



**BALTIMORE
METROPOLITAN
COUNCIL**

Congestion Management Strategy Guide



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Introduction

The Baltimore Regional Transportation Board (BRTB), as the metropolitan planning organization (MPO) for the Baltimore region, is required to implement a Congestion Management Process (CMP) as part of its metropolitan transportation planning process. Rather than a stand-alone management system that simply collects and reports data on congestion, the CMP is intended to be an integral component of the transportation planning process.

The CMP should function as a systematic, regionally accepted approach to identify the causes of congestion and develop solutions to address congestion problems. By collecting accurate, up-to-date information on transportation system performance, analyzing the causes of congestion, providing clear objectives in managing congestion, and assessing strategies to meet those objectives, the CMP is intended to move potential solutions into the funding and implementation stages.

Since the CMP is intended as a regional process that is fully integrated into the metropolitan transportation planning process, development of the CMP should engage a wide array of stakeholders who play an important role in transportation planning and operations within the region. In fact, the CMP development offers an opportunity to engage a wide array of stakeholders at the state and local levels, as well as federal partners and private industry.

It also offers an opportunity to broaden the traditional partner focus to include system operators and staff who focus on Transportation Systems Maintenance and Operation (TSMO), including partners involved in intelligent transportation systems (ITS), demand management, and emergency management.

A CMP Steering Committee was convened for this project to provide input and guidance and serve as the main conduit for coordination with regional partners. The CMP Steering Committee is comprised of representatives from local planning, transportation, public works, and emergency management agencies as well as state and federal transportation agencies.

Using This Guide

This guide was developed to illustrate congestion management strategies for the Baltimore region to consider implementing to address identified congestion or mobility issues; the strategies support the regional CMP objectives. The guide organizes individual congestion management strategies into broad categories:

- Demand Management & Regional
- Pricing
- Land Use
- Transportation Systems Management Operations (TSMO)
- Public Transportation
- Bicycle/Pedestrian/Micro-Mobility
- Road Capacity








Under each category, individual congestion management strategies are described. Descriptions include examples of where the strategy has been implemented, an overview of facilities or contexts where the strategy may be applied, and which CMP objectives are addressed. Following the full list of strategies, each CMP objective is presented along with a list of applicable strategies, which may be used to help support selection of strategies to help address different types of congestion or mobility challenges.

CMP Objectives

As part of the CMP development, regional congestion management objectives were identified that support the regional goals and objectives. These objectives define what the region wants to achieve and are an essential part of an objectives-driven, performance-based approach that supports the regional transportation planning process.

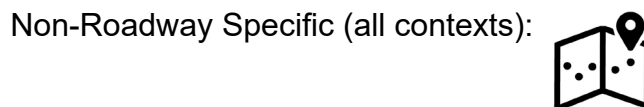
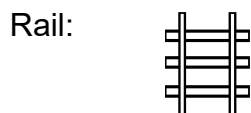
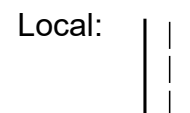
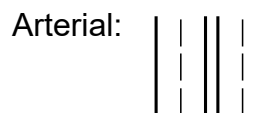
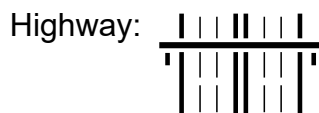
Congestion management objectives should draw from the regional vision and goals that are articulated in the metropolitan transportation plan. These objectives serve as a primary point of connection between the CMP and the metropolitan transportation plan and should reflect what the public and stakeholders value. The objectives also serve as a basis for defining performance measures to measure progress toward these objectives.

Congestion Management Objectives

	Enhance access to jobs and other opportunities
	Improve travel times and reduce traveler delay on all modes of travel
	Improve travel time reliability (consistency and predictability of travel times) and resiliency for motorists and transit
	Improve freight reliability
	Enhance travel choices , including access to transit, safe and convenient bicycling and walking, and other alternatives to driving alone
	Reduce traffic incidents that contribute to traveler delays and loss of life or injury
	Enhance inter-jurisdictional coordination to optimize transportation system performance

Applicability

The applicability identifies five options that provides context recommendations of where strategies may be applied. These options include highway, arterial, local, rail, and non-roadway specific. The intent is to identify the appropriate contexts for each strategy.



Strategies



Strategies								
Demand Management & Regional Strategies	Employee Outreach Programs	✓				✓		
	Commuter Benefits Policies	✓				✓		
	Parking Cash Out Policies	✓				✓		
	Regional Coordination							✓
Pricing Strategies	Value/Congestion Pricing		✓	✓			✓	
	Demand-Responsive Parking Pricing	✓	✓			✓		
	VMT Fees		✓					
Land Use Strategies	Land Use Controls	✓				✓		
	Growth Management	✓				✓		
	Transit-Oriented Developments	✓				✓		
	High-Density Development Incentives	✓				✓		
	Parking Management	✓				✓		
Transportation Systems Management & Operations Strategies (TSMO)	Incident Management		✓	✓			✓	
	Traffic Signal Coordination		✓	✓			✓	
	Adaptive Traffic Signals		✓	✓			✓	
	Adaptive Ramp Metering		✓	✓			✓	
	Active Traffic Management		✓	✓			✓	
	Real-Time Truck Parking Information				✓			
	Truck Weigh Technology				✓		✓	
	Reversible Commuter Lanes		✓	✓				
	Access Management		✓	✓			✓	
	Moveable Median Barriers		✓	✓			✓	
	Electronic Toll Collection		✓				✓	
	Hard Shoulder Running		✓	✓			✓	
	Restrict Intersection Movements		✓	✓			✓	
	Geometric Improvements		✓	✓			✓	
	One-Way/Two-Way Street Conversion	✓	✓	✓		✓	✓	
	Transit Signal Priority	✓	✓	✓		✓		
	Traveler Information Systems		✓	✓			✓	
	Work Zone Management		✓	✓			✓	
	Road/Weather Information Systems		✓	✓			✓	
	Traffic Management for Special Events		✓	✓			✓	
Freight Management		✓			✓			
Off-Hours Delivery Programs		✓	✓		✓	✓		

Objectives

Strategies



		✓	✓	✓	✓	✓	✓	✓
		✓	✓	✓	✓	✓	✓	✓
Public Transportation Strategies	Optimize Transit	✓					✓	
	Real-Time Transit Data	✓	✓	✓			✓	
	Transit Trip Planner	✓	✓	✓			✓	
	Enhanced Transit-Supportive Infrastructure	✓					✓	
	Universal Farecards	✓					✓	
	Bus Rapid Transit	✓	✓	✓			✓	
	Expanded Transit Network	✓					✓	
	Increase Transit Frequency/Service	✓					✓	
	Transit Priority Treatments	✓	✓	✓			✓	
	First/Last Mile Connections	✓					✓	
	Ferry Boats	✓	✓	✓			✓	✓
Bicycle/Pedestrian & Micro-Mobility Strategies	Bike Lanes	✓					✓	✓
	Traffic Calming	✓					✓	✓
	Pedestrian Infrastructure	✓					✓	✓
	Streetscape	✓					✓	✓
	Road Diets	✓					✓	✓
	Expanded Trail Network	✓					✓	
	Bikeshare Program	✓					✓	
	Electric Scooter Sharing	✓					✓	
	Ride Sourcing Applications	✓					✓	
	Microtransit	✓					✓	
	Car Sharing	✓					✓	
	Carpooling Applications	✓					✓	
	Autonomous Vehicle Services	✓					✓	

Objectives

Strategies



Road Capacity Strategies	Strategies	Objectives						
	Spot Improvements		✓	✓				
	Intersection Improvements	✓	✓	✓		✓		
	Freight Network Upgrades				✓			
	Freight Rail/Port Capacity				✓			
	Safety Improvements		✓	✓				
	Operational Improvements		✓	✓				
	New HOV or HOT Lanes		✓	✓				
	Removing Bottlenecks		✓	✓				
	Adding Turn Lanes		✓	✓				
	Grade Separated Intersections		✓	✓				
	Closing Network Gaps	✓	✓	✓				
	Add Travel Lanes		✓	✓				

Strategy Categories

The congestion management strategies included in this guide are organized into seven broad categories – Demand Management & Regional, Pricing, Land Use, Transportation Systems Management & Operations, Public Transportation, Bicycle/Pedestrian and Micro-mobility, and Road Capacity. While most strategies generally apply under one broad category there are instances when a strategy falls within two broad categories.

Demand Management & Regional Strategies

Demand Management is an approach to managing traffic congestion that promotes the use of available transportation resources and infrastructure already in place. The focus of demand management is on providing traveler choices by promoting alternatives to driving alone (such as carpooling, vanpooling, transit, bicycle, or walking), options that reduce the need to travel (such as telecommuting, compressed work week schedules, or combining trips), and shifting travel from congested to less congested times or routes. Demand Management strategies are often programs and policies that manage demand on the transportation system and promotes more efficient modes of travel with the overall goal to improve travel reliability.

Employer Outreach Programs

Programs that partner with employers to encourage transit use, ridesharing/ carpooling, or bicycling to get employees to jobsites; strategies include marketing/ outreach for transit, travel demand management services, carpool matching programs, and employee incentives for carpooling or using transit, in an effort to reduce the burden on the transportation system.

Examples

Commuter Choice Maryland offers employers monthly pass distribution options which encourage employees to ride MTA CityLink, LocalLink, Commuter Bus, Light RailLink, Metro SubwayLink, and MARC Train for less than full fare.

Applicability



CMP Objectives



Commuter Benefits Policies

Policies that require or encourage employers to offer commuter benefits programs – either pretax employee-paid, or employer-paid – that incentivize employees to use transit, carpool/vanpool, or bike to work, and thereby ease congestion.

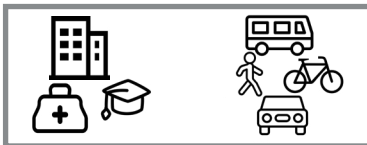
Examples

Permanent Maryland State employees are entitled to use MTA's BaltimoreLink at no charge with a valid State ID card. In Washington D.C. there is an ordinance that requires all D.C. companies with 20 or more employees to offer Commuter Benefits for transit to their employees (D.C. Commuter Benefits Law is part of the Sustainable D.C. Omnibus Amendment Act of 2014).

Applicability



CMP Objectives



Parking Cash Out Policies

Policies that require employers that offer parking benefits to also offer a cash-out option to employees, to de-incentivize commuting by single-occupancy vehicle.

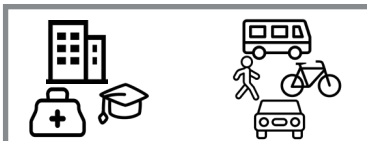
Examples

The University of Maryland parking cash-out program (implemented 2019/2020 academic year) offers incentives to the first 75 staff members and the first 25 graduate students who agreed to give up their parking pass for the entire academic year.

Applicability



CMP Objectives



Regional Coordination

Congestion occurs on state, county, and city operated roadways and between jurisdictional boundaries. Inter-jurisdictional coordination among state and local agencies can lead to more effective congestion management solutions for specific corridors and within the region.

Examples

The CMP Steering Committee is comprised of representatives from MDOT Transportation Business Units and all jurisdictions in the region. The Steering Committee works to guide the development for the regional CMP.

Applicability



CMP Objectives



Additional Resources

[FHWA Integrating Demand Management](#)

[FHWA Congestion Control and Demand Management](#)

[MWCOC Demand Management Strategies](#)

Pricing Strategies

Pricing is an approach to managing the overall demand during the peak demand hours and can be applied to managing the number of vehicles traveling on roadways/highways during the peak period or managing the parking demand. The goal of pricing strategies is to reduce or shift the demand (discretionary trips or parking) to off-peak periods or to other modes of travel allowing traffic to flow more efficiently. Shifting a portion of the demand provides a more reliable travel time and reliability of available parking during the peak and off-peak period.

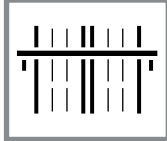
Value/Congestion Pricing

Pricing roads or lanes to encourage travel during off-peak hours, in high-occupancy vehicles, in environmentally friendly vehicles, or using other modes of travel to ease congestion.

Examples

The Intercounty Connector (MD 200) in Montgomery and Prince George's Counties, Maryland and I-95 in Baltimore, Maryland are all-electronic toll roads with variable prices to manage volumes.

Applicability



CMP Objectives



Demand-Responsive Parking Pricing

Demand-responsive parking pricing, fluctuating block-by-block and time of day or week to improve reliability of available parking and encourage travel by alternative modes.

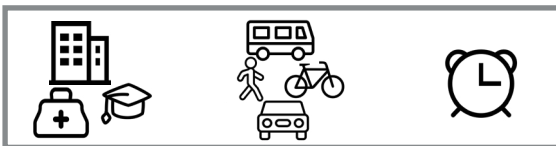
Examples

The Parking Authority of Baltimore City started using demand for parking spaces to determine the hourly parking meter rate on blocks in Central Downtown. Using data collected every six months, the Parking Authority adjusts rates to help create one or two available parking spaces on each block.

Applicability



CMP Objectives



VMT Fees

A mileage-based user fee that charges motorists based on the number of vehicle miles traveled, in some cases as an alternative to collecting fuel taxes, to encourage more efficient travel and reduce total miles traveled on roadways.

Examples

I-95 Corridor Coalition Mileage-Based User Fee Pilot Study. i95coalitionmbuf.org

Applicability



CMP Objectives



Additional Resources

[FHWA What is Congestion Pricing?](#)

[FHWA Overview of Parking and Access Pricing Strategies](#)

Land Use Strategies

Land Use management is an approach to addressing traffic congestion by effectively managing and directing growth. Land Use strategies aim to improve travel efficiency and reduce vehicle travel by developing more efficient land use patterns that support the need for fewer and shorter vehicle trips, and support use of transit, bicycling, and walking.

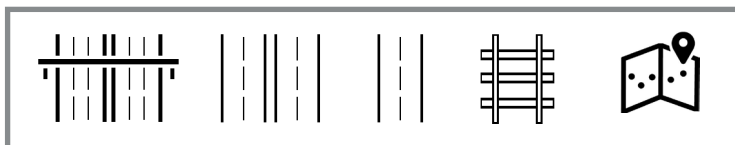
Land Use Controls

Update zoning and land use policies to support and encourage mixed use development and transit-friendly and walkable neighborhoods that reduce the number of trips needed by car.

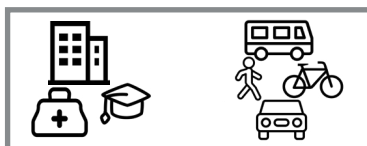
Examples

Howard County has an Adequate Public Facilities Ordinance that is designed to direct growth to areas where adequate infrastructure exists or will exist.

Applicability



CMP Objectives



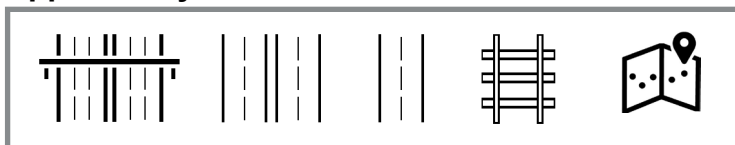
Growth Management

Establish a regional or county-level boundary to control urban sprawl and promote higher-density development that facilitates travel by transit, walking, or biking.

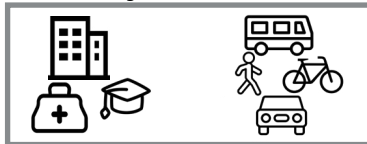
Examples

Maryland Department of Planning designated Priority Funding Areas. Howard County has an Agricultural Land Preservation Program designed to preserve farmland in the rural west part of the county and focus growth in other parts of the county.

Applicability



CMP Objectives



Transit-Oriented Developments

Newly constructed or redeveloped commercial or residential properties located near a transit stop or hub to facilitate travel by transit, enabled by zoning or other incentives.

Examples

The 2006 Comprehensive Master Plan for the City of Baltimore outlines a strategy for implementing projects around transit stations that meet Transit-Oriented Development (TOD) objectives. Additionally, the City of Baltimore Development Guidebook contains a checklist for TOD to guide Baltimore City agencies in reviewing proposed projects near transit stations, and in assessing the transit-friendliness of land-use plans, codes, and ordinances.

Applicability



CMP Objectives



High-Density Development Incentives

Using density bonuses to allow developers to build beyond zoned densities if they provide certain amenities, or tax incentives or create special tax districts to finance infrastructure improvements and/or development, all with the goal to reduce the number of trips by car.

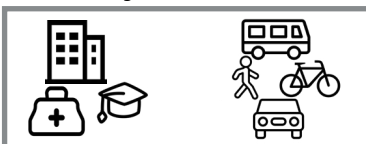
Examples

Montgomery County, Maryland requires 12.5 percent of all new residential units be affordable but the required affordable percentage rises to 15 percent for projects that take advantage of the County's density bonus program.

Applicability



CMP Objectives



Policies to reduce or remove parking minimums and allow developers to offer alternative solutions to providing access and to de-incentivize driving.

Examples

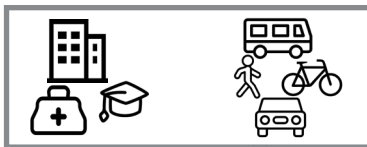
San Francisco Parking Policy Reforms set requirements and limits on existing parking and new parking facility development.

Chattanooga Area Regional Transit Authority developed peripheral parking garages and provided free shuttle service on either end of the business district.

Applicability



CMP Objectives



Additional Resources

[FHWA Linking Transportation and Land Use](#)

[TRB Transportation and Land Development – A Look Forward](#)

[FHWA Freight and Land Use Handbook](#)

[Transit-Oriented Development in Maryland](#)

Transportation Systems Management & Operations Strategies (TSMO)

Transportation Systems Management and Operations (TSMO) strategies are intended to effectively manage and operate existing facilities and systems. The strategies focus on maximizing the performance of the existing transportation facilities and infrastructure by improving system efficiency, reliability, and safety.

Incident Management

Programs to effectively manage the response to incidents and reduce incident clearance time to reduce congestion impacts.

Examples

MDOT's Coordinated Highways Action Response Team (CHART) focuses on mitigation of non-recurring congestion due to crashes, breakdowns, and weather.

Applicability



CMP Objectives



Traffic Signal Coordination

Coordinates a system of traffic signals to improve the operation of one or more directional movements that eases congestion by keeping traffic moving.

Examples

In 2016, MDOT SHA's Signal Retiming Program reduced delay by 875,000 hours and saved 231,000 gallons of fuel. In the Baltimore region, MD 139 - I-695 Ramps to Kenilworth Drive experienced a significant reduction in vehicle hour delay.

Applicability



CMP Objectives



Adaptive Traffic Signals

System that continuously monitors traffic conditions and dynamically adjusts the signal timing to optimize one or more operational objectives to improve traffic flow, best suited for arterials that experience high variability or unpredictable traffic demand.

Examples

Installed as part of MDOT's "Smart Signals" program at MD 2 in Annapolis, MD 3 in Crofton, and MD 22 in Aberdeen, Maryland.

Applicability



CMP Objectives



Adaptive Ramp Metering

Traffic signals installed on freeway/highway entrance ramps to control the frequency at which vehicles enter the highway and facilitate traffic flow to improve the efficiency and optimize the operations.

Examples

Several ramp meter locations along I-270 from I-70 to I-495 included as part of the I-270 Innovative Congestion Management program, in Montgomery and Frederick Counties, Maryland.

Applicability



CMP Objectives



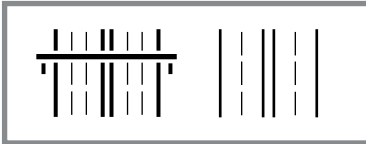
Active Traffic Management

System that actively monitors traffic and roadway conditions and manages recurring and non-recurring congestion through dynamic messaging and lane control, enhanced detection, and queue warnings.

Examples

Dynamic messaging is used on the I-95 corridor in the Baltimore region to provide information on travel times, accidents, and lane closures.

Applicability



CMP Objectives



Real-Time Truck Parking Information

Uses real-time data showing availability of suitable and safe parking spaces for freight vehicles to reduce unnecessary delays in finding parking, reduce freight cost, and improve safety for all motorists.

Examples

Illinois Department of Transportation (IDOT) has introduced a Truck Parking Information Management System (TPIMS) Project. A total of 53 IDOT Rest Areas will receive TPIMS that will include improved video security systems, electronic information kiosks, and automated truck parking counting systems.

Applicability



CMP Objectives



Truck Weigh Technology

Uses technology, weigh-in-motion or virtual weigh station devices, that capture and record truck axle weights and gross vehicle weights as they drive over a sensor, facilitating truck movement by removing the need to stop at a static weigh station.

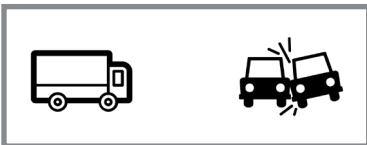
Examples

Virtual weigh-in-motions stations along I-83 in Parkton, Maryland and US 301 in Galena, Maryland.

Applicability



CMP Objectives



Reversible Commuter Lanes

Reversing the direction of travel on a two-way road to add peak direction capacity and decreases congestion by utilizing available land capacity from the off-peak direction.

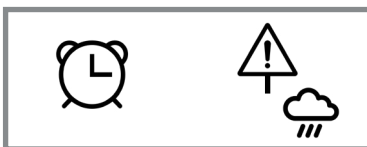
Examples

Hanover Street from I-95 to MD 2 in Baltimore City, Maryland, US 29 in Silver Spring, Maryland, US 50 at the Chesapeake Bay Bridge, Maryland.

Applicability



CMP Objectives



Access Management

Reducing access points on roadways to minimize traffic disruption due to turning vehicles, weaving conflicts and improve traffic flow.

Examples

US 301/MD 304 interchange construction in Queen Anne's County to reduce conflict points of traffic accessing US 301 from MD 304.

Applicability



CMP Objectives



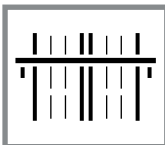
Moveable Median Barriers

Providing a reversible lane during peak or other relevant periods controlled by a moveable median barrier to provide additional capacity.

Examples

The Delaware River Port Authority utilizes moveable barriers on the Walt Whitman Bridge, Ben Franklin Bridge, and Commodore Barry Bridge in the Philadelphia region.

Applicability



CMP Objectives



Electronic Toll Collection

System that electronically charges a toll to an established customer account or by pay-by-plate eliminating the need to stop at a toll plaza and improving the traffic flow through the toll facilities.

Examples

US 40 at the Hatem Bridge, I-695 at the Francis Scott Key Bridge, US 50 at the Chesapeake Bay Bridge, MD 200 Intercounty Connector.

Applicability



CMP Objectives



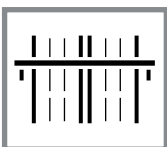
Hard Shoulder Running

Vehicles temporarily use the shoulder lane during peak periods and in response to incidents or other conditions as warranted to improve traffic flow.

Examples

Use of inside shoulder lane on I-695 as a new travel lane during peak period as part of the proposed I-695 TSMO Project.

Applicability



CMP Objectives



Restrict Intersection Movements

Restricting turning movements along a mainline roadway at key intersections during peak periods to reduce vehicle conflict and improve traffic flow.

Examples

MD 139 (Charles Street) in Baltimore, Maryland.

Applicability



CMP Objectives



Geometric Improvements

Design improvements on roadways and at intersections to increase capacity for motorists, pedestrians, and/or bicyclists.

Examples

Key Highway at Light Street intersection improvements includes sidewalk and ADA upgrades as well as Gwynns Falls Trail Extension, both in Baltimore, Maryland.

Applicability



CMP Objectives



One-Way/Two-Way Street Conversion

Converting two-way streets to one-way or one-way streets to two-way operations to improve multimodal accessibility, improve safety, and increase redundancy of the network, to improve reliability and reduce disruptions.

Examples

Allegheny County, Pennsylvania converted roadways in North Park to one-way with three separate travel ways, including a center lane for one-way vehicle flow, a parallel flow bike lane on the right, and a contra-flow bike lane on the left. This reduced vehicle/bicycle conflict to increase safety for all modes.

Applicability



CMP Objectives



Transit Signal Priority

Technology that communicates between a traffic signal and an approaching bus to give priority to the approaching transit vehicle to reduce delay at intersection and improve reliability.

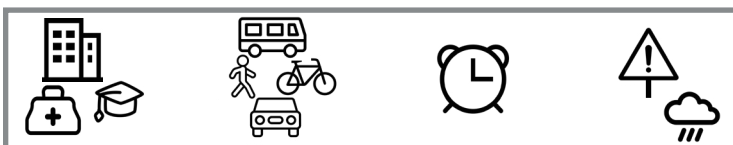
Examples

BaltimoreLink uses transit signal priority at key intersections along York Road and Loch Raven Boulevard in Baltimore, Maryland.

Applicability



CMP Objectives



Traveler Information Systems

Dynamic message signs, traveler radio, or other platforms to inform motorists of changing roadway conditions, including delays or incidents, to reduce the impacts of congestion due to incidents.

Examples

MDOT CHART services, MD 511, and WAZE.

Applicability



CMP Objectives



Work Zone Management

Use of sensors and infrared cameras installed on temporary traffic control devices to detect delays and incidents and to communicate information to emergency responders and transportation management centers to facilitate response and communications to travelers.

Examples

DDOT's I-295 reconstruction utilized ITS in the form of 13 portable DMS, 8 portable speed sensors, 2 portable Remote Traffic Microwave Sensors, and cameras to allow DDOT to monitor traffic conditions and provide real-time work zone traffic information to users.

Applicability



CMP Objectives



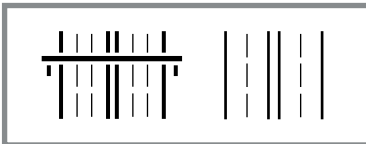
Road/Weather Information Systems (RWIS)

RWIS stations installed along roadways have instruments and equipment that provide weather and road surface conditions to transportation management centers.

Examples

MDOT SHA CHART has over 50 local weather stations along Maryland roadways that provide data including air temperature, pavement temperature, wind speed and direction, humidity, dew point, and any precipitation type. This data is available to the general public on CHART's website.

Applicability



CMP Objectives



Traffic Management for Special Events

Advanced planning and coordination to manage special event traffic, including sharing real-time information with other stakeholders to minimize disruptions.

Examples

Sporting and concert events at M&T Bank Stadium or Camden Yards in Baltimore, Maryland.

Applicability



CMP Objectives



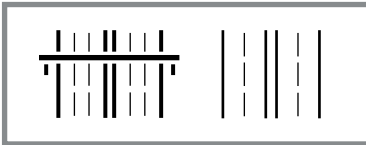
Freight Management

Ensuring efficient freight loading and unloading systems to reduce detention time at facilities.

Examples

Seagirt Marine Terminal Modernization: Berth Improvements TIP project to modernize and improve the Seagirt Marine Terminal to allow freight to move more efficiently through the terminal.

Applicability



CMP Objectives



Off-Hours Delivery Programs

Encouraging goods delivery to businesses during off-peak hours to reduce truck traffic on roadways during congested periods.

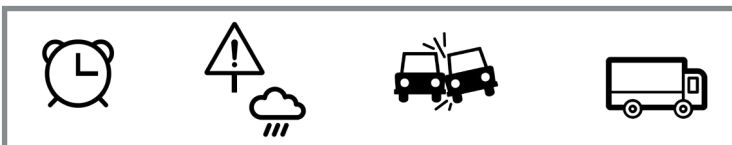
Examples

The Off-Hour Deliveries (OHD) Program in New York City focuses on shifting truck deliveries from peak period to off hours (7pm to 6am). This allows trucks to avoid congestion, creating a more reliable travel and delivery time, reducing emissions, creating less double parking, and increased safety for trucks, pedestrians, and bicyclists.

Applicability



CMP Objectives



Additional Resources

[FHWA TSMO Guidance](#)

[AASHTO TSMO Guidance](#)

[MDOT SHA 2018 TSMO Strategic Plan](#)

[FHWA Traffic Congestion and Reliability: Trends and Advanced Strategies for Congestion Mitigation](#)

Public Transportation Strategies

Public Transportation is an approach that focuses on improving access and increasing the capacity of existing services and facilities. The goal of public transportation strategies is to improve the safety and convenience for users and increase the desirability of public transportation.

Optimize Transit

Realigning transit routes, transit service schedules, or transit stop locations to improve efficiency, reliability and attractiveness of transit.

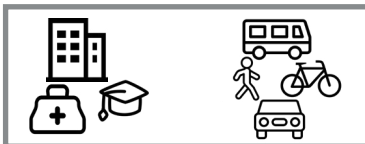
Examples

MTA BaltimoreLink overhauled the transit system throughout the region.

Applicability



CMP Objectives



Real-Time Transit Data

Resources that provide transit users real-time information on transit schedules and arrivals using vehicle location data to improve the transit experience.

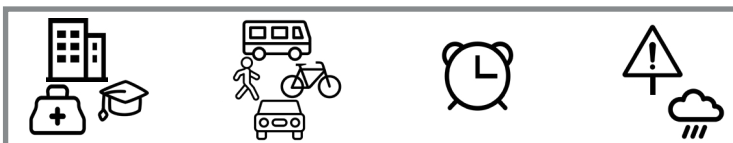
Examples

MTA Transit App provides bus route status and step-by-step directions to locations.

Applicability



CMP Objectives



Transit Trip Planner

An app or similar that uses real-time data to plot and customize routes for an individual that may also have a built-in reward system to encourage commuters to travel by transit.

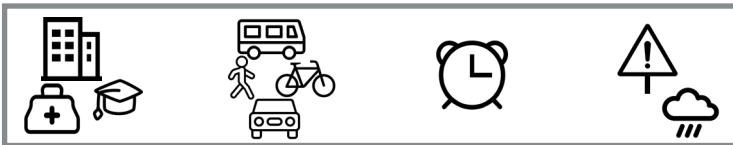
Examples

incentTrip is a multimodal trip planning app that provides reward points in the Washington metropolitan region.

Applicability



CMP Objectives



Enhanced Transit-Supportive Infrastructure

Providing safer transit stops with supportive facilities, such as benches, bus shelters, and lighting, as well as, real-time arrival information and, fare payment facilities.

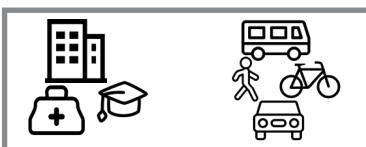
Examples

FLASH bus rapid transit stations in Montgomery County, Maryland.

Applicability



CMP Objectives



Universal Farecards

Develop electronic transit fare payment systems compatible across multiple transportation agencies or transit services in a region to facilitate transit use.

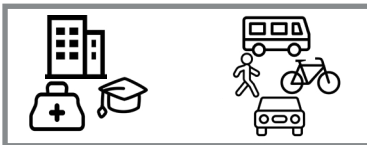
Examples

CharmPass mobile ticketing app from MDOT MTA.

Applicability



CMP Objectives



Bus Rapid Transit

Bus-based transit system that makes use of dedicated lanes, busways, traffic signal priority, off-board fare collection, elevated platforms, and/or enhanced stations to deliver faster, more efficient service as a cheaper, more adaptive alternative to rail-based transit.

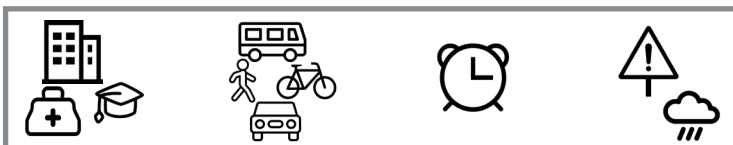
Examples

FLASH BRT in Montgomery County, Maryland.

Applicability



CMP Objectives



Expanded Transit Network

Expand existing transit network by adding new routes, new stops, new types of service, or more frequent service to improve and encourage transit use.

Examples

BaltimoreLink added expanded and more frequent service to address needs while eliminating underutilized stops and routes.

Applicability



CMP Objectives



Increase Transit Frequency/Service

Provide more frequent service by reducing headways or expanding service hours from peak-only to off-peak or mid-day hours.

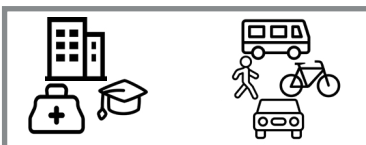
Examples

The Towson Circulator will provide a new fixed route service to serve the Charles Street, I-695, Loch Raven Boulevard, and Baltimore City/County Boundary areas.

Applicability



CMP Objectives



Transit Priority Treatments

A variety of treatments and options that can help improvement transit service. Treatments and options include transit signal priority, dedicated bus lanes, queue jumps for transit vehicles, and farside bus stops.

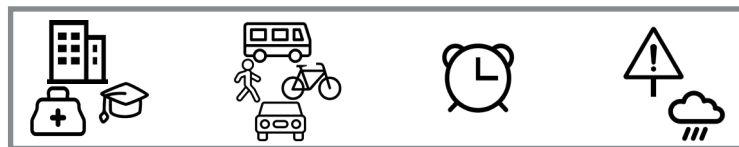
Examples

BaltimoreLink uses transit signal priority at key intersections along York Road and Loch Raven Boulevard. BaltimoreLink also uses dedicated bus lanes on Pratt and Lombard Streets.

Applicability



CMP Objectives



First/Last Mile Connections

Enhancing pedestrian and bicycle facilities that provide access to transit stations, provisions for bicycles on transit vehicles and at transit stops, including providing secure bike parking at transit stops and bike on bus/train storage to facilitate transit use.

Examples

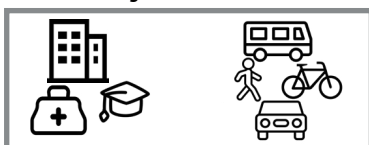
Metropolitan Atlanta Rapid Transit Authority partnered with ride-sharing services to provide connections to and from MARTA rail stations, and increased service when transit is not operating.

HART HyperLINK, Hillsborough County, Florida is a first/last mile shared-ride service smartphone app that connects users to a designated HART stop.

Applicability



CMP Objectives



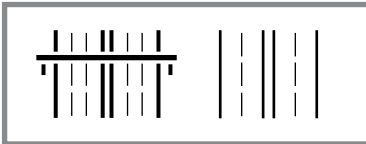
Ferry Boats

Passenger transportation across waterways to provide alternative modes of travel and reduce traffic.

Examples

Baltimore Water Taxi, Wharf Water Taxi in Washington, D.C.

Applicability



CMP Objectives



Additional Resources

[NACTO Transit System Strategies](#)

[MTA Transit Priority Toolkit](#)

Bicycle/Pedestrian and Micro-mobility Strategies

Bicycle/pedestrian and micro-mobility strategies focus on reducing congestion by improving the safety and convenience of traveling by bicycling, walking, or other micro-mobility options. These strategies aim to provide more opportunities to access destinations by non-motorized transportation options.

Bike Lanes

Adding bike lanes and other bike facilities along streets to enhance bike accessibility and safety and improve attractiveness of bicycle transportation.

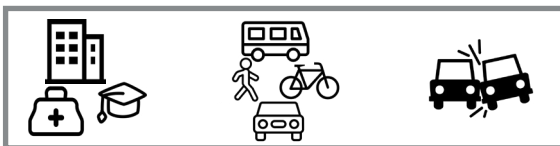
Examples

Baltimore City Bike Lanes.

Applicability



CMP Objectives



Traffic Calming

The combination of physical and non-physical measures that reduce speeding and improve conditions for non-motorized street users, i.e. mini roundabouts, bump-outs, pedestrian refuge islands, and digital speed signs.

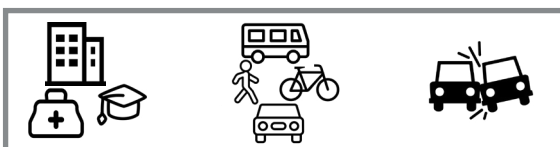
Examples

Mini roundabout and speed humps installed on Ridgely Rd in Lutherville, Maryland.

Applicability



CMP Objectives



Pedestrian Infrastructure

Improve safety and access for pedestrians by adding sidewalks to fill gaps in sidewalk, crosswalks, and pedestrian signals.

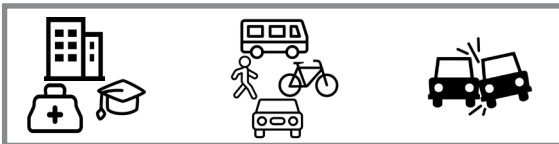
Examples

Patapsco Avenue from Magnolia Avenue to Patapsco River Bridge TIP project will provide sidewalk connections, ramps, crosswalks, and lighting improvements. A mixed-use trail and pedestrian accommodations will be constructed as well.

Applicability



CMP Objectives



Streetscape

Provide a more pleasant and inviting pedestrian environment by enhancing lighting, adding benches, widening sidewalks, and adding decorative treatments.

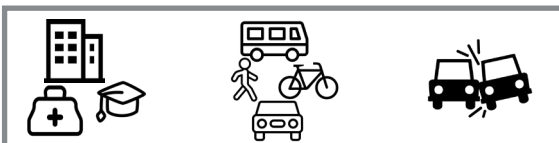
Examples

The MD 30 Business Streetscape in Hampstead from North Woods Trail to CSX Railroad.

Applicability



CMP Objectives



Road Diets

Remove a vehicular travel lane to dedicate space for other modes, often creating a shorter crossing distance for pedestrians and reducing speeds.

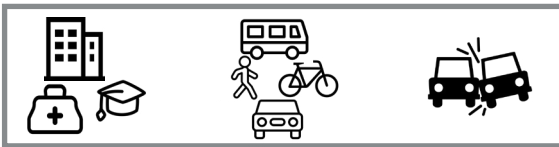
Examples

Harford Road between Echodale and White Avenues.

Applicability



CMP Objectives



Expand Trail Network

Constructing or improving off-street trails to allow easier, lower-stress regional transportation by bicycling or walking.

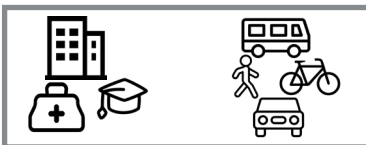
Examples

The Gwynns Falls Trail and Patapsco Trail projects in Maryland.

Applicability



CMP Objectives



Bikeshare Program

Programs to allow users to temporarily use a shared bicycle accessed at a bikeshare station to facilitate non-vehicular transportation options.

Examples

Pace Bikeshare in Annapolis, Capital Bikeshare in Washington, D.C.

Applicability



CMP Objectives



Electric Scooter Sharing

Scooters or other sharable mobility options that do not have a central hub and provide an alternative transportation option for short trips.

Examples

Jump, Lime, and Spin in Baltimore City.

Applicability



CMP Objectives



Ride Sourcing Applications

A variety of mobile applications that matches passengers with drivers using their personal, non-commercial vehicles.

Examples

Uber or Lyft.

Applicability



CMP Objectives



Microtransit

A form of demand responsive transit that offers small scale public transit services. These services can offer fixed routes and schedules and flexible routes and flexible scheduling of minibus vehicles.

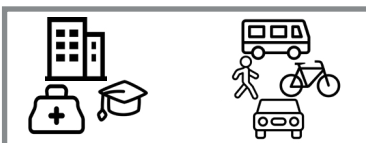
Examples

The Central Ohio Transit Authority (COTA) operates COTA/Plus a new micro-transit on-demand service that provides customers with further access to jobs, healthcare and more, while offering a fast, convenient, and comfortable transit solution.

Applicability



CMP Objectives



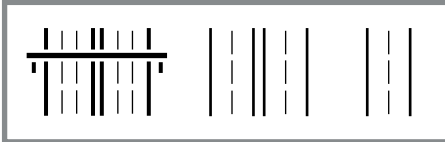
Car Sharing

A way to rent a car by the hour or the day and can be reserved in advance or last-minute. Cars are reserved online or through mobile applications.

Examples

Zipcar, Turo, GetAround, or Car2Go.

Applicability



CMP Objectives



Carpooling Applications

Mobile applications that connect drivers with riders to facilitate ridesharing and carpooling.

Examples

Commuter Connections connects people who live and work near each other with similar schedules who are interested in carpooling or vanpooling. Commuter Connections also provides information on transit services, park and ride locations, and telework centers. Via is a carpool service mobile application with the goal to fill as many seats as possible in cars headed towards popular destinations.

UberPool allows users going to a common destination to share rides with others.

Applicability



CMP Objectives



Autonomous Vehicle Services

On-demand self-driving vehicle companies that expand overall connectivity.

Examples

Olli shuttle in the National Harbor, Maryland and Drive.ai pilot programs in both Frisco and Arlington, Texas.

Applicability



CMP Objectives



Additional Resources

[FHWA The Need for Bicycle and Pedestrian Mobility](#)

[FHWA Separated Bike Lane Planning and Design Guide](#)

[FHWA Road Diets](#)

Road Capacity Strategies

Road capacity is an approach to mitigating traffic congestion by considering infrastructure or operational improvements. Road capacity strategies add capacity to existing roads.

Spot Improvements

Improvements to increase the capacity of a roadway in isolated and/or bottleneck locations, including but not limited to filling in gaps between lane drops and adding auxiliary lanes between close acceleration and deceleration lanes.

Examples

An auxiliary lane was added between MD 147 and Perring Parkway on I-695 to connect the existing acceleration and deceleration lanes.

Applicability



CMP Objectives



Intersection Improvements

Improvements to increase the safety and/or capacity of an intersection, including but not limited to: Adding turn lanes, channelizing right turns, adding pedestrian facilities, bus pull-off areas, signal phasing adjustments.

Examples

MD 174 at Severn Road received a new eastbound to northbound left turn lane, an extension of the existing westbound to northbound right turn lane, and traffic signal upgrades.

Applicability



CMP Objectives



Freight Network Upgrades

Improvements to freight corridors or locations where freight facilities are lacking.

Examples

Howard Street Tunnel TIP project involves reconstruction to create double-stack access to and from the Port of Baltimore.

Applicability



CMP Objectives



Freight Rail/Port Capacity

Increasing capacity and general attractiveness of other modes of transporting freight to reduce truck traffic on highways.

Examples

Baltimore & Potomac (B&P) Tunnel Project Selected Alternative consists of four new tracks and can accommodate double-stack container freight cars.

Applicability



CMP Objectives



Safety Improvements

Improvements to increase the safety of vehicles or pedestrians along a roadway or at an intersection.

Examples

Pennington Avenue Rehabilitation TIP project to rehabilitate the roadway and provide ADA compliant sidewalks, ramps, crosswalks, signal, signing, lighting, and pavement marking improvements.

Applicability



CMP Objectives



Operational Improvements

Improvements to sections of roadway or intersections that have a positive benefit on traffic operations.

Examples

A roundabout was constructed at Tufton Road at Worthington Ave/Greenspring Ave in Baltimore County to relieve morning queues along Worthington Avenue that often exceeded one mile.

Applicability



CMP Objectives



New HOV or HOT Lanes

Constructing new lanes or converting existing travel lanes to HOV or HOT lanes to reduce the attractiveness of single-occupancy vehicle trips.

Examples

Express Toll Lanes on I-95 north of the Fort McHenry Tunnel, Baltimore, Maryland.

Applicability



CMP Objectives



Removing Bottlenecks

Expanding capacity on roadways at locations where there is a decrease in capacity by adding additional travel lanes or other congestion relief methods.

Examples

I-695 Baltimore Beltway: US 40 to MD 144 widening from three to four travel lanes to alleviate the bottleneck at US 40.

Applicability



CMP Objectives



Adding Turn Lanes

Adding a center two-way left turn lane to arterial or local roads with closely spaced access points between intersections.

Examples

MD 45 (York Rd) contains a center two-way left turn lane between major intersections along the 6-mile Timonium/Cockeysville, Maryland corridor between I-695 and Shawan Road.

Applicability



CMP Objectives



Grade Separated Intersections

Constructing an interchange at a congested or unsafe intersection to add capacity or mitigate a safety issue.

Examples

MD 32 at Linden Church Road, US 301 at MD 304 in Maryland.

Applicability



CMP Objectives



Closing Network Gaps

Building new roadways to connect areas with limited accessibility and areas where there is a disconnect in the roadway network.

Examples

Hanover Road Corridor Improvement TIP project to construct a section of Hanover Road between Ridge Road and New Ridge Road on a new alignment in Maryland.

Applicability



CMP Objectives



Add Travel Lanes

Increasing capacity along roadways by adding additional travel lanes.

Examples

MD 32 widening from a two-lane roadway to a four-lane divided roadway between MD 108 to Linden Church Road in Maryland.

Applicability



CMP Objectives



Additional Resources

[FHWA Efficient Use of Highway Capacity Summary](#)

Objective 1

Enhance access to jobs and other opportunities



Land Use

- Land Use Controls
- Growth Management
- Transit-Oriented Developments
- High-Density Development Incentives
- Parking Management

TSMO

- One-Way/Two-Way Street Conversion
- Transit Signal Priority

Public Transportation

- Optimize Transit
- Real-Time Transit Data
- Transit Trip Planner
- Enhanced Transit-Supportive Infrastructure
- Universal Farecards
- Expand Transit Network
- Transit Priority Treatments
- Bus Rapid Transit
- Increase Transit Frequency/Service
- First/Last Mile Connections
- Ferry Boats

Pricing

- Demand-Responsive Parking Pricing

Road Capacity

- Intersection Improvements
- Closing Network Gaps

Bicycle / Pedestrian & Micro-mobility

- Bike Lanes
- Traffic Calming
- Pedestrian Infrastructure
- Streetscape
- Road Diets
- Expand Trail Network
- Bikeshare Program
- Electric Scooter Sharing
- Ride Sourcing Applications
- Microtransit
- Car Sharing
- Carpooling Applications
- Autonomous Vehicle Services

Demand Management

- Employer Outreach Programs
- Commuter Benefits Policies
- Parking Cash Out Policies

Objective 2

Improve travel times and reduce traveler delay



Public Transportation

- Real-Time Transit Data
- Transit Trip Planner
- Bus Rapid Transit
- Transit Priority Treatments
- Ferry Boats

TSMO

- Incident Management
- Traffic Signal Coordination
- Adaptive Traffic Signals
- Adaptive Ramp Metering
- Active Traffic Management
- Reversible Commuter Lanes
- Access Management
- Moveable Median Barriers
- Electronic Toll Collection
- Hard Shoulder Running
- Restrict Intersection Movements
- Geometric Improvements
- One-Way/Two-Way Street Conversion
- Transit Signal Priority
- Traveler Information Systems
- Work Zone Management
- Road/Weather Information Systems
- Traffic Management for Special Events
- Off-Hours Delivery Programs
- Freight Management

Pricing

- Value/Congestion Pricing
- Demand-Responsive Parking Pricing
- VMT Fees

Road Capacity

- Spot Improvements
- Intersection Improvements
- Safety Improvements
- Operational Improvements
- New HOV or HOT Lanes
- Removing Bottlenecks
- Adding Turn Lanes
- Grade Separated Intersections
- Closing Network Gaps
- Add Travel Lanes

Objective 3

Improve travel times reliability



Public Transportation

- Real-Time Transit Data
- Transit Trip Planner
- Bus Rapid Transit
- Transit Priority Treatments
- Ferry Boats

TSMO

- Incident Management
- Traffic Signal Coordination
- Adaptive Traffic Signals
- Adaptive Ramp Metering
- Active Traffic Management
- Reversible Commuter Lanes
- Access Management
- Moveable Median Barriers
- Hard Shoulder Running
- Restrict Intersection Movements
- Geometric Improvements
- One-Way/Two-Way Street Conversion
- Transit Signal Priority
- Traveler Information Systems
- Work Zone Management
- Road/Weather Information Systems
- Traffic Management for Special Events
- Off-Hours Delivery Programs

Pricing

- Value/Congestion Pricing

Road Capacity

- Spot Improvements
- Intersection Improvements
- Safety Improvements
- Operational Improvements
- New HOV or HOT Lanes
- Removing Bottlenecks
- Adding Turn Lanes
- Grade Separated Intersections
- Closing Network Gaps
- Add Travel Lanes

Objective 4

Improve freight reliability



Road Capacity

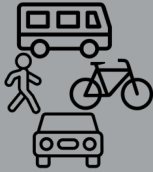
Freight Network Upgrades
Freight Rail/ Port Capacity

TSMO

Real-Time Truck Parking Information
Truck Weigh Technology
Freight Management
Off-Hours Delivery Programs

Objective 5

Enhance travel choices



Land Use

- Land Use Controls
- Growth Management
- Transit-Oriented Developments
- High-Density Development Incentives
- Parking Management

Public Transportation

- Optimize Transit
- Real-Time Transit Data
- Transit Trip Planner
- Enhanced Transit-Supportive Infrastructure
- Universal Farecards
- Bus Rapid Transit
- Expand Transit Network
- Increase Transit Frequency/Service
- Transit Priority Treatments
- First/Last Mile Connections
- Ferry Boats

Demand Management

- Employer Outreach Programs
- Commuter Benefits Policies
- Parking Cash Out Policies

Pricing

- Demand-Responsive Parking Pricing

TSMO

- One-Way/Two-Way Street Conversion
- Transit Signal Priority

Bicycle / Pedestrian & Micro-mobility

- Bike Lanes
- Traffic Calming
- Pedestrian Infrastructure
- Streetscape
- Road Diets
- Expand Trail Network
- Bikeshare Program
- Electric Scooter Sharing
- Ride Sourcing Applications
- Microtransit
- Car Sharing
- Carpooling Applications
- Autonomous Vehicle Services

Road Capacity

- Intersection Improvements

Objective 6

Reduce traffic incidents



Public Transportation

Ferry Boats

Pricing

Value/Congestion Pricing

TSMO

Incident Management

Traffic Signal Coordination

Adaptive Traffic Signals

Adaptive Ramp Metering

Active Traffic Management

Truck Weigh Technology

Access Management

Moveable Median Barriers

Electronic Toll Collection

Hard Shoulder Running

Restrict Intersection Movements

Geometric Improvements

One-Way/Two-Way Street Conversion

Traveler Information Systems

Work Zone Management

Road/Weather Information Systems

Traffic Management for Special Events

Off-Hours Delivery Programs

Bicycle / Pedestrian & Micro-mobility

Bike Lanes

Traffic Calming

Pedestrian Infrastructure

Streetscape

Road Diets

Road Capacity

Spot Improvements

Intersection Improvements

Freight Network Upgrades

Safety Improvements

Operational Improvements

New HOV or HOT Lanes

Removing Bottlenecks

Adding Turn Lanes

Grade Separated Intersections

Closing Network Gaps

Add Travel Lanes

Objective 7

Enhance inter-jurisdictional coordination



**Demand
Management**

Regional Coordination

