Traffic Capacity

An emerging literature of the past 20 years makes a compelling case that adding traffic capacity increases congestion (See Chapter 4) by attracting additional vehicle trips[28] and forcing more people to use their cars as roads become less safe and less pleasant for walking and bicycling. In short, widening roads may mean spinning our wheels and is not sustainable indefinitely. Conversely, street transformations such as Complete Street projects, road diets, and the conversion of signalized intersections to roundabouts have been found to allow the same traffic through-put, but at lower, safer, speeds, while providing new opportunities for walking, biking, and transit use (See box: Prospect Park West).

Photos: Ryan Snyder

Safety

The research of Dr. Eric Dumbaugh[29] and others,[30] shows that many of the engineering safety practices embodied in such authoritative sources as AASHTO's 2002 Roadside Design Guide are based on years of tradition, not necessarily strong evidence, and result in more, not fewer crashes than Complete Street designs. Urban standards that call for wide straight roads, wide lanes, infrequent intersections, and the removal of roadside objects, encourage speeding and result in a higher number of crashes.

A few transportation agencies are rethinking road standards in favor of Complete Street designs more in line with current safety evidence. New York City is leading the nation in innovative safety improvements for all street users. One result: bicycling trips increased 100% between 2007 and 2011. The city's focus on improved safety for bicyclists and pedestrians has especially benefited drivers. In 2011, the city recorded its lowest traffic fatality rate in 101 years of data collection, a 40% decrease since 2001.[31]

Noise

Studies show the human stress hormone cortisol rises with ambient noise.[32] Noise from traffic travelling at 50 mph can be ten times greater than at 25 mph. Indeed, traffic noise is one of the greatest impacts of high-volume roads on adjacent land uses. The remarkable Complete Street conversion of La Jolla Boulevard in the San Diego neighborhood of Bird Rock, discussed below, reduced traffic noise from about 60-70 dB(A) to 40 dB(A)[33]. Since noise is measured on a logarithmic scale, this represents at least a 100-fold decrease in noise level. This is one reason sidewalk cafes and strolling conversations are now a common sight in the area.

Prospect Park West: A Safer Street Serving More Trips

New York is leading the nation in innovative safety improvements for all street users. An example project is the Prospect Park West Traffic Calming/Bike Lane Project, which had the following benefits: (Photo: New York City Department of Transportation)

- Speeding decreased from 74% of drivers to 20%.
- Bicyclists riding on the sidewalk decreased from 46% to 3%.
- Weekday bicycle trips increased from 349 (June 2009) to 1,131 (August 2010).
- Children routinely accompany their parents on the bike lanes.
- Vehicle traffic peak volume was unchanged.
- Even with one traffic lane converted, counting cyclists, overall peak traffic increased.
- PM peak travel time through the corridor decreased by 4 seconds.
- Crashes were reduced 16%; injury crashes were reduced 62.5%.
- The pedestrian crossing distance, and thus traffic exposure, was reduced by half.

Case Study: La Jolla Boulevard– Bird Rock, San Diego

Each of the above benefits is reflected in the remaking of La Jolla Boulevard in the San Diego community of Bird Rock. For decades, this important street suffered from blight due to high speeds (38-42 mph), lack of safe pedestrian crossings, a shortage of parking, struggling businesses, and inadequate public space. After years of debate, several focus group sessions and various community workshops, the community settled on a plan to radically alter the boulevard using Complete Street concepts.

Changes included the development of five roundabouts, landscaped median islands 8–10 feet wide, pedestrian crossings and plazas, and diagonal parking on either side. Because of their efficiency at handling traffic, the roundabouts allowed the city to reduce the number of travel lanes from four to two. This reduces the pedestrian crossing distance substantially, resulting in less exposure to moving traffic.

The roundabouts reduced speeds to about 15-20 mph, substantially reducing both the number and severity of crashes. The reduction in lanes made space available for pedestrian seating and plazas, landscaped medians and other beautification treatments.

The accompanying reduction in traffic noise has been marked as one of the project's greatest benefits. Thriving businesses, sidewalk cafes, outdoor sales, and chance encounters with neighbors have made La Jolla Boulevard a community gathering place.

Landscaped roundabouts and medians combined with diagonal parking spaces create a village atmosphere that promotes more walking and better accommodates outdoor activities. The project triggered substantial revitalization of the adjacent businesses, and spurred a number of new developments, including a 139-unit condominium development, several new mixed use developments, and a major drugstore. Tax receipts from businesses spiked immediately after the reopening of the road.

Environment

The concept of sustainable communities is nearly meaningless without the provision of transportation choices beyond the personal automobile. Cities investing strategically in Complete Streets, such as Santa Monica, Vancouver, and Portland, find they can lower VMT and reduce criteria pollutants and greenhouse gas emissions from automobiles while providing a higher quality of life. Studies find that congestion, and emissions per vehicle trip and per capita, are lower in mixed use neighborhoods with many travel options.[34]

These beneficial effects align with SANDAG's Sustainable Community Strategy (SCS) which projects that most new housing units built in the region through 2050 will be multi-family, from luxury townhomes to affordable apartments. Greater reliance on alternative transportation, especially for short trips, supports and reinforces compact multi-family development patterns that lower total energy use for both space heating and transportation. Since many new housing units will be in designated Smart Growth Areas, it is imperative that cities plan now for Complete Streets in these areas, lest residents find walking and biking conditions too unwelcoming to adopt the transit-friendly lifestyle they will be offered. As discussed above, Complete Streets can also be built as green streets, with attendant on-site and downstream environmental benefits.

Conclusions

1. Designing streets primarily to reduce traffic delay has had numerous unintended consequences. Complete Streets treatments offer a way to keep traffic moving while providing for other modes and meeting other community values.
2. For the municipality, Complete Streets investments can increase tax collections and jobs, reduce road building and maintenance costs, reduce emergency response costs, and improve air and water quality.
3. "Green street" techniques such as bioswales and porous pavements can reduce the costs of constructing roads, managing stormwater, irrigating landscaped areas, and heating and cooling.
4. For the individual, Complete Streets provide cost effective health and mental health benefits, reduce transportation costs, provide safe travel for non-drivers, reduce all types of crashes, reduce noise-related stress, and create more opportunities for local shopping and entertainment.
5. The health and safety benefits of Complete Streets are especially noteworthy. Every $1 spent on walking and bicycling facilities can yield between $5-$100 in benefits, depending on which benefits are counted.
6. New York City is among the most ambitious US municipalities implementing walking, bicycling, and traffic safety improvements. In just over a decade, the city's crashes have dropped over 40%, to the lowest level in 100 years.

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3

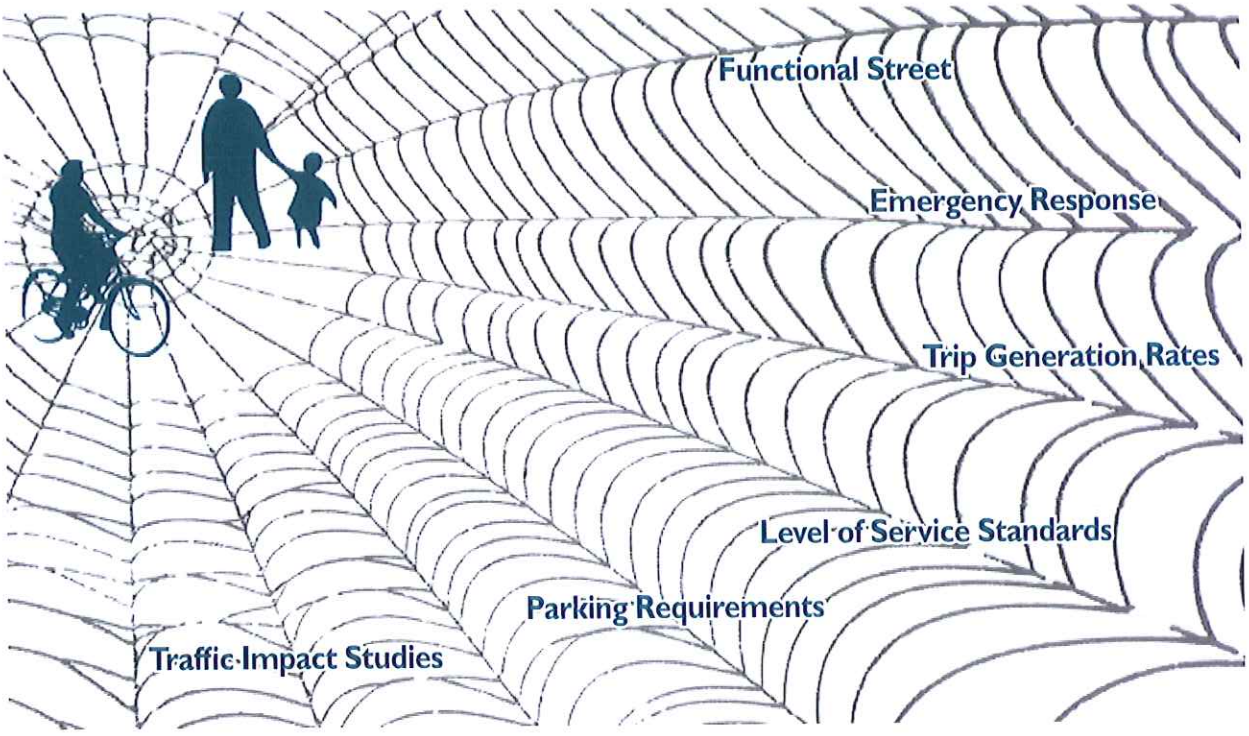
SETTING A POLICY DIRECTION

Why Adopt Complete Streets Policies?

At all levels of government, our current systems for planning, funding, implementing, operating, and maintaining transportation facilities are grounded in long-established policies, funding formulas, parking requirements, warrants, and guidelines (Figure 3-1). This entrenched policy web favors vehicle movement, with other street users considered only secondarily, and not with the research-based rigor we might hope for.

Any local government wishing to implement Complete Streets must therefore provide definitive policy direction, and reinforce it with staff training and changes in procedures, design guidelines, performance goals, and reporting mechanisms. As discussed in Chapter 4, clear policy direction also allows jurisdictions to avoid the "Level of Service straightjacket" imposed during CEQA review of new facilities and private developments.

Figure 3-1. Web of Auto-Oriented Planning Policies and Standards



Supportive State Policies

Adopting local Complete Street policies is more easily justified when corresponding State policies are in place. In California, state-level policy leadership promoting Complete Streets has been especially strong, in the form of new laws, guidance documents, and Caltrans policies, as follows (quoting actual language in each case):

The Complete Streets Act (AB1358)

The Complete Streets Act (2008) requires that,

> *Commencing January 1, 2011, upon any substantive revision of the circulation element, the legislative body shall modify the circulation element to plan for a balanced, multimodal transportation network that meets the needs of all users of streets, roads, and highways for safe and convenient travel in a manner that is suitable to the rural, suburban, or urban context of the general plan.*

Accordingly, every city in the region undergoing a General Plan update is now incorporating, to a greater or lesser degree, policies to provide safe accommodations for all users of the street. Jurisdictions, and their consultants, who fully understand the Complete Streets concept acknowledge within the General Plan that providing for all users is a new way of doing business, not simply an add-on program that competes with other departmental demands.

SB 97 CEQA and Greenhouse Gas Emissions

SB 97 (2007) directed the California Office of Planning and Research to revise the CEQA Guidelines to clarify how GHG emissions and their impacts should be addressed in the CEQA process. The eventual revisions, issued in March 2010, sought to redress the long-standing criticism that transportation impact analysis and mitigation has actually increased environmental impacts by focusing on the mitigation of traffic delay, which is not itself an environmental impact. The revisions emphasize the impact of a project on the circulation system as a whole, and on alternative modes in particular. The revised CEQA Guidelines are discussed further in Chapters 4 and 5.

Caltrans Deputy Directive, Complete Streets – Integrating the Transportation System, DD-64-R1[35]

This policy includes extensive discussion of the obligation and intention to provide a network of Complete Streets, including the necessity to break down departmental silos, revise manuals, and provide staff training:

> *Bicycle, pedestrian, and transit travel is facilitated by creating "complete streets" beginning early in system planning and continuing through project delivery and maintenance and operations. Developing a network of "complete streets" requires collaboration among all Department functional units and stakeholders to establish effective partnerships. (p. 1)*
>
> *[T]he Department and local agencies have the duty to provide for the safety and mobility needs of all who have legal access to the transportation system…To ensure successful implementation of "complete streets," manuals, guidance, and training will be updated and developed. (p. 2)*

Caltrans Director's Policy on Context Sensitive Solutions, DD#22

The intent of this policy is to move away from "one size fits all" road designs that ignore the context of a road segment, including demand for safe and convenient walking, biking, and transit. This is accomplished by (1) incorporating the viewpoints and needs of local stakeholders in all project phases, and (2) utilizing the flexibility in design afforded by primary guidance documents:

> *The Department's Highway Design Manual, Federal Highway Administration (FHWA) regulations, FHWA's Flexibility in Highway Design publication, and the American Association of State Highway Transportation Officials' A Policy on Geometric Design of Highways and Streets all share a philosophy that explicitly allows flexibility in applying design standards and approving exceptions to design standards where validated by applying sound engineering judgment. This design philosophy seeks transportation solutions that improve mobility and safety while complementing and enhancing community values and objectives. (p. 2)*

Regional Transportation Plan Guidelines (2010 Amendments)

The California Transportation Commission (CTC) approves regional transportation plans and projects. The Commission's guidelines for the preparation of Regional Transportation Plans were amended in 2010 to read, in part:

> *"MPOs and RTPAs should integrate Complete Streets policies into their Regional Transportation Plans, identify the financial resources necessary to accommodate such policies, and should consider accelerating programming for projects that retrofit existing roads to provide safe and convenient travel by all users.*
>
> *MPOs and RTPAs should encourage all jurisdictions and agencies within the region to ensure that their circulation elements and street and road standards, including planning, design, construction, operations, and maintenance procedures, address all users of the transportation system, to the extent practicable." (p. 24)*

Regional Policy Initiatives

SANDAG

In October 2011, the San Diego Association of Governments (SANDAG) adopted its first Sustainable Community Strategy (SCS) in conjunction with the 2050 Regional Transportation Plan (RTP). The SCS was required by SB375, a 2008 law that requires every California region to meet 2020 and 2035 targets for reductions in GHG emissions from cars and light trucks. The vision established by the SCS/RTP is "more sustainable, compact, well-designed communities interconnected by a transportation system that expands travel choices and reduces greenhouse gas emissions." Compared to previous RTPs, the 2050 RTP encompasses significantly more transit services and a 6-fold increase in funding for walking, bicycling, and traffic calming ("Active Transportation"). To support local efforts, SANDAG provides excellent, research-based resources[36] on planning for livable communities, including:

- Pedestrian design guidelines
- Smart growth design guidelines

- Parking strategies for smart growth areas
- Trip generation rates in smart growth areas
- A smart growth photo library
- Photo simulations of redeveloped/completed street scenes from around the region
- Transportation Demand Management implementation guidance
- The data-driven "Health Atlas" and other GIS tools

County Health Department

For the last several years, the San Diego County Department of Health and Human Services (HHSA) has brought significant attention to the role of infrastructure, neighborhood form, and other environmental issues in determining individual health outcomes. Among other efforts, HHSA teamed with SANDAG on the federally funded "Healthy Works" project, which in part brought a new health focus to the RTP/SCS, provided local health-related planning grants, and is establishing a network of high-tech pedestrian and bicycle counters to help measure progress.

Another and potentially powerful tool resulting from the Healthy Works collaboration is the creation of a large and unique set of GIS data layers that can reveal how environmental and social determinants of health are correlated with health outcomes (see Chapter 8). Still another aspect of this work is the piloting by SANDAG of Health Impact Assessments (HIA) on two infrastructure projects in the planning stage. The HIA is emerging as a potentially "game-changing" evaluation tool being pursued by planning departments nationwide, and by many California state agencies.

Air Pollution Control District

Pursuant to the California Clean Air Act, the APCD's Indirect Source Program has long provided technical assistance and comments to support smart growth and alternatives to automobile travel, which is the region's largest source of emissions. APCD published two advisory documents, Tools for Reducing Vehicle Trips Through Land Use Design and Slow Down! Taming Neighborhood Traffic, available upon request. Staff provides assistance to jurisdictions, developers, neighborhood organizations, business districts, and others regarding Complete Street policies and best practices in traffic calming, pedestrian and compact land use design.

The 10 Elements of an Ideal Complete Streets Policy

A Complete Streets policy can take many forms (Table 3-1). However, an effective policy must include several key components. In a 2010 report examining hundreds of Complete Streets policies, the National Complete Streets Coalition identified the best example policies of various types.[37] The report recommends the following elements be included in a Complete Streets policy:

1. Sets a vision.
2. Includes all modes.
3. Applies to both new and retrofit projects.

4. Emphasizes connectivity.
5. Applies to all phases of all applicable projects.
6. Specifies and limits exceptions, with management approval required.
7. Uses latest design guidelines, is flexible.
8. Is context-sensitive.
9. Sets performance standards.
10. Includes implementation steps.

Types of Complete Street Policies

Table 3-1 Pros and Cons of Various Policy Options

Policy Type	Pros	Cons
City Council Resolution	• Quick and easy, sets the vision	• Not comprehensive, may lack specificity and leave priorities, standards, procedures, and performance measures unchanged.
City Council Policy	• Can include most of the elements of an ideal policy.	• Possibly involves more steps, requiring longer preparation. • Not integrated with other policies with which it may conflict.
Ordinance	• Implements the vision and provides specific standards and procedures; has the force of law.	• More steps, requiring longer preparation. • May not have adequate policy support.
Tax Ordinance	• Provides the vision, relevant policies, and a funding source.	• May lack policy support. • Requires more public process since a public vote is required. • May be difficult to achieve (as part of a tax referendum) in a down economy.
Internal Policy	• Quicker implementation. • Required buy-in from affected agencies provides education opportunity across departments and disciplines.	• Not necessarily anchored in official policy. • May lack accountability mechanism such as performance measures and regular reports.

Policy Type	Pros	Cons
General Plan Policy	• Ideal policy vehicle for creating a Complete Street policy and exceptions to Level of Service. • The GP is the jurisdiction's "constitution". All other policies, zoning, and regulations must be consistent with the GP.	• General Plan amendments can require a lengthy process. • Must be followed up with specific implementation steps.
Street Design Manual	• Provides specific design guidelines allowing flexible options for complete street features.	• May lack necessary policy underpinning, including priorities, design flexibility, maintenance and operation details, performance measures, and a reporting requirement.
Pedestrian/Bike Plans	• Provide specific improvements and/or a framework for additional improvements.	• Tend not to provide guidance for balancing pedestrian or bicycle accommodations with those for other modes.
Focused Plans (Specific Plans, Corridor Plans, etc.)	• Tailored to a particular geographic area and population. • Provides a pilot to test ideas. • Successful strategies can be adapted to other projects, but may require a design- exception approval process.	• Limits applicability to a small area. • May lack some key elements that apply to a citywide policy, such as flexibility and accountability.

Once the Complete Street policy (or policies) is in place, it is important to ensure that related policies echo the Complete Street priorities. These may include street design requirements, traffic impact study guidelines, trip generation rates, parking requirements, and facility requirements for new development. Since this is a long-term effort, it is important to lay out how policy conflicts will be dealt with in the interim.

What *Not* to Include in a Complete Streets Policy

There are some policies that should not be included in a policy document governing community priorities, including road design and operation, for example:

» The Circulation Element of the General Plan should not specify roadway dimensions or the number of lanes for particular roads, since this may require a General Plan amendment should the community decide to reduce the number of lanes, revert to a lower classification, reduce speeds, narrow lanes, or otherwise provide for greater safety of all users.

» Most General Plans specify LOS C or D as a citywide standard while claiming a vision of expanded travel options for all. These two policies are difficult to reconcile, and may set the stage for later legal challenges. A specified LOS as the primary measure of transportation performance elevates traffic flow above all other community goals described in the General Plan, including traffic safety. A better approach is to map which areas or corridors will emphasize which modes. (These issues are explored further in the next chapter.)

With the emergence of Complete Streets as a significant planning imperative all over the country, alternative transportation metrics are evolving rapidly. Jurisdictions would be prudent to avoid stating explicit performance standards in the General Plan and other high-level planning documents, and instead establish multi-modal goals while retaining flexibility regarding how these will be attained, and how success is to be measured.

Conclusions

1. Various local standards, zoning requirements, and funding mechanisms discourage or even prohibit implementation of Complete Streets. To address these barriers, it is necessary to adopt policies establishing Complete Streets as a priority.
2. Policies at the federal, state, and regional level encourage or require Complete Street investments. All of the professional transportation organizations, such as AASHTO and ITE have endorsed Complete Streets and context-sensitive design, in which the local context and the needs of affected stakeholders take precedence over road classification.
3. Complete Street policies can be established in a variety of ways, but the most effective mechanism is through the Circulation Element of the General Plan. Where a General Plan update has been recently completed, a stand-alone Complete Street Policy or other mechanism can be used.
4. An effective Complete Street policy sets a vision for the community's streets, includes all modes, applies broadly, emphasizes connectivity, manages exceptions, recognizes neighborhood context, establishes performance standards, and includes implementation steps.
5. Two ways the General Plan can work against Complete Streets is by specifying roadway dimensions and Level of Service standards in the plan itself. It is recommended that broad goals for modal performance be specified, and that the plan identify which areas or corridors will emphasize which modes.

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L.O.S. STANDARDS AND COMPLETE STREETS

Level of Service Standards – A Barrier to Complete Streets?

Traffic flow has historically been analyzed using the vehicle Level of Service (LOS) metric, from A (free-flow) to F (stop and go). All jurisdictions in the San Diego region have established an LOS standard of C or D (E in downtowns), which routinely triggers roadway and intersection widening to reduce current or projected peak hour vehicle trips. LOS has been an important barrier to accommodating non-motorized modes and transit (since most transit riders are also walkers). Traffic engineer Gary Toth, a 34-year veteran of the New Jersey Department of Transportation, has written,

> *[I]n search of high LOS rankings, transportation professionals have widened streets, added lanes, removed on-street parking, limited crosswalks, and deployed other inappropriate strategies. In ridding our communities of the weeds of congestion, we have also pulled out the very plants that made our "gardens" worthwhile in the first place.*[38]

Follow the Money

The LOS rating mechanism provides legal leverage for a jurisdiction to demand traffic mitigation funds from developers during project entitlement. Even cities interested in Complete Streets are understandably reluctant to give up the LOS-based funding mechanism, grounded as it is in decades of technical validation, legal precedents, and simple logic. Yet, some cities in California and elsewhere have begun rethinking the application of LOS standards, and requiring developer funding of pedestrian, bicycle, and transit improvements instead of more travel lanes.

Alternatives to LOS

Strategic Relaxation of LOS

Some cities have designated in the General Plan or other governing document certain intersections, corridors, or districts where LOS standards will be lower or will not apply at all (Table 4-1). These are typically areas where expanding traffic capacity would unduly harm neighborhood character, undermine pedestrian comfort in a highly walkable zone, or compromise other community values.

Table 4-1 L.O.S. Relaxation Examples

City	Target Area	Alternative Method
San Jose, CA	• Downtown • Transit corridors • Neighborhood business districts	• "Protected Intersections" cannot be expanded • Projects impacting them must fund walk/bike/transit improvements
National City, CA[39]	• City-wide	• Designated "Community Corridors" (Complete Street avenues) cannot be widened
San Diego, CA	• Downtown	• LOS lowered from D to E, but improvements to LOS F streets may not endanger pedestrians
Lancaster, CA	• Lancaster Blvd.	• LOS lowered from D to E
Sacramento, CA[40]	• Downtown Core Area Multi-Modal Districts	• LOS lowered from D to F; impacts require enhancements to non-auto travel modes
Portland, OR	• Central Portland, including Downtown	• LOS F acceptable at peak hours
Vancouver, BC	• Downtown and West End	• No LOS applied. Capacity expansions prohibited.

Multi-Modal Metrics

At this writing, there were a number of road performance metrics available as an enhancement, supplement, or replacement of LOS (Table 4-2). While the array of tools may seem daunting, they are all based on similar approaches and research results. Cities are encouraged to experiment with these tools in their next road planning effort, and consider adapting one or more for future projects.

Example: MMLOS from the 2010 HCM

As an illustration of a multi-modal metric, the 2010 update of the ubiquitous Highway Capacity Manual includes a MMLOS methodology for quantifying trade-offs between service quality for vehicles, transit vehicles, bicycling, and walking when considering alternative designs. As with most of the other new metrics, the walk/bike computations are based on research that identified key factors (Table 4-3) affecting the decision to walk or bicycle on a particular street. The disadvantages of this method are that it is not yet widely tested, it requires additional data collection, not all important factors may be quantifiable (and are thus excluded), and it retains some of the flaws inherent in reliance on vehicle LOS.

Table 4-2 Matrix of Roadway Performance Metrics

Method	Method Type	Modes			
		AUTO	TRANSIT	BICYCLE	PEDESTRIAN
Pedestrian Environmental Quality Index	Checklist, Computational				●
Bicycle Environment Quality Index	Checklist, Computational			●	
Charlotte MMLOS	Other			●	●
Florida DOT MMLOS	Computational	●	●	●	●
HCM 2010 MMLOS	Computational	●	●	●	●
Fort Collins MMLOS	Checklist, Computational	●	●	●	●
Person Delay	Computational	●	●	●	●
Layered Networks	Other	●	●	●	●
Auto Trips Generated	Other	●	●	●	●

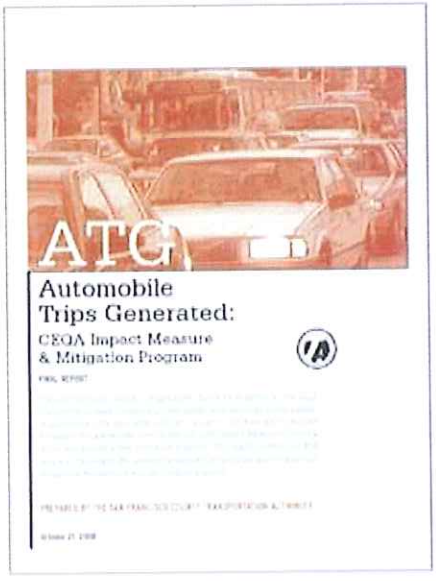
Adapted from Ronald T. Milam, Fehr and Peers, 2012. See online resource, MMLOS Toolkit.[41]

Table 4-3. MM LOS Factors for Calculating Pedestrian and Bicycle Level of Service (2010 HCM)

Pedestrian Level of Service Factors	Bicycle Level of Service Factors
Link Factor • Outside travel lane width (+) • Bicycle lane/shoulder width (+) • Buffer presence (e.g., on-street parking, street trees) (+) • Sidewalk presence and width (+) • Volume and speed of motor vehicle traffic in outside lane (-)	Link Factor • Volume and speed of traffic in outside travel lane (-) • Heavy vehicle percentage (-) • Pavement condition (+) • Bicycle lane presence (+) • Bicycle lane, shoulder, and outside lane widths (+) • On-street parking presence and utilization (+/-)
Intersection Factor • Permitted left turn and right-turn-on-red volumes (-) • Cross-street motor vehicle volumes and speeds (-) • Crossing length (-) • Average pedestrian delay (-) • Right-turn channelizing island presence (+)	Intersection Factor - Signalized • Width of outside through lane and bicycle lane (+) • Cross-street width (-) • Motor vehicle traffic volume in the outside lane (-)
Roadway Crossing Difficulty Factor (if mid-block crossing is allowed)	Driveways and Unsignalized Intersections per Mile

Auto Trips Generated

In 2003, the San Francisco Municipal Transit Agency (SFMTA) determined that the use of LOS to measure and mitigate transportation impacts from new development was resulting in infrastructure changes that were contrary to its long-standing Transit First Policy.[42] The city analyzed alternative options and settled on the simple metric, Auto Trips Generated (ATG). Development projects must demonstrate compatibility with the Transit First Policy and pay a mitigation fee for each new vehicle trip generated, thus creating a strong incentive to minimize trips. The collected fees will be applied to transportation performance improvements, either site-specific or city-wide, with all modes eligible. At this writing, the city is conducting a Nexus Study to establish the fee amount.[43]



LOS and CEQA – A Failed Marriage?

The ATG metric represents a significant departure from the customary assumption that traffic delay represents a "physical impact to the environment" – a fundamental requirement of CEQA. The SFMTA's study of alternative traffic metrics determined that LOS (traffic delay) is a measure of motorist convenience – a social impact – rather than an environmental impact. Indeed, agencies are within their rights to remove the LOS analysis from the CEQA umbrella. Traffic studies may still be needed to determine traffic-related physical impacts, namely conventional pollutants and GHGs, but LOS alone is a poor predictor of emissions. Mitigation of ATG via multimodal improvements addresses the direct air quality impacts, not the social benefit of reducing congestion, and is thus more in line with CEQA's purpose.

Evidence presented in this report suggests improvements to non-vehicular travel promise to alleviate traffic congestion more effectively than traditional LOS mitigations but in an environmentally responsible way. Nevertheless, SFMTA staff report they fully expect to be sued following replacement of LOS with ATG, but welcome the opportunity to set a legal precedent. California jurisdictions wishing to reduce the influence of LOS should follow the progress of the SFMTA's ATG adoption process.

Is Traffic Congestion Inevitable?

The conventional traffic planning paradigm assumes that traffic volumes grow steadily, based on traffic generation rates for each land use, and that failure to plan for them will lead to gridlock. However, studies of both road widening and road removal suggest that traffic demand is largely flexible, and equilibrates with the supply provided, rather than being a fixed number based on population or land uses.[44]

Induced Travel and Disappearing Traffic

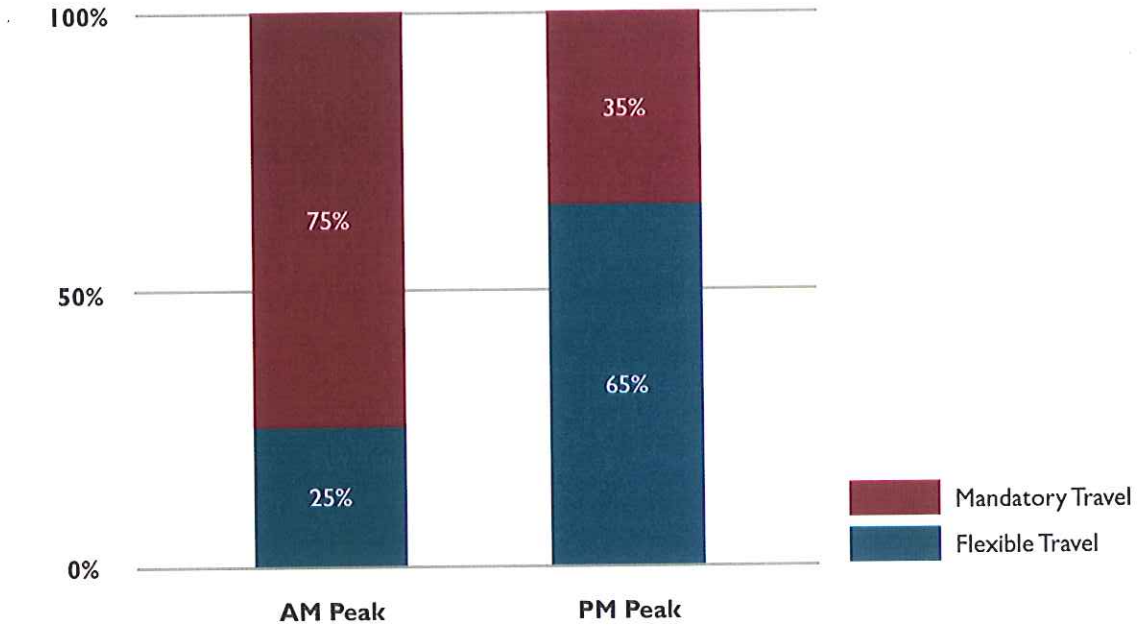
Two traffic demand phenomena have been studied: (1) the "induced travel" effect, in which far more drivers than predicted by a traffic model head for a new or expanded roadway, and (2) "disappearing traffic," wherein modeled gridlock or diversion of traffic to other roads following the removal of a key roadway fails to occur as predicted. A study of induced traffic in California showed that 60-90% of new roadway capacity is filled by new traffic within five years,[45] primarily from existing travelers switching modes or routes to the new or expanded facilities.

Similarly, a study of 60 roadway removal cases worldwide showed that around 16-25% of traffic simply disappears.[46] Surveys of the "disappeared" drivers show they switched to a different mode, changed travel times or destinations, or decided not to take the trip at all. These cases suggest that drivers exercise a larger degree of flexibility regarding when, how, and whether to travel than current traffic models assume.

Mandatory vs. Flexible Travel

Vehicle trips can be categorized as either mandatory (work or school related) or flexible (shopping, dining, visiting friends, etc.). Data from the National Highway Travel Survey show that on weekdays, morning peak trips are comprised of 75% mandatory and 25% flexible trips (Figure 4-1). By contrast, 65% of afternoon peak trips are flexible.[47] Thus, maintaining peak LOS in every location may not be necessary in order to accommodate travel needs, and in fact may be a poor use of public resources.

Figure 4-1. Weekday Vehicle Travel



Driving Declines

The New York Times recently reported,[48]

> *In 2008, 46.3 percent of potential drivers 19 years old and younger had drivers' licenses, compared with 64.4 percent in 1998, according to the Federal Highway Administration, and drivers ages 21 to 30 drove 12 percent fewer miles in 2009 than they did in 1995.*

Both young adults[49] and retirees show a majority preference for dense, lively neighborhoods built for walking, bicycling, and transit. Retirees are trading large-lot suburban homes for close-in walkable neighborhoods, partly for the opportunities, and partly in anticipation of outliving their ability to drive. The result of these choices, coupled with rising gas prices, will sooner or later show up in reduced or stabilizing traffic volumes in the San Diego region as it has in other regions.[50]