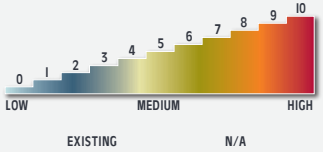
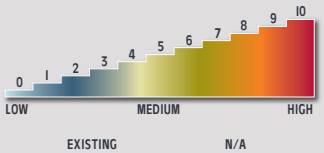
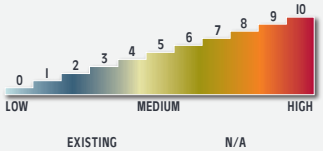
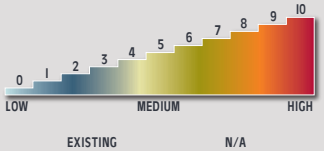
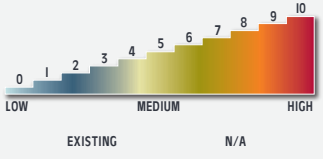
Appendix D: Congestion Management Strategies Matrix

Congestion Management Process Plan

Corridor _____ From _____ To _____ Analyst _____ Date _____

Category	Implementation Time Frame	Congestion Mitigation Strategy	Distribution of Trip Types: Regional Traffic	Regional Access	Local Access	Local Circulation	Potential Effectiveness	Recommendations/ Comments
CATEGORY 1: Strategies to Reduce Vehicle Miles Traveled	Long	**1.01 Congestion Pricing (MnPASS):** 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.						
	Short	**1.02 Alternative Work Hours:** There are three main variations: staggered hours, flex-time, and compressed work weeks. Staggered hours require employees in different work groups to start at different times 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.						
	Short	**1.03 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.						
	Short	**1.04 Guaranteed Ride Home Programs:** These 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.						
	Short	**1.05 Alternative Mode Marketing and Education:** Providing education on alternative modes of transportation can be an effective way of increasing demand for alternative modes. This strategy can include mapping Websites that compute directions and travel times for multiple modes of travel.						

Congestion Management Process Plan

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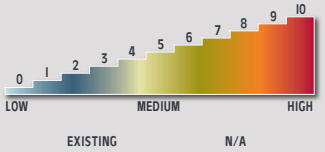
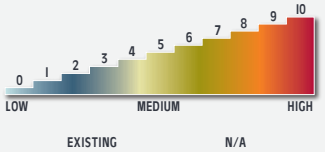
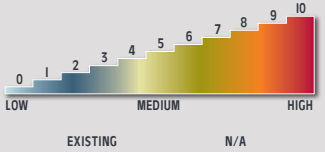
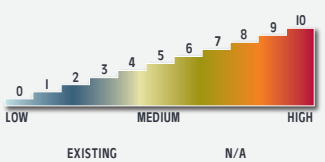
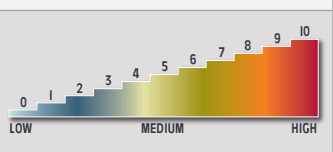
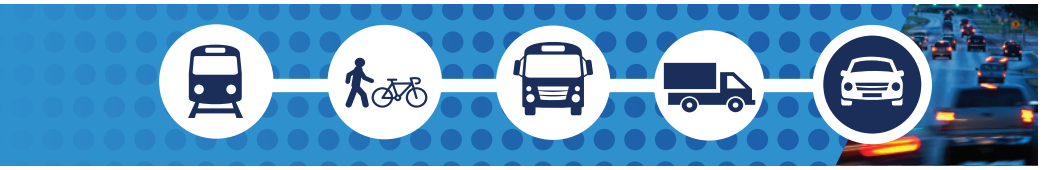
CATEGORY 1: Strategies to Reduce Vehicle Miles Traveled	Short	**1.06 Safe Routes to Schools Program:** This federally-funded program provides 100 percent funding to communities to invest in pedestrian and bicycle infrastructure surrounding schools.						
	Short	**1.07 Preferential or Free Parking for HOVs:** This program provides an incentive for employees to carpool with preferred of free-of-charge parking for HOVs.						
	Short	**1.08 Event Transportation Management Plans:** Cities develop multimodal transportation management plans to identify and communicate transportation options to participants.						
	Short	**1.09 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).						
	Short	**1.10 Trip Reduction Ordinance:** These ordinances use a locality's regulatory authority to limit trip generation from a development. They spread the burden of reducing trip generation among existing and future developments better than Negotiated Demand Management Agreements.						

Congestion Management Process Plan



Category	Implementation Time Frame	Congestion Mitigation Strategy	Distribution of Trip Types: Regional Traffic	Regional Access	Local Access	Local Circulation	Potential Effectiveness	Recommendations/ Comments
CATEGORY 1: Strategies to Reduce Vehicle Miles Traveled	Long	**1.11 Infill Developments:** This strategy takes advantage of infrastructure that already exists, rather than building new infrastructure on the fringes of the urban area.					0 1 2 3 4 5 6 7 8 9 10 LOW MEDIUM HIGH EXISTING N/A	
	Long	**1.12 Transit Oriented Developments:** This strategy clusters housing units and/or businesses near transit stations in walkable communities. By providing convenient access to alternative modes, auto dependence can be reduced.					0 1 2 3 4 5 6 7 8 9 10 LOW MEDIUM HIGH EXISTING N/A	
	Long	**1.13 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.					0 1 2 3 4 5 6 7 8 9 10 LOW MEDIUM HIGH EXISTING N/A	
	Long	**1.14 Mixed-Use Development:** This strategy allows many trips to be made without automobiles. People can walk to restaurants and services rather than use their vehicles.					0 1 2 3 4 5 6 7 8 9 10 LOW MEDIUM HIGH EXISTING N/A	
	Long	**1.15 Long-Range Comprehensive Land Use Planning:** This strategy supports cities, counties, and the region in identifying and planning for population, household, and employment changes and their impacts on land use, transportation, other infrastructure, and natural resources.					0 1 2 3 4 5 6 7 8 9 10 LOW MEDIUM HIGH EXISTING N/A	

Congestion Management Process Plan

Category	Implementation Time Frame	Congestion Mitigation Strategy	Distribution of Trip Types: Regional Traffic	Regional Access	Local Access	Local Circulation	Potential Effectiveness	Recommendations/ Comments
CATEGORY 2: Strategies to Shift Automobile Trips to Other Modes	Short	**2.01 Transit Capacity Expansion:** This strategy adds new vehicles to expand transit services.					LOW – MEDIUM – HIGH; EXISTING – N/A	
	Short/Long	**2.02 Increasing Bus Route Coverage and/or Frequencies:** This strategy provides better accessibility to transit to a greater share of the population. Increasing frequency makes transit more attractive to use.					LOW – MEDIUM – HIGH; EXISTING – N/A	
	Long	**2.03 Implementing Regional Transitways:** Bus rapid transit (BRT), and light rail transit (LRT) best serves dense urban centers where travelers can walk to their destinations. Transitways from suburban areas can sometimes be enhanced by providing park-and-ride lots.					LOW – MEDIUM – HIGH; EXISTING – N/A	
	Short	**2.04 Providing Real-Time Information on Transit Routes:** Providing real-time information on transit progress either at bus stops, terminals, transit stations and/or personal wireless devices makes intermodal travel more attractive.					LOW – MEDIUM – HIGH; EXISTING – N/A	
	Long	**2.05 Reducing Transit Fares:** This strategy encourages additional transit use, to the extent that high fares are a real barrier to transit. However, due to the direct financial impact on the transit system operating budgets, reductions in selected fare categories may be a more feasible strategy to implement.					LOW – MEDIUM – HIGH; EXISTING – N/A	
	Long	**2.06 Provide Transit Advantages:** Transit advantages on the street and highway system support reliable transit service. Strategies include exclusive right-of-way, bus-only lanes, bus-only shoulders, and bus bypass ramps.					LOW – MEDIUM – HIGH; EXISTING – N/A	

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CATEGORY 2: Strategies to Shift Automobile Trips to Other Modes	Short	**2.07 Provide Transit Signal Priority:** Transit signal priority can move high-frequency buses through congested intersections and create more reliable transit travel times.					LOW MEDIUM HIGH; EXISTING N/A	
	Long	**2.08 Encourage off-board fare collection:** To yield more reliable transit travel times, encourage off-board fare collection at arterial BRT stops and at the busiest transit boarding locations.					LOW MEDIUM HIGH; EXISTING N/A	
	Short	**2.09 The continued monitoring of local freight volumes and the location of major freight generators allows transportation authorities to respond to freight congestion with appropriate policies and projects.**					LOW MEDIUM HIGH; EXISTING N/A	
	Short/Long	**2.10 New Sidewalk Connections:** Increasing sidewalk connectivity encourages pedestrian traffic for short trips.					LOW MEDIUM HIGH; EXISTING N/A	
	Short	**2.11 Enhanced Pedestrian Crossings:** Transit benefits from quality and connected pedestrian infrastructure. Visibly marked crosswalks can make the pedestrian street crossing experience more pleasant and noticeable, which could increase transit service ridership.					LOW MEDIUM HIGH; EXISTING N/A	
	Short/Long	**2.12 Designated Bicycle Facilities on Local Streets:** Enhancing the visibility of bicycle facilities can increase the perception of safety. In many cases, bicycle lanes can be added to existing roadways through restriping.					LOW MEDIUM HIGH; EXISTING N/A	

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CATEGORY 2: Strategies to Shift Automobile Trips to Other Modes	Short	**2.13 Improved Bicycle Facilities at Transit Stations and Other Trip Destinations:** Bicycle racks and bicycle 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.					0 1 2 3 4 5 6 7 8 9 10 LOW MEDIUM HIGH EXISTING N/A	
	Short	**2.14 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.					0 1 2 3 4 5 6 7 8 9 10 LOW MEDIUM HIGH EXISTING N/A	
	Long	**2.15 Exclusive Non-Motorized ROW:** Abandoned rail rights-of-way and existing parkland can be used for medium- to long-distance bicycle trails, improving safety and reducing travel times.					0 1 2 3 4 5 6 7 8 9 10 LOW MEDIUM HIGH EXISTING N/A	
	Long	**2.16 Complete Streets:** Design and operate the entire right-of-way for the most vulnerable users. Safe access for all users including pedestrians, bicyclists, motorists, and transit may lead to fewer crashes and lower levels of delay systemwide.					0 1 2 3 4 5 6 7 8 9 10 LOW MEDIUM HIGH EXISTING N/A	
	Long	**2.17 Preservation Projects with Multimodal Improvements:** This strategy includes scoping pavement, bridge, and infrastructure preservation projects to identify the needs of all applicable travel modes when developing and constructing to address each mode's needs and incorporate multiple congestion management strategies into a single project.					0 1 2 3 4 5 6 7 8 9 10 LOW MEDIUM HIGH EXISTING N/A	
	Long	**2.18 Park-and-Ride Lots:** These lots can be used in conjunction with HOV/HOT lanes, express bus services, and transitways. They are particularly helpful when coupled with other commute alternatives such as carpool/vanpool programs, transit, and/or HOV/HOT lanes. The lots may be publicly owned or a public-private partnership.					0 1 2 3 4 5 6 7 8 9 10 LOW MEDIUM HIGH EXISTING N/A	

Category	Implementation Time Frame	Congestion Mitigation Strategy	Distribution of Trip Types: Regional Traffic	Regional Access	Local Access	Local Circulation	Potential Effectiveness	Recommendations/ Comments
CATEGORY 3: Strategies to Increase Vehicle Occupancy	Short	**3.01 Ridesharing (Carpools & Vanpools):** In ridesharing programs, participants are matched with potential candidates for sharing rides. This typically is arranged/encouraged through employers or transportation management agencies that provide ride-matching services. These programs are more effective if combined with HOV lanes, parking management, guaranteed ride home policies, and employer-based incentive programs.					0 1 2 3 4 5 6 7 8 9 10 LOW MEDIUM HIGH EXISTING N/A	
	Short/Long	**3.02 Employer-Landlord Parking Agreements:** Employers can negotiate leases so that they pay only for parking 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.					0 1 2 3 4 5 6 7 8 9 10 LOW MEDIUM HIGH EXISTING N/A	
	Long	**3.03 Parking Management:** This strategy reduces the instance of free parking to encourage other modes of transportation. Options include reducing the minimum number of parking spaces required per development, increasing the share of parking spaces for HOVs, introducing or raising parking fees, providing cash-out options for employees not using subsidized parking spaces, and expanding parking at transit stations or park- and-ride lots.					0 1 2 3 4 5 6 7 8 9 10 LOW MEDIUM HIGH EXISTING N/A	

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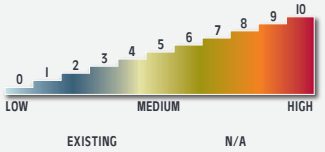
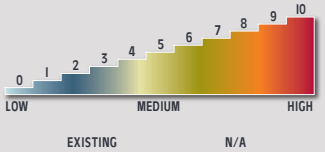
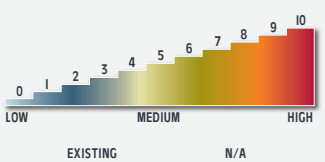
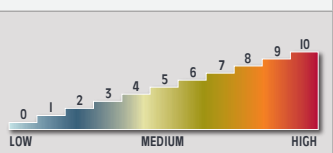
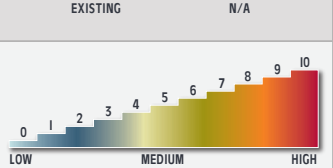
Category	Implementation Time Frame	Congestion Mitigation Strategy	Distribution of Trip Types: Regional Traffic	Regional Access	Local Access	Local Circulation	Potential Effectiveness	Recommendations/ Comments
CATEGORY 4: Strategies to Improve Roadway Operations	**Short/Long**	**4.01 Dynamic Messaging:** Dynamic messaging uses changeable message signs to warn motorists of downstream queues; it provides travel time estimates, alternate route information, and information on special events, weather, or accidents.						
	Short/Long	**4.02 Advanced Traveler Information Systems (ATIS):** ATIS provide 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.						
	Long	**4.03 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.						
	Long	**4.04 Automated and Connected Vehicles:** Automated vehicles could have a profound impact on congestion mitigation by optimizing platooning and the capacity of the street network. This strategy recommends being proactive with policy on automated and connected vehicles such that implementation is not preemptive and policy is not reactionary.						
	Short/Long	**4.05 Advanced Traffic Management System (ATMS):** This strategy uses real-time information to improve traffic flow. A few methods that could be utilized to improve traffic flow based on ATMS information are re-routing of traffic, dynamic messaging, or signal timing adjustments.						

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CATEGORY 4: Strategies to Improve Roadway Operations	Short/Long	**4.06 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.					0 1 2 3 4 5 6 7 8 9 10 LOW MEDIUM HIGH EXISTING N/A	
	Long	**4.07 Bottleneck Relief:** This strategy corrects short, isolated, and temporary lane reductions, substandard design elements, and other physical limitations that form a capacity constraint and results in a traffic bottleneck.					0 1 2 3 4 5 6 7 8 9 10 LOW MEDIUM HIGH EXISTING N/A	
	Long	**4.08 Changeable Lane Assignment/Dynamic Lane Control:** This policy encourages creative lane distribution to increase capacity and improve traffic flow. This strategy includes reversible flow lanes and movable median barriers, which add capacity during peak periods.					0 1 2 3 4 5 6 7 8 9 10 LOW MEDIUM HIGH EXISTING N/A	
	Long	**4.09 Vehicle Use Limitations and Restrictions:** This strategy includes all-day or selected time-of-day restrictions of vehicles, typically trucks, to increase roadway capacity.					0 1 2 3 4 5 6 7 8 9 10 LOW MEDIUM HIGH EXISTING N/A	
	Short	**4.10 Improved Signage:** Improving or removing signage to clearly communicate location and direction information can improve traffic flow.					0 1 2 3 4 5 6 7 8 9 10 LOW MEDIUM HIGH EXISTING N/A	
	Short	**4.11 Geometric Improvements for Transit:** This strategy includes providing for transit stop locations that do not affect the flow of traffic, improve sight lines, and improve merging and diverging of buses and cars.					0 1 2 3 4 5 6 7 8 9 10 LOW MEDIUM HIGH EXISTING N/A	

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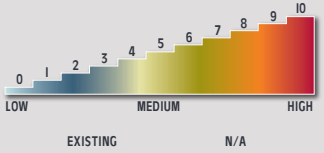
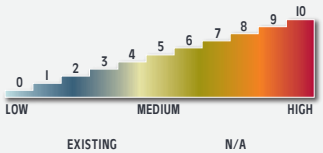
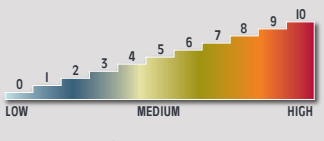
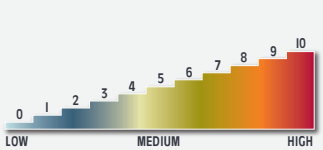
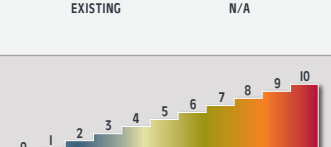
CATEGORY 4: Strategies to Improve Roadway Operations	Long	**4.12 Intermodal Enhancements:** Coordinating modes makes movement from one mode to the other easier. These enhancements typically include schedule modification to reduce layover time or increase the opportunity for transfers, creation of multimodal facilities, informational kiosks, and improved amenities at transfer locations. These improvements can apply improve the freight and pedestrian experience.						
	Short	**4.13 Goods Movement Management:** This strategy restricts delivery or pickup of goods in certain areas or during certain times to reduce congestion.						
	Short	**4.14 Towing Improvements:** Implementing a zero-tolerance policy for towing on metro freeways and in construction zones on non-freeway arterials will reduce turbulence and lead to more reliable thoroughfares.						
	Short/Long	**4.15 Shared Mobility:** Shared mobility implementation has the opportunity to create a more balanced and cost-effective transit network where the lowest ridership demand areas are served by transportation network companies (TNCs) in lieu of on-demand dial-a-ride. This strategy highlights the potential to partner with private TNCs, such as Uber, Lyft, or Via Transportation, in creating policies and services for shared mobility.						
	Short/Long	**4.16 Ramp Metering:** This strategy reinforces ramp metering to reduce the congestion impact from merging.						

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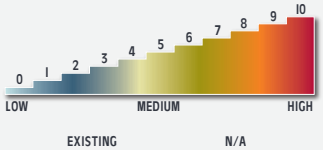
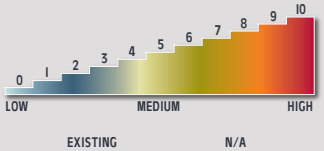
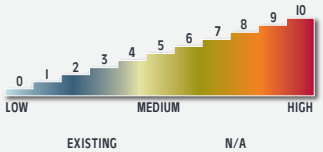
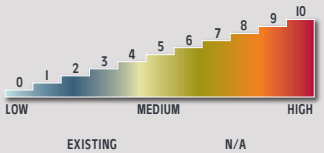
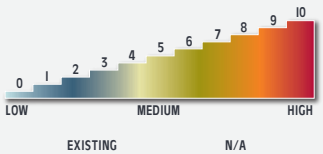
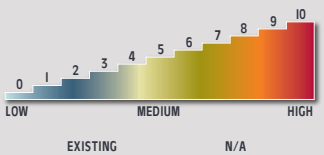
CATEGORY 4: Strategies to Improve Roadway Operations	Long	**4.17 Freeway auxiliary lanes that are shorter than one-mile:** This strategy recommends adding auxiliary lanes to help drivers merge into freeway traffic more efficiently, increasing safety and lessening congestion impacts.						
	Long	**4.18 Ramp modifications:** This strategy reinforces ramp modifications to reduce the congestion impact from merging or diverging traffic.						
	Long	**4.19 Interchange removal:** This strategy supports the removal of urban interchanges when feasible and when the removal would support other congestion mitigation efforts, such as reducing turbulence and maintenance cost.						
	Short/Long	**4.20 Signal Timing:** Adjust the signal timing through the corridor to reflect current volumes, travel patterns, and to relieve congestion.						
	Short	**4.21 Parking Restrictions:** This strategy is used to convert parking lanes to travel lanes during peak periods. Parking signs can be used to notify vehicles to not park in certain areas during peak periods to add capacity to the roadway.						
	Short	**4.22 One-Way Conversions:** Converting streets from two-way to one-way at strategic locations can increase traffic flow, offer improved signal timing, and accommodate odd-spaced signals. Additionally, one-way conversions can simplify crossings for pedestrians, who must look for traffic in only one direction.						

Category	Implementation Time Frame	Congestion Mitigation Strategy	Distribution of Trip Types: Regional Traffic	Regional Access	Local Access	Local Circulation	Potential Effectiveness	Recommendations/ Comments
CATEGORY 4: Strategies to Improve Roadway Operations	Long	**4.23 Network Management:** This strategy encourages the use of alternative, uncongested intersections to reduce congestion at key intersections and improve safety.					0 1 2 3 4 5 6 7 8 9 10 LOW MEDIUM HIGH EXISTING N/A	
	Long	**4.24 Superstreet Corridors:** This strategy uses superstreet corridors to improve suburban and ex-urban mobility by delivering two-way progression, reducing intersection size, and improving bus travel time and reliability.					0 1 2 3 4 5 6 7 8 9 10 LOW MEDIUM HIGH EXISTING N/A	
	Long	**4.25 Alternative Intersection Design:** This strategy encourages untraditional solutions, such as superstreet and non-freeway interchange types like single loop interchanges, quadrant roads, High T intersection, and elevated left turns.					0 1 2 3 4 5 6 7 8 9 10 LOW MEDIUM HIGH EXISTING N/A	
	Short	**4.26 Snow Removal:** This strategy involves ensuring that snow is cleared from priority roadways and corridors during and after a snow event. Ensuring that snow removal is done consistently and efficiently will allow roadways to maintain capacity during a snow event.					0 1 2 3 4 5 6 7 8 9 10 LOW MEDIUM HIGH EXISTING N/A	
	Short	**4.27 Pavement and Bridge Deicing:** This strategy involves making sure there is a proper protocol in place to deice bridges and roadways during cold weather events. Snow or ice on roadways or bridges have potential to cause significant delay and crashes.					0 1 2 3 4 5 6 7 8 9 10 LOW MEDIUM HIGH EXISTING N/A	

Congestion Management Process Plan

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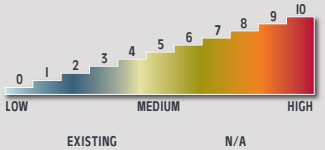
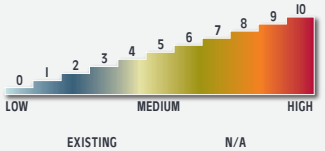
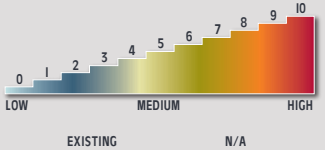
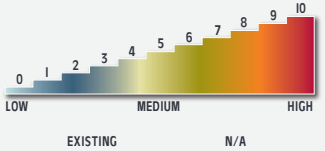
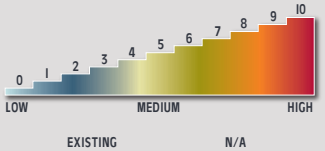
CATEGORY 4: Strategies to Improve Roadway Operations	Short/Long	**4.28 Incident Detection and Management Systems:** This strategy addresses primarily non-recurring congestion, typically includes video monitoring and dispatch systems, and may also include roving service patrol vehicles.						
	Short/Long	**4.29 Dynamic Access Changes:** This strategy uses closing interchanges, intersections, or restricting movements at interchanges and intersections in real-time to address congestion.						
	Long	**4.30 Access Management Policies:** This strategy includes adoption of policies to regulate driveways and limit curb cuts and/or policies that require continuity of pedestrian, bicycle, and trail facilities.						
	Long	**4.31 Coordinated Preservation Projects:** This strategy includes analyzing the locations of programmed transportation projects and avoiding simultaneous construction on parallel corridors that serve as alternate routes.						
	Short	**4.32 CMP Safety Mitigation:** The CMP process includes safety issues in the identification of congested corridors by making use of crash data produced by MnDOT. This system produces reports by crash type or cause, which can subsequently be used to identify safety issues on the major roadway network for both congested and non-congested roadways. Reducing the number of crashes that occur on major roadways can reduce nonrecurring congestion. While the delay incurred resulting from crashes cannot be determined easily, it is a significant contribution of delay on major roadways.						

Congestion Management Process Plan

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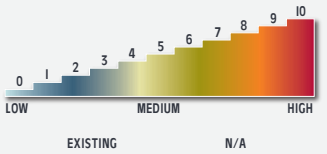
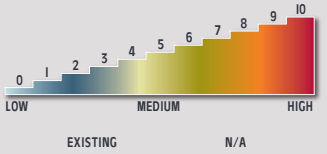
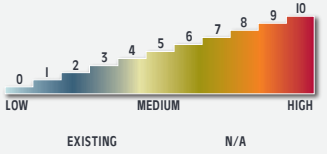
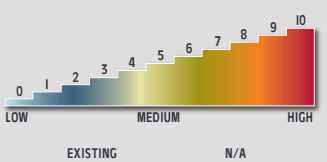
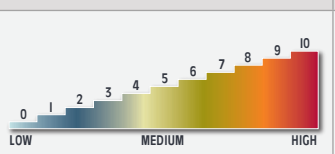
CATEGORY 5: Strategies to Add Capacity	Long	**5.01 Corridor Preservation:** This strategy includes implementing, where applicable, land acquisition techniques such as full title purchases of future rights-of-way and purchase of easements to plan proactively in anticipation of future roadway capacity demands.						
	Short/Long	**5.02 Turn Lanes:** This strategy is used to optimize the flow of traffic for making left or right turns usually using only concrete islands or pavement markings. Turn lanes increase capacity and improve operations by reducing queue distances and delays for both the through and turning movements.						
	Short/Long	**5.03 Reallocation of current right-of-way space:** Restriping to adjust the width, number, or directionality of lanes can add capacity in the direction or movement that is experiencing congestion.						
	Short	**5.04 Intersection Improvements:** Intersections can be widened and lanes restriped to increase intersection capacity and safety. This may include widened shoulders. Intersection geometry can be changed from a standard intersection to a continuous flow intersection, roundabout, reduced-conflict intersection, ¾ intersection with J-turns or partial interchanges.						
	Long	**5.05 High Occupancy Vehicle Lanes:** Adding new HOV lanes increases corridor capacity while, at the same time, providing an incentive for single-occupant drivers to shift to ridesharing. In the Twin Cities, we have converted our HOV lanes into MnPASS high occupancy toll (HOT) lanes where single-occupant vehicles pay tolls to use the facility while transit and vehicles with two or more occupants use the facility for free.						

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CATEGORY 5: Strategies to Add Capacity	Long	**5.06 Managed Lanes:** FHWA defines managed lanes as highway facilities or a set of lanes in which operational strategies are implemented and managed (in real time) in response to changing conditions. Examples of managed lanes may include high-occupancy toll (HOT) lanes with tolls that vary based on demand, exclusive bus-only lanes, truck 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.					0 1 2 3 4 5 6 7 8 9 10 LOW MEDIUM HIGH EXISTING N/A	
	Long	**5.07 Interchange configuration modifications:** Examples include hybrid interchanges and partial cloverleaf interchange modifications.					0 1 2 3 4 5 6 7 8 9 10 LOW MEDIUM HIGH EXISTING N/A	
	Long	**5.08 Additional General Purpose Lanes:** Increase the capacity of congested roadways through additional general-purpose travel lanes, including freeway auxiliary lanes that are longer than one-mile and converting signalized 4 lane arterials to 6 lane arterials.					0 1 2 3 4 5 6 7 8 9 10 LOW MEDIUM HIGH EXISTING N/A	
	Long	**5.09 Increase the capacity of the system through new roadway facilities:** Examples include local roads parallel to freeways, collector-distributor roads at freeway interchanges, and frontage roads.					0 1 2 3 4 5 6 7 8 9 10 LOW MEDIUM HIGH EXISTING N/A	