintain and improve mobility and accessibility while minimizing fiscal burden and social and environmental impacts.
- **Invest in technology to support sustainable futures.** The County and constituent cities can think beyond traditional transportation infrastructure planning to consider how to meet future transportation needs with sustainable technologies. This should include technologies to promote efficient travel patterns and system operations, as well as advanced vehicle and fuel technologies that can reduce energy use and GHG emissions.
- **Support integrated planning.** To reduce greenhouse gases and ensure cost-effective use of resources, planning efforts should be coordinated with local governments as well as other county and state agencies. For example, transit should be planned to serve the highest-density areas and these areas should be designed to support multi-modal access to transit. Bicycle and pedestrian investments should be targeted in areas where land uses support bicycling and walking. In Alameda County, the CWTP should be consistent with the regional Sustainable

Communities Strategy, the East Alameda County Conservation Strategy, the County's Climate Action Plan, and other regional and County planning efforts focused on sustainability. Additionally, County transportation investments should be coordinated with efforts to identify infrastructure vulnerable to the impacts of sea-level rise.

- **Integrate sustainability metrics into County activities.** Ongoing tracking of sustainability related-performance measures will help the County assess whether it is moving towards or away from a more sustainable system, whether specific objectives or targets are being met, and where improvement is needed.
- **Exercise fiscal constraint.** Achieving the outcomes described above should not come at the expense of over spending the transportation program, or require such costly investments that they cannot be realistically funded. Best management practices should be applied to maintain the existing transportation system (including highways, transit, and non-motorized facilities) in a state of good repair, at the lowest long-term cost.

CASE STUDIES

Three case studies are presented here – the City of Portland, Oregon,the City of Alexandria, Virginia, and Fruitvale Transit Village. The first two case studies illustrate a multi-sector sustainability effort undertaken by a municipal government, including sustainable transportation as well as coordinated land use and environmental planning. The third case study illustrates how a partnership between a community-based organization and public agencies created an inner-city transit-oriented development that met the needs of local residents and supported environmental and social sustainability through infill development and a community-based process.

Case Study #1 – Portland, Oregon

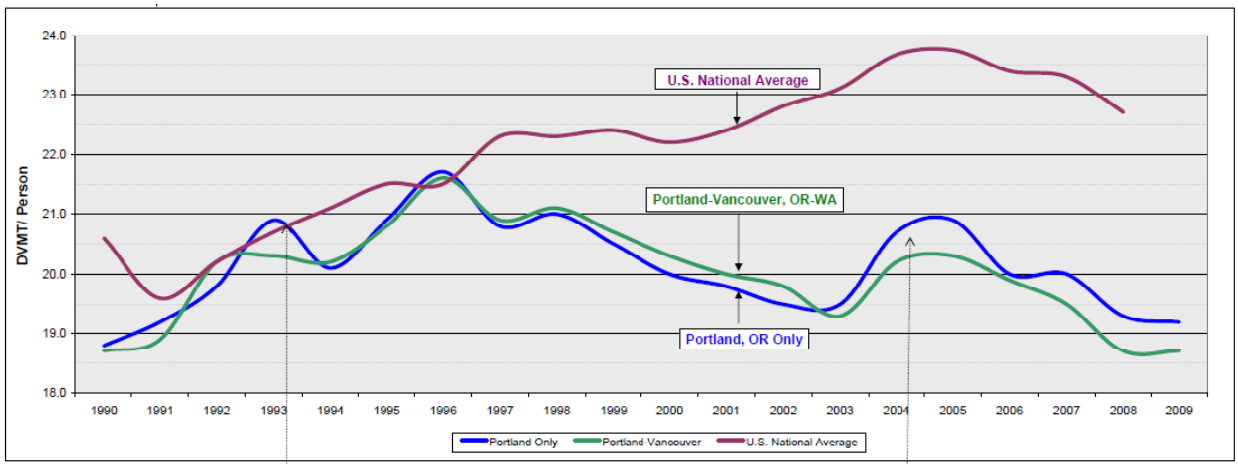
The City of Portland, Oregon has been pursuing sustainability for decades with a focus on integrated transportation and land use planning. The city's policies have completed a regional focus on growth management, led by Portland Metro, the regional government. The City has integrated sustainability functions into its planning department, which is now titled the Bureau of Planning and Sustainability. The mission of the Bureau is to create a "prosperous, equitable, and healthy city." The City's Planning and Sustainability Commission advises City Council on the City's long-range goals, policies and programs for land use, planning and sustainability. The Bureau's 2011 – 2013 Strategic Plan outlines six goals, which include the following elements directly related to transportation:

- Affordable housing and transportation options;
- Healthy, walkable and bikeable, and prosperous "20-minute neighborhoods" that encourage and enable Portlanders to meet their daily needs locally; the concept is that most life needs can be fulfilled within 20-minutes of home.
- Green streets and boulevards throughout the city; and
- Reducing greenhouse gas emissions through urban design and complete neighborhoods.

A 1994 study found that residents in areas with good transit and mixed land use walked for 27 percent of trips and took transit for 12 percent, compared with outlying neighborhoods in the region with poor transit or land use where the combined walk and transit mode share was under 8 percent. VMT per capita in these core neighborhoods was less than half that in outlying areas. Supported by these data, the city has coordinated transportation and land use planning to achieve conditions that support reductions in vehicle travel. Through its land use and transportation plans, including the Comprehensive Plan and the Transportation System Plan (TSP), city policies and investment priorities have supported transit-oriented development (TOD), infill, and neighborhood revitalization. The TSP focuses on reducing automobile travel and providing alternative modes that will help sustain air quality and other environmental resources. Likely due to city and regional transportation and growth management

policies, per capita VMT in the Portland metro area, which was about the same as U.S. average VMT in the mid-1990s, has declined to about 15 percent lower than this average (Figure 2).

Figure 2 Daily VMT Per Person, Portland, OR (Metro) vs. U.S.



Source: David Horowitz, Metro Regional Government, Portland, OR, based on FHWA Highway Performance Monitoring System Data. See: library.oregonmetro.gov/files//1990-2009_dvmt-portland-us.pdf

City codes establish *minimum* densities for mixed-use areas where transit service is provided or planned in the future. Tools such as density bonuses, transfer of development rights, and tax abatements have been used to facilitate transit-oriented development (TOD) around the region's growing light rail system, which now includes four lines covering 52 miles. Major infill projects such as the Pearl District and South Waterfront, coordinated with the introduction of streetcar service, have added over 8,000 new housing units to the downtown area.

The City has also invested heavily in pedestrian improvements as well as bicycle facilities and other supportive infrastructure and outreach programs. The TSP's modal plans include a Pedestrian Plan and a Bicycle Plan. The city now has in place 324 miles of bike lanes, bike boulevards, off-street paths, and cycle tracks (Figure 3). As a result, Portland has the highest bicycle mode share – 6 to 8 percent – of any large city. An extensive traffic calming has made neighborhoods more livable and improved pedestrian safety.

Figure 3 A "Bike Box" in Downtown Portland

Finally, Portland has taken an aggressive approach to maximizing the efficiency of the existing roadway system. The TSP includes a plan that addresses TDM and parking, and a plan for transportation system management (TSM). The TDM plan includes parking management measures, such as elimination of parking minimums downtown and reductions in transit station areas; as well as support for transportation management associations. A TSM policy calls for giving preference to transportation improvements that "use existing roadway capacity efficiently and improve the safety of the system." Measures include synchronizing signals, access management, transit signal priority, and ITS along major corridors. A city-wide program to develop coordinated signal timings at 135 signals has been estimated to reduce GHG emissions by 50 metric tons of carbon per signal per year.[4]

Lessons learned from Portland's experience include:

- **Sustainability requires long-term commitment. The City's successes as measured in terms of VMT per capita, bicycle mode shares, and other factors are a result of over 30 years of local and regional planning.**
- **Use policies and investments to support infill and neighborhood revitalization. Portland has used transportation funds to improve the quality of life in its urban neighborhoods through measures such as streetscaping, traffic calming, and bicycle boulevards.**
- **Coordinate development with transit. Portland has adopted transit-friendly land use policies and zoning measures such as high floor-area ratios, density bonuses, by-right mixed-use development, and parking reductions in locations with rail or frequent bus service.**
- **Focus on operations as well as demand.** Low-**cost efficiency measures such as traffic signal improvements have saved travelers time as well as reducing energy use, GHG emissions, and air pollution.**

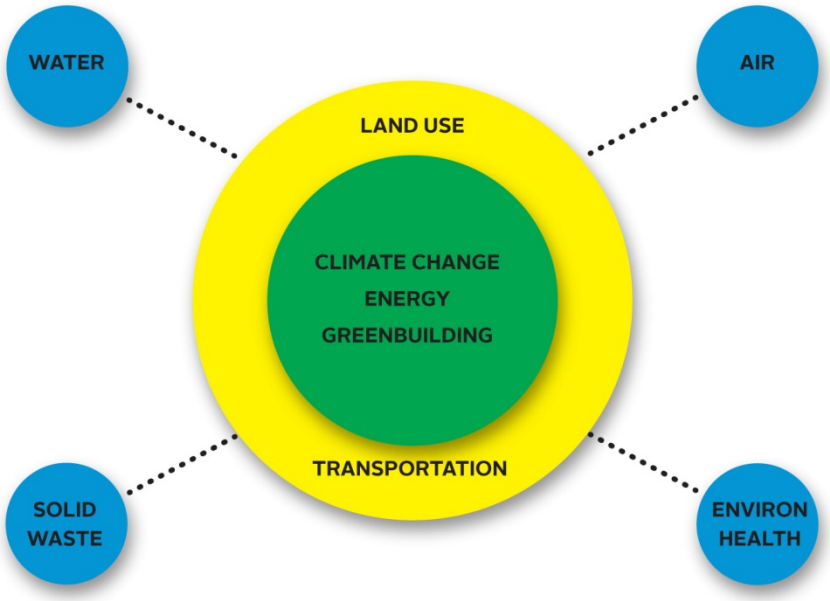
Case Study #2 – City of Alexandria, Virginia

Alexandria is the seventh largest city in the Commonwealth of Virginia, with a population of about 140,000. Sustainability is considered a shared responsibility across the City's governmental structure, but the Office of Environmental Quality in the Department of Transportation & Environmental Services has lead responsibility for this topic. Many Alexandria neighborhoods are compact, walkable, high-income suburbs of Washington D.C., and the city government operates its own bus system as well as being served by regional rail.

[4] Peters, J.; R. McCourt and R. Hurtado (2009). *Reducing Carbon Emissions and Congestion by Coordinating Traffic Signals.* ITE Journal, April 2009.

Beginning in 2007, the City worked with Virginia Tech to develop a definition of "sustainability" that provides the foundation of Alexandria's efforts to define itself as an "eco-city." The City views sustainability as having three components – ecological, economic, and social. The City has developed an Environmental Action Plan 2030 (EAP) that provides the foundation for incorporating sustainability principles into all the City's programs and plans. The Plan identified the challenges of climate change and energy/peak oil as the primary policy and political drivers over the next 20 years. As illustrated in Figure 4, these primary issues will also greatly influence the need to address related issues, such as water and air quality, land use planning, and transportation.

Figure 4 Key Issues in Alexandria, VA Environmental Action Plan



Source: City of Alexandria, VA (2008). *Environmental Action Plan 2030.*

The transportation principles and goals in the EAP are shown below:

> *Transportation - Encourage modes of transportation that reduce dependence upon the private automobile by promoting mass transit and pedestrian- and bike-friendly transportation networks. The city will integrate transportation options with land use decisions in order to ensure a healthy environment while continuing economic growth.*

- Goal 1: Move aggressively toward a culture of city streets that puts "people first" by implementing development and transportation projects consistent with the following level of precedence: pedestrians, bicyclists, public transportation, shared motor vehicles, and private motor vehicles.
- Goal 2: Educate individuals and organizations on the availability of transportation alternatives that will reduce dependency on single occupancy vehicles.
- Goal 3: Improve and expand an integrated rapid transportation system that includes intercity passenger rail, heavy rail, trolleys, streetcars, and buses.
- Goal 4: Develop a city-wide environmentally sustainable comprehensive parking strategy.

The plan also identifies nine broad strategies for supporting cross cutting connections among important sustainability-related topics, such as land use, transportation, open space, energy and environmental health. For example, these include:

1. Establish a city-wide network of high quality, affordable, and accessible eco-sustainable neighborhoods and villages with optimal densities to balance land use and transportation policies with open space, green infrastructure, and energy efficient building policies.
2. Develop a holistic city transportation system that puts the health, mobility, and accessibility of "people first" by implementing development and transportation programs and projects consistent with the following level of precedence: pedestrians, bicyclists, public transportation, shared motor vehicles and private motor vehicles.

With the EAP in place, the City of Alexandria is working to incorporate the concepts of sustainability into its Master Plan and Area Plans as they are updated. For example, the North Potomac Yard Small Area Plan includes a transportation network with a Metrorail station, dedicated high capacity transit corridor, buses, shuttles, car sharing, and bicycle facilities. An aggressive Transportation Management Plan will be required and parking will be managed, shared, priced, and designed to reduce car trips. The Plan is designed to allow employees and residents access to essential services within a five minute walk. The measures are expected to keep auto mode share in the area at less than 50 percent.

Lessons learned from Alexandria's experience include:

- **Take a holistic approach to sustainability. The City has identified actions for each of its program areas including transportation, air quality, water resources, environmental health, energy, land use and open space, and solid waste. Performance targets for other areas, including environment, energy, and land use, relate to transportation.**
- **Transportation and land use strategies are inseparable. This is evident, for example, through the City's policies that call for land use patterns that support accessibility by all modes, and integrating transportation options with land use decisions.**
- **Performance targets should be considered aspirational. Some of the performance targets in the EAP represent a major change in behavior, but the City included them because citizens encouraged them to push for changes.**

For more information, see: http://alexandriava.gov/Eco-City

Case Study #3 – Fruitvale Transit Village

Fruitvale Village, a transit-oriented development project in Oakland, California, that broke ground in 1999, illustrates how a community-based process can revitalize an economically-depressed area and provide access to public transportation. Fruitvale, an ethnically diverse neighborhood of approximately 53,000 people, with just over half of its residents identifying themselves as Latino, is located southeast of downtown Oakland. It is a low-income community, with an average household income of $36,266.[5] At the time the project began, Fruitvale was also seen as a high-crime area.

Fruitvale Village is a multi-phase development. To date, Phase 1 has been completed, with an area of 257,000 square feet, including the following components:

- Retail space (40,000 square feet);
- Commercial space that houses community services including a clinic, library, senior center, and the Unity Council's headquarters (114,000 square feet);
- Mixed-income housing (47 units); and
- 150-car parking garage in addition to parking for BART.

[5] 1990 U.S. Census. Retrieved from http://www.fhwa.dot.gov/environment/ejustice/case/case6.htm

The project began in 1991, when the local transit authority, Bay Area Rapid Transit (BART), announced plans to build a multi-layered parking structure next to the existing Fruitvale station (Figure 5).

Figure 5 Parking Lot Before Fruitvale Transit Village Development

Source: Federal Highway Administration.

The community opposed BART's parking design due to fears of increased traffic and pollution as well as the creation of a barrier between the Fruitvale station and the community. Based on the strong opposition to the project, BART withdrew its proposal. The Unity Council, a community development corporation created in 1964, was central to the success of this project as the organization entered into a partnership with BART to create a project plan through a community-based process.

Many years of work contributed to this project's success. In 1992, the Unity Council won a Community Development Block Grant to create an alternative plan for Fruitvale station. An economic study commissioned by the Unity Council found that businesses were leaving the area and that a real estate development near the transit station could help combat the vacancy problem.[6] Over the next several years, the Unity Council participated in other fundraising efforts and led the visioning and planning process. Partnerships between the Unity Council and BART as well as with other entities were central to the success of this project. In 1993, the Unity Council and the University of California at Berkeley's National Transit Access Center (UC NTRAC) held a community design symposium to help illustrate how community members' ideas could be translated into design elements for the transit station. By the time the project broke ground in 1999, many partners had contributed to the effort including: The Unity Council, National Transit Access Center, University of California at Berkeley, Bay Area Rapid Transit District (BART), City of Oakland, Metropolitan Transportation Commission (MPO for Bay Area), Federal Transit Administration, U.S. Department of Housing & Urban Development, and U.S. Environmental Protection Agency.[7]

[6] Oakland City Magazine. (2005.) "The Fruits of Village Unity." Retrieved from http://www.unitycouncil.org/download/article_reviving_fruitvale.pdf

[7] Federal Highway Administration. "Fruitvale Transit Village Project." http://www.fhwa.dot.gov/environment/ejustice/case/case6.htm

Figure 6 View of Fruitvale Transit Village from Above

Source: Federal Transit Administration.

Lessons learned from Fruitvale Transit Village include:

- Partnerships are powerful tools that can help overcome legal, financial and regulatory barriers. In the case of Fruitvale Transit Village, contributions on the part of the Unity Council, the City of Oakland, and BART helped tackle issues such as development rights, fundraising and zoning changes necessary to prepare for the project construction.
- Community-based organizations can be allies to government agencies when discussing neighborhood-level issues and projects. Because these organizations have close ties to a community, they can identify community members' needs and anticipate their reactions to a particular issue or proposal.
- Providing retail space near transit provides more than just economic benefits. In this inner-city area that struggled with crime, more foot traffic in the transit village and to the surrounding commercial districts has helped create a feeling of safety and the addition of shops in the area has given people more incentive to use BART.
- Achieving support from the community on a transit project has helped improve many aspects of the community, not just transportation. In Fruitvale, crime rates have decreased, retail vacancy is less than 1 percent and the area provides a large source of city sales tax revenue for Oakland.[8]

[8] Oakland City Magazine. (2005.) "The Fruits of Village Unity." Retrieved from http://www.unitycouncil.org/download/article_reviving_fruitvale.pdf

CHALLENGES

This section discusses the most significant challenges that transportation agencies have faced in incorporating sustainability principles into transportation planning and programming. Case studies of a dozen transportation agencies for NCHRP Project 8-74, which is focused on sustainability performance measurement at transportation agencies, indicated the following challenges were most significant:

- **Turning goals into measurable actions** – Many agencies are able to identify, agree upon and set goals that include concepts of sustainability, but are finding it more difficult to implement programs that will help lead to these goals. Identifying ways to effectively track progress towards these goals is also challenging.
- **Outside agency scope** – Achieving sustainability requires the cooperation of many agencies and entities with a range of responsibilities.
- **Measurement at the project level** – Sustainability impacts are often easier to measure at a regional scale, and more difficult to measure on a project by project basis. For example, regional travel demand models currently do not provide meaningful energy or air quality calculations for small scale projects.

Additional challenges for Alameda County include:

- **Integrating land use and transportation planning.** SB 375 is intended to encourage integration of land use development with transportation investments to reduce vehicle miles traveled and greenhouse gases. However, land use planning cycles are out of sync with transportation planning cycles, and the authority for land use and transportation planning decisions resides in separate agencies. Coordinating these is an ongoing challenge for the CWTP and beyond.
- **Trading off equity and environmental protection.** Some definitions of sustainability include both environmental protection (e.g. greenhouse gas reduction and air quality improvement) and preservation of social and geographic equity. These aspects of sustainability do not always work in harmony. The goal of achieving equitable distribution of funds among local governments in Alameda County may conflict at times with a desire to maximize the greenhouse gas reduction and air quality improvement benefits of specific types of transportation projects (particularly transit investments). This could be addressed in part by ensuring that overall investments among communities are balanced, but that investments are appropriate for each community. For example, in the context of a low-density community, signal timing improvements or incentivizing carpooling are likely to yield more cost-effective reductions in greenhouse gases than is expanding transit service.
- **Trading off mobility and energy/GHG reduction.** While reducing VMT clearly supports environmental sustainability, there is disagreement over the extent to which VMT can be reduced without negatively impacting economic growth and personal mobility. The challenge is to develop land use and transportation systems that maximize the *accessibility* of people and businesses to jobs, workforce, goods, services, and markets (i.e., the opportunities that can be reached within a given travel time) – while minimizing the *distances* that must be traveled. This can be done through compact, balanced, and mixed-use land use patterns that allow shorter trips and increase connectivity within neighborhoods, combined with improved transit, bicycle, and pedestrian infrastructure. Pricing strategies can also ensure that the capacity of the transportation system is used most efficiently to support economic growth.
- **Meeting LOS/congestion standards vs. reducing VMT.** Closely tied in with the previous issue is the question of how traffic impacts associated with new development are mitigated. California has long had in place requirements for county-level congestion management systems to meet level of service (LOS) standards as well as requirements in California Environmental Quality Act (CEQA) review to evaluate whether projects would result in exceedance of LOS standards. However, these requirements provide incentives for capacity expansion (as a mitigation

measure), rather than VMT reduction. Recognizing the potential conflict with state GHG reduction policies, the state recently issued new CEQA guidelines that shift the emphasis away from LOS and congestion standards and allow communities to set alternative goals such as trip and VMT reduction.[9] It is not yet clear what effects this change will have on sustainability outcomes, including infrastructure supply as well as travel demand.

- **Expanding the scope of transportation planning activities beyond traditional infrastructure investment.** Creative response to climate change and fiscal challenges may require re-definition of the scope of transportation planning. Many innovative and promising strategies to reduce greenhouse gas impacts may require thinking beyond concrete and paint to include planning for new technologies and programs such as electric vehicles, dynamic ridesharing, and smart parking management.

STRATEGIC INVESTMENT OPPORTUNITIES

This section discusses how the CWTP can encourage implementation of a more sustainable transportation system. The Alameda CTC, in cooperation with regional and local partners, is already engaged in a number of actions directed at increasing transportation sustainability. The Alameda Countywide Transportation Plan Draft Briefing Book (December 2010) identifies a number of projects and programs that support a sustainable transportation system. Some are led by the CTC, while others are led by other partners in cooperating with the CTC. Figure 7 shows some examples of these programs and identifies which sustainability principles (as indicated by an X) each appears to most directly support.

Figure 7 Existing Alameda County and Major Regional Transportation Programs and Sustainability Objectives

	Outcome Principles			Process and Program Principles			
Program	Environment	Economy	Equity & Quality of Life	Fiscal Constraint	Maximize Existing Efficiency	Integrated Planning	Track Performance
Regional Sustainable Communities Strategy	X		X			X	X
MTC Transit Sustainability Project				X			
New Rail Transit Projects	X	X	X				
New BRT/Bus Enhancements	X	X	X		X		
Paratransit Services			X				
Countywide Bicycle Plan	X		X				
Trade Corridors Improvement Fund		X					
ICM & SMART Corridors Projects	X	X			X		

[9] http://ceres.ca.gov/ceqa/docs/Adopted_and_Transmitted_Text_of_SB97_CEQA_Guidelines_Amendments.pdf

	Outcome Principles			Process and Program Principles			
Program	Environment	Economy	Equity & Quality of Life	Fiscal Constraint	Maximize Existing Efficiency	Integrated Planning	Track Performance
LOS Monitoring Reports & CMA Performance Reports		X					X
Local TDM Programs such as in Berkeley and Pleasanton	X		X		X		

To support sustainability in the future, the CTC can consider expanding programs similar to those listed in Table 2, particularly those which address both the environmental and financial components of sustainability. Some examples of cost-effective investment types include local TDM programs to reduce vehicle trips, local parking pricing programs, and Intelligent Transportation Systems improvements to reduce highway congestion. However, the cost-effectiveness of individual investments depends greatly on the context. The CTC can work to ensure that investments are appropriate for the context. The CTC can also help municipalities achieve economies of scale by sharing resources, e.g., by developing a TDM resource center and outreach program serving multiple communities, or developing model zoning ordinances and design guidelines for bicycle facilities and transit accessibility.

Some more specific ideas include the following:

- **The CTC could consider creation of a new pilot program category to fund innovations in transportation sustainability.** MTC's Climate Initiatives Program funds demonstration projects to test the most innovative strategies to promote changes in driving and travel behaviors. Potential projects may seek to increase the use of low-GHG alternative fuels, expand car-sharing programs, or implement low-GHG tire incentive programs or pricing demonstration projects. Alameda CTC could consider creation of a similar program to fund innovative approaches to climate change and sustainability at the county level. This could also be a means to explore possible innovative technological solutions to climate and sustainability challenges.
- **The CTC can evaluate sustainability outcomes.** For certain CWTP programs, the CTC could require project sponsors to collect data on sustainability outcomes. Before-and-after usage data on new bicycle and transit facilities, for example, could help inform which types of investments are most successful and cost-effective in which locations. The city of San Francisco, for example, evaluated before-and-after results from its pilot program to put colored bicycle lanes and bicycle boxes on Market Street in downtown San Francisco and found increased levels of bicycling after the improvements were installed.[10] The CTC can also use ongoing performance measurement to track progress towards overall sustainability goals, such as the share of trips made by bicycling, walking, transit, or carpool, by jurisdiction.
- **The CTC can study innovative solutions to sustainability challenges.** To inform future CWTP efforts, the CTC could launch a study to identify innovative sustainability solutions and emerging challenges. For example, it could study the need for future infrastructure (pavement striping, parking facilities, charging stations) to support electric vehicles, and adopt or develop model building codes that require charging stations as part of new development. It could also examine the need for modifying investment priorities to address the likely impact of climate change-related sea-level rise on low-lying transportation infrastructure.

[10] Source: San Francisco Bicycle Coalition. http://www.sfbike.org/?market

- **The CTC can be a leader in sustainability.** The CTC can ensure that county agencies and departments are meeting internal transportation-related sustainability goals through their operations, e.g., by offering employees transportation incentives, reducing or eliminating hidden parking subsidies, promoting acquisition of energy-efficient fleets, offering employees access to car-sharing vehicles, and other strategies.

ISSUE PAPER: TRANSPORTATION DEMAND MANAGEMENT (TDM) AND PARKING MANAGEMENT[1,2]

EXECUTIVE SUMMARY

This issue paper outlines the key principles of transportation demand management (TDM) and parking management, and how they may be implemented in Alameda County. Key conclusions include:

- TDM and parking management include a wide variety of different demand measures that can be designed to influence travel behaviors in a variety of urban and suburban contexts.
- TDM and parking management have been shown to be highly effective at achieving the transportation vision, goals, and objectives of the new Countywide Transportation Plan, most notably the need to reduce vehicle trips in light of new statewide regulation.
- Determining a specific role for the Alameda CTC is one of the biggest challenges in regards to TDM and parking management. TDM and parking management are often implemented at the local level, yet there likely remains a robust regional role for the Alameda CTC to play in terms of guidance and oversight, direct program administration (such as Alameda County's Guaranteed Ride Home program), and technical assistance for local jurisdictions.
- The Countywide Transportation Plan presents a unique opportunity to guide a growing regional movement that emphasizes demand-side solutions to the county's transportation challenges. The Countywide Transportation Plan is also well-positioned to support the efforts of municipalities to further innovate and utilize these strategies to achieve a shared vision for a sustainable and efficient transportation network. Initial concepts include:
    - Provide dedicated funding to the Guaranteed Ride Home (GRH) program, the Alameda CTC's primary TDM program.
    - Develop a comprehensive TDM program in which the Alameda County GRH program is expanded.
    - Develop Countywide TDM and parking management guidelines.
    - Create a robust technical assistance program to help jurisdictions implement TDM.
    - Initiate a TDM and/or parking certification program for.

[1] For purposes of this paper TDM and parking management are largely discussed as separate strategies. However, parking management by itself can also be categorized as one of many TDM tools.

2 Certain concepts and specific language in this paper were adapted from a previous Nelson\Nygaard report: "Regional Parking Strategies for Climate Protection," Metropolitan Transportation Commission, January 2010.

- Ample precedent exists for the Alameda CTC to refer to in its efforts to establish countywide TDM and parking management policies and programs. The case studies included in this issue paper include:
  - San Mateo C/CAG Trip Reduction Guidelines
  - San Francisco Commuter Benefits Ordinance
  - National Capital Region Transportation Planning Board Technical Assistance Program and the D.C. Performance Based Parking Pilots
  - Massachusetts Downtown Initiative (MDI)
  - GreenTRIP Certification Program

INTRODUCTION

The Alameda CTC *Countywide Transportation Plan and Transportation Expenditure Plan Briefing Book* provides an overview of transportation demand management (TDM) and parking management, identifies best practices, and highlights what Bay Area jurisdictions and agencies are currently doing to utilize these strategies. This issue paper builds on the information provided in the *Briefing Book* to describe how TDM and parking management can be supported through the Countywide Transportation Plan and Transportation Expenditure Plan.

The development and implementation of the new Countywide Transportation Plan and Transportation Expenditure Plan are occurring within the context of a changed economic, regulatory, and social environment in which the concept of creating a more sustainable way of living through transportation and land use investments has become a primary focus. The passage of AB 32 and SB 375 requires that Alameda County take a different approach to transportation planning – one that aggressively addresses the impact of greenhouse gas emissions by reducing vehicle miles traveled (VMT). Managing travel demand through TDM and/or parking management techniques offers cost effective and proven approaches to reducing VMT, by leveraging existing investments, and can complement investments in transit systems and other alternatives to driving. This issue paper further illustrates the efficacy and importance of TDM and parking management, while offering a potential framework for ways in which the Alameda CTC might facilitate supportive TDM and parking management policies.

The *Briefing Book* also addressed the related field of Transportation Systems Management, or TSM, at some length. TSM measures seek to improve the efficiency of road networks using technology-based solutions such as ramp metering and user information systems. By contrast, TDM measures seek to reduce demands on existing roadway and parking capacity using incentives and disincentives designed to influence travel choice. While TSM measures have an important role to play in developing a comprehensive transportation strategy, they are already well understood and widely used in Alameda County, while TDM strategies remain largely the purview of private employers. For this reason, this paper focuses on TDM and parking management.

What is TDM and Parking Management?

As discussed in the *Briefing Book*, TDM and parking management strategies represent a new, and increasingly prevalent, approach to transportation planning. This approach seeks to address transportation challenges, such as congestion and the need for adequate parking, not with traditional supply-side solutions, but rather with projects and programs that manage travel *demand*. Supply-side solutions focus on increasing roadway capacity or building more parking, an approach that has been criticized for creating additional congestion through "induced demand,"[3,4,5] exacerbating parking inefficiencies,[6] and contributing to a number of other public health and social impacts related to driving.[7] As discussed below, research shows that TDM and parking management have had demonstrable and cost-effective success in influencing people's core travel choices and behaviors, thereby reducing vehicle trips, congestion, and vehicle emissions; while improving mobility, accessibility, and the efficiency of local and regional transportation networks.

TDM strategies are diverse and vary depending on the context, but typically fall into the following categories:[8]

- **Financial incentives,** such as subsidized transit passes, parking cash-out programs, commuter checks, or guaranteed ride home programs;
- **Shared vehicle services,** such as shuttles or carpools/vanpools;
- **Alternative commute scheduling,** such as telecommuting or compressed work weeks;
- **Promotional activities,** such as travel marketing programs, travel training, or on-site transportation coordinators;
- **Infrastructure,** such as car or bicycle sharing services, secure bicycle parking, or on-site amenities (lockers, showers, etc.);
- **Parking management** is a broad topic, but typically includes demand-responsive pricing of curb spaces, "unbundling" of parking costs from rents and leases, reduced or eliminated minimum parking requirements, use of new meter technologies to allow multiple forms of payment and dynamic pricing, district-based parking management, shared parking strategies, and the use of parking revenue to support other mobility programs.

It is important to note that TDM and parking management usually take place at the local level with local jurisdictions approving TDM ordinances, establishing transportation conditions of approval and setting parking policy. Similarly, execution of TDM strategies also typically happens at the local, and often at the project level, as municipalities, employers, developers, and public or private institutions assume responsibility for ensuring that TDM programs and parking management efforts are implemented. However, parking and demand management can have regional impacts. This is discussed in greater detail below.

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[3] Hansen, M., & Huang, Y. (1997). Road supply and traffic in California urban areas. *Transportation Research Part A: Policy and Practice,* 31(3), 205-218.

[4] Goodwin, P. (1996). Empirical evidence on induced traffic: A review and synthesis. *Transportation, 23,* 35-54.

[5] Cervero, R. (2003). Road Expansion, Urban Growth, and Induced Travel: A Path Analysis. *Journal of the American Planning Association, 69* (2), 145-163.

[6] Shoup, D. (2005). *The High Cost of Free Parking.* Planners Press, American Planning Association.

[7] American Public Health Association. (2010). *The Hidden Health Costs of Transportation.* Washington D.C.: American Public Health Association.

[8] For a complete description and list of these strategies, please refer to the *Briefing Book.*

BENEFITS OF TDM AND PARKING MANAGEMENT

The Countywide Plan must balance a multitude of competing priorities within a highly competitive funding environment. Because TDM and parking management have been shown to be effective transportation planning tools in a variety of urban and suburban contexts, it is likely that these concepts can play an important role in ensuring that the Countywide Plan meets its goals and objectives. Some of the key benefits are:

- **Congestion and trip reduction:** Numerous studies demonstrate the effectiveness of TDM and parking management strategies in reducing vehicle trips and VMT. These include, but are not limited to:
    - *Pricing of parking:* "Market-based" parking pricing strategies seek to achieve availability targets (typically, 15% of spaces) by setting prices based on demand. A 2005 study showed that a 10% increase in parking charges reduces vehicle trips by 1-3%, depending on demographic, geographic, travel choice and trip characteristics.[9] Figure 1 shows how minimum employee parking charges affected VMT, trips taken, and trip delay in four California regions. In the San Diego region, a $3 employee parking charge reduced VMT by 2.4% and trip delay by 7%.[10] Parking fees and pricing programs can also:
        - Reduce vehicle emissions from cars circling around looking for a parking space;
        - Generate funds for alternative modes, like bicycle and pedestrian improvements, and
        - Discourage people from driving, and encourage them to take alternative modes.

Figure 1 Impacts of Employee Parking Fees

Region	Price	VMT	Trips	Delay
Bay Area	$1	-0.8%	-0.9%	-2.7%
	$3	-2.1%	-2.4%	-7.0%
Sacramento	$1	-1.0%	-1.1%	-2.5%
	$3	-2.6%	-2.8%	-6.5%
San Diego	$1	-0.9%	-1.0%	-2.5%
	$3	-2.4%	-2.6%	-7.0%
South Coast	$1	-0.9%	-1.1%	-2.9%
	$3	-2.5%	-2.8%	-8.5%

Source: Harvey and Deakin, 1997, Table B.7, in 1991 U.S. dollars; Accessed at VTPI, http://www.vtpi.org/tdm/tdm26.htm

[9] Erin Vaca and J. Richard Kuzmyak (2005*), Parking Pricing and Fees,* Chapter 13, TCRP Report 95, Transit Cooperative Research Program, Transportation Research Board, Federal Transit Administration (www.trb.org/publications/tcrp/tcrp_rpt_95c13.pdf). Accessed on Victoria Transport Policy Institute, http://www.vtpi.org/tdm/tdm26.htm

10 Greig Harvey and Elizabeth Deakin (1997), "The STEP Analysis Package: Description and Application Examples," Appendix B, in Apogee Research, *Guidance on the Use of Market Mechanisms to Reduce Transportation Emissions,* USEPA (Washington DC; www.epa.gov/omswww/market.htm). Accessed on Victoria Transport Policy Institute, http://www.vtpi.org/tdm/tdm26.htm

- *Subsidized transit passes:* Passes purchased in bulk at a discount can be provided free to users (such as residents of an area, students at a university, or other groups) or at a discount. Figure 2 shows the drive-alone and transit mode splits before and after subsidized transit pass implementation in different locations. These programs all led to reductions in driving alone, as well as a 3-16% increase in transit use.

Figure 2 Mode Shifts Achieved with Free or Discounted Transit Passes

Location	Drive to work		Transit to work	
Municipalities	**Before**	**After**	**Before**	**After**
Santa Clara (VTA)[11]	76%	60%	11%	27%
Bellevue, WA[12]	81%	57%	13%	18%
Ann Arbor, MI[13]	N/A	(4%)	20%	25%
Universities				
UCLA[14] (faculty/staff)	46%	42%	8%	13%
Univ. of Washington[15]	33%	24%	21%	36%
Univ. of British Colombia[16]	68%	57%	26%	38%
Univ. of Wisconsin, Mil.[17]	54%	41%	12%	26%
Colorado Univ. (students)[18]	43%	33%	4%	7%

[11] Santa Clara Valley Transportation Authority, 1997.

12 1990 to 2000; http://www.commuterchallenge.org/cc/newsmar01_flexpass.html.

[13] White et. al. "Impacts of an Employer-Based Transit Pass Program: The Go Pass in Ann Arbor, Michigan."

[14] Jeffrey Brown, et. al. "Fare-Free Public Transit at Universities." *Journal of Planning Education and Research* 23: 69-82, 2003.

[15] 1989 to 2002, weighted average of students, faculty, and staff; From Will Toor, et. al. *Transportation and Sustainable Campus Communities*, 2004.

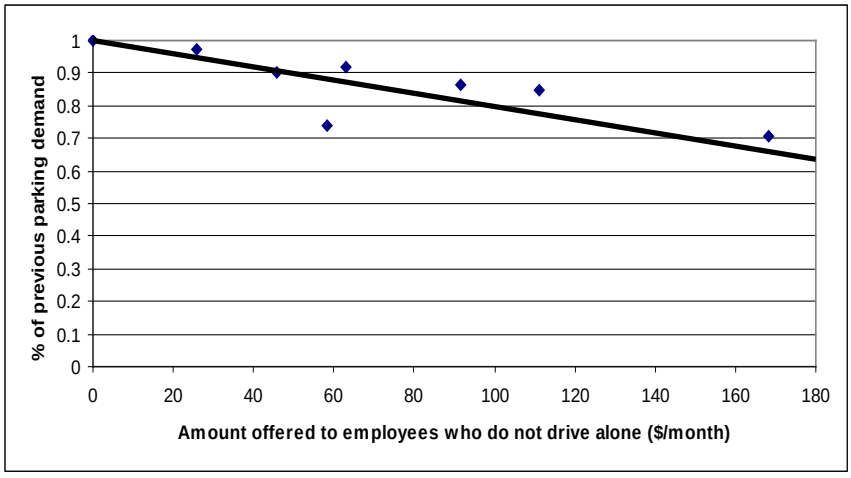
[16] 2002 to 2003, the effect one year after U-Pass implementation; From Wu et. al, "Transportation Demand Management: UBC's U-P ass – a Case Study", April 2004.

[17] Mode shift one year after implementation in 1994; James Meyer et. al., "An Analysis of the Usage, Impacts and Benefits of an Innovative Transit Pass Program", January 14, 1998.

[18] Six years after program implementation; Francois Poinsatte et. al. "Finding a New Way: Campus Transportation for the 21st Century", April, 1999.

- *Parking Cash Out:* Parking cash out is a TDM program that provides a subsidy to employees who choose to commute by alternative modes rather than making use of on-site parking. The primary benefit of parking cash out programs is their proven effect on reducing auto congestion and parking demand. Figure 3 illustrates the effect of parking cash-out at seven different employers located in and around Los Angeles. Additionally, a 1997 demonstration program including Alameda County and the Cities of Oakland, Pleasanton and Albany showed great promise: in the county, Oakland and Albany, 16-20% of participants changed their commute behavior (in Pleasanton, participation declined, but the existing program there had already grown substantially since implementation). Incentives consisted of Commuter Check transit vouchers or cash incentives ranging from $1.50 to $2.50 per day. All of the program sites were within one-quarter mile of transit and offered BART connections.

Figure 3 Effects of Parking Cash Out on Parking Demand[19]



- *Ridesharing:* Ridesharing programs nationally have been shown to reduce daily auto commute trips to specific worksites by 5-15% if they consist solely of educational efforts, and up to 30% if combined with cash incentives such as parking cash out or vanpool subsidies.[20] Furthermore, because rideshare passengers tend to have relatively long commutes, mileage reductions can be relatively large. Rideshare programs have also been shown to reduce commute VMT by up to 8.3%, total regional VMT by up to 3.6%, and regional vehicle trips by up to 1.8%.[21]

[19] Source: Derived from Donald Shoup, "Evaluating the Effects of Parking Cash-Out: Eight Case Studies," 1997. Based on the cost in 2005 dollars.

[20] Reid Ewing (1993), *TDM, Growth Management, and the Other Four Out of Five Trips.*

[21] Apogee (1994), *Costs and Cost Effectiveness of Transportation Control Measures; A Review and Analysis of the Literature,* National Association of Regional Councils (www.narc.org). Accessed at VTPI, http://www.vtpi.org/tdm/tdm34.htm

TDM Resource Center (1996), *Transportation Demand Management; A Guide to Including TDM Strategies in Major Investment Studies and in Planning for Other Transportation Projects,* Office of Urban Mobility, WSDOT (www.wsdot.wa.gov).

- *Carsharing:* Carsharing programs are short-term, members-only rental arrangements in which cars can be obtained on short notice (typically, by making a reservation online) from various unstaffed locations using cards or fobs. Research demonstrates that each carsharing vehicle takes nearly 15 private cars off the road – a net reduction of almost 14 vehicles.[22] Additionally, the average reduction in vehicle ownership in North American cities with carsharing programs was 20%. Finally, a UC Berkeley study of San Francisco's City CarShare found that members drive nearly 50% less after joining. The study also found that when people joined the carsharing organization, nearly 30% reduced their household vehicle ownership and two-thirds avoided purchasing another car.[23]
- *Guaranteed Ride Home Program:* A GRH program provides "commuter insurance" for employees, in the form of vouchers allowing participants who do not drive to work to make a limited number of free (excepting tips and gas) after-work trips via taxi or rental car under certain conditions. In Alameda County's GRH program, these include medical emergencies, unscheduled overtime, or times when a rideshare vehicle is unavailable (because the vehicle has broken down or the driver had to leave early or stay late). One survey found that 59% of rideshare and transit users said GRH was a factor in their decision not to drive24. GRH programs are also relatively inexpensive: another study found average costs of less than $5 per employee, per year25.

- **Quick results and longer-term impacts:** Capital projects can take years to design, clear environmental review, and construct. TDM and parking reform efforts can be implemented on a relatively fast timeline. Moreover, impacts from these programs and projects are often immediate. TDM programs have been shown to have immediate effects on travel behavior and mode choice, while implementation of parking reforms, such as dynamic pricing, can result in instantaneous changes to parking availability and local congestion related to "cruising" for parking. Finally, many of the behavioral impacts result in long-term and systemic changes. As described above, as an example, the use of car sharing has been shown to fundamentally reduce household vehicle ownership and travel behavior.
- **Cost-effective:** TDM programs and parking reform efforts are cost-effective, a crucial factor for the Countywide Transportation Plan to consider in the context of competing priorities.[26] First, TDM strategies can be implemented quickly, have relatively small up-front capital costs, and relatively low ongoing operating costs. Second, TDM programs can leverage existing infrastructure investments, such as transit service or high occupancy vehicle (HOV) lanes. For example, as shown in Figure 2, substantial mode shifts to transit can be achieved through transit pass programs, thereby increasing transit ridership and making transit systems themselves more cost-effective. Third, TDM programs can leverage the resources of the private sector. Many TDM programs, such as new shuttle services, financial incentives, ridesharing services, and marketing, are actually funded by private employers and institutions. Finally, effective parking management can be an additional source of revenue for local jurisdictions, although this aspect of parking management should be managed carefully, as discussed below.

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[22] Transportation Research Board (2005), *Carsharing: Where and How it Succeeds,* Transit Cooperative Research Program Report 108. http://onlinepubs.trb.org/Onlinepubs/tcrp/tcrp_rpt_108.pdf

[23] Cervero, R., & Tsai, Y.-H. (2003). *San Francisco City CarShare: Travel-Demand Trends and Second-Year Impacts.* University of California at Berkeley, Institute of Urban and Regional Development, Berkeley.

[24] K.T. Analytics (1992), TDM Status Report; Guaranteed Ride Home, Federal Transit Administration, USDOT (www.fta.dot.gov/library/planning/tdmstatus/FTAGUAR2.HTM).

[25] Comsis Corporation (1993), Implementing Effective Travel Demand Management Measures: Inventory of Measures and Synthesis of Experience, USDOT and Institute of Transportation Engineers (www.ite.org). Available at www.bts.gov/ntl/DOCS/474.html.

[26] For example, see the cost effectiveness of TDM in Portland for reducing GHG. Portland Bureau of Transportation. "Technical Memorandum #2: Strategies for Reducing GHG Emissions." July 2010. Prepared by Nelson\Nygaard Consulting Associates.

- **Politically viable:** Whether it is carpooling, using the company shuttle, utilizing commuter checks, or even riding a bicycle to work, large numbers of people already participate in a TDM program. In fact, many public and private employers highlight their TDM efforts and commute benefits as a means to attract employees. Consequently, these programs appear to be a politically viable option for additional funding and expansion throughout the County.

  Parking management, however, can be more politically challenging, as parking policy decisions tend to generate vociferous debate, as seen in the City of Oakland in the summer of 2009 when the City raised parking rates and lengthened meter hours in several commercial districts. However, if "done right" in terms of program design and responsiveness to community concerns, the implementation of dynamic pricing and other parking reforms can result in strong support from the public and local business community. Experience in Redwood City, Pasadena, and numerous other jurisdictions has shown that clear articulation of policy goals such as parking availability, as well as reinvestment of additional revenue back in the community in the form of infrastructure improvements or complementary mobility strategies, can overcome the typical public objections to changes in parking policy.

- **Region-wide applicability and flexibility:** TDM and parking management strategies are adaptable to local conditions, needs, and policies. As an example, clearly, the parking challenges facing Berkeley are quite different that those in Hayward or Pleasanton. However, the core philosophies and methodologies behind each of the strategies remain the same, and can be tweaked or refined to meet the goals and objectives of different municipalities.
- **Pro-market:** Most municipal codes require that developers build more parking than the market warrants, thereby artificially distorting the market for parking. Parking reforms, such as reduced, maximum or eliminated minimum parking requirements, can improve the efficiency of the regional economy in general. In particular, reducing parking requirements reduces the overall cost to build new housing and commercial developments, especially in transit-rich and walkable locations.

CHALLENGES

One of the Alameda CTC's primary challenges is to determine exactly what its role will be in regards to TDM and parking management. Currently, the Alameda CTC does play a direct, but limited role in these areas. For example, the Alameda CTC currently administers the County's Guaranteed Ride Home program. However, parking management is typically under the control of local jurisdictions, while many TDM programs are implemented at the project level. Moving forward with the development of the Countywide Transportation Plan it is crucial that the Alameda CTC find the appropriate balance between regional involvement and local implementation.

One potential countywide role would be to support smart parking and transportation demand management at the local level through technical assistance and incentive programs. There are a number of challenges at the local level that a countywide program could assist cities to overcome. Many of these are driven by the fact that local governments are increasingly constrained by limited budgets. Many cities simply do not have the capital or staffing resources to expand their TDM efforts or engage in comprehensive parking reform.

First, technical assistance directed at helping cities design TDM programs, write TDM ordinances and conditions of approval, and tailor strategies to local conditions could be a worthwhile role for the Alameda CTC. Second, any successful TDM program requires ongoing enforcement and evaluation. Traditionally, enforcement and evaluation efforts for TDM programs fall to local jurisdictions, and private entities. However, local jurisdictions often lack the resources to continually monitor TDM programs, while private developers and employers do not always prioritize the ongoing implementation of their TDM efforts. There is also potential for the Alameda CTC to provide a universal framework for program development, implementation, and ongoing management. For example, the Alameda CTC could fund a countywide evaluation of existing TDM and parking management efforts, which would likely involve developing a universal and consistent reporting format and/or contracting for a single evaluator. The Alameda CTC could also help develop model TDM ordinances, thereby helping to reduce the concern some communities

might have that higher parking rates, for example, would drive development to the next city or town. Finally, the Alameda CTC could develop countywide guidelines similar to those used in San Mateo County, which would then be implemented at the local level.

Parking reform efforts are resource intensive. Their success depends on a process that is well-designed, highly transparent, supported by robust data, and responsive to public input. However, many cities have not comprehensively reviewed their parking codes in years or decades, while even fewer have conducted a recent inventory of their existing parking supply or gathered data on parking demand. Consequently, even cities that have clear policy direction and political will to address parking challenges lack the required data to make informed and transparent decisions. The need for parking technical assistance is substantial, and, potentially offers the most appropriate role for the Alameda CTC in regards to parking management. As discussed in the case studies below, other regional agencies throughout the country have had success in supporting locally-driven TDM and parking reform efforts through technical assistance programs.

CASE STUDIES

San Mateo C/CAG Trip Reduction Guidelines

The San Mateo City and County Association of Governments (C\CAG) serves as the state designated Congestion Management Agency for San Mateo County. As such, C/CAG is responsible for preparing a periodic Congestion Management Program for the County. To comply with Air District Regulation 13, Rule 1, C\CAG developed a set of guidelines for the implementation of the land-use component of the congestion management program that includes TDM requirements for new development[27]. Whereas many other Congestion Management Agencies have retreated from TDM requirements in the face of opposition from employers and developers, the flexible nature of the program implemented in San Mateo County has led to continued success and innovation.

As required in county Congestion Management Programs, C/CAG guidelines must be followed for all projects that are projected to generate a net increase of 100 or more peak hour vehicle trips, and local governments are encouraged to apply the guidelines to all projects that the jurisdiction believes may have an impact on local or countywide traffic conditions.

Rather than requiring or prescribing specific actions by local governments, the C/CAG guidelines provide a framework and a recommended set of options for achieving vehicle trip reduction goals. Local governments are responsible for ensuring that the developer, property-owner, and/or tenant will "reduce demand for all new peak hour trips projected to be generated by a development [and] can select one or more of the options that follow," or may propose other methods for mitigating vehicle trips. C/CAG recommended options include:

1. Reducing the scope of the project
2. Accepting a one-time payment from the project sponsor of $20,000 per peak hour trip to fund ongoing TDM implementation (if a jurisdiction collects its own transportation impact fee, the "portion used to mitigate the impacts of the project's traffic will count as credit toward the [required] reduction in trips.")
3. Adopt CMA guidelines for projects
4. Require the developer and subsequent tenants to implement a package of TDM programs that have the capacity to fully reduce demand for new peak hour trips (the developer/tenants are not held responsible for the extent to which these programs are actually used)
5. Negotiate with C/CAG staff for other acceptable ways to mitigate trips

[27] City and County Association of Governments of San Mateo County (C/CAG), "Guidelines for Implementing the Land Use Component of the Congestion Management Program, " as amended by the C/CAG Board of Directors, September, 2004. Note that Air District Regulation 13, Rule 1: Employer Trip Reduction Requirements was suspended in 1996, following passage of SB 437.

These C\CAG guidelines are not meant to limit choices, and note specifically that "it is up to the local jurisdiction, working together with the project sponsor to choose the method(s) that will be compatible with the intended purpose of the project and the community that it will serve."

Project sponsors and tenants that are required to implement TDM programs may choose a combination of complementary TDM measures from a checklist developed by C/CAG. Each of the TDM strategies has been assigned a peak hour vehicle trip reduction value that is based on evidence from transportation-related academic and professional research and the best professional judgment of C/CAG staff. TDM measures include the parking related measures, as shown in Figure 4 below.

In addition to these measures, C\CAG offers to credit each employer/tenant with reduction of up to three peak hour trips for conducting a twice-yearly survey of employees, to examine their travel patterns and assess performance of specific TDM measures and the program as a whole. Although individual commuters are not subject to monitoring and enforcement of TDM provisions by cities or other outside agencies, and developers/property owners and their tenants are not responsible for actual participation rates, or trip reduction performance, employers are accountable to local governments for program implementation.[28] This combination of auto-enforcement and accountability can serve as a model for implementation of a flexible but results-oriented regional parking reform agenda.

Figure 4 C/CAG San Mateo County TDM Checklist

TDM Measure	Trip Reduction Credit
Charging employees for parking	Two peak-hour trips will be credited for each parking spot charged out at $20 per month for one year. Money shall be used for TDM measures such as shuttles or subsidized transit tickets.
Implementation of a parking cashout program	One peak-hour trip will be credited for each parking spot where the employee is offered cash payment in return for not using parking at the employment site.
Encourage shared parking	Five peak hour trips will be credited for an agreement with an existing development to share existing parking
Participate in/create/ or sponsor a Transportation Management Association	Five peak hour trips will be credited
Coordinate TDM programs with existing developments/employers	Five peak-hour trips will be credited

Lessons Learned

- **One possible role for the county would be to develop guidelines which could then be implemented by cities.**
- **A "menu" of options for achieving trip reduction targets can offer flexibility and contribute to employer acceptance.**
- **TDM trip-reduction impacts can be quantified using available research and professional judgment.**
- **Offering trip-reduction credits for surveys is a way to collect data and ensure ongoing monitoring.**

[28] C/CAG TDM guidelines state that, "the developer/tenants will not be held responsible for the extent to which these programs are actually used [but] the developer shall pay for a monitoring program for the first three years of the development. The purpose of the monitoring program is to assess the compliance of the project with the final TDM plan."

San Francisco Commuter Benefits Ordinance

In January 2009, San Francisco's Commuter Benefits Ordinance (Ordinance 199-08) went into effect. Under this local ordinance, all employers with 20 or more employees are required to offer a commuter benefits program to their employees. This ordinance promises to contribute to reduced parking demand, reduced VMT, and ultimately reduced greenhouse gas emissions in the Bay Area by seeking to make more comparable the subsidies and benefits available to commuters using all modes of transportation (similar to parking cashout).

The federal government currently allows employees to deduct up to $230 per month from their paychecks, pre-tax, to pay for transit and vanpool expenses. Under the Commuter Benefits Ordinance affected employers are now required to allow their employees to participate in the existing federal government's program as described above. Employees who work an average of at least 10 hours per week while working for the same employer within the previous calendar month are eligible.

Employers have three options for providing commuter benefits to their employees and may offer a combination of options 1 and 2:

1. **Pre-tax Transit:** Under existing Federal Tax Law 132(f), employers set up a program that allows employees to use up to $230 a month in pretax wages to purchase transit passes or vanpool rides.
2. **Employer Paid Transit Benefits:** Employer pays for workers' transit fares on any of the San Francisco Bay Area mass transit systems or reimburses workers for their vanpool expenses. Reimbursements for transportation expenses must be of at least an equivalent value to the purchase price of a San Francisco MUNI Fast Pass.
3. **Employer Provided Transit:** Employer offers workers free shuttle service on a company-funded bus or van between home and place of business.

Employers can administer the benefit themselves by purchasing transit tickets or vouchers that can be redeemed for passes, tickets, and vanpool expenses each month and distributing them to employees or employers may hire a third-party administrator to manage their program.

The Department of the Environment may issue employers a fine for non-compliance. The current fee structure is: $100 for a first violation, $200 for a second violation within the same year, $500 for each additional violation within the same year.

Lessons Learned

- **The San Francisco program offers another example of a flexible approach to achieving TDM objectives.**

National Capital Region Transportation Planning Board Technical Assistance Program and the D.C. Performance Based Parking Pilots

The National Capital Region Transportation Planning Board (TPB) is the federally designated Metropolitan Planning Organization (MPO) for the District of Columbia and surrounding jurisdictions in Maryland and Virginia. In addition to its core responsibilities as an MPO, TPB provides a variety of technical assistance programs to its local partners, such as congestion monitoring, travel forecasting, traffic counts, and surveys of personal travel behaviors. Technical assistance is funded by formula as each jurisdiction is allocated a flexible technical assistance budget.

In recent years, the District Department of Transportation (DDOT) in D.C. has begun to focus on parking management as a means to address severe parking challenges. In particular, the DDOT wanted to utilize variable pricing of parking as a means to: 1) ensure adequate parking for residents; 2) encourage turnover as a means to support local business; and 3) promote non-automotive transportation and reduce congestion. Parking challenges and congestion related to high demand for curbside spaces in the Capitol

Hill/Ballpark and Columbia Heights neighborhoods was particularly acute, and these two areas were targeted for a performance-based parking pilot program.

The first step in implementing the pilot program was to gather a robust data set on existing parking conditions that would enable the DDOT to accurately set meter rates to achieve desired occupancy and turnover rates. The resource challenges presented by the data collection effort, however, were immense. The study area for the Columbia Heights zone was 43 blocks, while the study area for the Capitol Hill/Ballpark zone was 145 blocks. Furthermore, the DDOT wanted to collect data for a variety of parking conditions, especially around the Washington Nationals ballpark where data was needed for days/nights when the Nationals were playing and days/nights when the Nationals were not in town. Data was also needed for a combination of days, nights, weekdays, and weekends.

The data collection effort involved the use of License Plate Reader (LPR) technology, which involves outfitting data collection vehicles with LPR cameras and laptops to count vehicles, record license plates, and cross-check with vehicle registrations ($7,500 to $10,000 installation costs per vehicle). The raw data is then used to generate occupancy and turnover rates by block. The LPR technology requires two individuals to conduct the counts, one to drive and one to monitor the data collection software. Data collection and analysis was managed by staff at TPB. DDOT was required to submit a formal letter requesting technical assistance. TPB provided a draft scope of work and budget, which DDOT had to then review, modify, and approve. The approximate budget for the data collection and analysis was $150,000 to $200,000 per pilot area.

The pilot program just completed its second year of data collection, and while there have been challenges, both MPO and DDOT staff indicate that the partnership has been a success and resulted in positive outcomes. More specifically, the data collection has enabled the DDOT to obtain an accurate inventory of its on-street spaces, determine occupancy and turnover rates, and highlight “hot spots” of high demand and parking congestion. The data has also enabled the DDOT to initiate dynamic pricing, as well as adjust district boundaries. For example, the DDOT has proposed both increases and decreases to parking meter rates as a means to achieve its target occupancy rates. The pilot zones have also generated additional parking revenue, which has since been allocated to a variety of projects within each zone, such as streetscape work, sidewalk improvements, additional bike sharing stations, wayfinding signage, as well as additional transportation studies. Finally, the data collection vehicles offer a means by which to “piggyback” enforcement onto the data collection efforts. While not a focus of this effort, the LPR technology could also be tailored to enforcement of parking regulations.

When evaluating the pilot projects, TPB and DDOT staff highlighted some of the challenges they encountered. First, the LPR technology is expensive, thereby limited by the number of data collection vehicles. This can be problematic with study areas over a certain size. Second, the LPR camera and software is effective, but does have its deficiencies. For example, the LPR camera and software have trouble reading dirty license plates and plates from certain states. In addition, the technology requires ongoing maintenance to ensure accurate data collection. The software is updated frequently and costs approximately $3,000 per year. Another drawback is that the data collection vehicles must be driven slowly (5-10 miles per hour) in order to get accurate readings, which makes data collection challenging for larger study areas.

Another challenge is that the data is not “real-time.” Given the volume of data records obtained by the LPR technology it does take a significant amount of time to analyze and “scrub” the data. At its fastest, the data analysis for the two pilot projects could take two months, but for the first two years of the pilot project it has taken 9-12 months. It is likely that the turnaround time for the data analysis will improve in recent years as TPB staff becomes more familiar with the analysis process. The DDOT believes that as the pilot programs continue they will be able to obtain quarterly data to make additional pricing adjustments.

The Performance Based Parking Pilots in D.C. highlight the potential for a technical assistance partnership between a regional agency and a local jurisdiction. While there are some challenges to overcome, this partnership model and the use of LPR technology appear to be crucial to effective parking management in the future.

Lessons Learned

- **Another useful role for county or regional bodies is to provide technical assistance in areas that may be difficult for cities for financial or other reasons.**
- **Parking management requires robust data collection.**
- **License plate reader technology enabling parking data collection can be expensive, and its purchase and use by cities would likely be prohibitive.**

Massachusetts Downtown Initiative (MDI)

The Massachusetts Downtown Initiative (MDI) is a program of the State of Massachusetts' Department of Housing and Community Development (DHCD). As part of DCHD's Division of Community Services, the MDI is a core component of DCHD's various technical assistance programs. Its primary mission is to assist local jurisdictions in revitalizing their downtowns through workshops, "desktop" technical assistance with DCHD planning staff, an on-call consultant database, and an annual grant program to fund downtown planning processes. The MDI is managed by one dedicated DCHD staff member and has a three-year budget of approximately $300,000.

While the MDI stresses a "holistic" approach to downtown revitalization that includes both economic and community development needs, parking management has become a primary focus of the initiative in recent years. In 2007, MDI hosted a workshop for municipal planners, city staff, and elected officials to provide an overview of parking management practices and how they could benefit and support downtown revitalization. The workshop focused on parking theory, best practices, and implementation of parking reforms. The workshop was viewed as a success by program participants and MDI staff. As a result, MDI now hosts an annual parking workshop, where parking management theory and best practices are highlighted, but the primary focus is on the practical challenges of implementation, such as legal authority, new technology, and funding. The popularity of the workshop also resulted in the creation of a dedicated "parking" category within MDI's annual technical assistance grant program.

Since 2008, MDI has awarded $10,000 in on-site technical assistance to several jurisdictions in Massachusetts. For example, a 2009 the grant was awarded to the Town of Needham, where a parking study resulted in a set of parking recommendations that included shared parking arrangements to manage existing supply, better management of on-street parking through pricing, zoning changes, and the creation of an in-lieu fee program. In 2010, work in the Town of Lexington resulted in a similar set of recommendations, including the establishment of variable pricing to meet newly defined availability goals, improved parking information, access improvements to existing parking supply, and establishment of a shared parking program.

In addition to the immediate project outcomes, the MDI technical assistance program has catalyzed additional parking work – grant recipients have allocated additional local resources to the implementation of the parking recommendations, while several local jurisdictions have funded independent parking studies. Finally, the MDI's recent work in parking management has enabled the MDI to support one of its top priorities – the creation of downtown business improvement districts (BIDs). The MDI program manager has capitalized on the increasing awareness of the nexus between effective parking management and downtown economic vitality to facilitate the development of BIDs new within several downtowns.

Lessons Learned

- **Another approach to technical assistance would be to offer workshops for local staff and officials.**
- **Yet another approach would be to offer grants for on-site technical assistance.**
- **Grants can serve as a catalyst for additional local investment.**

GreenTRIP Certification Program

GreenTRIP is a certification program which seeks to reward residential projects located within "infill" development areas that reduce vehicle trips and associated greenhouse gas emissions in the San Francisco Bay Area. The program was initiated by TransForm, a non-profit that focuses on Bay Area transportation issues. Eligibility requirements include:

- Primarily multi-family housing with a maximum of 20% single family homes,
- Minimum 50 units,
- Minimum project density of 20 units/net acre,
- Project cannot violate a jurisdiction's urban growth boundaries,
- Project is within the nine-county Bay Area.

Developers submit their projects for consideration by filling out a detailed application form that requires the developer to provide a host of project information, including size, number and type of units, number and type of parking, trip reduction strategies, transit proximity, and other TDM measures. The project is then evaluated according to specific project characteristics and project location, as opposed to a single set of universal standards that do not take into account local context (for example, parking can range as high as 1.5 spaces per unit).

If a project is approved and certified, the GreenTRIP program is designed to support the development of the project to see that it is actually built. More specifically, the developer is provided with a number of benefits, including:

- Letters of support to appropriate agencies and decision-making bodies
- Testimony at public hearings
- Customized project reports, including traffic models
- Customized press releases
- Tailored technical assistance to help implement TDM and parking strategies

The GreenTRIP program recently completed its pilot phase in which five new residential projects were awarded certification.[29] The outcomes of these five projects are substantial. For example, the reduction in parking in one project allowed the developer to save $3.9 million in construction costs, allowing for construction of 30 more affordable units. In addition, the five GreenTRIP projects will result in the distribution of more than 2,000 subsidized transit passes and over $7 million will be paid by the developers to VTA and AC Transit over the next 40 years.

Lessons Learned

- **An existing incentives-based strategy within the county encourages development that reduces trips by offering public support, customized publicity and reports, and technical assistance.**
- **Developers can reduce costs substantially by reducing the amount of parking in their developments, savings which can then be used to generate additional housing or other uses.**

Vehicle Trip "Cap and Trade"

Overview

[29] Three of these initial projects were located in Alameda County: South Hayward BART Affordable Family & Senior Housing, The Crossings in San Leandro and Parker Place in Berkeley.

The concept of "cap and trade" has typically been discussed in the context of reducing greenhouse gas emissions, but there has also been limited application of the "cap and trade" as a transportation demand management (TDM) tool. An initial research scan reveals that vehicle trip cap and trade has been applied on a geographically limited basis, primarily at the community, campus-wide, or project level. In short, a city will set a limit, or "cap," on the number of daily vehicle trips allowed for a project (e.g., no more than 1,000 daily motor vehicle trips to and from the site). Alternatively, a trip cap can be set to limit only peak period trips (e.g. no more than 100 trips allowed during the evening rush hour period of 4-6 pm). The "trade" part of the concept in these instances usually takes the form of the developer or land owner "buying down" vehicle trips in excess of the cap in the form of per-trip fees.

Whether a trip cap is expressed as a limit on daily trips or peak period trips, the limit is normally monitored and enforced by conducting regular traffic counts. Typically, if the project exceeds the allowable number of trips during any particular count period, a grace period is allowed during which the project is given time to make additional efforts to strengthen its TDM programs. If a subsequent count shows that the allowable number of trips continues to be exceeded, then a per-trip fee is often assessed. The proceeds of the fee are then used to help develop additional transportation infrastructure and services (e.g. additional roadway capacity, public transit service or public transportation demand management programs).

A trip cap can be compared to the practice used in many communities of limiting the number of square feet of development allowed on a property, in order to avoid generating too many vehicle trips. Rather than limiting development on a site *in order to limit traffic*, a trip cap directly limits traffic – the real public goal of many development caps – and then allows the property owner to develop at considerably higher intensity, provided that the resulting traffic is kept within the agreed-upon limit. Trip caps can be adjusted based on the occupancy of a particular building so that trip reduction can be realized before the project is fully occupied.

As currently developed, trip caps require a project site that can be isolated – at least reasonably well – for counting purposes. If a development project has only one, or only a limited number, of entries and exits, then counting entering and exiting vehicles is relatively easy. A trip cap can also be applied to an entire district (such a large office park or mixed-use development), provided that the district has an institutional framework – such as a master property developer with the power to assess dues and implement rules, or an assessment district with the power to assess fees.

One potential drawback to trip caps is that employers or land owners can respond to them by simply reducing or capping the number of employees on a property, while continuing to maintain heavy employee subsidies for driving to work alone. Employers often just expand operations in a different local jurisdiction, such as a nearby suburb with an auto-oriented zoning code and limited transit service where there are no transportation demand management requirements.

Case Study

Stanford University

As Stanford University continued to grow and develop throughout the 1980s, the impacts from increased traffic were impacting the surrounding neighborhoods. In an effort to manage this growth, limit its impacts, yet ensure that Stanford could continue to develop in a manner that would ensure its prominence as one of the country's preeminent academic and research institutions, Santa Clara County Board of Supervisors approved the Stanford University General Use Permit (GUP) in 1989, which placed many conditions on Stanford's land use, growth, and development. By agreeing to the GUP and meeting its requirements Stanford was granted approvals to develop its land. The 1989 CUP was revised and updated in 2000.

A major component the GUP was a cap placed on the number of vehicle commute trips. In short, the university's goal is not to exceed the 2001 measured number of vehicles entering and exiting the university during peak periods over the life of the GUP. The vehicle trip cap is monitored through three cordon counts conducted each year. The County provides Stanford a great deal of flexibility in how it meets the trip cap – it does not mandate a specific employee trip reduction program, but rather sets a cap and allows

Stanford to figure out what array of programs are best to meet the cap. As a result, Stanford as a robust and varied campus-wide transportation and TDM program that includes: a free campus shuttle, subsidized transit passes, ridesharing, a commute "club", various financial incentives, commute planning services, car-sharing and car rental, emergency-ride-home services, and various parking policies designed to reduce vehicle trips to and from campus.

In addition to ensuring it retains its development approvals, one of Stanford's primary motivations for meeting the trip is the financial costs of CUP-defined mitigations. More specifically, if the cordon counts exceed the baseline volume by 1% or more for any two out of three consecutive years, Stanford will be required to pay for intersection mitigations in several nearby jurisdictions and fund additional trip-reduction programs. The cost of such mitigations, especially the intersection mitigations, is significant.

As a result of its TDM efforts, the drive-alone at Stanford for all commuters decreased by more than 13% from 2003 to 2007. In addition, Stanford has benefited from the flexibility of the GUP and its approval process. In short, Stanford has been highly competitive for research and development grants because its land use approval process is streamlined and allows for quick turnaround on development projects.

Applicability to Alameda County

An initial scan of research on vehicle trip "cap and trade" programs indicates that the concept has been applied on a limited basis, and not at a regional or countywide level. However, cities have begun to look more closely at citywide trip caps. For example, the City of Santa Monica is exploring how a citywide trip cap and trade program might be implemented through a network of sub-area transportation management associations (TMAs). In short, each TMA would be allocated a trip cap and a "market" would be established that would allow TMAs to buy and sell trips.

Given the diversity of Alameda County and issues facing the four planning areas, the use of regionwide vehicle cap and trade program might be overly ambitious and complex at this time. However, the County could play a role in helping cities better utilize trip caps at the district or project-level by providing guidelines and best practices for such efforts.

Lessons Learned

- Not applied extensively. Limited examples have been focused on small geographic areas, such as individual development projects or campuses.
- Another approach to technical assistance would be to offer guidelines to jurisdictions for "cap and trade" programs for new development.

STRATEGIC INVESTMENTS

The Countywide Transportation Plan presents a unique opportunity to guide a growing regional movement that emphasizes demand-side solutions to the county's transportation challenges. The Countywide Transportation Plan is also well-positioned to support the efforts of municipalities to further innovate and utilize these strategies to achieve a shared vision for a sustainable and efficient transportation network. Outlined below are some concepts for specific actions that the Alameda CTC could take, and programs that the Countywide Plan could include, to support TDM and parking management. This list is not exhaustive, but offers an initial framework for moving forward.

1. **Provide dedicated funding to the Guaranteed Ride Home (GRH) program, the Alameda CTC's primary TDM program.**

   The Alameda County GRH Program is currently administered by the Alameda CTC. When a registered employee uses an alternative means of transportation to get to work, they are guaranteed a means of getting home should they have medical emergency or unexpected changes to their work schedule. Twelve years of employee and employer surveys to enrolled participants have shown that employees' assurance that they have a "back-up" way to get home is often incentive enough to encourage them to not drive alone. This program has eliminated approximately 180,000 vehicle round trips per year since its inception.

   Since its inception, the Alameda County GRH program has been funded exclusively through grants from the Bay Area Air Quality Management District's Transportation Fund for Clean Air (BAAQMD-TFCA) and has been free of charge to employers and employees in Alameda County. Despite the fact that GRH has been highly competitive in the TFCA program over the past twelve years, being reliant on a sole funding source may not be sustainable, particularly in today's fiscal climate.

   Given the program's continued success in eliminating vehicle trips, the Alameda CTC could expand this program by including the GRH program within the next Countywide Transportation Plan either alone or as part of an overall TDM Program as described below. A dedicated revenue source would help to diversify GRH's funding sources while ensuring greater program stability. Furthermore, additional funding would enable the Alameda CTC to expand its outreach and marketing of the program to additional employers, as one of the biggest obstacles to higher use of the GRH program is simply lack of information about the program's existence. Locally, other counties such as Contra Costa, San Francisco, and San Mateo fund their guaranteed ride home programs through similar provisions that enable sales tax funds to be used for TDM programs.

2. **Expand the Alameda County GRH program into a comprehensive countywide TDM program.**

   This concept was one of the primary recommendations of the "Performance Evaluation of the ACCMA (now Alameda CTC) Guaranteed Ride Home Program," adopted by the Board in 2009[30]. The full recommendation is included below:

   > "We recommend that the CMA expand the GRH program into a comprehensive TDM program. Of all the GRH programs we examined, the CMA program is the only one that is not operated as part of a comprehensive program that includes other TDM or commute alternative efforts. Expanding the program would allow the CMA to broaden the range of commute alternative services it provides to residents of Alameda County while fulfilling the Travel-Demand Management Element of its Congestion Management Program. It would also work toward meeting the objectives of AB 32 and SB 375, state legislative mandates to reduce emissions of greenhouse gases. Additional commute alternative services that the CMA could offer include ridematching, financial incentives for carpooling and vanpooling, discounted transit passes, personalized transit itineraries, subsidized bicycle parking racks and lockers,

[30] Prepared by Eisen Letunic.

bicycle commuting maps and promotions and other marketing strategies. To fund these additional services, the CMA should investigate the county's sales tax for transportation, the TFCA and funding sources from other public agencies."[31]

Best practices show that a well-balanced and comprehensive TDM program, which offers a variety of measures which support each other, will be more effective than a TDM program built around a single trip reduction measure. Many TDM measures are mutually supportive and offer an excellent opportunity to leverage the trip reduction effects of other measures. A sample of potential TDM measures that the Alameda CTC could also fund include additional ridematching services, subsidized transit passes, bicycle infrastructure at work places, and additional marketing and promotion. The County's GRH program has thus far been successful at reducing vehicle trips. Through additional dedicated funding, the Alameda CTC could build on the success of this program by incorporating other TDM measures that are mutually supportive.

3. Develop Countywide TDM and parking management guidelines.

Given the countywide transportation oversight and planning responsibilities of the Alameda CTC, the agency is well-positioned to provide guidance to local jurisdictions. The development of countywide guidelines has several potential benefits. First, though some Alameda County cities have already been aggressively developing TDM programs and parking reform efforts, others have not implemented such strategies. A set of countywide guidelines could help cities begin to "tackle" those questions, and ensure that jurisdictions integrate best practices. (See Case Study San Mateo C/CAG)

Of course, the question of how those guidelines are applied and implemented is also crucial. On the one hand, "guidelines" could remain just that – a set of regional advisory statements or "best practices" that local jurisdictions could refer to as they move forward with developing their own TDM or parking management policies and programs. On the other hand, regional "guidelines" could also be tied to regional funding allocations to ensure that local jurisdictions follow them and meet certain targets. One Bay Area precedent that illustrates this dynamic is MTC's 2005 Transit-Oriented Development (TOD) Policy for transit expansion projects, discussed in greater detail in the case studies. (See Case Study MTC TOD Policy)

It is beyond the scope of this paper to answer these questions and develop a specific set of such guidelines. However, based on best practices in TDM and parking management it is recommended that any set of guidelines related to TDM and parking management emphasize some, or all, of the following core characteristics.

- *Outcome based,* with specific performance targets. Performance-based strategies with specific project-level, corridor-level or regional targets promise to be the most effective and politically viable, and the easiest to implement and administer. Performance-based strategies will facilitate more locally-appropriate solutions and can tap into the innovation and entrepreneurship of the public, private and non-profit sectors to a greater extent than strategies that prescribe specific implementation methods.
- *Effectiveness* at achieving regional goals.
- *Well-balanced and comprehensive.* Experience has shown that the most effective TDM programs are ones that have varied and mutually supportive demand management measures. For example, a TDM program that includes both subsidized transit passes and a guaranteed ride home program has the potential to reduce vehicle trips to a greater degree than one of those measures by itself. In short, TDM programs should offer as broad a choice to employees and travelers as possible in order to encourage a variety of travel behaviors and populations.

[31] Alameda County Congestion Management Agency. "Performance Evaluation of the ACCMA Guaranteed Ride Home Program," February 27, 2009.

- *Flexible,* so implementers can "play or pay." Some employers – particularly those with labor contracts and multiple work sites – are limited in the changes they can make to their existing parking and commuter benefits programs at all their work sites. Some jurisdictions will be more willing to reform parking codes and management policies than others.
- *Non-punitive,* so that stakeholders are not penalized for compliance with previous parking policies. For buildings that were constructed to meet local minimum parking standards, any new parking taxes, fees, or regulations should be calculated based on audited parking utilization rates. Limits on the expansion or reconstruction of existing parking lots are appropriate if audits reveal excess supply.
- *Politically viable.* As discussed before, parking decisions are one of the more high-profile components of local land use decisions. As is often the case with proposed policy changes, there are many stakeholders with different perceptions of the problem and potential solutions. Local businesses often believe that free and available public parking is crucial to their economic health, banks often refuse to lend to development that does not meet traditional parking requirements, and elected officials may understand the need to manage parking supply, but may not fully understand the linkage between managing parking and managing congestion. Implementing parking management strategies depends on extensive education and outreach with many stakeholders.
- *Effective marketing and public outreach.* As local experience has demonstrated, the manner in which TDM programs, and parking management policies in particular, are rolled out is crucial to their success. If the public perceives that such policies and programs have been developed without community input, it is very likely they will actively reject such measures, irrespective of their intent. Therefore, any countywide TDM and parking policy should require a local jurisdiction to demonstrate a proactive communication strategy with opportunities for education to, and feedback and input from the public.
- *User friendly.* Furthermore, TDM programs and parking management must be easy for the public to understand and use. Policies and their objectives should be clearly articulated and supported by data, while new technologies (such as parking meters) should be designed for straightforward public consumption.
- *Financially feasible and cost-effective.* Prioritize strategies that are low cost or no cost and provide the biggest "bang for the buck" should be encouraged.
- *Easy and efficient to administer.* Difficulties with implementation, administration, and enforcement highlight the importance of considering the implementation steps of all relevant stakeholders in program design. Strategies that are easy and efficient to administer (a) will be transparent and simple to understand for the public and implementers; (b) will be supported with proper funding and targeted technical assistance; (c) will have clearly defined roles and responsibilities for stakeholders, including enforcement agencies; (d) provide a clear nexus; and (e) be accountable, with periodic monitoring and evaluation. Those responsible for enforcement need to be funded, staffed and informed of additional responsibilities.

Individual jurisdictions or groups of jurisdictions could also initiate local or subregional programs. These would ideally include opportunities to measure success so that they might serve as a pilot for future countywide and regional efforts.

4. **Create a robust technical assistance program.**

Perhaps the most obvious and crucial role that the Alameda CTC could fill in regards to TDM and parking management is in the area of technical assistance. For the most part, Alameda County jurisdictions understand the concepts of TDM and parking management, and would like to, at a minimum, gain a better understanding of how these strategies could address local challenges. Meanwhile, some cities are ready to implement new TDM and parking management policies, yet are unable to move forward without additional resources.

The types of technical assistance that the Alameda CTC could provide are numerous. Outlined below are a number of potential "categories" of technical assistance concepts, many of which are illustrated in greater detail in the case studies.

- *Information clearinghouse:* As TDM and parking management play an increasingly important role in improving the region's transportation network, it is crucial that elected officials, staff, developers, financial institutions, employers, and the public have a shared understanding what TDM and parking management are, how they can benefit their communities, and how they can be implemented in a local context. In order to facilitate this dialogue, the Alameda CTC could fund a number of "shared learning" activities (see Case Study: Massachusetts Development Initiative). These include:
    - A full-time position at Alameda CTC to coordinate and monitor TDM and parking management efforts throughout the county.
    - A regional TDM and parking management sub-committee that could serve as an advisory body to both the Alameda CTC and local jurisdictions. The sub-committee would be comprised of local and regional staff, as well as individuals representing developers, financial institutions (lenders), employers, local business, and the public.
    - TDM and parking management workshops and trainings that emphasize key concepts, best practices, but, more importantly, the practicalities of implementation.
    - On-site assistance, such as one-day charrettes that evaluate a well-defined local challenge and outline potential solutions.
    - Development and distribution of easy-to-understand reference materials.
    - Marketing and promotional materials for local and regional TDM programs.
    - A list of on-call TDM and parking management consultants to assist local governments.
    - Model ordinances.

  MTC and Alameda CTC have already undertaken a number of these technical assistance programs as part of the campaign on regional parking reform and local assistance for Priority Development Areas.[32] For example, MTC currently hosts parking fundamentals workshops and in 2007 put on a regional parking "seminar," which had over 125 participants. Furthermore, MTC funds six customized "Parking Advanced Implementation Labs" that are designed to assist local jurisdictions with a "particular actionable policy." One of these labs focused on parking at the San Leandro BART station. Finally, MTC recently developed a parking "Toolbox/Handbook": *Reforming Parking Polices to Support Smart Growth: Parking Best Practices & Strategies for Supporting Transit Oriented Development in the San Francisco Bay Area.* The handbook helps local jurisdictions define what type of area they are and identifying parking strategies that are likely to be effective in this type of area. It describes the various strategies and provides examples of best practices from around the region and country.

  Additionally, the Alameda CTC, through its Transit Oriented Development Technical Assistance Program (TOD TAP), has funded two parking studies, a shared parking study at MacArthur BART and a parking and stormwater study at Coliseum BART, in Oakland.

  Alameda CTC continues to fund technical assistance activities that complement other regional efforts. The Alameda CTC could expand the TOD TAP program to further focus on local parking needs in Alameda County, supplement MTC's activities or continue to work with MTC to ensure some of its efforts continue to be directly tailored to the experiences of Alameda County jurisdictions, such as the San Leandro parking labs example. One possibility would be

[32] http://mtc.ca.gov/planning/smart_growth/parking/

for Alameda CTC to fund additional MTC "parking labs" specifically within Alameda County. Alternatively, individual jurisdictions could implement programs within their cities or subregionally within the County, again, serving as pilots for the County.

- *TDM and parking management grant programs:* The success of TDM and parking management efforts depends on a planning process that is well-designed, highly transparent, supported by robust data, and responsive to public input. In addition, capital expenses for TDM programs (such as carsharing or on-site amenities) and parking management (new meter and sensor technology) are also substantial. To help overcome these basic resource challenges, the Alameda CTC could expand its technical assistance grant program to include:
    - Planning grants:
        - Development of local TDM and commute benefits ordinances (see Case Study: SF Commuter Benefits Ordinance).
        - Development of project-specific TDM programs.
        - Parking studies to revise local parking codes and/or develop parking ordinances for jurisdictions to adopt, develop district-based management, etc. (see Case Studies: Massachusetts Development Initiative and National Capital Region Transportation Planning Board Technical Assistance Program and DC Performance Based Pilots).
        - Parking impact fee studies.
        - Data collection and analysis (see Case Study: National Capital Region Transportation Planning Board Technical Assistance Program and DC Performance Based Pilots).
    - Capital grants:
        - On-site transportation coordinators for employers or institutions of a certain size.
        - Installation of on-site amenities, such as secure bicycle parking, lockers/showers, etc.
        - Acquisition and installation of parking meters (for curb parking) and parking access and revenue control systems (for off-street lots).
        - Purchase and operation of enforcement vehicles and license plate recognition systems, parking stall occupancy sensors, or handheld enforcements (see Case Study: National Capital Region Transportation Planning Board Technical Assistance Program and DC Performance Based Pilots).
    - Monitoring, enforcement, and evaluation grants:
        - Local monitoring and enforcement of TDM ordinances and project-specific TDM programs.
        - "Follow-up" evaluations of planning or capital grants to measure outcomes of studies and resulting policies, programs, and projects.
        - Travel demand surveys.
        - Data collection and analysis.

Alameda CTC's current TOD TAP program is funded by MTC's Transportation and Land Use Program and the transportation sales tax. This program does not require a local funding match. The details and requirements of an expanded grant program merit additional research and planning. If the Alameda CTC were to move forward with such a program it would likely need to address some key program parameters. First, eligibility requirements would have to be determined. Currently, local jurisdictions are eligible for the TOD TAP program but private and public developers, employers, and institutions would also benefit from such technical assistance. Second, it would have to be determined if County dollars would leverage local and private dollars by requiring a local match.

Finally, how such an expanded grant program is funded is a fundamental, yet complicated question. It is beyond the scope of this paper to identify a specific funding mechanism or the details of allocations. The most obvious choice, and the one in which the Alameda CTC has the most influence over, is through the local sales tax measure. More specifically, Alameda CTC could consider expanding the funding category within the next Countywide Plan and Transportation Expenditure Plan that allocates a certain percentage of the local sales tax measure to TDM and parking management. Moving forward, this is an issue that must be addressed in much more detail.

5. **Initiate a TDM and/or parking certification program.**

Much as the Leadership in Energy and Environmental Design (LEED) certification program administered by the U.S. Green Building Council has spurred a sustainable building boom, a TDM and/or parking certification program could help achieve widespread regional adoption of TDM programs and parking reforms. Such a program could bestow recognition upon communities and individual employers and developers who lead the way forward as the first to implement policy and program reforms.

- Such a program would establish policy and program reform targets for local governments, developers, and employers that vary based on the transit accessibility of their location and for employers by their industry sector (e.g. regional medical clinics would have different standards than offices housing professional service firms).
- Through a coordinated marketing strategy, regional agencies would highlight the successful implementation of parking reforms by certified cities, projects, and employers, articulating the connection between parking policies and climate change.
- Local governments may also consider requiring communities to meet certain certification standards in order to receive planning assistance, infrastructure, or service funds.

As stated earlier, TransForm, a Bay Area non-profit focused on regional transportation issues, recently created GreenTRIP, a certification program for residential infill projects within the nine-county Bay Area. This certification program rewards residential projects that seek to reduce vehicle trips and greenhouse gas emissions through TDM and parking management. Alameda CTC may wish to explore ways in which to partner with TransForm to see how this program could be expanded, applied to commercial developments, or tailored to specific contexts with Alameda County. The biggest challenge for the GreenTRIP program is expanding its reach and ensuring that developers, local agencies, and decisions makers are aware of the benefits of the program. One option is to require GreenTRIP certification in certain locations, such as Alameda County's priority development areas (PDAs).

ISSUE PAPER: TRANSIT SUSTAINABILITY AND INTEGRATION

INTRODUCTION

This report outlines principles of transit sustainability and integration and how they may be implemented in Alameda County. Key conclusions include:

- "Sustainability" and "integration" consist of interconnected elements of financial sustainability, high-quality customer service and environmental benefit.
- Opportunities would appear to exist to better coordinate fares, schedules and possibly branding among multiple operators, improving system connectivity and legibility through inter-operator agreements, an "umbrella" oversight body, or agency mergers.
- The County and region could improve the long-term financial standing of the transit system by prioritizing capital improvements that served to improve cost-effectiveness of operations, as well as connectivity.
- Opportunities would appear to exist to improve the cost-effectiveness of ADA complementary paratransit services, and possibly to leverage those services to provide service to the general public.
- A Countywide Transit Plan could leverage planning work now underway to ensure the sustainability of county transit operations.

Why Transit Matters

The financial challenges faced by Alameda County transit operators have been at the forefront of discussions about the Countywide Plan. BART, AC Transit and other operators have repeatedly had to cut service and raise fares; AC Transit made headlines by cutting service twice last year. This situation, however, is not new, or temporary, as long-term structural deficits in both operations and capital funding already existed. To solve this problem in a way that ensures that transit can meet rising demand and achieve equity, environmental and other goals will require a hard look at elements of the whole, interconnected system – and not just each operator individually – including service delivery structure, efficiency and cost effectiveness, connectivity and service gaps. These are components of transit sustainability and integration. There are many people who already depend on our transit services, but both demographic trends (including an aging population and a greater preference for urban living among younger generations) and growing social and environmental concerns (about climate change, energy independence and other issues) suggest that both demand and need are only going to grow.

Integration and Sustainability

Transit "integration" and "sustainability" are interrelated concepts. While much of the focus in discussions of transit sustainability is on financial elements, it also includes social and environmental components. The definition of "sustainability" that has been developed by the Metropolitan

Transportation Commission (MTC) for its regional Transit Sustainability Project (TSP) includes these three dimensions:

- *Customer: A system that functions as an accessible, user-friendly and coordinated network for transit riders, regardless of mode, location or jurisdiction*
- *Financial: A system that can cover its operating and capital costs with a growing share of passenger fare revenues as well as reliable streams of public funding*
- *Environmental: A system that can attract and accommodate new riders in an era of emission-reduction goals, and is supported through companion land use and pricing policies*

The first element of a "sustainable" transit system as defined by MTC – sustainable for the customer – also serves as a description of an "integrated" transit system, one that functions seamlessly for the customer in terms of fares, routes, transfers and information throughout the region.

A sustainable transit system is also one that has resolved or is able to successfully manage tensions between competing goals. While the TSP definition of transit sustainability includes a "customer" element, in reality, there is no such thing as a single transit "customer." Rather, there are many different customers with diverse needs, and transit services providing the greatest equity benefits are also often among the most expensive to deliver.

Moreover, in the context of the Bay Area and Alameda County, where there are multiple transit operators, developing an integrated transit system means striking a proper balance between competing objectives of local control and regional coordination. A transit system that is seamlessly integrated from a customer's point of view does not necessarily have to be a *single* system. However, it must *function* like one.

The Transit Sustainability Project will include an Inner East Bay Comprehensive Operations Analysis, or COA, similar to San Francisco Muni's Transit Effectiveness Project (TEP) and the Santa Clara VTA's Comprehensive Operations Analysis (COA). COAs seek to redesign services to increase productivity, reducing or eliminating many less-productive services in order to reallocate resources to services that have the most potential to increase transit ridership. Service reductions can improve an agency's cost-effectiveness by focusing resources on corridors that are more productive (i.e. have more riders). This can even result in increased ridership to the extent that service is actually increased in productive corridors, and the environmental component of transit sustainability stems from increased ridership. However, these changes can negatively impact riders on less productive corridors, and it must be remembered that any definition of transit sustainability must include not just financial and environmental elements, but equity – ensuring high-quality services for all of the divergent markets that a transit provider serves. In Alameda County, AC Transit has sought to make targeted cuts in service in a way that minimizes impacts on riders and on ridership.

ELEMENTS OF A SUSTAINABLE AND INTEGRATED SYSTEM

The TSP's overarching goal of a "more robust, financially viable transit system that is both cost-effective and customer-focused" serves as a good starting point for defining how a sustainable and integrated Alameda County (and Bay Area) transit system could function.

More specific goals for a sustainable and integrated system could include:

- **Coordination of fares, schedules and branding.** The first two elements, in particular, are fundamental to a transit system that functions seamlessly from a user perspective. The need to pay multiple fares during the course of a single journey is an inconvenience, a possible cause for confusion, and makes transit less competitive cost-wise compared to alternatives. Transfers that are not reliably timed can also have a magnified effect on the decision to take a future trip by transit, as multiple studies have found that time spent waiting for transit *feels* significantly longer

than it actually is. Common branding to create the appearance of a single system is less important so long as long as information is clear and readily accessible and rider awareness of where to wait and which vehicles to board is not compromised. MTC and transit operators have taken steps to create a "virtually" integrated system using the Clipper card program (which reduces the inconvenience of paying multiple fares). In addition, a Regional Transit Connectivity Study completed in 2006 recommended improvements to signage and other wayfinding elements at major multimodal hubs, and the use of "real-time" wait time information to reduce the anxiety associated with transit waits.

- **Physical optimization of connections.** In many cases, transfers between transit services are more onerous than need be because of design and placement of stops. It can be prohibitively expensive to retrofit existing infrastructure; in some cases, however, the distance between stops might be reduced, and the path made more direct and obvious, using lower-cost means.
- **Avoidance of delay.** Speed is an essential element of sustainable transit service for two reasons. First, reduced travel times benefit riders and are attractive to potential riders. Second (and less well-understood) is the relationship between speed, frequency and operating cost. When travel times are reduced, more service can be provided using the same number of vehicles and operators; or, the same level of service may be provided at reduced cost. Transit vehicles operating in mixed traffic flow are vulnerable to increasing traffic congestion; slow but steady degradations of speed over time can result in a vicious cycle whereby either costs must increase or service must be reduced (and indeed, this is precisely what has happened to AC Transit and other operators in recent years). Conversely, reducing delay can result in a virtuous cycle of increased ridership providing more revenue. Reducing delay also means an increase in reliability, another essential component of a sustainable system, both from a current customer service and new customer attraction standpoint.
- **Service that responds to context.** Different types of riders have different needs; land use (in terms of density, design, and mixture of uses) matters greatly; and there are system design imperatives one should be aware of and respond to in designing a transit service. In practice, this will often mean addressing questions such as: What is the right-size vehicle for this service? Should this service be a community circulator and feeder, or should it provide a "one-seat" ride to a faraway destination? What are the appropriate hours and frequencies for this service? What are the goals (e.g. productivity or equity) this service is designed to achieve?

Possible Strategies

Based on these goals, a number of possible strategies might be available to improve transit sustainability and integration:

- Consider/support measures to better integrate fares and schedules, as well as branding;
- Prioritize capital projects that would improve connectivity and reduce operating costs;
- Explore alternative service delivery models for ADA paratransit service; and
- Develop a Countywide Transportation Plan focused on building on implementation of the TSP recommendations.

These strategies are further explored in the concluding section of this document, Strategic Investment Opportunities.

CASE STUDIES

The following case studies illustrate several of the concepts described above, including fare and schedule integration, prioritization of capital projects that reduce operating costs, and alternative paratransit models.

Fare and Schedule Integration

Verkersverbund (Germany and Switzerland)

A *verkehrsverbund*, or VV, is a governance model common in Germany and Switzerland. In some ways, VVs are similar to U.S. Metropolitan Planning Organizations (MPOs): they are regional planning bodies that provide capital and some operating funding to local transit operators. However, VVs are stronger in other, key ways: they are able to coordinate and integrate fares and schedules, so that transfers between different operators are as seamless as possible. Transit vehicles operated by local providers may also carry the VV's branding, so that service provided by dozens of different operators appears, from the customer perspective, as though it were provided by a single entity.

In his book *The Transit Metropolis*, UC Berkeley professor Robert Cervero summarized the role of VVs as follows: "These umbrella organizations ensure that problems that commonly plague regional transit services—such as fare penalties for transferring, conflicting timetables, and interagency rivalries—are eliminated."

Munich's *Munchener Verkehrs-und Tarif-Verbund*, or MVV, is governed by an executive board including state and local representatives. The board sets service and fare policies (such as maximum headways), and it approves budgets. Day-to-day administration, however, is left to a management board consisting of staff from individual operators. This board sets actual timetables, fare zone boundaries, work rules and contract terms, and is responsible for marketing. Individual operators effectively function as contract operators, responsible for actual delivery of service.

Zurich's *Zürcher Verkehrsverbund*, or ZVV, coordinates service provided by more than 40 individual operators, including public agencies and private companies. Its governing Cantonal Transport Board sets minimum service standards, such as connectivity requirements, and it sets maximum budgets. It collects revenues, then distributes them to operators based on a reimbursement system that takes into account the amount of service provided as well as performance criteria. The ZVV is said to have a "watchdog role" – it manages a competitive bidding process for provision of some services. Within two years of the ZVV's establishment and introduction of a single regional fare structure in 1990, ridership on feeder buses had increased 53 percent.

The potential for application of the VV model to American cities would depend to a great extent on the degree to which localities were willing to surrender control over service planning. While a board including local representatives could set policy, and while managers of local agencies could jointly maintain control over details of the implementation of those policies, ultimately, routes, schedules and fares would be set at the regional level. The VV model can be considered a structure that combines important efficiencies of a single regional transit provider with elements of local control.

Capital Improvements to Reduce Operating Costs

San Francisco Transit Effectiveness Project

San Francisco's Transit Effectiveness Project, or TEP, was previously cited in this issue paper as an example of a Comprehensive Operations Analysis, or COA. COAs seek to better align transit service with demand in order to improve both customer service and cost-effectiveness. The TEP, however, included an additional element: capital investments that would serve to reduce operating costs.

The TEP's recommendations, adopted in 2008, included a range of "Travel Time Reduction Proposal" (TTRP) measures on "Rapid Network" corridors. The Rapid Network includes the busiest routes in the San Francisco Municipal Railway (Muni) system. TTRP measures include signal priority, new signals, stop spacing optimization, bus bulbs, dedicated transit lanes, and ticket vending machines.

By reducing travel times, these measures would reduce operating costs. This is because, as was previously explained, fewer vehicles would be required to provide the same frequency of service. If a round trip takes 100 minutes, then 10 vehicles are required to provide service every 10 minutes; but if that round-trip travel time can be reduced to 90 minutes, then only nine vehicles are required. In this case, a 10 percent reduction in travel time would result in a 10 percent decrease in operating costs, although in practice, time and cost savings do not always equate (in this instance, for example, a 5 percent reduction in travel time would not reduce costs). Maintenance costs can also be reduced if vehicles are required to stop and start less often.

Muni's parent agency, the San Francisco Municipal Transportation Agency or SFMTA, recently released a draft TEP Implementation Strategy. It called for $87 million worth of TTRP measures to be implemented by Fiscal Year 2020 along approximately 59 miles of right-of-way. This relatively modest investment is projected to reduce travel times in these segments by an average of 20 percent. Muni intends to invest the savings in additional service, and no estimate of cost savings has been released.

It should be noted that while reduced travel times can benefit customers both directly and indirectly (though increases in service made possible by cost savings), some measures can be controversial. Stop spacing optimization, for example, can by removing stops reduce access and increase door-to-door travel times for some, and there may be community opposition to stop removal or to addition of stops at new locations if, for example, parking would have to removed. Additionally, measures such as bus-only lanes can require removal of parking spaces or travel lanes. Like AC Transit and other Alameda County transit operators, SFMTA has encountered community opposition to such measures, and despite an official Transit-First Policy in San Francisco has yet to implement widespread stop optimization or Bus Rapid Transit projects including dedicated lanes.

Alternative Demand-Responsive Models

Pittsburgh Route-Deviation Paratransit

Unlike many localities, which reserve paratransit for people with disabilities, Pittsburgh operates a network of fixed-route shuttles that deviate off the route in response to demand. One example is the Airport Corridor Transportation Association (ACTA) Employer Shuttle, which picks up suburban passengers from a designated stop every 20 minutes but strays from the route (within 1.5 miles) to drop people at their destination. These free-fare shuttles are primarily geared toward commuters and students, but serve people with disabilities and, importantly, were designed with the disability community in mind. As employee shuttles, the shuttles are partially funded by employers. The ACTA worked with developers and businesses to optimize routes and stops to efficiently transport employees and customers from bus stops to their locations off the fixed-route paratransit loop. Once on the vehicle, passengers arrange for a pick-up time to return to the bus stop.

Additionally, in neighborhoods without conventional transit, Pittsburgh operates Community Buses and the Elder Express. The two circulate neighborhoods on a fixed route and schedule in small vehicles. The services link passengers to major trip generators and to the fixed-routes of conventional transit for access to services, jobs, and schools. The principal users of the services are low-income people, including students and seniors, and commuters. There is no charge for the service, although riders must apply to obtain a free pass.

These flexible services offer a way to provide coverage in low-demand areas with dispersed origins and destinations at a reasonable cost and can reduce or eliminate the expense of separate, exclusive paratransit service for people with disabilities. In some settings, the cost savings from providing combined service for people with disabilities and the general public can be crucial in making transit

service economically viable. Combining service for people with disabilities and other riders theoretically helps consolidate demand density and promotes economies of scale. While paratransit savings have not been realized in Pittsburgh, fixed-route ridership has increased.

Finally, the transportation agency, the Port Authority of Allegheny County, has instituted an educational campaign in Pittsburgh area high schools to overcome some of the reticence to use feeder paratransit and flexible-route paratransit shuttles. Prior to entering the workforce, the agency trains 16-21 year-old high school students with disabilities to access feeder paratransit and other fixed-route transit. This travel instruction serves to increase transportation independence among disabled students.

Vancouver Connector Paratransit

Operating demand-responsive, stand-alone paratransit service is costly: it's not unusual for paratransit trips to cost an agency 10 times more than a fixed-route trip. Feeder paratransit circumvents the provision of costly, comprehensive paratransit service. Instead of providing curb-to-curb service on a single, dedicated paratransit vehicle, feeder paratransit serves the much shorter, curb-to-fixed-route transit stop trip. In Vancouver, British Columbia, feeder service evolved as a way to provide long trips between the suburbs and central Vancouver that otherwise would be too expensive or time consuming due to roadway congestion. Prospective riders phone to request a paratransit ride and are assigned a feeder paratransit trip if:

- The requested destination would require a lengthy paratransit trip; or
- The requested trip occurs during peak hours; or
- The rider asks for a feeder trip

While feeder paratransit was initially unpopular among riders due to the transfer between the paratransit vehicle and conventional transit, focus group participants who use feeder service preferred feeder to direct paratransit service on a number of measures (travel time, schedule convenience, service availability, sense of independence). On the other hand, direct paratransit scored better on personal effort and comfort level.

The upside for Custom Transit, the Vancouver paratransit operator, is that feeder trips cost less than half as much as a similar trip exclusively on paratransit, including account planning, booking, and operating costs. On an average paratransit trip of 12 miles, only 4.9 miles were on feeder paratransit. The average trip time was 41 minutes, not including wait time. Overall cost savings from reduced paratransit mileage was estimated at $139,000, or roughly 1.3% of the annual paratransit budget at the time.

As the Vancouver case shows, in highly-transit served areas with frequent fixed-route service, connector paratransit can substantially reduce costs without inhibiting the mobility of people with disabilities.

King County, Washington Community Access Transportation

Formerly known as the Community Partnership Program, King County Metro's CAT program includes two component:, a "Vanworks" program under which Metro pays for vanpools provided by community organizations to clients eligible for Metro's ADA program, and who are traveling to work sites; and an "Advantage Vans" program, described below.

As of 2009 the program included 76 vans loaned to 26 community agencies, all of which have agreed to provide at least 50 one-way trips per month to individuals eligible for Metro's ADA program, Access Transportation. Metro provides maintenance (through a contract with Veolia) and, for agencies that provide at least 100 one-way trips per month to Access-eligible individuals, up to $10,000 per month in operating expenses. Assuming that all of the trips provided by CAT partners to Access-eligible customers would have been taken on Access, Metro has calculated that the CAT program produced $2.7 million in avoided operating costs in 2009, after subtracting out the cost of operating the CAT program.

Even if only half of the CAT trips by Access-eligible customers would have been taken on Access, the net savings would still have been $926,000. Staff activities include:

- Monitoring performance of required maintenance to ensure that vehicles are properly maintained, and sometimes troubleshooting issues that arise between the CAT partners and Metro's maintenance provider
- Inspection of driver records to ensure that training has been conducted, drivers have required licenses, and that checks of driving history and background have been conducted and maintained
- Inspecting vehicles to verify their condition
- Reviewing reports to ensure that they are being done properly, so that the reported trip information is reliable and that reimbursed expenses are proper
- Indentifying additional partners and setting up agreements with them

CHALLENGES

While a number of possible opportunities clearly exist to make the transit system in Alameda County more sustainable and integrated, so, too, do a number of challenges. Obstacles include:

- **Limited funding.** As AC Transit's recent budget difficulties have made painfully clear, the existing model for funding transit services within the county is not sustainable. Sales taxes in particular are highly unreliable, tied directly as they are to economic cycles. Furthermore, the current model does not establish any linkage between revenues and environmental or equity objectives. While San Francisco's model for funding transit service is hardly a model (Muni, too, has suffered through severe budget crises in recent years), some funding does come directly from parking fee and fine revenues, discouraging overreliance on autos while providing support for transit alternatives.
- **Lack of physical integration of services.** Existing transit infrastructure in the county is not always amenable to integration. For example, within Downtown Oakland BART stations, the Jack London Amtrak station and the ferry terminal at the opposite end of Jack London Square are several blocks apart. Even where services provided by different operators connect – typically, at BART stations – those connections are not always optimized or made clear. AC Transit has recently established a hub at the Uptown Transit Center on 20th Street just west of Broadway in Downtown Oakland, near a portal to the 19th Street Oakland BART station; however, the Center is just around the corner from the portal and thus just out of sight, and signage indicating the connection or providing directions remains inadequate.
- **Multiple operators.** Within the county, there are seven major transit operators, not including shuttle services provided by cities or TMAs. MTC's Clipper Card program has gone some distance toward "virtual integration" by reducing barriers associated with separate fare structures, and its Regional Connectivity Study has pointed the way toward clearer passenger information related to connecting services at multi-agency hubs such as BART stations. Nonetheless, county operators continue to charge separate fares, and while some effort is made to coordinate schedules (for example, by timing connecting bus services to meet BART trains), there is no body responsible for ensuring schedule coordination.
- **Diverse needs.** Just as Alameda County is a sprawling, diverse place, encompassing a range of communities from urban to suburban, old to new, and from very poor to very wealthy, its transit providers must serve diverse travel markets. One key tension common to transit agencies everywhere but especially relevant in Alameda County is between "choice riders" (so called because they may choose to drive instead) and "transit-dependents." There are especially high numbers of transit-dependents in North County; significant capital investments have been made to try to attract choice riders, particularly commuters.

STRATEGIC INVESTMENT OPPORTUNITIES

Given all of the above, what opportunities for a more sustainable, integrated transit system might exist for implementation through the Countywide Plan and Transportation Expenditure Plan? The opportunities identified here should be viewed as mere concepts, as ideas that might serve as a starting point for further discussion; a determination of their ultimate feasibility would require much more extensive analysis than can be provided here.

- **The Alameda CTC might encourage a regional discussion on establishment of an "umbrella" body with limited powers to coordinate fares and schedules.** Mergers of major transit agencies in Alameda County and the Bay Area would appear unlikely in the near term for a variety of reasons, including concerns about local control of transit decision-making processes (and for just these reasons, may be undesirable). Even an oversight body such as a European-style *verkehrsverbund* might be difficult to establish. However, the Transit Sustainability Project will be considering institutional structures. A previous MTC effort, the 2007 Regional Rail Plan, recommended consideration of a regional rail authority empowered to negotiate with freight railroads for use of their rights-of-way for passenger services, and as part of that effort, a number of models for greater structural integration of transit service provision were explored, including "federation" models such as Chicago's Regional Transit Authority or more powerful regional rail authorities. In any case, there would clearly be some benefits to partial, if not full consolidation; there would also be disadvantages in terms of local control. Agreement on a single regional fare structure, for example, could prove to be difficult, even if staff and board members from existing transit agencies jointly set such a policy. Alternately, cost-sharing arrangements such as the existing Fast Pass arrangement between BART and Muni in San Francisco might be used to reduce transfer penalties, or joint tickets or passes could be issued for trips requiring travel on services provided by two separate agencies (for example, a joint BART/AC Transit fare instrument). The Clipper Card and Regional Connectivity programs will provide greater "virtual" integration over time, potentially reducing the need for stronger measures. Nonetheless, these ideas seem worthy of further study, despite the significant political obstacles to implementation. For any such structure to be implemented, there would have to be significant "buy-in" from affected communities and policymakers.
- **The Alameda CTC might prioritize funding transit capital projects that would serve to improve connectivity and reduce operating costs.** Projects that result not in new services, but in improvements to the speed and reliability of existing services, can serve to save money over time by reducing operating costs. Given the current and long-term challenges to financial sustainability faced by County transit operators, such a policy would appear prudent. Moreover, a strategy of prioritizing capital investments that could serve to improve existing transit services might offer a greater return on investment for the County than regular operating subsidies. An example is AC Transit's East Bay Bus Rapid Transit project, which the agency has projected would result in a slight increase in costs, but only because significantly more service would be provided; cost-effectiveness as measured in terms of cost per trip would be improved substantially. The project would also result in thousands of new transit trips per day, despite capital costs of approximately $14 million per mile, low relative to rail projects. Other examples are the packages of relatively modest improvements, such as stop consolidations, recommended by AC Transit staff as part of "mini-COAs" conducted for the agency's two busiest corridors, the Lines 1 and 1R and Lines 51A and 51B corridors (indeed, the latter was formerly simply the Line 51 corridor; splitting the route to improve reliability was a key recommendation of the study). Such projects may not have the political appeal of new service, yet they can prove to be much more cost-effective ways to "buy" increased ridership. Such projects might also include measures to improve connectivity, ease transfers and better integrate services, such as relocations of stops. Ideally, such a policy would prioritize not just transit projects that would benefit transit operations, but multimodal projects that would benefit or at least would not negatively impact transit operations. In multimodal projects, transit operations can be impacted by improvements for other modes; for example, traffic calming measures designed to improve pedestrian and bicycle conditions can slow buses as well as cars.

- **The Alameda CTC might work with transit providers to identify more cost-effective means of providing ADA paratransit service, based on the outcomes of the TSP.** Traditional Americans with Disabilities Act complementary paratransit service is very expensive to provide. Paratransit providers in Alameda County have experimented with some alternate models, such as taxi subsidies. Other models may be available, however, that would allow for more cost-effective delivery of ADA services. Moreover, some might be leveraged to provide demand-responsive service to members of the general public, as described in the case studies.
- **The Alameda CTC might sponsor a Countywide Transit Plan.** Finally, the Inner East Bay COA planned as part of the MTC TSP presents an opportunity to develop a Countywide Transit Plan, similar to the existing Countywide Pedestrian and Bicycle Plans. A Countywide Transit Plan would include East County, which will not be included in the Inner East Bay COA; it could also build on the COA by further addressing issues of implementation, funding and operations, just as the SFMTA TEP Implementation Strategy built on the TEP recommendations.