



Appendix B
Congestion Management Strategies

Table B-1: Demand Management Strategies

Strategy	Congestion Impact	Implementation Costs	Implementation Time Frame	Local Practicality
Transportation Demand Management				
<p>Alternative Work Hours Three main variations: staggered hours, flex-time, and compressed work weeks. Staggered hours require employees in different work groups to start at different times in order to spread out their arrival/departure times. Flex-time allows employees to arrive and leave outside of the traditional commute period. Compressed work weeks involve reducing the number of days per week worked while increasing the number of hours worked per day.</p>	<ul style="list-style-type: none"> • Reduce peak-period VMT • Improve travel time among participants 	<ul style="list-style-type: none"> • No capital costs • Agency costs for outreach and publicity • Employer costs associated with accommodating alternative work schedules 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Very Practical
<p>Telecommuting Telecommuting policies allow employees to work at home or a regional telecommute center instead of going into the office, all the time or only one or more days per week.</p>	<ul style="list-style-type: none"> • Reduce VMT 	<ul style="list-style-type: none"> • First-year implementation costs for private-sector (per employee for equipment) • Second-year costs tend to decline 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Very Practical
<p>Ridesharing Participants are matched with potential candidates for sharing rides, typically arranged/encouraged through employers or transportation management agencies (TMAs), which provide ride-matching services. More effective if combined with HOV lanes, parking management, guaranteed ride home policies, and employer-based incentive programs.</p>	<ul style="list-style-type: none"> • Reduce work VMT • Reduce SOV trips 	<ul style="list-style-type: none"> • Savings per carpool and vanpool riders • Costs per year per free parking space provided • Administrative costs 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Very Practical
<p>Implementing Park-and-Ride Lots Used in conjunction with HOV lanes and/or express bus services. Particularly helpful when coupled with other commute alternatives such as carpool/vanpool programs, transit, and/or HOV lanes.</p>	<ul style="list-style-type: none"> • Reduce regional VMT (up to 0.1 percent) • Increase mobility and transit efficiency 	<ul style="list-style-type: none"> • Structure costs for parking area • If investing in a transit connection, transit costs such as bus bays and shelters • Amenities such as lighting, trash cans, emergency phones, and bike racks/lockers 	<ul style="list-style-type: none"> • Medium-term: 5 to 10 years 	Practical

Table B-1: Demand Management Strategies (continued)

Strategy	Congestion Impact	Implementation Costs	Implementation Time Frame	Local Practicality
Transportation Demand Management				
<p>Congestion Pricing Can be implemented statically or dynamically. Static congestion pricing requires that tolls are higher during traditional peak periods. Dynamic congestion pricing allows toll rates to vary depending upon actual traffic conditions. The more congested the road, the higher the cost to travel on the road. Dynamic congestion pricing works best when coupled with real-time information on the availability of other routes.</p>	<ul style="list-style-type: none"> • Decrease demand during peak periods 	<ul style="list-style-type: none"> • Capital costs for electronic toll collectors, booths, software, and cameras • Operating and maintenance costs • Road pricing is revenue generating so the costs can be covered by the revenue accrued 	<ul style="list-style-type: none"> • Medium-Term: 5 to 10 years 	Practical
<p>Guaranteed Ride Home Programs Provide a safety net to those people who carpool or use transit to work so that they can get to their destination if unexpected work demands or an emergency arises.</p>	<ul style="list-style-type: none"> • Increase transit and carpool participation 	<ul style="list-style-type: none"> • Administrative costs • Operations cost of providing a ride to those who need it 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Very Practical
<p>Car Sharing Programs These programs and station cars allow a large group of people to share a pool of vehicles, usually owned by an implementing agency or private company, and split the associated costs. Cars are parked in neighborhoods, at transit stations, or at employers for quick access. Users generally pay per use fee or an annual/monthly fee.</p>	<ul style="list-style-type: none"> • Encourages people to use transit as primary form of transport as they can use the shared car to supplement transit use 	<ul style="list-style-type: none"> • Costs vary but program generates revenue, so it can pay for itself • Donated or reduced priced parking spaces usually assist with making these programs viable 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Practical

Table B-1: Demand Management Strategies (continued)

Strategy	Congestion Impact	Implementation Costs	Implementation Time Frame	Local Practicality
Transportation Demand Management				
<p>High Occupancy Vehicle Lanes Increases corridor capacity while at the same time provides an incentive for single-occupant drivers to shift to ridesharing. Most effective as part of a comprehensive effort to encourage HOVs, including publicity, outreach, park-and-ride lots, rideshare matching services, and employer services.</p>	<ul style="list-style-type: none"> • Reduce VMT • Reduce regional trips • Increase vehicle occupancy 	<ul style="list-style-type: none"> • Capital costs vary depending on whether a new land is added or an old lane is redesignated • Annual operations and enforcement 	<ul style="list-style-type: none"> • Medium-term: 5 to 10 years (includes planning, engineering, and implementation) 	Practical
<p>Managed Lanes Managed lanes may include high-occupancy toll (HOT) lanes with tolls that vary based on demand, exclusive bus-only lanes, HOV and clean air and/or energy-efficient vehicle lanes, and HOV lanes that could be changed into HOT lanes in response to changing levels of traffic and roadway conditions.</p>	<ul style="list-style-type: none"> • Decrease travel times • Increase transit use and improve bus travel times 	<ul style="list-style-type: none"> • Can create environmental and community impacts • Managed Lanes have additional costs for various technology devices 	<ul style="list-style-type: none"> • Assumes medium to long-term: 5 to over 10 years 	Practical
<p>Auto Restricted Zones Areas where vehicular travel is regulated, controlled, or restricted in some manner. Generally used in urban areas.</p>	<ul style="list-style-type: none"> • Increase walking, biking, or transit trips 	<ul style="list-style-type: none"> • Design and implementation costs variable • Operating and maintenance costs variable 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Practical
<p>Live Near Your Work Campaign Strives to educate individuals on the true cost of transportation so that they can make better decisions regarding where to live.</p>	<ul style="list-style-type: none"> • Decrease vehicle miles traveled 	<ul style="list-style-type: none"> • Marketing costs • Employer/employee outreach 	<ul style="list-style-type: none"> • Medium-term: 5 to 10 years 	Very Practical
<p>Alternative Mode Marketing and Education Providing education on alternative modes of transportation can be an effective way of increasing demand for alternative modes. Can include mapping websites that compute directions and travel times for multiple modes of travel.</p>	<ul style="list-style-type: none"> • Increase walking, biking, or transit trips 	<ul style="list-style-type: none"> • Varies depending on extent of educational or marketing campaign 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Very Practical
<p>Safe Routes to Schools Program Federally-funded program, provides 100 percent funding to communities to invest in pedestrian and bicycle infrastructure surrounding schools.</p>	<ul style="list-style-type: none"> • Increase walking and/or biking 	<ul style="list-style-type: none"> • Federally funded program 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Very Practical
<p>Employer-Landlord Parking Agreements Employers can negotiate leases so that they pay only for spaces used by employees. In turn, employers can pass along parking savings by purchasing transit passes or reimbursing non-driving employees with the cash equivalent of a parking space.</p>	<ul style="list-style-type: none"> • Encourage employees to walk, bike, or take transit 	<ul style="list-style-type: none"> • Economic incentives used to encourage employer and landlord buy-in 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Practical

Table B-1: Demand Management Strategies (continued)

Strategy	Congestion Impact	Implementation Costs	Implementation Time Frame	Local Practicality
Transportation Demand Management				
Preferential or Free Parking for HOVs Provides an incentive for employees to carpool.	<ul style="list-style-type: none"> • Increase carpooling and vanpooling 	<ul style="list-style-type: none"> • Relatively low costs, primarily borne by private sector, including signing, striping, and administrative costs 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Practical
Location-Specific Parking Ordinances Parking requirements can be adjusted for factors such as availability of transit, a mix of land uses, or pedestrian-oriented development that may reduce the need for on-site parking. Encourages transit-oriented and mixed-use development.	<ul style="list-style-type: none"> • Increase walking, biking, or transit trips 	<ul style="list-style-type: none"> • Economic incentives used to encourage developer buy-in 	<ul style="list-style-type: none"> • Long-term: 10 or more years 	Practical
Parking Management Reduces the instance of free parking so as to encourage other modes of transportation. Options include reducing the minimum number of spaces required per development, increasing the share of parking spaces for HOVs, introducing or raising parking fees, providing cash-out options for employees not utilizing subsidized parking spaces, and expanding parking at transit stations or park-and-ride lots.	<ul style="list-style-type: none"> • Increase walking, biking, or transit trips • Decrease congestion 	<ul style="list-style-type: none"> • Administrative costs 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Practical
Public Transit Improvements				
Reduced Transit Fares Encourages additional transit use, to the extent that high fares are a real barrier to transit.	<ul style="list-style-type: none"> • Reduce daily VMT • Reduce congestion • Increase ridership 	<ul style="list-style-type: none"> • Loss in revenue per rider • Capital costs per passenger trip • Operating costs per passenger trip • Operating subsidies needed to replace lost fare revenue if increased ridership does not offset loss • Alternative financial arrangements need to be negotiated with donor agencies 	<ul style="list-style-type: none"> • Short-term: Less than 1 year 	Practical

Table B-1: Demand Management Strategies (continued)

Strategy	Congestion Impact	Implementation Costs	Implementation Time Frame	Local Practicality
Public Transit Improvements				
<p>Increased Bus Route Coverage or Frequencies Provides better accessibility to transit to a greater share of the population. Increasing frequency makes transit more attractive to use.</p>	<ul style="list-style-type: none"> • Increase ridership • Decrease travel times • Reduce VMT 	<ul style="list-style-type: none"> • Capital costs per passenger trip • Operating costs per passenger trip • New bus purchase likely 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years (includes planning, engineering, and implementation) 	Very Practical
<p>Real-Time Information on Transit Routes Provides real-time information on bus progress either at bus stops, terminals, and/or personal wireless devices.</p>	<ul style="list-style-type: none"> • Increase ridership • Decrease travel times 	<ul style="list-style-type: none"> • Design and implementation costs vary • Operating and maintenance costs vary 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Very Practical
<p>Premium Transit Best serves dense urban centers where travelers can walk to their destinations. Premium transit from suburban areas can sometimes be enhanced by providing park-and-ride lots.</p>	<ul style="list-style-type: none"> • Reduce VMT 	<ul style="list-style-type: none"> • New systems require large up-front capital outlays and ongoing sources of operating subsidies 	<ul style="list-style-type: none"> • Long-term: 10 or more years (includes planning, engineering, and construction) 	Practical
<p>Hard Shoulder Running for Transit Vehicles Allows the use of the shoulder for transit vehicles during congested periods. By coupling this strategy with others that encourage transit use, the strategy can encourage drivers to switch to transit use.</p>	<ul style="list-style-type: none"> • Increase transit trips • Decrease congestion 	<ul style="list-style-type: none"> • May require shoulder paving, signage, striping, and construction of refuge spots 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Practical
<p>Transit Capacity Expansion: This strategy adds new vehicles to expand transit services.</p>	<ul style="list-style-type: none"> • Increase ridership • Decrease single occupancy vehicle trips 	<ul style="list-style-type: none"> • Capital costs for new bus purchases 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Very Practical
<p>Provide Exclusive Bus Right-Of-Way Exclusive right-of-way includes bus ways, bus-only lanes, and bus bypass ramps. This strategy is applied to freeways and major highways that have routes with high ridership.</p>	<ul style="list-style-type: none"> • Increase mobility • Reduce congestion by improving bottlenecks • Increase traffic flow 	<ul style="list-style-type: none"> • Capital costs vary depending on whether a new land is added or an old lane is redesignated 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Practical

Table B-1: Demand Management Strategies (continued)

Strategy	Congestion Impact	Implementation Costs	Implementation Time Frame	Local Practicality
Bicycle/Pedestrian/Trail				
<p>New Sidewalk Connections Encourages pedestrian traffic for short trips.</p>	<ul style="list-style-type: none"> • Increase mobility and access • Discourage motor vehicle use for short trips • Increase non-motorized mode share 	<ul style="list-style-type: none"> • Construction costs for sidewalks 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years (includes planning, engineering, and implementation) 	Very Practical
<p>Designated Bicycle Lanes on Local Streets Enhancing the visibility of bicycle facilities increases the perception of safety. In many cases, bicycle lanes can be added to existing roadways through restriping.</p>	<ul style="list-style-type: none"> • Increase mobility and access • Increase non-motorized mode share • Separate slow-moving bicycles from motorized vehicles • Reduce vehicle and bicycle accidents 	<ul style="list-style-type: none"> • Design and construction costs for paving, striping, signals, and signage • ROW costs if widening necessary • Bicycle lanes may require improvements to roadway shoulders to ensure acceptable pavement quality 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years (includes planning, engineering, and implementation) 	Very Practical
<p>Improved Bicycle Facilities at Transit Stations and Other Trip Destinations Bicycle racks and bike lockers at transit stations and other trip destinations increase security. Additional amenities such as locker rooms with showers at workplaces provide further incentives for using bicycles.</p>	<ul style="list-style-type: none"> • Increase non-motorized mode share 	<ul style="list-style-type: none"> • Capital and maintenance costs for bicycle racks, lockers, and locker rooms 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years (includes planning, engineering, and implementation) 	Very Practical
<p>Improved Safety of Existing Bicycle and Pedestrian Facilities Maintaining lighting, signage, striping, traffic control devices, and pavement quality, and installing curb cuts, curb extensions, median refuges, and raised crosswalks can increase bicycle and pedestrian safety.</p>	<ul style="list-style-type: none"> • Increase non-motorized mode share • Reduce vehicle and bicycle/pedestrian accidents 	<ul style="list-style-type: none"> • Increased monitoring and maintenance costs • Capital costs of sidewalk improvements and additional traffic control devices 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Very Practical

Table B-1: Demand Management Strategies (continued)

Strategy	Congestion Impact	Implementation Costs	Implementation Time Frame	Local Practicality
Bicycle/Pedestrian/Trail				
<p>Exclusive Non-Motorized ROW Abandoned rail rights-of-way and existing parkland can be used for medium- to long-distance bike trails, improving safety, and reducing travel times.</p>	<ul style="list-style-type: none"> • Improve mobility • Increase non-motorized mode share • Reduce VMT • Separate slow-moving bicycles from motorized vehicles • Reduce vehicle and bicycle accidents 	<ul style="list-style-type: none"> • ROW costs • Construction and engineering costs • Maintenance costs 	<ul style="list-style-type: none"> • Medium-term: 5 to 10 years (includes planning, engineering, and implementation) 	Practical
Land Use/Growth Management				
<p>Design Guidelines for Pedestrian-Oriented Development Maximum block lengths, building setback restrictions, and streetscape enhancements are examples of design guidelines that can be codified in zoning ordinances to encourage pedestrian activity</p>	<ul style="list-style-type: none"> • Increase non-motorized mode share • Decrease SOV trips • Reduce VMT 	<ul style="list-style-type: none"> • Capital costs largely borne by private sector; developer incentives may be necessary • Public sector may be responsible for some capital and/or maintenance costs associated with ROW improvements 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Practical
<p>Mixed-Use Development Allows many trips to be made without automobiles. People can walk to restaurants and services rather than use their vehicles.</p>	<ul style="list-style-type: none"> • Increase walking, biking, or transit trips • Decrease SOV trips • Decrease in VMT 	<ul style="list-style-type: none"> • Public costs to set up and monitor appropriate ordinances • Economic incentives used to encourage developer buy-in 	<ul style="list-style-type: none"> • Long-term: 10 or more years 	Practical

Table B-1: Demand Management Strategies (continued)

Strategy	Congestion Impact	Implementation Costs	Implementation Time Frame	Local Practicality
Land Use/Growth Management				
<p>Infill and Densification Takes advantage of infrastructure that already exists, rather than building new infrastructure on the fringes of the urban area.</p>	<ul style="list-style-type: none"> • Increase walking, biking, or transit trips • Decrease SOV trips • Decrease in VMT 	<ul style="list-style-type: none"> • Public costs to set up and monitor appropriate ordinances • Economic incentives used to encourage developer buy-in 	<ul style="list-style-type: none"> • Long-term: 10 or more years 	Practical
<p>Transit-Oriented Development Clusters housing units and/or businesses near transit stations in walkable communities.</p>	<ul style="list-style-type: none"> • Increase walking, biking, or transit trips • Decrease SOV trips • Decrease in VMT 	<ul style="list-style-type: none"> • Public costs to set up and monitor appropriate ordinances • Economic incentives used to encourage developer buy-in 	<ul style="list-style-type: none"> • Long-term: 10 or more years 	Practical
<p>Negotiated Demand Management Agreements As a condition of development approval, local governments require the private sector to contribute to traffic mitigation agreements. The agreements typically set a traffic reduction goal (often expressed as a minimum level of ridesharing participation or a stipulated reduction in the number of automobile trips).</p>	<ul style="list-style-type: none"> • Decrease vehicle trips • Increase carpooling and vanpooling 	<ul style="list-style-type: none"> • Implementation costs vary depending upon level of reduction required and are primarily borne by private sector 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Practical
<p>Trip Reduction Ordinance Use a locality's regulatory authority to limit trip generation from a development. Spread the burden of reducing trip generation among existing and future developments better than Negotiated Demand Management Agreements.</p>	<ul style="list-style-type: none"> • Decrease vehicle trips • Increase carpooling and vanpooling 	<ul style="list-style-type: none"> • Implementation costs vary depending upon level of reduction required and are primarily borne by private sector 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Practical

Table B-2: Operational Management Strategies

Strategy	Congestion Impact	Implementation Costs	Implementation Time Frame	Local Practicality
ITS & Transportation Systems Management				
<p>Ramp Metering Uses a signal at the point where the ramp meets the freeway, which regulates the rate and spacing of traffic entering the freeway based on actual conditions; allows freeways to operate at their optimal flow rates, thereby speeding travel and reducing accidents.</p>	<ul style="list-style-type: none"> • Decrease travel times • Reduce accidents • Improve traffic flow on major facilities 	<ul style="list-style-type: none"> • Operating and maintenance costs • Significant costs associated with enhancements to centralized control system • Capital costs include up to \$50,000 per meter, costs for sensors, and communication equipment 	<ul style="list-style-type: none"> • Medium-term: 5 to 10 years 	Not Practical
<p>Traffic Signal Coordination Signals can be pre-timed and isolated, pre-timed and synchronized, actuated by events such as the arrival of a vehicle, pedestrian, bus or emergency vehicle, set to adopt one of several pre-defined phasing plans based on current traffic conditions, or set to calculate an optimal phasing plan based on current conditions.</p>	<ul style="list-style-type: none"> • Improve travel time • Reduce number of stops • Reduce VMT 	<ul style="list-style-type: none"> • Capital investment can vary from \$2,000 to over \$100,000 per signal • Operating and maintenance costs per signal 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Very Practical
<p>Intermodal Enhancements Coordinating modes to make movement from one mode to the other easier. Can include schedule modification to reduce layover time or increase the opportunity for transfers, creation of multi-modal facilities, informational kiosks, and improved amenities at transfer locations.</p>	<ul style="list-style-type: none"> • Improve travel time • Increase the use of alternative mode split 	<ul style="list-style-type: none"> • Capital investment can vary depending upon improvement 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Practical
<p>Reversible Traffic Lanes Lane traffic changes direction depending upon time or day or special events. Direction of flow may be established using signals, signage, or pavement markings. Appropriate where traffic flow is highly directional. This type of routing is often used on bridges and tunnels where adding lanes can be expensive or impossible.</p>	<ul style="list-style-type: none"> • Increase peak direction capacity • Decrease peak travel times • Improve mobility 	<ul style="list-style-type: none"> • Capital costs can be relatively small when compared to adding lanes. • Barrier separated costs • Maintenance costs vary 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Not Practical
<p>Goods Movement Management Restricts delivery or pickup of goods in certain areas so as to reduce congestion.</p>	<ul style="list-style-type: none"> • Decrease congestion 	<ul style="list-style-type: none"> • Administrative costs 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Practical

Table B-2: Operational Management Strategies (continued)

Strategy	Congestion Impact	Implementation Costs	Implementation Time Frame	Local Practicality
ITS & Transportation Systems Management				
Dynamic Messaging Uses changeable message signs to warn motorists of downstream queues, provides travel time estimates, provides alternate route information, and provides information on special events, weather, or accidents.	<ul style="list-style-type: none"> • Effective at decreasing non-recurrent congestion 	<ul style="list-style-type: none"> • Dynamic signs can run between \$75,000 and \$250,000 each plus wiring, sensors, and cameras 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Very Practical
Highway Information System Provide travelers with real-time information that can be used to make trip and route choice decisions.	<ul style="list-style-type: none"> • Reduce travel times and delay • Some peak-period travel shift 	<ul style="list-style-type: none"> • Design and implementation costs variable • Operating and maintenance costs variable 	<ul style="list-style-type: none"> • Medium-term: 5 to 10 years 	Very Practical
Advanced Traveler Information Systems Provides an extensive amount of data to travelers, such as real time speed estimates on the web or over wireless devices, and transit vehicle schedule progress. It also provides information on alternative route options.	<ul style="list-style-type: none"> • Reduce travel times and delay • Some peak-period travel shift 	<ul style="list-style-type: none"> • Design and implementation costs variable • Operating and maintenance costs variable 	<ul style="list-style-type: none"> • Medium-term: 5 to 10 years 	Very Practical
Integrated Corridor Management (ICM) This strategy, built on an ITS platform, provides for the coordination of the individual network operations between parallel facilities creating an interconnected system. A coordinated effort between networks along a corridor can effectively manage the total capacity in a way that will result in reduced congestion.	<ul style="list-style-type: none"> • Very effective at decreasing recurrent congestion 	<ul style="list-style-type: none"> • Design and implementation costs variable 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Practical
Transit Signal Priority (TSP) This strategy uses technology located onboard transit vehicles or at signalized intersections to temporarily extend green time, allowing the transit vehicle to proceed without stopping at a red light.	<ul style="list-style-type: none"> • Significantly reduce transit travel times and delay 	<ul style="list-style-type: none"> • Cost of technology improvements 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Practical
Multilingual Communication Implementing the use of multilingual marketing materials will help reach populations that might not otherwise get the message.	<ul style="list-style-type: none"> • Increase walking, biking, or transit trips 	<ul style="list-style-type: none"> • Varies depending on extent of educational or marketing campaign 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Practical
Channelization This strategy is used to optimize the flow of traffic for making left or right turns usually using concrete islands or pavement markings.	<ul style="list-style-type: none"> • Reduce travel times and delay 	<ul style="list-style-type: none"> • Design/construction costs variable • Maintenance costs variable 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Practical
Intersection Improvements Intersections can be widened and lanes restriped to increase intersection capacity and safety. This may include auxiliary turn lanes (right or left) and widened shoulders.		<ul style="list-style-type: none"> • Design and construction costs variable 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Practical

Table B-2: Operational Management Strategies (continued)

Strategy	Congestion Impact	Implementation Costs	Implementation Time Frame	Local Practicality
ITS & Transportation Systems Management				
<p>Bottleneck Removal This strategy removes or corrects short, isolated, and temporary lane reductions, substandard design elements, and other physical limitations that form a capacity constraint that results in a traffic bottleneck.</p>	<ul style="list-style-type: none"> • Reduce travel time • Very effective at decreasing recurrent congestion 	<ul style="list-style-type: none"> • Capital costs variable and may be substantial 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Practical
<p>Vehicle Use Limitations and Restrictions This strategy includes all-day or selected time-of-day restrictions of vehicles, typically trucks, to increase roadway capacity.</p>	<ul style="list-style-type: none"> • Reduce travel time • Reduce accidents • Improve traffic flow on major facilities 	<ul style="list-style-type: none"> • Administrative costs 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Practical
<p>Geometric Improvements for Transit Service Includes providing for transit sites that do not affect the flow of traffic but improved sight lines, and improve merging and diverging of buses and cars.</p>	<ul style="list-style-type: none"> • Increase mobility • Reduce congestion by improving bottlenecks • Increase traffic flow • Improve safety 	<ul style="list-style-type: none"> • Costs vary by type of design 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Practical
<p>Improved Signage Improving or removing signage to clearly communicate location and direction information can improve traffic flow.</p>	<ul style="list-style-type: none"> • Reduce travel time • Improve traffic flow on major facilities 	<ul style="list-style-type: none"> • Capital and maintenance costs 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Practical

Table B-2: Operational Management Strategies (continued)

Strategy	Congestion Impact	Implementation Costs	Implementation Time Frame	Local Practicality
Incident Management				
<p>Freeway Incident Detection and Management Systems Effective way to alleviate non-recurring congestion. Systems typically include video monitoring, dispatch systems, and sometimes roving service patrol vehicles.</p>	<ul style="list-style-type: none"> • Reduce accident delay • Reduce travel time • Reduce VHT and PHT 	<ul style="list-style-type: none"> • Capital costs variable and substantial • Annual operating and maintenance costs 	<ul style="list-style-type: none"> • Medium-term: 5 to 10 years 	Very Practical
Access Management				
<p>Access Management Policies This strategy includes adoption of policies to regulate driveways and limit curb cuts and/or policies that require continuity of sidewalk, bicycle, and trail networks.</p>	<ul style="list-style-type: none"> • Increase walking, biking, or transit trips 	<ul style="list-style-type: none"> • Administrative costs 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Very Practical
Corridor Preservation/Management				
<p>Corridor Preservation This strategy includes implementing, where applicable, land acquisition techniques such as full title purchases of future rights of way and purchase of easements to plan proactively in anticipation of future roadway capacity demands.</p>	<ul style="list-style-type: none"> • Significant benefits to reduce future congestion through careful planning 	<ul style="list-style-type: none"> • Significant land acquisition costs 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Practical
<p>Corridor Management Applicable mostly in moderate to high density areas, this includes strategies to manage corridor rights-of-way. The strategies range from land-use regulations to landowner agreements such as subdivision reservations, which are mandatory dedications of portions of subdivided lots that lie in the future right-of-way.</p>	<ul style="list-style-type: none"> • Significant benefits to reduce future congestion through careful planning 	<ul style="list-style-type: none"> • Mostly administrative costs 	<ul style="list-style-type: none"> • Short-term: 1 to 5 years 	Practical
Capacity Increases				
<p>Highway Widening by Adding Lanes Increase the capacity of congested roadways through additional general purpose travel lanes</p>	<ul style="list-style-type: none"> • Increase capacity, reducing congestion in the short term • Long-term effects on congestion depend on local conditions 	<ul style="list-style-type: none"> • Costs vary by type of highway constructed; dense urban areas can be very expensive • Can create environmental and community impacts 	<ul style="list-style-type: none"> • Long-term: 10 or more years (includes planning, engineering, and construction) 	Practical

