SAN FRANCISCO COUNTY TRANSPORTATION AUTHORITY

SAR 97-2

STRATEGIC ANALYSIS REPORT

I. TOPIC: Restricting Private Vehicle Traffic on Market Street

II. INITIATED BY: Commissioner Tom Ammiano

III. INTRODUCTION: Purpose of Document

The purpose of this Strategic Analysis Report is to provide the SFCTA Board with a brief but comprehensive summary of background and analysis of transportation-related issues regarding the proposal to restrict private vehicle traffic in the downtown portion of Market Street. As the name suggests, this Strategic Analysis Report, or SAR for short, is furthermore intended to highlight for the Board the strategic significance of these issues in areas of SFCTA jurisdiction, as well as to identify implications for future policy decisions by the Board in its capacity as administrator of Proposition B funds and as Congestion Management Agency for San Francisco. Every effort was made to make this into a factual document, avoiding speculation, leaving judgment to the reader. The document was designed to inform policy-level decision-making. Its abbreviated length (only 13 pages plus exhibits) is, therefore, an attempt to optimize its usefulness to Authority Board members. In pursuit of this goal, technical discussion has been condensed and only those facts are included which were deemed essential to outline the policy-level issues. Additional information is available from the sources cited, or by calling José Luis Moscovich, Director of Plans & Programs, at (415) 557-6857.

IV. SUMMARY

The SAR provides a context and a road map for policy-makers regarding future decisions about potential private vehicle restrictions on the downtown portion of Market Street. While it does not make any recommendations, the SAR analyzes four potential alternatives in order to illustrate the range of possible actions and associated trade-offs. It also discusses various improvements which do not involve vehicle restrictions, but which can still help to achieve the goals of improved transit travel time/ reliability and increased bicycle and pedestrian safety. The evaluation of alternatives shows the relative magnitude of the expected transportation benefits and impacts, pointing out data (such as origin/destination of Market Street users) still needed in order to better quantify the problem. Similarly, the SAR highlights the importance of non-transportation issues, such as economic vitality, as they relate to the appropriateness and success of the private vehicle restrictions. The SAR identifies the next steps, including recommended studies, that would need to be done prior to implementing any of the proposals.

It is apparent from the SAR discussion that low capital costs and the ability to easily reverse most of the improvements discussed, suggest that private vehicle restrictions could be implemented in phases. For the same reasons, testing of the proposals would be possible through a trial demonstration.

Finally, Market Street is unique from many other streets which have had private vehicle restrictions. Some of its characteristics make it more compatible with private vehicle restrictions (e.g. the lack of on-street parking and garage access to parcels fronting on Market Street) and others make it less so (e.g. the role Market Street plays in connecting the North and South of Market Street grids). Nevertheless, it is clear that Market Street is part of a *multimodal* transportation system. The challenge for policy-making is to agree on a vision for how that system should work. This vision should take into account any tradeoffs to be made between modes, as well as the associated non-transportation benefits and impacts.

V. BACKGROUND

This section provides background information relevant to the evaluation of vehicle restriction proposals for Market Street, including a description of the transportation and land use context, a summary of relevant San Francisco studies, and key findings from a survey of other cities with vehicle restriction experiences.

A. Transportation and Land Use Context

Market Street is the major east-west thoroughfare connecting Twin Peaks and the downtown and forming the dividing line between North and South of Market. The section of Market Street addressed by this SAR runs from Van Ness Avenue in the west to Steuart Street in the east. In terms of land use, there are three major areas: Civic Center - with a high concentration of government uses, Mid-Market - dominated by mid-rise office and residential buildings with ground floor retail, and

Downtown - with major employment, cultural, and recreational destinations.

Street Classification: Market Street is part of the Congestion Management Roadway Network. West of Eighth Street, Market is a 6-lane roadway with traffic traveling in both directions while east of Eighth Street Market shrinks to 4-lanes. Market Street is also a Transit Preferential Street (TPS) and is designated as a Primary Transit Street in the Transportation Element of the San Francisco General Plan. This is the highest level of transit preferential classification in the plan, and it means that the emphasis should be on moving transit vehicles rather than automobile traffic. BART and MUNI Metro run in the Market Street subway. MUNI motor buses, trolley buses, and historic F-Line streetcar service operate at street level. Market Street already has in place most of the TPS measures identified in the General Plan including transit exclusive/priority lanes, traffic signal timing modified to benefit transit, and boarding islands to facilitate passenger loading/unloading and speed up transit travel time.

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Transit: Eighteen of MUNI's 80 routes run on or below Market Street carrying 40% of MUNI's average daily ridership. MUNI's Market Street surface routes alone carry about 145,000 passengers per day, about 20% of average daily ridership. Mission Street is also a Primary Transit Street. Its four MUNI lines carry about 50,000 riders per day. Mission Street also carries SamTrans and Golden Gate Transit buses, providing important regional transit connections to the north bay and peninsula. Including regional transit, Mission Street routes carry an average of 75,000 riders per day, about half that of Market Street.

Figure 1 shows westbound transit vehicles per hour during the p.m. peak for Market and Mission Streets. Market Street has a maximum of 100 transit vehicles per hour (vph) between Geary and First Streets. Mission has a maximum of 70 transit vph. Between Third and Seventh Streets, Mission and Market Streets carry a comparable number of transit vehicles per hour.

Traffic: While Market Street is a very significant transit street in terms of vehicle and passenger throughput, it is less significant in terms of non-transit vehicle volumes. Traffic volumes on Market are considerably lower than on parallel south of Market Street roads (See Figure 2). For instance, between Fifth and Sixth Streets, Market Street carries around 850 vehicles per hour (vph) during the p.m. peak. Mission, Howard and Folsom Streets carry 1,500, 2,100, and 1,900 vph respectively. The high volume of transit vehicles, signal timing optimized for transit, lack of left turns, and absence of on-street parking and vehicle access to Market Street businesses all contribute to lower vehicle volumes compared to parallel South of Market (SOMA) streets. These same reasons also explain why Market doesn't seem to be used much as a through street for vehicular traffic during peak periods. However, Market does serve an important function for vehicular traffic by bridging the discontinuities between the north and south of Market Street grids. For example, O'Farrell Street has no direct connection to South of Market. As a result, O'Farrell Street traffic typically uses Market Street to access a southbound street such as New Montgomery Street.

Cross street traffic is considerably greater than through traffic on Market Street. This is particularly noticeable where freeway access routes cross Market Street. For instance, during the p.m. peak period over 3,500 vph cr[illegible] Market Street at Ninth Street, while only about 1,000 v[illegible] travel east and west on Market through this intersection.

The maximum traffic volumes on Market Street coincide with maximum transit vehicle volumes between Fourth and First Streets. This area also includes access points to the Transbay Terminal at First and Fremont Streets. Four Market Street lines have their terminus there. Traffic volumes are lower between Fourth and Eighth Streets than either east or west of this section. This may be a reflection of the land use pattern.

Commercial Traffic: Commercial vehicles use Market Street to make deliveries to Market Street businesses and to circulate in the downtown area. Commercial traffic is heavier during the midday than during the p.m. peak. A 1983 cordon count of the downtown area recorded that 3.4% of all vehicles entering the cordoned area between 10 a.m. - 6 p.m. and 1.4 % between 4:30 p.m.-5:30 p.m. were trucks. There is no on-street parking on Market Street east of Van Ness Avenue, but there are truck loading bays. A 1990 study by the Department of Parking and Traffic (DPT) found that most Market Street buildings east of Second Street have freight loading access via alleys or side streets. However, west of Geary Street there are a number of smaller shops which lack rear

door access and therefore, receive all deliveries from Market Street.

Bicycles: East of Octavia Street, Market Street is identified as a Class III bike route in the City's *Bicycle Plan*. Class III bikes routes are signed, but not striped with bike lanes. In addition to providing access to major destinations, Market Street is attractive to bicyclists because it provides relatively flat east-west access, and the limited left turns eliminate potential conflicts with other vehicles. There is little data available on bicycle volumes on Market Street. However, in 1997 Wilbur Smith Associates counted 307 bicycles traveling westbound on Market Street at Fifth in the p.m. peak. Traffic counts show about 320 vehicles (62 MUNI vehicles, 258 other vehicles) traveling westbound at this intersection. This indicates that bicycle volumes may exceed automobile volumes at certain Market Street intersections during the peak period.

"... [B]icycle volumes may exceed automobile volumes at certain Market Street intersections during the peak period."

Pedestrians: Market Street is a very active pedestrian street. West of Eighth Street sidewalks are 26' wide and east of Eighth Street, when Market loses 2 lanes of traffic, sidewalks are widened to about 35' on each side. Despite the width, sidewalks can be overflowing during the a.m. and p.m. rush hour and at lunch time in the downtown area.

B. Relevant Studies - San Francisco

1. DPT Feasibility Study for Market Street Transit-Commercial Street (1990) -As recently as 1990 a resolution was introduced at the Board of Supervisors urging that a trial vehicle restriction be implemented on Market Street between Steuart and Eighth Streets in conjunction with the Market Street Transit Thoroughfare project. The restriction was to apply to private, non-commercial vehicles. The resolution also proposed shifting Golden Gate Transit service from Howard Street to Market Street. Although the resolution was not adopted, the Department of Parking and Traffic (DPT) undertook a study of the proposal. The study included an assessment of existing conditions and specifically looked at causes of transit delay on Market Street. About 50% of stops or major delays all day were attributed to traffic signals and 50% to passenger loading. Caution should be used when interpreting these findings, since some of the signal delay may have been due to cars stopping in front of transit vehicles at a signal causing them to miss the green light, and overall traffic delay may have been underestimated because Market Street re-construction occurring during the study period may have contributed to a reduction in traffic volumes. The primary causes of minor delays or slowdowns were traffic and double parking (42%-51%), slowing down at intersections to prevent trolley buses from dewiring (20%-28%), and pedestrian conflicts (12%-14%).

The study did not recommend pursuing the vehicle restriction proposal because of the difficulty of enforcement and the likelihood of only a small improvement for transit. The study did recommend a number of improvements that do not require vehicle restrictions. Improvements that have been implemented include installing DO NOT BLOCK INTERSECTION signs, prohibiting left turns from Fremont Street onto Market Street except for transit, enforcing loading zones through tow-away, and enforcing the transit lane on First Street between Market Street and the Transbay Terminal. Other recommendations, such as allowing Golden Gate Transit basic service buses to operate on Market Street west of Third Street on a trial basis and expediting passenger loading by instituting rear-door boarding procedures on Market Street buses, have not been implemented.

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2. DPT Before-and-After Study of Market Street Transit Only Lane (1997) - In response to the August 1996 closure of the Central Freeway, DPT altered traffic signal timing on Market Street between Van Ness Avenue and Seventh Street in order to better accommodate increased traffic volumes. The change favored cross traffic to the detriment of transit preferential timing along this section of Market Street. In order to mitigate delays to MUNI caused by the signal timing changes, in November 1996 DPT established a transit only lane on Market Street eastbound from Twelfth Street to Fifth Street and westbound from Eighth Street to Eleventh Street. A before-and-after study conducted by DPT found that eastbound transit travel time was decreased by only 12 seconds on this segment during the p.m. peak hour for a total travel time of 8 minutes 3 seconds.[1] The transit

[1] This information is only of anecdotal value. Before-and-after measurements were only taken on one day each. Averaging data collected over several days would have produced more robust results.

only lanes did appear to reduce the number of non-transit vehicles in the transit lane from 116 to 36 vph in the p.m. peak. The study noted that one possible reason for lack of significant transit time savings was that traffic congestion was not the major cause of transit delay along this segment of Market Street and that other factors such as passenger boarding, signal timing, or other transit vehicles may play a more significant role. Travel time savings in the westbound direction were not analyzed.

3. SFRA's Mid-Market Redevelopment Survey Area - The San Francisco Redevelopment Agency (SFRA) was in the process of preparing a draft environmental impact report (EIR) for the Mid-Market Redevelopment Survey Area. The EIR is currently on hold pending a decision about boundaries and the advisability of redevelopment. A concept plan has been completed for the area roughly bounded by Fourth, Mission, Octavia, and one block north of Market Street. The plan mentions, but takes no position on the potential for vehicle restrictions on Market Street. However, it notes that Mid-Market merchants do not consider traffic to be a problem and that they want on-street parking on Market Street.

C. Survey of Other Cities

Authority staff surveyed other North American cites with vehicle restriction experience in order to compare their experiences with the proposals for Market Street in San Francisco. Among cities surveyed were Chicago, Denver, Minneapolis, Philadelphia, Portland, and Vancouver. Streets with vehicles restrictions are typically referred to as *transit malls* in these cities.

Table 1 categorizes these cities according to the overall success or failure of the transit mall, reflecting transportation, economic, and social concerns. There have been several transit and pedestrian malls in the United States which have been transportation and economic success stories, although the failures are more numerous. On the other hand, there are literally hundreds of transit and pedestrian malls in Western Europe which are unabashed economic successes.

The following sections highlight findings about the transportation and economic successes and failures of transit malls and their applicability to San Francisco.

San Francisco and Market Street Context

San Francisco shares certain urban characteristics with the cities surveyed, but is nonetheless distinct. It is similar in size, density and mode split to Chicago and Philadelphia; however, its downtown retail and financial districts haven't faced their problems. San Francisco is larger, denser, and less auto-dependent than Minneapolis, Denver, or Portland. In many ways, it is somewhat similar to Vancouver, but larger. San Francisco and Vancouver are probably more similar than the other North American cities surveyed to European cities.

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Market Street is fundamentally different from streets which are transit malls in other cities in terms of its function as an urban form giver and in the complexity of its traffic patterns. Uniquely, Market Street is the boundary between the South of Market and North of Market street grids. Closing it to autos would create complex traffic detour issues not faced in other cities which have a more uniform street grid that allows for easier re-routing of traffic.

The function of Market Street in giving access to the parcels which front it is also somewhat different than that of most streets. Streets exist primarily to allow for movement of people and goods and to provide access to uses which front the street. Market Street's primary mobility function is for transit, not for cars. It provides access to parcels which front it for transit users, pedestrians, cyclists, and deliveries (via loading bays), but not for cars. No parcels along Market Street east of Eighth Street have direct garage or on-street parking access. In the other cities surveyed, the streets had provided more direct access for private vehicles to parcels along the street, with on-street parking, driveway, or garage access before they were converted to malls. Nevertheless, Market Street does provide automobile visibility for retailers along the street.

Findings

Transit - The design of the transit mall is important in facilitating transit travel. Most of the transit malls have worked well for the public transit operators. Travel times have been reduced, transfers facilitated, and transit capacity increased. Muni could probably expect smoother operations and faster travel times based on these other examples. However, in Portland, Chicago, and Vancouver adding polluting and noisy diesel buses to the mall allowed the transit function to dominate the street environment, to the detriment of pedestrians and ground floor retailers.

Private and Commercial Vehicles - There are different policies about whether to allow taxis and delivery vehicles. Generally, allowing taxis and delivery vehicles is not problematic, although they can sometimes obstruct transit by double parking if the lanes are too narrow. This shouldn't be a problem on Market Street; however, as it has 4 lanes plus loading bays. The closing of malls to auto traffic generally has not created major congestion problems in the other cities examined. Allowing autos limited access (e.g. by forcing right turns at certain intersections) has worked in Portland.

Pedestrians/Bicyclists - The impact of malls on pedestrians and bicycles has been mixed. Pedestrian-friendly and safety-enhancing design is important in this regard. If only transit runs on the street, it is important not to give the pedestrian a false sense of security by installing raised crosswalks or making transit lanes too narrow. It is important to maintain a certain activity level on the street in order for pedestrians to feel safe. Assessing the impact on bicycles is difficult because bicycle circulation has not been considered for some of the transit malls. Sometimes there have been problems accommodating both bikes and transit if the transit lanes are too narrow.

Economic Issues - In general, the economic impact of transit malls on local businesses has not been positive. However, it is difficult to separate the economic effect of transit malls on local businesses from other local economic changes. Larger retailers have generally been opposed to auto restrictions, due to reduced auto access and visibility, and parking problems. Smaller retailers, and especially entertainment oriented operators, are more supportive. Office building tenants have generally been more supportive than retailers. The economic effect may be positive for the corridor area as a whole, but may present problems for some retailers along the mall.

In some of the cities where transit malls have been deemed an economic failure (Chicago, Philadelphia), downtown retail has been struggling in general. Retailers along malls have suffered from competition from suburban shopping malls and from indoor shopping centers along the mall. Some cities (Vancouver, Chicago) constructed transit malls partly to bring more shoppers to the street; however, transit malls by themselves have not proved to be an appropriate way to economically revitalize a street. Nevertheless, Minneapolis, Denver, and Portland have had success recently in converting their malls into destination retail areas that fill a niche suburban malls don't.

Based on these examples it seems that a key question is the existing economic health of the merchants along the street. If the street is already struggling, then conversion to a mall might further its decline. Applying these experiences to San Francisco, a mall would probably have a less negative effect on commercial users east of Fifth Street than on those between Fifth and Eighth Streets.

VI. Strategic Analysis

A. Identification of Objectives

For the purpose of this SAR, the objectives of applying private vehicle restrictions to Market Street were derived from discussions with the proponents, including members of the Transit-First Market Street Alliance, a volunteer organization working in support of the removal of private automobiles from Market Street. Based on these discussions, the principal goals are improved transit reliability/travel time, increased safety for bicyclists and pedestrians, and creating an attractive and vibrant street. Fewer delays to Market Street transit due to private vehicles is expected to speed up MUNI service throughout the City, but especially in the downtown. Consequently, San Francisco residents who currently avoid traveling downtown because of traffic, would benefit from improved accessibility to downtown through faster, more reliable transit service. Increased accessibility (via bicycle, foot, and transit) and a more pedestrian-friendly environment would attract residents and tourists alike, improving economic vitality.

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We also interviewed those opposed or neutral to the idea of restricting private vehicle access on Market Street, including members of organizations representing property owners and business interests (e.g. the Chamber of Commerce, the Market Street Association, and the Union Square Association). The most frequently cited concerns were impacts on economic vitality, increased traffic congestion (e.g. Mission Street, Union Square area), and difficulties

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associated with freight access and passenger pick up/drop off logistics. Concerns about economic vitality reflect a feeling that vehicle restrictions will result in a perceived loss of access to Market Street and the downtown, leading to a decline in economic activity. There is also a fear that vehicle restrictions could create an atmosphere that attracts vagrants and loiterers and generally creates a less desirable and safe environment that could, in turn, lead to a loss of business. Personal security was considered to be particularly important if private vehicle restrictions were in place during evening hours.

This input was used to inform the definition of alternatives described in Section B and the evaluation of the alternatives discussed in Section E.

B. Definition of Alternatives

Based upon the identified transportation objectives (improved transit reliability/travel time and increased bicycle and pedestrian safety) staff developed four alternatives for private vehicle restrictions on Market Street. The alternatives are intended to illustrate the range of possible actions that could achieve the desired goals so that the Board has a better sense of choices available and the associated trade-offs. The alternatives have been developed sufficiently to enable fatal-flaw screening and an order-of-magnitude level of analysis in order to provide meaningful input to potential policy decisions. The analysis of alternatives also includes a discussion of other approaches that do not require vehicle restrictions in order to be effective. This provides a better understanding of the range of potential options. The four alternatives, depicted in Figure 3, are described below. **It should be noted that all alternatives assume that north-south traffic can still cross Market Street.**

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1. Enforce Existing Traffic Regulations - This alternative is the least drastic in terms of the changes that it introduces to the current operation of Market Street. The intent is to improve Market Street for transit, bicyclists, and pedestrians by enforcing the existing traffic regulations. Priority would be given to enforcement of the transit lanes on Market, First, and Fremont Streets. Loading zones would be enforced to ensure easy access for commercial vehicles while reducing the need to illegally double park on Market Street. Parking Control Officer's (PCOs) would be needed to ticket double-parked vehicles and to facilitate traffic and pedestrian flow at key intersections. This alternative is an extension of the current Unclog the Streets Program, which focuses on PCOs directing traffic flow at selected intersections.

2. Focus on Transit Bottlenecks Fourth to First - This alternative would prohibit private vehicles from using the segment of Market Street (Fourth St. to First St.) which has the highest volume of transit vehicles per hour and the greatest conflicts with traffic. Private vehicles heading eastbound on Market Street would be required to make a right turn onto Fourth Street. Eastbound access would not be permitted again until Fremont Street. Private vehicles would be prohibited westbound on Market Street between Sansome/Sutter Streets and Fourth Street.

3. No Through Traffic Eighth St. to Beale St. - This alternative would prohibit through traffic on Market Street between Eighth and Beale Streets by requiring all private vehicles to exit Market Street at designated intersections using RIGHT TURN ONLY signs. Access onto Market Street would remain unchanged from today to facilitate circulation and allow visibility of Market Street businesses. Eliminating private vehicle through traffic should reduce traffic volumes on Market Street, which would benefit transit, bicyclists, and pedestrians.

4. Vehicle Ban Eighth St. to Main St. - This alternative would completely ban private vehicles from Market Street between Eighth and Main Streets. West of Main Street private vehicles would be permitted to facilitate circulation on Spear and Steuart Streets which dead-end at Market Street.

Additional Assumptions

All of the alternatives are evaluated twice, once assuming that the vehicle restrictions are in place from *4 p.m. to 7 p.m. and that they apply to both private and commercial vehicles*, and once assuming a *24 hour vehicle restriction period where commercial vehicles are assumed to be exempt* from the vehicle restrictions. To ensure comparability, the following assumptions apply to all four alternatives:

- North-south traffic is allowed to cross Market Street
- Taxis are exempt from vehicle restrictions, consistent with current City policy which allows taxis to use transit lanes.

- Bicycles and paratransit are exempt from vehicle restrictions.
- Golden Gate Transit basic service would move to Market Street from Mission Street. The routes would operate on Market Street between Eighth and Third Streets as shown in Figure 4. This removes 20 buses per hour from Mission Street during the p.m. peak.

Shifting SamTrans service to Market Street was not analyzed because SamTrans is considering cutting service on Mission Street once the BART extension to SFO is completed. Assumptions about taxi access, Golden Gate Transit, and the time of day that vehicle restrictions are enforced are further discussed in Section E *Analysis of Alternatives* and Section G *Trade-offs Analysis*.

C. Performance Measures

Our analysis focuses on the performance of the different alternatives using four major transportation system measures: **traffic handling ability, transit service impacts, bicycle safety**, and **pedestrian safety.** In addition, we looked at **ease of enforcement, cost**, and the **importance of non-transportation issues** as they relate to the acceptability and success of the proposals.

D. Study Area/Analysis Approach

Transportation system performance evaluation included the street system north of Market to Clay Street and south of Market to Townsend Street. The more detailed intersection analyses generally focused on streets closer to Market Street because impacts from diverted traffic would be most significant closer to Market Street.

The traffic analysis was done at a planning level, without the benefit of an iterative process for balancing intersections and optimizing the whole transportation network. While it is possible to devote more effort to detailed traffic analysis and modeling, it must be understood that, given the numerous routing options available to drivers on San Francisco's dense street grid and the lack of origin/destination data for Market Street vehicles, it would be difficult to accurately predict how traffic would divert even using the most sophisticated modeling tools. What is more important to making potential policy decisions at this stage are the *relative* differences in the performance of the alternatives.

The traffic handing ability of the four alternatives was assessed by looking at the total volume of vehicles that would be diverted from Market Street, and performing a fatal flaw screening of key intersections based on volume to capacity (v/c) ratios taking into account the summation of the largest volumes for conflicting movements. This is an accepted process for planning-level analysis such as would be used to inform potential policy decisions. The analysis used a conservative assumption of intersection capacity of 1,500 vehicles per hour, rather than the 1,800 or 1,900 that is usual in suburban locations. This is necessary to reflect relatively high volumes of pedestrians and bicyclists, the presence of transit vehicles in mixed traffic, and complex intersection geometries (particularly north of Market Street), all of which have the net effect of reducing vehicular capacity.

While it is possible that implementing private vehicle restrictions on Market Street could reduce overall vehicle trips in the immediate area by discouraging unnecessary trips or inducing mode shift, this analysis conservatively assumed that the current volume of traffic on Market Street would divert onto nearby streets. This assumption is consistent with the unique role that Market Street plays in bridging the discontinuities between the North and South of Market street grids.

Traffic analyses were based on p.m. peak traffic counts from DPT, Wilbur Smith Associates, and Korve Engineering. It should be noted that the intensity of land use in the downtown area means that there is no dominant direction flow for Market and Mission Streets during the peak. Given this, the analysis of performance of the private vehicle restriction alternatives during the p.m. peak should give a good indication of likely performance during the a.m. peak, as well.

Transit service impacts were qualitatively addressed using ridership and frequency statistics by route, obtained from MUNI, Golden Gate Transit, and SamTrans. Bicycle and pedestrian safety benefits were qualitatively estimated based on accident data provided by DPT. Capital costs are based on unit estimates from DPT and DPW. Enforcement costs are based on hourly rates provided by DPT and SFPD.

While the SAR analysis focuses on transportation impacts, it qualitatively addresses the importance of non-transportation issues because of their relevance to the policy-making process. Two main categories of non-transportation issues, economic vitality and personal security, were qualitatively evaluated based on our survey of other cities with vehicle restriction experience and on our interviews with interested parties in San Francisco.

E. Analysis of Alternatives

Table 2 summarizes the performance evaluation of the four alternatives. Several of the criteria are interpreted using a range of impacts such as low to high. The first rating evaluates the alternative when it is in place from 4 p.m. to 7 p.m. and the second evaluates the alternative when it is in place 24 hours a day. The following sections provide a functional assessment along with an assessment of the relevance of non-transportation issues to each alternative. Section G provides a trade-off analysis of the alternatives to assist in making potential policy decisions about private vehicle restriction on Market Street.

Enforcement of Existing Traffic Regulations:
This alternative will not change any of the current traffic regulations affecting Market Street. Freight access to Market Street should be improved by enforcing loading zone time limits. The presence of Parking Control Officers (PCOs) at critical intersections and ticketing of double-parked vehicles will facilitate traffic flow and contribute to improved safety for bicyclists and pedestrians. Enforcement of transit lanes will help improve transit travel time and reliability; however it will not help as much as some of the private vehicle restriction proposals because the transit lanes are not optimally located to benefit transit[2]. For example, the westbound transit lane starts west of Eighth Street where Market Street has more capacity because there are 3 lanes in each direction compared to 2 lanes east of Eighth Street. Furthermore, transit and traffic volumes are higher in the section of Market Street where there are no transit lanes. For example, there are about 180 vph per lane west of Eighth Street and 400 vph per lane west of First Street during the p.m. peak. This translates to over 50% more traffic per lane where there are 2.7 times as many transit vehicles.

This alternative is relatively easy to implement logistically, but it requires a commitment of city funds for PCO and SFPD enforcement. No capital costs are involved.

Focus on Transit Bottlenecks Fourth to First Sts. -
This alternative prohibits eastbound traffic between Fourth and First Streets and westbound traffic between Sutter/Sansome and Fourth Streets. Two streets in this area do not have a direct connection across Market Street and traffic would need to be re-routed. For example, O'Farrell Street traffic would have to go left on Grant Avenue and then right on Post Street to be able to cross over to SOMA. There would probably be lower westbound volumes on Market Street from Fourth to Seventh Streets because Seventh Street is the first place SOMA traffic can make a left onto Market Street west of Fourth Street. Displaced volumes would be relatively small compared to the volume of vehicles crossing Market Street. For instance, 2,000 vph cross at Third Street while only 400 vph turn onto Market Street from Third Street.

This alternative would provide added benefits for transit service because it eliminates vehicles from the section of Market Street that has the highest private vehicle volumes. In addition, access to the Transbay Terminal would be improved because there would be fewer vehicles turning right onto First Street from Market Street, potentially delaying the F-Line and curb buses that also need to turn right.

Estimated capital cost is $1,500 for installing signs related to the vehicles restrictions. Enforcement costs for a 4 p.m. - 7 p.m. vehicle restriction would be comparable to the first alternative because PCOs would be concentrated at the same intersections. If the ban were to be extended to 24 hours, freight vehicles would need to be exempt from the ban, or allowed during specified hours. This is more problematic to enforce because of the difficulty of identifying commercial vehicles and the confusion it may cause other motorists who would see freight vehicles using Market Street, but may not recognize them as such.

Because private vehicles would be completely banned, non-transportation issues might become more important. For instance, a 24 hour vehicle ban may make the area seem less safe at night because of the lack of street activity. During the day there is a high volume of transit vehicles and high pedestrian volumes as well, because of the major employment and recreational destinations in downtown, and this would remain the same even with the vehicle restrictions. For this reason, it is unlikely that vehicle restrictions on this stretch of Market Street would have a noticeable impact on the volume of commercial activity. However, the *perception* of reduced auto accessibility and its impact on motorists' choice of shopping destinations could be further explored through

[2] The westbound transit lane is between Eighth and Eleventh Streets. The eastbound transit lane is between Twelfth and Fifth Streets.

customers surveys at stores in the area, and through an origin/destination survey of Market Street users[3].

No Through Traffic Eighth to Beale Sts. - Requiring all traffic except transit to make right turns at certain intersections, prevents through traffic while still allowing private vehicles to access every block of Market Street. As a result, vehicle volumes will be reduced, benefiting transit overall. However, requiring a right turn at an intersection with a high level of pedestrian activity could cause traffic to queue and delay curb lane transit. Although right turns also are a potential source of conflict with bicyclists, bicyclists should be able to safely pass vehicles on the left at forced right turn intersections.

Capital costs associated with this alternative are for signage and striping. Costs ($1,800) are slightly higher than for the previous alternatives because the extent of the affected area is greater. It would be more of a challenge to enforce traffic regulations for this alternative than for the Transit Bottleneck alternative. With a private vehicle ban, it is easy to identify a vehicle that has violated the ban. In contrast, police must witness an illegal turn being made in order to enforce it.

This alternative would raise concerns about economic vitality impacts resulting from increased congestion in the downtown area and decreased volumes of private vehicle traffic on Market Street. Unlike a vehicle ban, this alternative allows private vehicles to access every block of Market Street and would maintain a level of vehicular visibility for Market Street businesses.

Vehicle Ban Eighth to Main Sts. - This alternative would have the greatest benefit to Market Street transit, but would also result in the greatest traffic increases on surrounding streets. Shifting Golden Gate Transit basic service to Market Street would help off-set increases on Mission Street. Five intersections would be without direct connection between North and South of Market. The added complexity that this causes contributes to the 'Low' traffic handling ability of this alternative. While the diverted traffic volume is lower than the current cross traffic volume, the actual level of impact is not possible to estimate without having origin/destination traffic for Market Street.

Bicyclists and pedestrians on Market Street would benefit the most from this alternative because of the decrease in traffic volume and in right turn conflicts with vehicles. However, increased traffic volumes on nearby streets, such as Mission Street, may contribute to decreased safety for bicyclists and pedestrians on those streets.

Capital costs are the highest for this alternative ($2,500) although still very low compared to most transportation capital improvements. This alternative also has the greatest enforcement costs, primarily because additional PCOs may be needed at selected north and south of Market intersections to facilitate increased traffic flows and SFPD enforcement of Mission Street transit lanes would be required. Similar to the 24 hour Transit Bottleneck alternative, a 24 hour private vehicle ban would be more problematic to enforce because freight would have to exempt from the ban, or allowed access during specified hours.

Concerns about economic vitality would be strongest with this alternative because of the length of the private vehicle ban, approximately 1.7 miles, and the real and perceived impacts it may have on access to the downtown. While the volume of transit vehicles and pedestrians would remain high during the day because of the concentration of employment, recreational, and government uses on the Market Street corridor, it would be important to evaluate the effect that the perceived loss of access would have on choice of destination for shoppers. As mentioned for the Transit Bottleneck alternative, customer surveys and an origin/destination survey of Market Street users would be an appropriate means of investigating this issue.

F. Non-Vehicle Restriction Improvements

Table 3 identifies other ways to improve transit reliability and bicycle and pedestrian safety on Market Street regardless of whether vehicle restriction proposals are implemented.[4]

G. Trade-Off Analysis/How to Interpret the Data

Traffic Handling Ability: Table 2 shows the traffic handling ability of all four alternatives expressed using a range of high to low where high is equivalent to the

[3] The *1992 Citywide Travel Behavior Survey* (The Planning Dept.) contains information on mode choice for non-commute trips such as shopping and recreation. For instance, 33% of visitors to large retail establishments in Superdistrict 1 (the northeast quadrant of the City, east of Van Ness and north of Townsend) arrived via auto, 39% via transit or taxi, and 23% by walking.

[4] It should be noted that the Enforce Existing Traffic Regulations alternative does not require private vehicle restrictions either.

overall level of service (i.e. level of congestion) of Market Street and the surrounding streets today. The stricter the vehicle restrictions on Market Street, the lower the traffic handling ability (i.e., the greater the congestion) of the surrounding street system. What is most important to making a policy decision about potential vehicle restrictions is to try and understand how this translates to system performance. While it is difficult, if not impossible, to accurately predict intersection level of service without origin/destination information for Market Street traffic, it is possible to obtain an idea of the *relative* magnitude of the difference between the alternatives by looking at the estimated volume of diverted vehicles.

Currently, around 2,600 vph turn onto or off of Market Street between First and Fourth Streets. Note that this does not mean that 2,600 vehicles are displaced since vehicles which both turn on and off of Market Street between First and Fourth Streets are counted twice. Using this same qualification, prohibiting vehicles between Eighth and Beale Streets affects 4,600 vph. Prohibiting through traffic between Eighth and Beale Streets would affect around 3,000 - 3,500 vph. To put this in perspective, a lane of traffic can generally handle from 700 to 900 vph. It is important to note that since most of the traffic is not using Market Street as a through street, the displaced traffic may only travel a few blocks on another parallel road such as Mission Street. Volumes are lower for both transit and other vehicles in the midday so traffic handling ability would be better for all alternatives midday compared to the p.m. peak. Estimates of diverted volumes have not been reduced to reflect the assumption that taxis would be exempt from the vehicle restrictions. While taxis probably make up a small percentage of overall traffic, they may be a significant percentage of traffic at certain locations (e.g. next to a hotel). Similarly, if commercial vehicles were exempted from the private vehicle restrictions, diverted volumes would be even lower.

It should be noted that there would also be benefits to traffic circulation if private vehicles were banned from Market Street. For instance, elimination of turning movements onto Market Street could improve traffic flow on cross streets such as Third Street.

Transit Reliability/Travel Time: Reducing vehicle volumes on Market Street could potentially benefit 14 of MUNI's 80 routes, affecting 20% of MUNI's average daily ridership. Actual travel time savings are not possible to predict without knowing how much transit delay is currently caused by traffic. Furthermore, benefits and impacts to transit operating on other downtown streets would have to be considered. For example, Mission Street would be expected to absorb some of the vehicles diverted from Market Street. Since there are transit lanes on Mission Street, increased enforcement of these transit lanes would be necessary to ensure that private vehicles don't use the transit lanes except to make a right turn. At the same time, banning private vehicles on Market Street would probably improve the level of service on Third Street, an important transit street, by eliminating turns onto Market Street .

To help ensure that Market Street transit is not adversely impacted by the addition of GGT, there would need to be a reduction in vehicle volumes and/or effective enforcement of double-parking and PCOs directing traffic at intersections with heavy pedestrian volumes to prevent curb transit from being delayed by right turn queues. Furthermore, since GGT would operate on Market Street either all day or not at all in order to avoid confusing passengers, it would be necessary to enforce these measures from the a.m. peak to the p.m. peak regardless of when the vehicle restrictions are in effect.

Finally, there are other possible means of improving transit travel time that do not require vehicle restrictions such as enforcement of existing traffic regulations, decreasing passenger boarding time by allowing rear-door boarding , retiming the signals to benefit transit, or extending the existing Market Street transit lanes. There are trade-offs associated with all these improvements. For instance, enforcement benefits all modes of travel, but requires a commitment to fund ongoing operating costs. Signal timing would benefit Market Street transit, but at the expense of shortened green times for cross traffic.

Golden Gate Transit: Golden Gate Transit (GGT) has a long-standing desire to move their basic service routes to Market Street. These GGT routes used to operate on Folsom and Howard Streets, but have recently moved to Mission Street. While Market Street speeds may be lower, this may be an acceptable trade-off because Market Street is closer than Mission Street to many non-commute destinations such as Union Square. GGT can best be accommodated on Market Street with the alternatives that reduce or prohibit private vehicles from the a.m. peak through the p.m. peak. Allowing GGT to operate on Market Street west of Third Street means adding 20 buses per p.m. peak hour to the curb lane where MUNI already operates 32 buses per hour. For comparison, there are 67

MUNI buses per hour operating in the curb lane west of First Street during the p.m. peak. It would be possible for GGT to operate on Market Street until Second or First Streets, but the high volumes of MUNI vehicles in the curb lane east of Third Street mean that reducing private vehicle volumes would be especially important in order to avoid delays to MUNI. Prior to moving GGT to Market Street, it would be necessary to address the concerns of MUNI unions which have traditionally opposed this move.

Taxis - Consistent with City policy that allows taxis to use transit lanes, it was assumed that taxis are exempt from the vehicle bans, but not from turn restrictions. It is possible that restricting private vehicle access to Market Street could encourage greater volumes of taxis on Market Street. Taxi restrictions could be implemented if necessary.

Carpools - It would be possible to consider allowing carpools to be exempted from private vehicle restrictions; however, it would be necessary to know the volume of carpools using Market Street and their origin/destination patterns before making any recommendation. If carpools are permitted, signage would have to clearly indicate where carpools are allowed in diamond lanes and where they are not.

Bicycle Safety: Decreasing the volume of motor vehicles on Market Street should improve bicycle safety. However, some of the improvements on Market Street that benefit transit and pedestrians, aren't very beneficial for cyclists. For instance, boarding islands were accommodated by narrowing the outer traffic lanes adjacent to the islands. As a result, cyclists often get squeezed against the curb by motor vehicles at these locations. The desire for a bike lane or more space for bicyclists on Market Street has been mentioned. Operating all transit in the center lanes would address this issue, but transit travel time would likely suffer. Even midday there would still be 87 transit vph on Market Street (67 MUNI, 20 Golden Gate Transit). Another possibility is narrowing the sidewalks in order to make the curb lanes wider or to provide a grade separated bike lane. This is not a straight forward task on Market Street, partly because of the BART/MUNI Metro Station entrances and the sidewalk narrowing that has already occurred to accommodate the boarding islands. If a policy-level decision was ever made to pursue this option, it would be advisable to conduct an engineering-level study first. Low cost improvements include pavement stencils that indicate the safest path of travel for cyclists and a bicycle safety education program for drivers and cyclists. A higher cost improvement would be creating additional loading bays, particularly west of Eighth Street, where there is currently frequent illegal double parking. This would improve freight access and enhance bicycle safety.

Pedestrian Safety: Reduction in traffic volumes and right turn vehicle-pedestrian conflicts on Market Street may improve pedestrian safety. The presence of PCOs at key intersections can have a similar effect. On the other hand, banning vehicles may encourage more jaywalking which contributes to pedestrian accidents. The current pattern of accidents involving pedestrians on Market Street seems to implicate jaywalking, possibly to and from transit boarding islands, as a contributing factor (See Figure 5).

Cost/Funding - All four alternatives have low capital costs, but ongoing enforcement costs. Enforcement costs need to be covered by a city funding source as they are generally ineligible for state and federal transportation funding. In contrast, many of the suggestions for improving transit travel time/reliability and bicycle and pedestrian safety would involve capital costs. Transit improvements discussed in the SAR (e.g. automatic vehicle locator system) would compete well for federal Congestion Mitigation and Air Quality (CMAQ), and Surface Transportation Program Guarantee (STP-G) funding though they are competing against other MUNI needs such as bus replacement. State Transportation Improvement Program (STIP) funding is also a possible funding source, though transit expansion type projects would compete better for this funding than a transit enhancement project (e.g. bus stop improvements) or bicycle or pedestrian projects because of the current STIP guidelines. Bicycle and pedestrian projects typically face a great deal of competition as there are many projects competing for a limited amount of funding. Potential sources include STP-G funding and the state Bicycle Lane Account. Bicycle and pedestrian safety projects, and transit preferential street projects are eligible for several categories of Prop. B funding, but they do compete with other projects citywide for the same funding.

Ease of Enforcement/Commercial Vehicle Access - Most of the alternatives are relatively easy to enforce when in effect for less than 24 hours a day. Alternatives that include a 24 hour private vehicle ban are more difficult to enforce because commercial vehicles need to

be exempted from the ban, or allowed access during specified hours. The difficulty relates to identifying commercial vehicles and the increased temptation to private vehicles to violate the ban. In the near future high tech solutions such as digital camera enforcement of transit only lanes or use of sensors to identify commercial vehicles may make enforcement less expensive and more effective. Enforcing existing traffic regulations and creating additional loading bays on Market Street can benefit transit, by keeping the curb lane free of double-parked vehicles, and freight, by improving access to businesses, without restricting private vehicle access.

Non-transportation Issues - Non-transportation issues, such as economic vitality and personal security, are perceived to be more important the more stringent the private vehicle restrictions and the longer hours per day that the restrictions are in force. They don't preclude private vehicle restrictions, but it is important to consider these issues in the design of the restriction. For instance, allowing private vehicle access for a few blocks at a time preserves a level of visibility from vehicles while discouraging through traffic and reducing overall vehicle volumes. Increasing sidewalk uses (e.g. food stands, vendors) and extending sidewalk and retail activity into evening hours can improve personal security during the evening and benefit nearby businesses. While these issues can be hard to quantify, the next section makes some suggestions for how to do so should the private vehicle restriction proposals be pursued.

VII. Next Steps/Follow-up

This section provides a road map for policy makers should the City decide to further investigate the possibility of implementing private vehicle restrictions on Market Street. It includes a list of suggested follow-up studies as well as a checklist of Do's and Don'ts for a trial private vehicle restriction.

A. Follow-up Studies

Prior to initial demonstration

The first two studies are the most important with respect to ensuring the success and appropriateness of a trial vehicle restriction.

1. The City should undertake an origin/destination study of Market Street users from Van Ness Avenue to Steuart Street. At a minimum, the study should look at travel during the midday and the P.M. peak period. It is important to understand how Market Street is functioning today in order to better predict how traffic circulation would be affected by potential vehicle restrictions.
2. DPT and MUNI should jointly identify and measure the sources of transit delay on Market Street in order to better estimate the potential benefits to MUNI of proposed private vehicle restrictions.
3. DCP and DPT should conduct a survey of buildings fronting on Market Street and on the blocks and alleys adjacent to Market Street to identify vehicular access to the buildings so that this can be taken into account in the design of any demonstration project. The study should identify possible locations for additional loading zones near Market Street (i.e. on intersecting streets) if the demonstration will restrict freight access to Market Street.

Prior to final implementation of vehicle restrictions

1. The Office of Economic Development and/or the Planning Department should undertake a study to look at similar private vehicle restriction projects in other cities to determine the correlation between the economic success of the project and the types of land use in the corridor and estimates the potential economic impacts of such proposals on San Francisco. When evaluating the economic impacts, the study should consider the influence of the prior economic vitality of the businesses, the types of businesses, the prior level of private vehicle access (e.g. was there on-street parking, garage access, etc.), the prior mode split of persons with destinations in the area, the prior level of traffic congestion, and the overall economic climate affecting the city. As part of the study, the Planning Department should identify short and long term changes to land use which would be compatible with vehicle restrictions on Market Street (e.g. increasing pedestrian-friendly uses such as sidewalk cafes).

B. Checklist of Do's and Don'ts For A Vehicle Restriction Demonstration

1. The goals of the demonstration project must be clearly identified so that it can be designed to specifically meet those goals.
2. DPT and MUNI should jointly manage the demonstration project and coordinate with all affected departments on the design and implementation.
3. The demonstration project should be easy to terminate, requiring minimal expenditure of time a resources.
4. The demonstration project should involve an outreach program to educate local merchants, employers,

residents, property owners, tourists, and Bay Area visitors about the purpose of the trial and how to get around downtown during the demonstration period. The outreach program should also be used to solicit concerns both before and during the trial period so that this information can be used to modify the demonstration project as needed, in order to increase its chances of success.

5. There should be a before-and-after study to evaluate the benefits of the demonstration. At a minimum, the following transportation variables should be measured: transit travel time on Market and Mission Streets; source and amount of transit delay on Market Street; traffic volumes and level of service on Market and selected north and south of Market streets where traffic may be expected to divert; and bicycle volumes on Market Street.
6. There should be a before-and-after survey of Market Street area merchants to measure effects on economic vitality and a survey of customers focusing on perception issues related to the vehicle restrictions such as ease of access to the downtown and personal security on Market Street. The survey should also ask customers for relevant travel behavior information such as their mode of travel to downtown and their trip origin.
7. Private vehicle restrictions should be designed so that they are easy to enforce and minimize potential confusion for all users.
8. The demonstration period should be at least three months to allow people to adjust and change their travel behavior. This will facilitate measurement of longer term impacts on transportation performance and economic vitality.
9. The demonstration project should concentrate on improving the conditions which have the greatest impact on transit reliability on Market Street and make dramatic enough changes so that any benefits can readily be identified through the demonstration.

VIII. Bibliography/Sources Consulted

1 *1992 Citywide Travel Behavior Survey: Visitor Travel Behavior,* The Planning Department (August, 1993).

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3 *Feasibility Study for Market Street Transit-Commercial Street,* DPT (1990).

4 *Memorandum: Before-and-After Study of Market Street Transit Only Lane,* DPT (March 27, 1997).

5 San Francisco Master Plan, The Planning Department.

6 *San Francisco Bicycle Plan,* DPT (December 17, 1996).

7 *San Francisco Cordon Count,* JHK & Associates for the DPW (July, 1983).

8 *Short Range Transit Plan July 1997 - June 2000,* San Francisco Municipal Railway (November, 1977).

Additional information was provided by BART, the Department of Parking and Traffic, the Department of Public Works, Golden Gate Transit, the Public Transportation Department (MUNI), SamTrans, and the San Francisco Police Department.

IX. Authority Staff Credits

Maria Lombardo, Senior Transportation Analyst, was the principal investigator for the SAR. Matthew Seubert, Assistant Transportation Analyst, assisted with all aspects of the SAR and was solely responsible for the survey of other cities and all graphics.

Table 1
Overview of Transit Malls in Other North American Cities

Failures

- Transit malls in **Chicago** and **Philadelphia** have been deemed economic failures.
- Chicago's State Street Mall had some positive impacts for transit, but was a design, pedestrian, and economic failure.
- Philadelphia's Chestnut Street Transitway has been unsuccessful on all fronts.
- Poor design and difficult economic conditions for downtown retail played major roles in the decision to reopen these streets to traffic.

Mixed Records

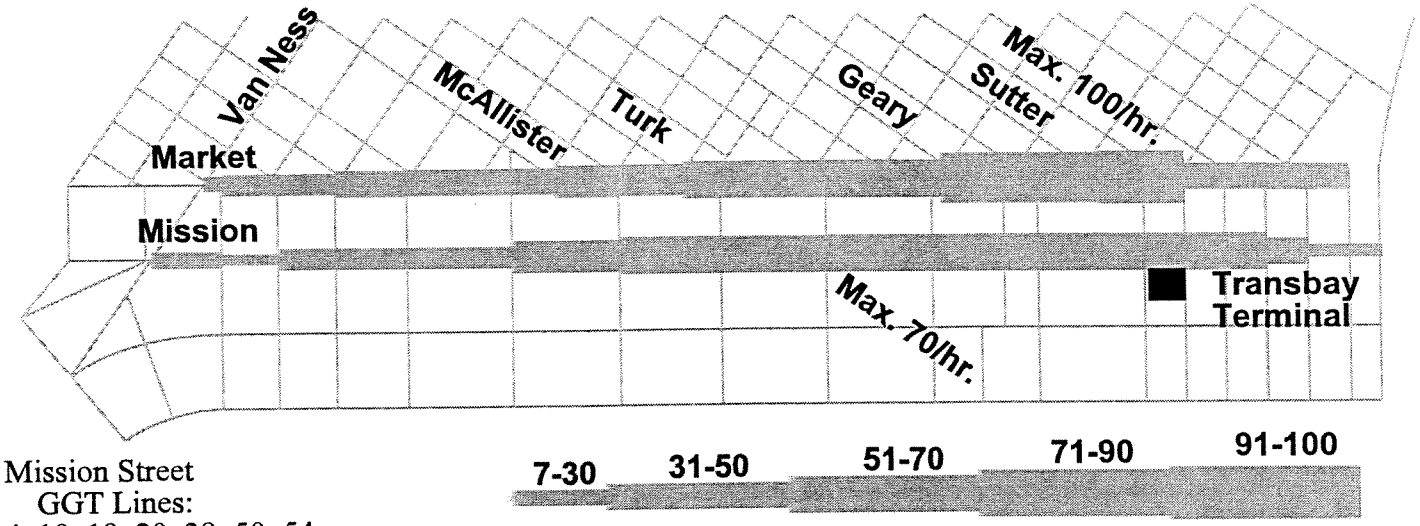
- Malls in **Minneapolis**, **Vancouver**, and **Denver** have been successful in meeting their transportation objectives, and have had mixed economic records.
- Minneapolis's Nicollet Mall, Vancouver's Granville Mall, and Denver's 16th Street Mall have some design problems due to their narrow transit lanes, but overall can be regarded as a transportation success.
- Although the Denver and Minneapolis malls have recently experienced a period of economic success, large department stores are still not very supportive of the malls.

Successes

- **Portland's** transit malls have been successful.
- Portland is in an economically healthy city, with a commitment to coordinated land use and transportation planning.
- Their malls have been an economic benefit to the downtown as a whole, but have had some negative effects on individual ground-floor retailers.
- Retaining some auto access on the mall has been important in ensuring the economic success of most commercial uses along the mall, and in enhancing safety.

Figure 1: Transit Vehicles Per Hour

PM Peak – All Carriers – Outbound



Mission Street
GGT Lines:
4, 10, 18, 20, 38, 50, 54, 67, 74, 76, 78, 80, 90, 93
SamTrans Lines:
5M, 7B, 7F, 1F, 16F, 17F, 18F, 19F, 41F

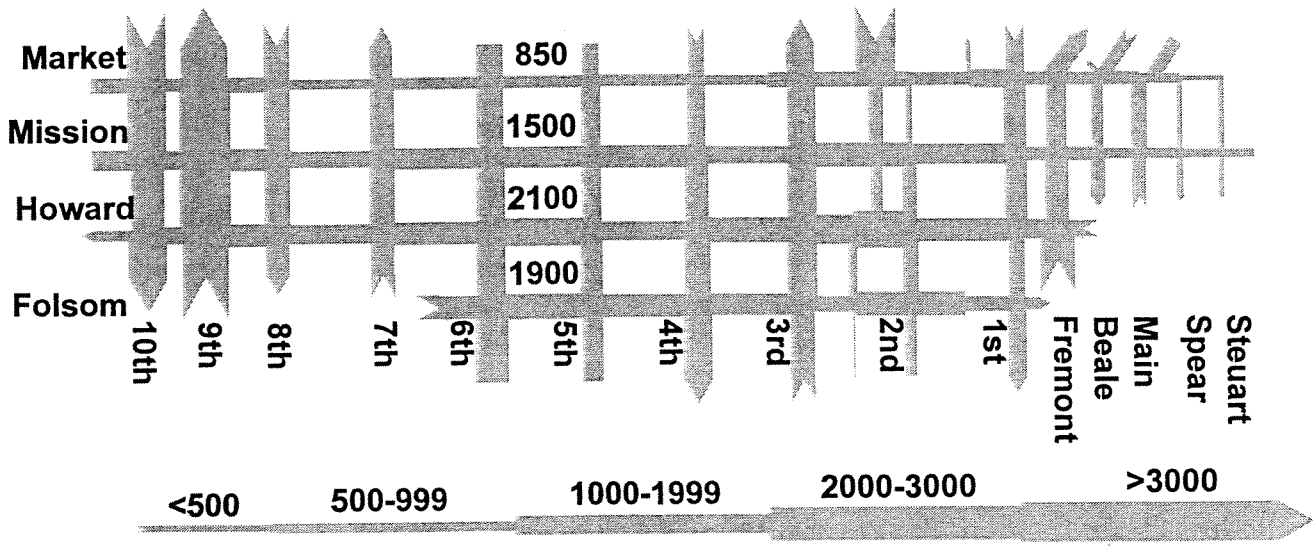
Mission Street
Muni Lines:
14, 14L, 14x, 26

Market Street Muni Lines:
2, 5, 6, 7, 9, 16ax, 16bx, 21, 31, 38, 38L, 66, 71, F

Sources: SFCTA Transportation Analysis Database, Muni, Golden Gate Transit, SamTrans

Figure 2: Vehicles Per Hour

PM Peak – Both Directions



Sources: SFCTA Transportation Analysis Database, DPT, Wilbur Smith Associates, Korve Engineering

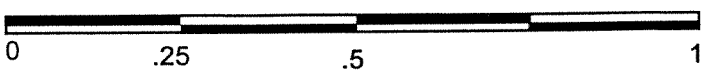
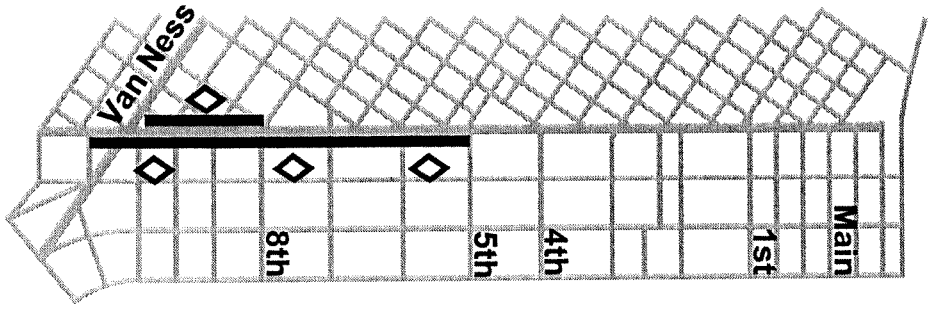


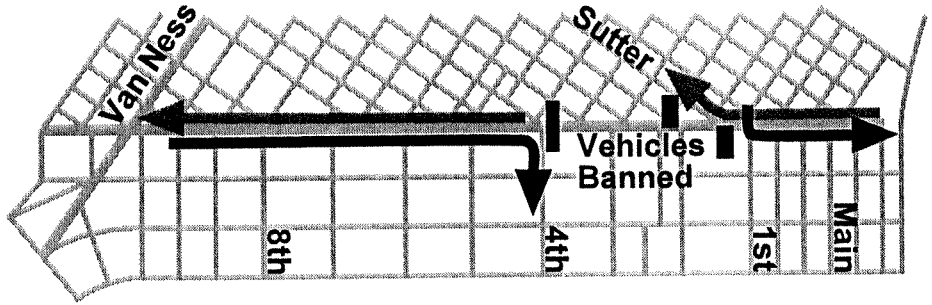
Figure 3: Potential Vehicle Restriction Alternatives

Enforce Existing Traffic Regulations

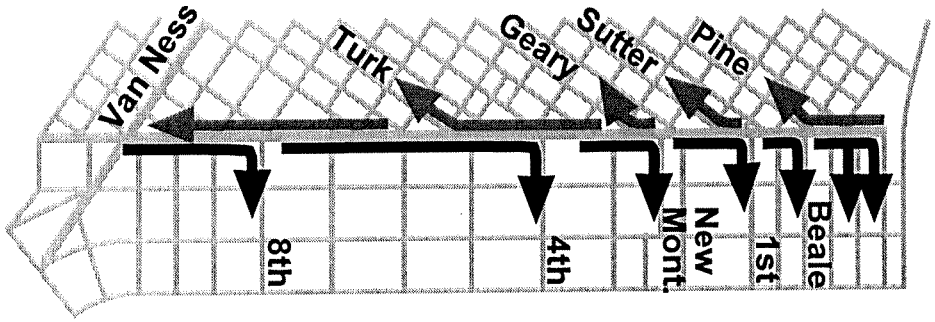


Transit Lane

Focus on Transit Bottlenecks: 4th to 1st Sts.



No Through Traffic: 8th to Beale Streets



Vehicle Ban: 8th to Main Streets

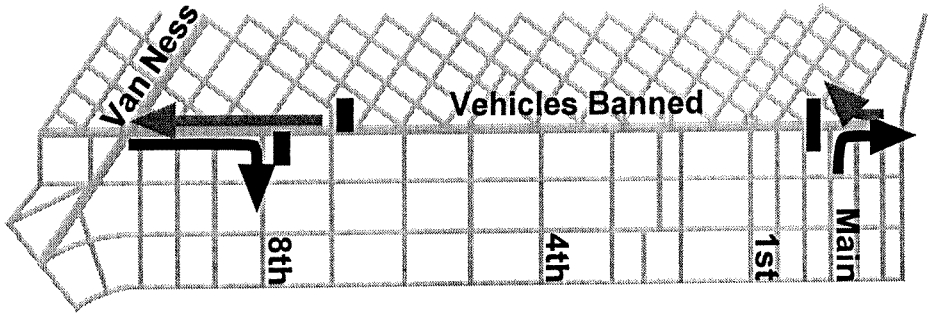


Figure 4: Golden Gate Transit Basic Bus Routes

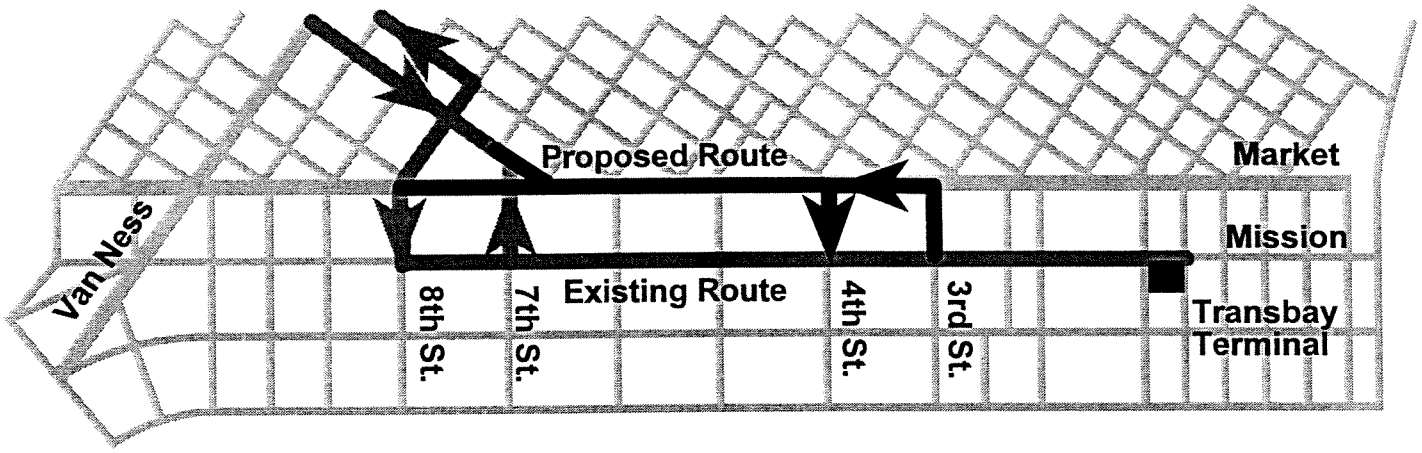


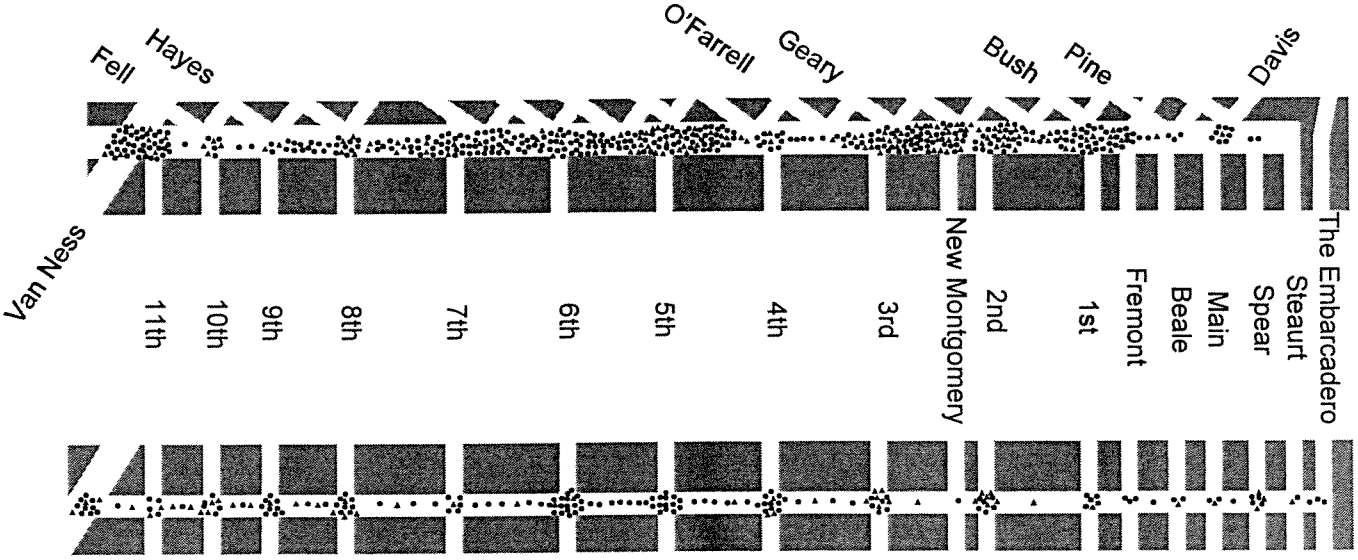
Figure 5: Pedestrian and Bicycle Accidents
on Market and Mission Streets Between Van Ness and The Embarcadero

- Accident Involving a Pedestrian
- ▲ Accident Involving a Bicyclist

(Accident Locations Are Diagrammatic)

...on Market Street

- There were 475 accidents over a five-year period (1991-1995)
- Pedestrian accidents were 3 times as numerous as bicycle accidents
- The number of accidents at intersections was the same as the number between them



...on Mission Street

- There were 180 accidents over a five-year period (1991-1995)
- Pedestrian accidents were nearly 3 times as numerous as bicycle accidents
- The number of accidents at intersections was roughly 3 times the number between them

Sources: DPT, SFPD

Table 2
Evaluation of Alternatives for Market Street Private Vehicle Restrictions [1]

	Enforce Existing Traffic Regulations	Focus on Transit Bottlenecks Fourth St. to First St.	No Through Traffic Eighth St. to Beale St.	Full Vehicle Ban Eighth St. to Main St.
Transit Reliability/ Travel Time Benefit (2)	Low - Low	Med./High - Med./High	Medium - Medium	High - High
Traffic Handling Capability (3)	High - High	Medium - Medium	Medium - Medium	Low - Low
Bicycle Safety Benefit (4)	Low - Low	Medium - Medium	Low/Med. - Low/Med.	Medium - Medium
Pedestrian Safety Benefit (4)	Low - Low	Medium - Medium	Low/Med. - Low/Med.	Medium - Medium
Cost (1000's)(5)				
Capital	$0 - $0	$1.5 - $1.5	$1.8 - $1.8	$2.5 - $2.5
Enforcement	$340 - $901	$360 - $961	$427 - $1,139	$518 - $1,381
Ease of Enforcement (6)	High - High	High - Medium	Medium - Medium	Medium - Low
***Importance* of Non-transportation issues** (7)				
Economic Vitality	Low - Low	Low/Med. - Med.	Medium - Medium	High - High
Personal Safety	Low - Low	Low - High	Low - Medium	Low - High

(1) Each alternative is rated based on the vehicles restrictions being in place from 4 p.m. - 7 p.m. with private and commercial vehicles subject to the restrictions (left rating) and for 24 hours with commercial vehicles exempt from the restrictions (right rating).
(2) Qualitatively assessed based on transit frequency, ridership, and estimated changes in vehicle volumes.
(3) Qualitative area wide assessment based on estimated diverted traffic and LOS along key corridors in the study area.
(4) Qualitative measure, based on DPT's high accident intersection data, SFPD accident database, and expected changes in traffic volumes.
(5) Capital costs cover materials for signage. Labor costs are not included. Enforcement costs are yearly costs based on hourly rates for PCOs (DPT) and SFPD. 24 hour enforcement cost is based on 11 a.m. - 7 p.m. enforcement since it is anticipated that active enforcement would not occur at the same level for 24 hours continuously. Overtime costs are not included.
(6) Qualitative measure based on complexity of the alternative and level of enforcement needed to ensure its success.
(7) Qualitative assessment of the *perceived* importance of non-transportation issue to the acceptability of the vehicle restriction, based on

Table 3
Other Approaches to Improving Market Street
For Transit, Bicyclists, and Pedestrians

Short-Term:

- DPT can study the possibility of extending the existing Market Street transit lanes[1].
- DPT can investigate the possibility of adjusting signal timing to benefit Market St. transit[2].
- If MUNI's proof-of-payment demonstration on the 30-Stockton and 45-Union-Stockton is successful, consider instituting proof-of-payment on Market Street surface lines.
- DPT can implement low cost bicycle safety improvements on Market Street that are identified in the *Bicycle Plan* such as replacing catch basin grates with ones designed for safe bicycle use and marking pavement stencils that indicate the safest path of travel for cyclists.
- DPT and DPW can consider creating additional freight loading bays on Market St.
- MUNI can identify locations on Market Street where lengthening bus islands could reduce transit delay caused by other transit vehicles loading/unloading at the bus island and implement where feasible[3].
- DPT's Bicycle and Pedestrian Safety Program Coordinator (a grant funded position to begin following the reauthorization of ISTEA) could develop a safety education program that has a focus on Market St.
- Ask publishers and other relevant distributors of tourist information about San Francisco to remove Market Street from the 49-mile Scenic Drive, to discourage additional vehicle traffic on Market Street, and ask them to promote use of the F-Line as an alternative[4].

Long-term:

- DPT can use the monitoring capabilities of the Integrated Traffic Management System (ITMS)(currently entering its first stage of development) to deploy PCOs where and when they are most needed to facilitate transit and traffic flow in the Market Street corridor.
- Integrate DPT's ITMS and MUNI's Geographic Positioning System (GPS) so they are compatible and information from both systems can be used to improve transportation system performance for both transit and traffic (e.g. by changing signal timing in real time, re-routing transit around congestion, etc.)
- DPT and DPW can implement complementary capital improvements such as provision of bicycle parking, providing pedestrian furniture, bicycle racks on buses, etc.
- DPT can consider converting the westbound curb lane east of Eighth St., where Market St. is six lanes wide, to a bicycle lane.
- Use ITS technologies (e.g. digital cameras that don't require an enforcement person on site) to enforce transit only lanes. (DPT, MUNI, SFPD).

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[1] DPT is currently studying the possibility of extending the eastbound lane from Fifth St. to Third St. and the westbound lane from Fifth St. to Eighth St.

[2] DPT is investigating the possibility of converting Post St. between Montgomery and Kearny Sts. from one-way eastbound to one-way westbound. This would allow DPT to add more green time for Market St. transit at New Montgomery, a major bottleneck for eastbound transit vehicles.

[3] DPT is considering removal of the Stockton St. boarding island at Ellis and Market Sts. which would allow creation of a continuous transit only lane on Stockton St. between the Stockton Tunnel and Market St.

[4] DPT is considering removal of the downtown portion of Market St. from the 49-mile Drive Scenic Route.