metroplan orlando
A REGIONAL TRANSPORTATION PARTNERSHIP

2040 Long Range Transportation Plan

Technical Report 4:

Congestion Management Process

Final Adopted Plan

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250 South Orange Avenue, Suite 200, Orlando, FL 32801 | 407-481-5672

www.metroplanorlando.com | MetroPlan Orlando | @metroplan_orl

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EXECUTIVE SUMMARY

The MetroPlan Orlando 2040 Long Range Transportation Plan includes an update of the Congestion Management Process (CMP). Maintaining a CMP is required for all Metropolitan Planning Organizations under Florida law and in Transportation Management Areas (TMAs), under federal law. Consistent with the guidance from the Final Rule on the CMP for TMAs (Section 450.320), as presented later in this report, the intent of the CMP Update is to "address congestion management through a process that provides for safe and effective integrated management and operation of the multimodal transportation system." A vibrant Congestion Management Process can serve a valuable role in addressing the region's transportation needs in light of the following:

- Many roadway corridors in the urban area have already been built out to their maximum number of travel lanes;
- Funding limits the number of new large-scale projects that can be planned and constructed;
- Transportation safety continues to be a concern, especially for cyclists and pedestrians.

Given the considerations above and the fact that many of the region's major transportation projects (Wekiva Parkway, SunRail, and Ultimate I-4 improvements) require significant funds, the CMP will become increasingly important.

Historically, MetroPlan has staffed and funded significant congestion management related projects through the Management and Operations (M&O) Subcommittee and corridor level signal retiming projects, which have yielded significant benefits for drivers. This Congestion Management Process builds on those successes and expands the process to be more multimodal and to address safety.

1.0 INTRODUCTION

The CMP is a management system and process conducted to improve traffic operations and safety through strategies that reduce travel demand or through operational improvements. As a Metropolitan Planning Organization (MPO), MetroPlan Orlando is required by the federal government to implement a CMP as part of its planning efforts. The public will benefit from having a functional CMP in place, since it can improve travel conditions through low-cost improvements or strategies. These can be implemented in a relatively short timeframe (one to five years) compared to more traditional capacity improvements, such as adding travel lanes, which can take 10 years to implement - at significantly higher cost. Projects identified through the CMP also may be added to updates of the Long Range Transportation Plan, should they require a longer timeframe.

The Federal Highway Administration (FHWA) defines a CMP as "a systematic approach collaboratively developed and implemented throughout a metropolitan region, that provides for the safe and effective management and operation of new and existing transportation facilities through the use of demand reduction and operational management strategies."

The CMP is an essential part of the metropolitan planning process, which establishes the requirement for MetroPlan Orlando to implement a CMP.

The MetroPlan Orlando CMP allows for an annual process to identify projects that are needed to reduce congestion and are prioritized for funding in MetroPlan's Transportation Improvement Program; this process is administered by MetroPlan Orlando's Management and Operations (M&O) Subcommittee.

The remainder of this document describes MetroPlan Orlando's CMP.

1.1 Causes of Congestion

Congestion management begins by understanding the problem. ***Figure 1-1*** shows the results of a national study presented by FHWA on the sources of congestion. Six major causes of congestion are identified:

- **Bottlenecks** — points where the roadway narrows or regular traffic demands (typically at traffic signals) cause traffic to back up. These are the largest source of congestion and typically cause a roadway to operate below its adopted level of service standards.
- **Traffic incidents** — crashes, stalled vehicles, debris on the road. These incidents cause about one quarter of congestion problems. A focus of the MetroPlan Orlando CMP will be on reducing crashes that can cause congestion and expediting incident response to clear incidents where Intelligent Transportation Systems (ITS) surveillance is in place.
- **Work zones** — for new road building and maintenance activities such as filling potholes and maintenance work. The amount of congestion from these actions can be reduced by various strategies.

- **Bad weather** — cannot be controlled. Travelers can be notified of the potential for increased congestion, and signal systems can adapt to improve safety.
- **Poor traffic signal timing** — the faulty operation of traffic signals or green/red lights where the time allocation for a road does not match the volume on that road. Poor signal timing is a source of congestion on major and minor streets.
- **Special events** — cause "spikes" in traffic volumes and changes in traffic patterns. These irregularities either cause or increase delay on days, times, or locations where there usually is none.

As shown in ***Figure 1-1***, bottlenecks are the largest cause of congestion nationally, followed by traffic incidents and bad weather. These national data are widely used in CMP updates because there are few comprehensive local studies on the causes of congestion. The data suggest that local causes are likely to be similar, with bottlenecks and traffic incidents typically being the top two causes of congestion.

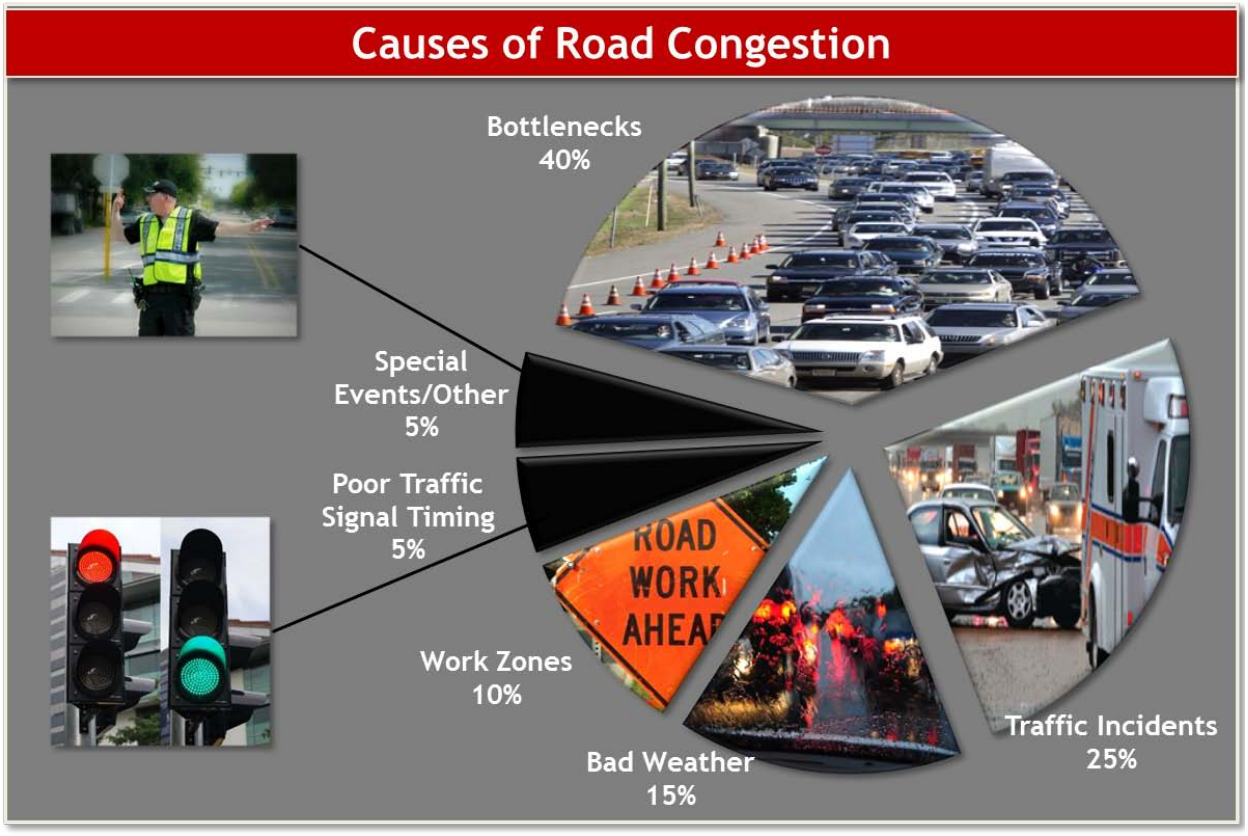


Figure 1-1: Causes of Road Congestion

2.0 CONGESTION MANAGEMENT PROCESS REQUIREMENTS

Regulations and guidance for developing a CMP are provided at the federal and state levels. In addition to these requirements, MetroPlan Orlando's CMP takes into consideration ongoing transportation initiatives that are related to the overall objectives.

2.1 Federal Requirements

Public Law 112-141, the Moving Ahead for Progress in the 21st Century Act (MAP-21), became law on July 6, 2012. This legislation provides federal transportation funding for fiscal years 2013 and 2014. Fundamental aspects of this legislation will likely be extended to future fiscal years through continuing legislation or through a new transportation bill. MAP-21 was the first transportation legislation enacted since 2005 and provides updated policy and programmatic framework for investments to guide the growth and development of the country's transportation infrastructure. MAP-21 is designed to create a streamlined, performance-based, multimodal program to address the needs of the national transportation system as outlined in these goals:

2.1.1 National Goals

- **Safety** — to achieve a significant reduction in traffic fatalities and serious injuries.
- **Infrastructure condition** — to keep the highway infrastructure in good repair.
- **Congestion reduction** — to achieve a significant reduction in congestion on the National Highway System (NHS).
- **System reliability** — to improve the efficiency of the surface transportation system.
- **Freight movement and economic vitality** — to improve the national freight network, strengthen the ability of rural communities to access trade markets, and support regional economic development.
- **Environmental sustainability** — to enhance the performance of the transportation system while protecting the natural environment.
- **Reduced project delivery delays** — to reduce project costs, promote the economy, and expedite the movement of people and goods by eliminating delays in project development and delivery, including reducing regulatory burdens and improving agencies' work practices.

MAP-21 continues the requirement for MPOs, like MetroPlan Orlando, to address congestion management as provided for in the Intermodal Surface Transportation Efficiency Act (ISTEA), passed in 1991, and successor laws including the Transportation Equity Act for the 21st Century (TEA-21). The requirements guiding congestion management evolved under the next federal transportation act, the Safe Accountable Flexible Efficient Transportation Equity Act–A Legacy for Users (SAFETEA-LU), passed in 2005. SAFETEA-LU required a "congestion management process" in TMAs, instead of a "congestion management system." According to FHWA, the change in name is intended to change perspective and practice to address congestion through effective management and operations, better links to the planning process based reduced travel demand and operational management strategies as well as

capacity increases. Aside from the name, the CMP requirements did change substantially from the CMS requirements. The federal requirements for a CMP are summarized below.

2.1.2 Federal Regulations

The following section summarizes the federal requirements for a CMP in TMAs. This guidance is codified in the Code of Federal Regulations (CFR) (Section 450.320) — Statewide Transportation Planning; Metropolitan Transportation Planning; Final Rule).

a. The transportation planning process in a TMA shall address congestion management through a process that provides for safe and effective integrated management and operation of the multimodal transportation system.

- Cooperatively developed and implemented metropolitan-wide
- Travel reduction strategies
- Operational management strategies

b. The CMP should result in multimodal system performance measures and strategies reflected in the Long Range Transportation Plan and Transportation Improvement Program (TIP).

- Acceptable levels of service may vary from area to area
- Consider strategies that:
    I. Manage demand
    II. Reduce single occupant vehicle travel
    III. Improve transportation system management and operations
- Where general purpose lanes are determined to be appropriate, give explicit consideration to features that facilitate future demand management strategies.

c. The CMP shall be developed, established, and implemented in coordination with M&O activities. The CMP shall include:

- Methods to monitor and evaluate:
    I. System performance
    II. Causes of congestion
    III. Alternative strategies
    IV. Implementation of actions
    V. Effectiveness of implemented actions
- Definitions of congestion management objectives and performance measures to assess the extent of congestion and support the evaluation of the effectiveness of strategies. Performance measures should be tailored to specific needs.
- Establishment of a coordinated program for data collection and system performance monitoring to define the extent and duration of congestion. To the extent possible, this program should be coordinated with existing sources.

- Identification and evaluation of the anticipated performance and expected benefits of congestion management strategies that will contribute to more effective use and improved safety of the transportation system. Examples of strategies to consider include:
    I. Demand management measures, including growth management and congestion pricing
    II. Traffic operational improvements
    III. Public Transit improvements
    IV. Innovation and technologies identified in the regional Intelligent Transportation System (ITS) architecture
    V. Additional system capacity, where necessary
- Identification of an implementation schedule, responsibilities, and possible funding sources for each strategy
- A process for periodic assessment of the effectiveness of implemented strategies. Results of this assessment shall be provided to decision makers and the public to guide the selection of effective strategies for future implementation.

d. TMAs designated as nonattainment for ozone or carbon monoxide may not program federal funds for any project that will result in a significant increase in Single Occupant Vehicles (SOVs), with the exception of safety improvements or the elimination of bottlenecks (within the limits of the appropriate projects that can be implemented).

e. In TMAs designated as nonattainment for ozone or carbon monoxide, the CMP shall provide an analysis of reasonable (including multimodal) travel demand reduction and operational management strategies for a corridor in which a project with a significant increase in single occupancy vehicle (SOV) capacity is proposed to move forward with federal funds.

f. State laws, rules, and regulations pertaining to congestion management systems or programs may constitute the congestion management process, if FHWA and FTA find that these are consistent with the intent of this process.

2.1.3 CMP Guidebook
Federal Eight-Step Congestion Management Process

In April 2011 the FHWA released Congestion Management Process: A Guidebook, which provides additional detail and guidance to MPOs in the development and implementation of a congestion management process.

This guidebook includes an eight-step process that summarizes the key parts of an ongoing congestion management process. These steps are summarized in ***Figure 2-1***.

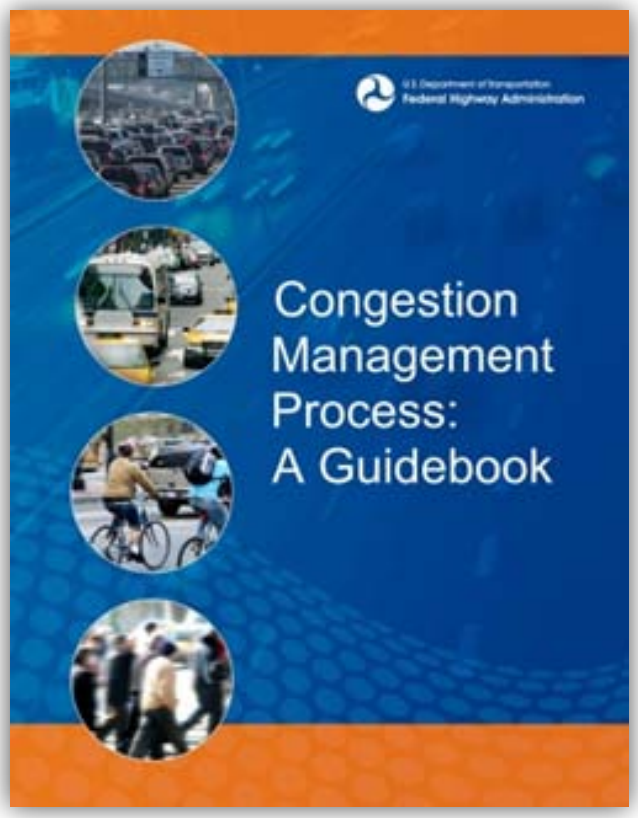


Figure 2-1: Federal Eight-Step Congestion Management Process

2.2 State Requirements and Related Initiatives

Maintenance of a CMP is a requirement for all MPOs under Florida law. For MPOs in TMAs, it is also required under federal law. Consistent with the guidance from the Final Rule on the CMP for TMAs (Section 450.320), as presented earlier in this report, of the CMP Update is to "address congestion management through a process that provides for safe and effective integrated management and operation of the multi-modal transportation system."

2.2.1 TSM&O and Related State Initiatives

The Florida Department of Transportation has developed a statewide strategic plan for Transportation Systems Management and Operations (TSM&O). The strategic plan focuses on several elements that coincide with goals and strategies used by MetroPlan Orlando, such as:

- Performance measurement
- Active management of the multimodal network
- Safety and mobility

The FDOT TSM&O vision is "To operate our transportation system at the highest level of cost effective performance." TSM&O initiatives strive to implement projects that maximize the efficiency of the system. Actions and strategies listed in the Strategic Plan include:

- Ramp signals
- Advanced Traffic Management Systems (ATMS)
- Severe Incident Response Vehicles
- Managed lanes
- Incident management
- Rapid Incident Scene Clearance
- Traveler information
- Arterial management
- Work zone traffic management
- Weather information
- Variable speed limits

These types of improvements and policies are similar to the goals and strategies in the CMP; the primary difference is that the CMP focuses on areas that are congested, whereas TSM&O includes the entire transportation system. FDOT is currently coordinating with MPOs and local partners to more effectively integrate planning with TSM&O initiatives.

2.3 Related MetroPlan Orlando Activities

MetroPlan Orlando's Management and Operations (M&O) Subcommittee was formed in 2003 to address the increased emphasis on safe and efficient management of existing facilities. Since

its inception, the M&O Subcommittee has increased its emphasis on transportation strategies that make systems more efficient.

The M&O Subcommittee has directed congestion management activities, plans and processes that exceed the requirements of federal transportation bills. The evolving concepts of congestion management continue to move toward a more data driven, performance based approach, and the M&O Subcommittee continues to implement new technologies and systems to improve regional efficiencies.

Since adopting the year 2030 Long Range Transportation Plan and implementing the initial CMP, the M&O Subcommittee has programmed several types of improvement strategies. Typical improvements include intersection safety projects, pedestrian improvements, signalization upgrades, turn lanes, adaptive signal control, signal re-timing, and advanced traffic management systems. Regional Traffic Management Centers have been implemented, including communication networks and infrastructure.

A signal re-timing effort is funded through MetroPlan Orlando to minimize unnecessary delays. To monitor performance, travel time before-and-after studies are completed for the re-timed corridors. The resulting benefit/cost analysis has helped assure that the efforts are justified, consistently resulting in strong benefit/cost ratios. Travel time savings are also computed, with the year 2013 effort indicating that the re-timing has saved 426,921 vehicle-hours of travel time.

The M&O subcommittee also supports Road Rangers by promoting the program and setting aside annual funding. Road Rangers provides free assistance during incidents to improve safety and reduce delay. When Road Rangers respond to non-emergency incidents, the incidents are cleared faster. Their presence also allows emergency responders to be available for actual emergencies, rather than stopping to help someone with a flat tire, or someone who needs radiator fluid.

2.4 M&O Committee Guidance on the CMP Update

A workshop with the MetroPlan Orlando Management and Operations (M&O) Subcommittee on March 14, 2014 was part of the update to the Congestion Management Process. This workshop included a presentation on revised requirements for a CMP and a series of exercises to guide development of the updated CMP documented in this report. One exercise focused on how well the process currently addresses the guidance in the Federal Eight-Step Process. A summary of those results is in ***Table 2-1***. Favorable support was given to the processes to address Regional Objectives and Program and Implement Strategies. Weakness was identified in addressing Multimodal Performance Measures and to the step to Analyze Congestion Problems and Needs. A significant focus of this update to the CMP will be to strengthen these two areas.

Table 2-1: Evaluation of Existing Congestion Management Process

Federal Eight-Step Process		Great Job (5)	Addresses requirement (4)	Good, but needs improvement (3)	Does not address the requirement (2)	Unsure (N/A)	Total Points	Avg. Points
No.	Topic	Total Points	Total Points	Total Points	Total Points	Amount Selected		
1	Develop Regional Objectives	15	12	18	0	0	45	3.8
2	Define the Regional CMP Network	0	20	18	0	1	39	3.3
3	Develop Multimodal Performance Measures	0	8	15	8	1	32	2.7
4	Collect Data/ Monitor System Performance	0	16	21	2	0	39	3.3
5	Analyze Congestion Problems and Needs	0	16	18	2	1	37	3.1
6	Identify & Assess Strategies	0	16	21	0	1	38	3.2
7	Program and Implement Strategies	5	20	18	0	0	43	3.6
8	Evaluate Strategy Effectiveness	0	12	18	4	1	35	2.9

3.0 METROPLAN ORLANDO'S EIGHT-STEP CONGESTION MANAGEMENT PROCESS

This section documents the revised Congestion Management Process that will be used to address the federal requirements and unique needs and opportunities of the three-county area served by MetroPlan Orlando. This process closely matches the Federal Eight-Step Process and includes additional detail where appropriate.

Figure 3-1 illustrates the Eight-Step process that will be used by MetroPlan Orlando. The first three steps will typically be updated concurrent with each update of the Long Range Transportation Plan which takes place every four to five years. Steps 4 through 8 will potentially be updated on an annual basis. The remainder of this section details the steps and how they will be implemented.

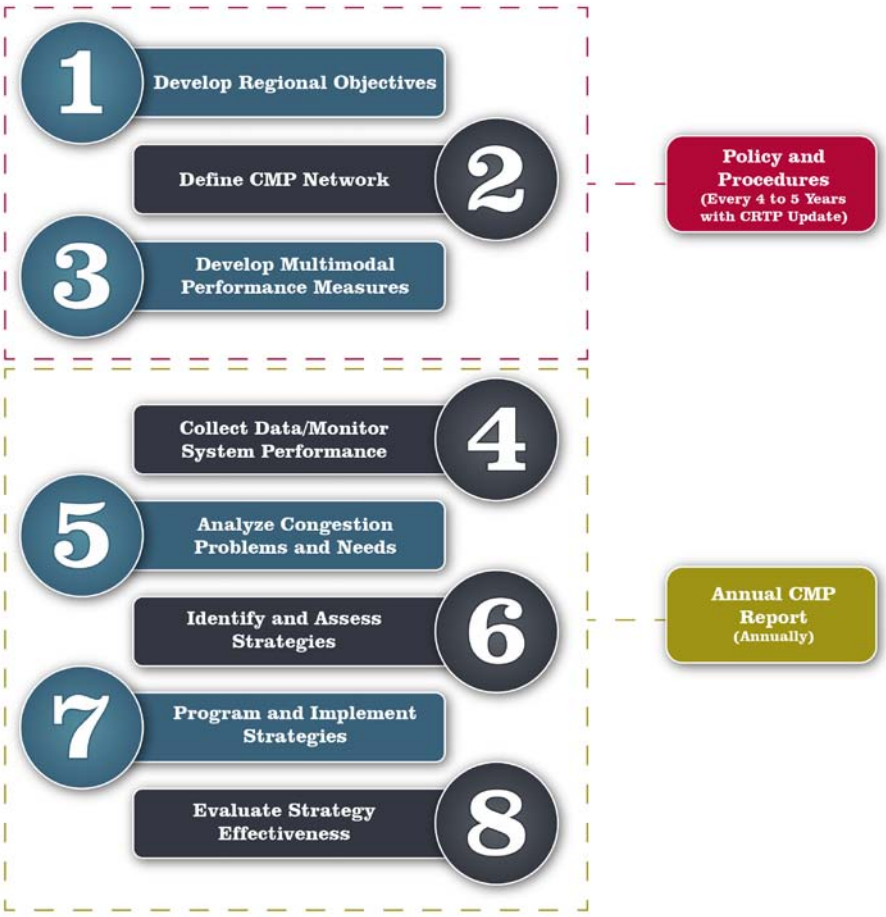


Figure 3-1: MetroPlan Orlando Eight-Step Congestion Management Process

3.1 Step 1: Regional Congestion Management Objectives

Consistent with federal rules and guidance, the first step in the CMP is the definition of objectives to guide the overall process. This update of the Congestion Management Process continues to use the objectives identified for MetroPlan Orlando's 2009 update of the CMP with additional guidance from the M&O Subcommittee. Additional coordination with the Transportation Technical Committee helped ensure that the CMP is consistent with the Long Range Transportation Plan and other MPO plans, goals, and objectives.

To maintain consistency with regional goals and plans, the CMP objectives were selected from the list of Year 2040 LRTP objectives. While some of the objectives shown in Table 3-1 are more applicable than others, it is appropriate for the CMP to address each area identified in the table.

Table 3-1: Congestion Management Process Regional Objectives

Objective	Definition
Freight & Goods Movement	Enhance appropriate facilities to support efficient freight and goods movement.
Balanced System	Provide a system with options that increase vehicle occupancy, minimize per capita vehicle miles traveled by auto, and promote travel by non-auto modes.
Bicycle System	Provide an integrated bicycle system that connects major generators and attractors and promotes intermodal travel opportunities.
Pedestrian System	Provide a pedestrian system that connects to an intermodal transportation system to support neighborhood and community livability and vitality.
Safety	Consider public safety in developing and preserving the transportation system, including consideration for emergencies and natural disasters.
Safety Enhancements	Identify and implement safety enhancements to improve security and reduce crashes, injuries, and fatalities.
System Preservation	Provide appropriate monitoring and maintenance to preserve and enhance system safety and security.
Cost-effectiveness	Provide a cost-effective system to meet the mobility needs of people, freight, services, and goods.
Mobility Enhancements	Promote investment in the transportation system that increases the use of transit, bicycle, and pedestrian modes and reduces dependency on single occupant auto travel.
Intelligent Transportation System	Apply efficient and cost-effective technology to developing and enhancing the regional transportation system.
System Function and Performance	Designate, manage, and preserve system function to promote efficiency and cost-effectiveness consistent with adopted standards.
Investment Coordination	Coordinate local, regional, state, federal and private transportation investments to maximize opportunities and benefits of joint study, design, and construction of projects in the region's Long Range Transportation Plan.
Intergovernmental Coordination	Provide a coordinated and balanced regional perspective on transportation, land use, and system investment.
Air Quality	Develop strategies and evaluate systems that protect air quality.
Funding	Prepare financially feasible and implementable plans that demonstrate sound fiscal policy.

3.2 Step 2: CMP Network

This section of the CMP report presents an overview of the geographic area of application and the transportation network for the MetroPlan Orlando CMP.

Area of Application

The CMP area of application includes the transportation system that needs to be evaluated and monitored and where congestion management policies and procedures need to be applied. The geographic area of application for this CMP Update consists of the major roadway network in Orange, Osceola, and Seminole counties in its entirety.

Transportation Network

Consistent with federal guidelines, the MetroPlan Orlando CMP addresses the multimodal transportation network. In addition to evaluating congestion on the roadways, the CMP evaluates transit, bicycle/pedestrian/trail, and freight movement networks within its area of application. The CMP roadway network is described below.

Roadway Network

The network includes all functionally classified roadways included in the adopted LRTP and/or the Existing plus Committed (E+C) five-year road network (typically, the existing condition plus five years). For example, ***Figure 3-2*** illustrates the existing plus committed roadway network at the time that this document was developed and includes roadways through 2019. This represents the study area and network for the MetroPlan Orlando CMP.

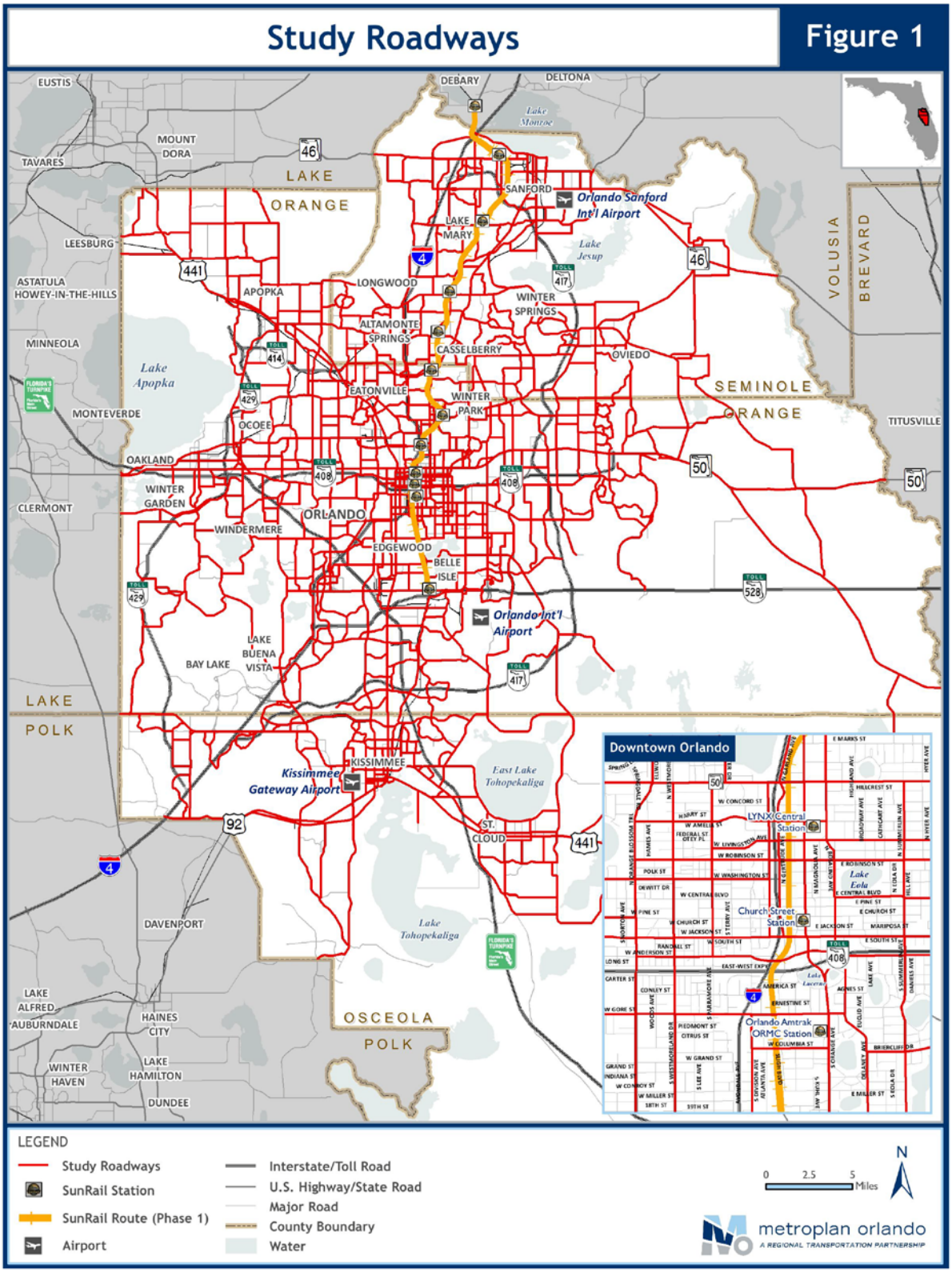


Figure 3-2: Congestion Management Process Regional Network

3.3 Step 3: Development of Multimodal Performance Measures

Performance measures are tools to measure and monitor the transportation system in the CMP. They assist in identifying, tracking and monitoring congestion, but they are dependent upon the transportation network and the availability of data. They typically are used to measure the extent and severity of congestion and to evaluate the effectiveness of the implemented strategies.

As identified by FHWA, a set of good performance measures:

- Includes quantifiable data that are simple to present and interpret and have professional credibility,
- Describes existing conditions and can be used to identify problems and to predict changes,
- Can be calculated easily and with existing field data, uses techniques available for estimating the measure, and achieves consistent results,
- Applies to multiple modes and is meaningful at varying scales and settings.

Performance Measures

The performance measures for the MetroPlan Orlando CMP were selected to address the existing conditions for the three-county multimodal transportation network. The measures also are in compliance with the federal direction to use measures that cover a multimodal network. The measures include elements that address safety, roadway improvements, public transit, bicycle/pedestrian/multi-use trail facilities, travel demand management (TDM), and goods movement.

These performance measures were identified through monitoring activities by various local and state agencies within the three-county area. ***Table 3-2*** summarizes the recommended performance measures for use with the CMP. ***Figure 3-3*** relates the objectives identified in 3.1 with the CMP performance measures.

Table 3-2 Congestion Management Process Performance Measures

Performance Measure	Systemwide	Corridor	Reason
Annual Average Serious Injuries and Fatalities (by Safety Emphasis Area)	YES	YES	FDOT MAP-21 Reporting
Vehicle Miles Traveled	YES	YES	FDOT MAP-21 Reporting
Percent of Travel in Generally Acceptable Operating Conditions (Peak Hour)	YES	YES	FDOT MAP-21 Reporting
Delay	YES	YES	FDOT MAP-21 Reporting
Travel Time Reliability	YES	YES	FDOT MAP-21 Reporting
Percent Miles Severely Congested (Based on V/C Ratio)	YES	Possible	FDOT MAP-21 Reporting
Combination Truck Miles	YES	YES	FDOT MAP-21 Reporting
Combination Truck Travel Time Reliability	YES	YES	FDOT MAP-21 Reporting
Combination Truck Delay	YES	YES	FDOT MAP-21 Reporting
Combination Truck Percent Miles Severely Congested	YES	YES	FDOT MAP-21 Reporting
Fixed Route Major Transit Incidents	YES	YES	FDOT MAP-21 Reporting
Percent of Congested Roadway Centerline Miles with Transit Service	YES	YES	Relates transit service to congested corridors.
Passenger Trips per Revenue Hour	YES	Possible	Transit Measure (From NTD)
Average Peak Service Frequency	YES	Possible	Transit Measure (From NTD)
On-Time Performance	YES	Possible	Transit Measure (From NTD)
Annual Ridership	YES	Possible	Transit Measure (From NTD)
Percent of Congested Roadway Centerline Miles with Pedestrian Facilities	YES	Possible	Multimodal Measure
Percent of Congested Roadway Centerline Miles with Bicycle Facilities	YES	Possible	Multimodal Measure
Number of Registered Carpools or Vanpools	YES	NO	TDM Measure
Number of Crashes Involving Heavy Vehicles	YES	Possible	Freight Safety Measure
Signal retiming cost/benefit	NO	YES	Existing Measure
Peak-hour travel speed – indicated as a percent of the posted speed limit.	NO	YES	Existing Measure
Incident duration	YES	YES	Existing Measure

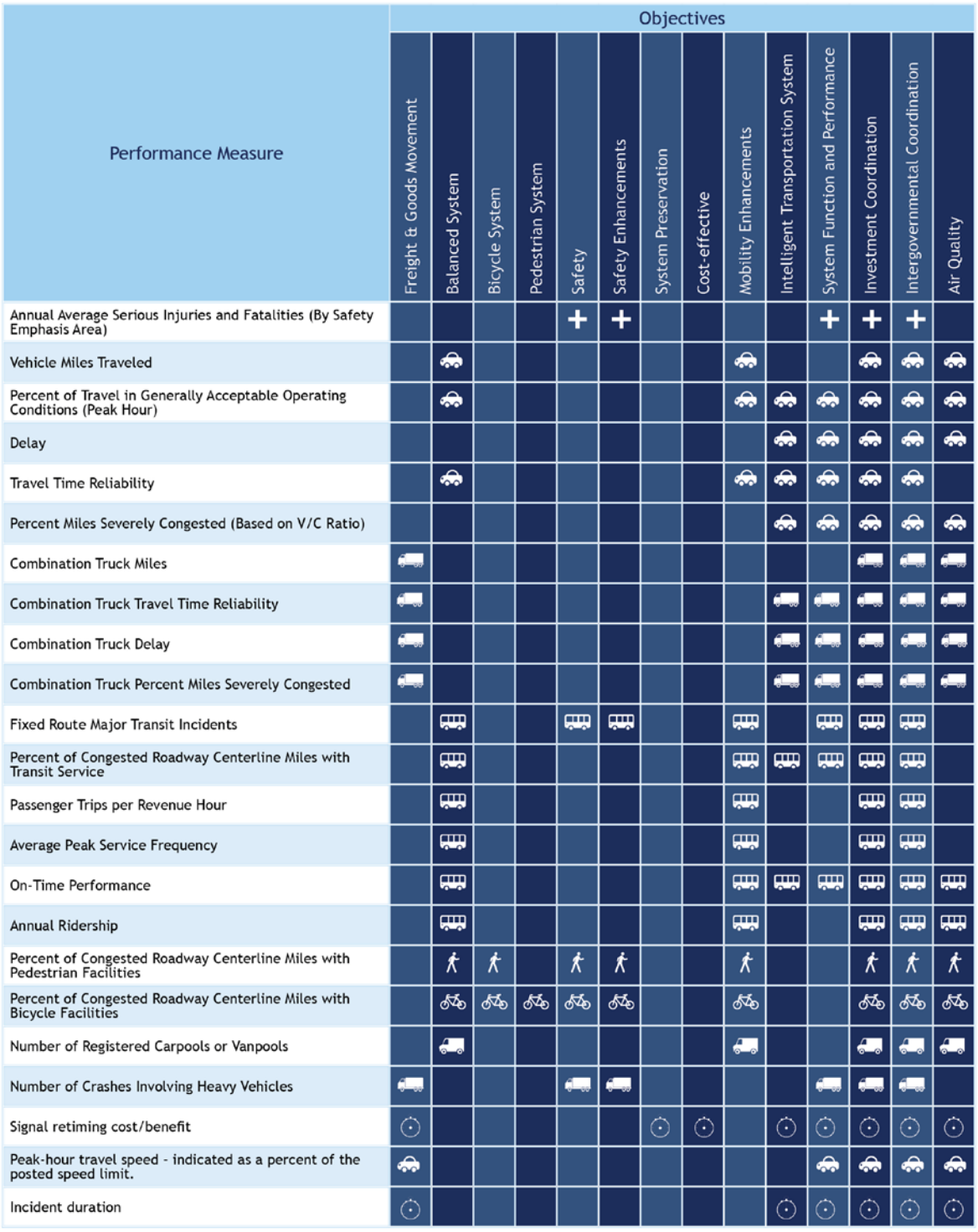


Figure 3-3 Relation of CMP Objectives to Performance Measures (the icons used to indicate the relationship are based on the dominant mode, when applicable)

3.4 Step 4: Data Collection and System Performance

FHWA identifies congestion monitoring as just one transportation system performance aspect that leads to more effective investment decisions for transportation improvements. Safety, physical condition, environmental quality, economic development, quality of life, and customer satisfaction are among others that require monitoring.

The Final Rule on Metropolitan Transportation Planning calls for a coordinated data program "to assess the extent of congestion, to contribute in determining the causes of congestion, and evaluate the efficiency and effectiveness of implemented actions." It also indicates that "to the extent possible, this data collection program should be coordinated with existing data sources and coordinated with operations managers in the metropolitan area."

The goal of the MetroPlan Orlando CMP system monitoring plan is to develop an ongoing system relies primarily on data already collected or planned to be collected in the three counties. The components of the plan include roadways, public transit, bicycle/pedestrian/trail, TDM, and goods movement where:

- Roadways are monitored through annual Level of Service (LOS) analysis using traffic counts and other data constantly collected throughout the region.
- Crashes are monitored to help measure non-recurring congestion.
- Transit performance is monitored continuously through various operating and capital plans.
- Bicycle/pedestrian/trail data are monitored and updated in various city and county databases.
- Significant goods movement corridors are evaluated to address mobility needs of the goods movement providers.
- Significant data can be provided by FDOT to address metropolitan and statewide performance measurement reporting requirements of MAP-21.

The MetroPlan Orlando CMP will make use of an Annual Congestion Management System Report to document performance.

MetroPlan Orlando, as part of the system monitoring plan, will typically update the Congestion Management System Report annually. Each year, the MPO will develop a map of congested roadways. Between January and June, preliminary existing and five-year networks will be developed using the most recent traffic counts from the three counties and the latest available FDOT counts, which typically lag behind the county counts.

3.5 Step 5: Analysis of Congestion Problems and Needs (Congested Corridor Selection)

This section summarizes the evaluation of the CMP strategies, including the process for selecting corridors and projects for implementation. Also included are an implementation schedule, implementation responsibilities, costs, and possible funding sources for each strategy proposed.

3.5.1 Congested Corridor Selection and Project Selection Process

The purpose of the CMP is to identify actual projects. The CMP involves selecting congested corridors to be evaluated for potential projects/programs that could be implemented on them. The process has three phases, with an overview illustration provided in ***Figure 3-4:***

3.5.2 Congested Corridor Network Identification (Phase 1)

Annual monitoring reviews level of service on the roads to identify recurring congestion. Roadways that are congested today or forecasted to be congested in five years are considered for review through the CMP. Corridors are identified as "not congested," "approaching congestion or minimally congested," or "extremely congested," as summarized below.

- **Not Congested (currently or in five years without improvements)** — Corridors that are not anticipated to operate below their adopted Level of Service (LOS) standards, either as they are or after improvements in the five-year program are made.
- **Approaching Congestion or Minimally Congested** — Corridors that are approaching congestion or are minimally congested, based on one of the following three criteria (projects on these corridors may have the greatest impact):
    - *Approaching Congestion* — Corridors that are not congested but have segments with traffic volumes at more than 90% of the roadway's capacity at the adopted LOS standard either now or in the forecasted five-year condition without improvement.
    - *Congested Today* — Existing corridors with traffic volumes that exceed the adopted LOS standard but do not exceed the physical capacity of the roadway.
    - *Congestion in 5 Years* — Corridors forecasted in five years to have traffic volumes that exceed the adopted LOS standard but do not exceed the physical capacity of the roadway.

- **Extremely Congested** — Roadways in the Existing + Committed (E+C) five-year network that have forecast volumes greater than their physical capacities. (This typically occurs when using detailed analysis and the volume-to-capacity ratio is 1.08 or greater.)

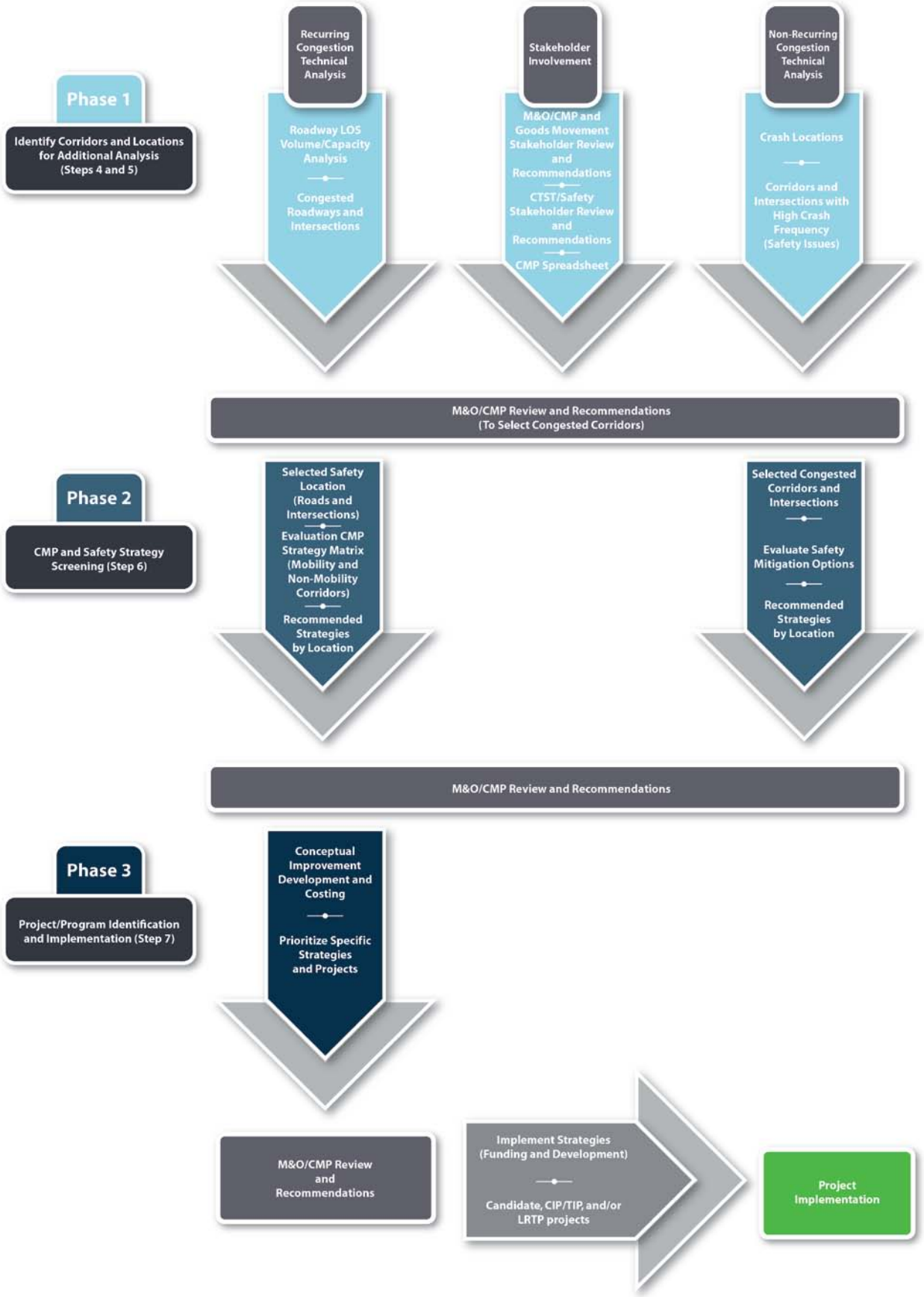


Figure 3-4: Process for Annual CMP Updates and Reporting

Crash data management systems also identify corridors or intersections with a high frequency of crashes that cause non-recurring congestion. Safety improvements reduce potential harm to persons in our communities and can also reduce congestion.

Generally, non-congested corridors do not need to be addressed by the CMP but, the other two categories typically require congestion-relieving strategies (project, mobility improving program, etc.). Extremely congested corridors typically require capacity improvements or strategies that rely significantly on public transportation or reducing travel demand. In some cases, extremely congested corridors may respond favorably to operational improvements. These would be considered on a case-by-case basis. Corridors and intersections that are approaching congested or are minimally congested typically will be the most responsive to CMP improvement strategies. CMP improvements can significantly benefit roads that are constrained and nearing congestion.

After the congested network and corridors are identified, two to three corridors are selected for detailed analysis, project identification and implementation. The M&O committee reviews selected corridors. Once selected and evaluated, they typically will not be re-evaluated for three to five years. Corridors typically are selected because:

1. They are not in the 5-year work program or identified as projects in the 10-year plan, and are forecasted to operate below their adopted level of service standard.
2. They would receive the greatest mobility or operational benefit from the CMP.
3. They are identified as Long Term Concurrency Roadways, using mobility strategies that would be strengthened through mobility improvements.

3.5.3 Other Considerations

The formalized technical process for evaluating recurring and non-recurring congestion may be augmented by these resources:

- **Goods Movement Stakeholder Input** — This is often summarized as hot-spots where goods movement related improvements have been identified.
- **Safety Stakeholder Input** — Typically this information is provided by members of a local Community Traffic Safety Team (CTST), first responders (law enforcement, fire, and/or EMS) or local elected officials.
- **CMP Spreadsheet** — This is an identification of specific issues or concerns identified by or presented to the Management and Operations (M&O) Subcommittee.

3.6 Step 6: Congestion Management Strategies

This section of the CMP Update identifies and evaluates the strategies intended to mitigate congestion in the MetroPlan Orlando roadway network. A Toolbox of Strategies is presented to help policy makers and planners effectively use these congestion reduction strategies.

For MPOs with more than 200,000 people within their planning areas, federal regulations require that the MPO:

> ***"shall address congestion management … through the use of travel demand reduction and operational management strategies."***

In addition, the Final Rule on Statewide and Metropolitan Transportation Planning, states:

> ***"development of a congestion management process should result in multimodal system performance measures and strategies that can be reflected in the metropolitan transportation plan and the Transportation Improvement Program (TIP)."***

Based on these regulations, MPOs must use the CMP to address congestion. Improvement projects must be implemented to help the transportation system run more efficiently.

3.6.1 CMP and Safety Strategy Screening (Phase 2)

As indicated in Figure 3-4, once congested corridors are selected for review, they are screened to identify mitigation strategies to reduce congestion or improve safety. The CMP Strategy Matrix (in Appendix A) addresses recurring congestion, and a safety mitigation review addresses nonrecurring congestion. Nonrecurring congestion is also caused by weather, events and work zones. The matrix includes strategies in five tiers as identified in the CMP Strategy Toolbox. The CMP Strategy Matrix typically is used to quickly review a corridor, and the safety mitigation review is applied based on a review of crash data.

A full range of potential strategies has been identified for MetroPlan Orlando in its multimodal CMP network. These strategies are grouped into categories and presented in ***Figure 3-5***. A full range of demand and operational management strategies are identified for MetroPlan Orlando to assist in mitigating congestion.

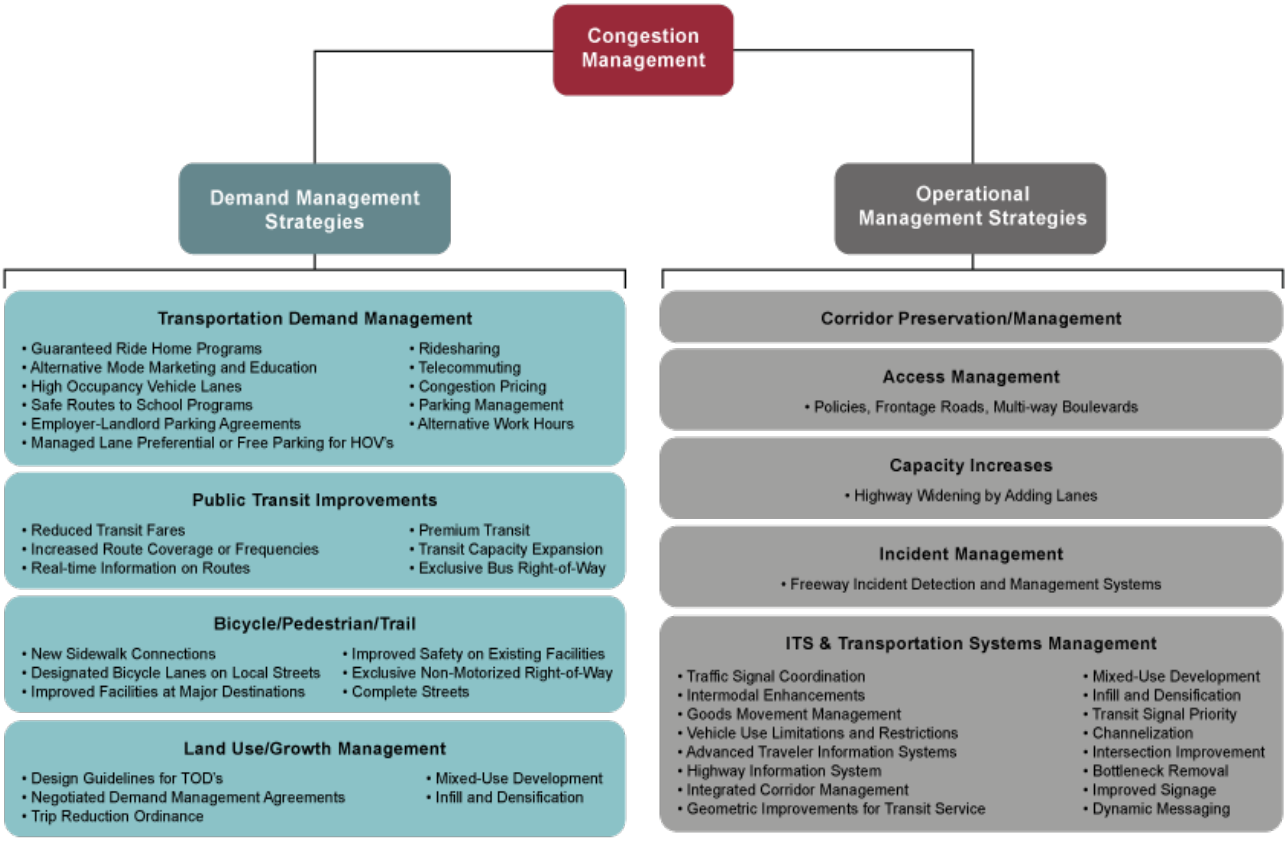
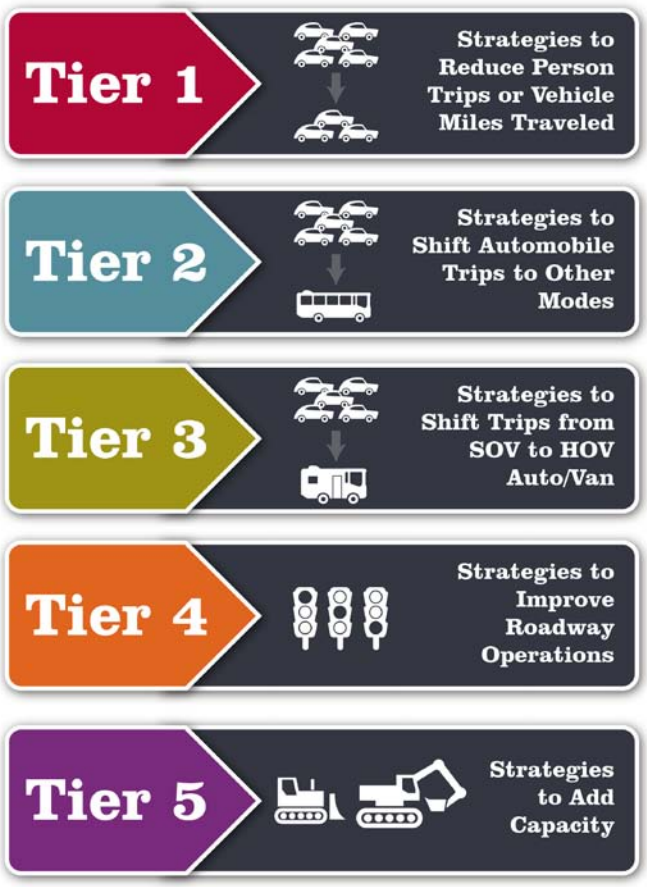


Figure 3-5: Range of Congestion Strategies

3.6.2 Congestion Mitigation Toolbox of Strategies

The CMP uses a strategy toolbox with tiers of strategies to support the congestion strategies for corridors. Following an approach used by other MPOs and promoted by FHWA, the toolbox is arranged so measures at the top take precedence over those at the bottom. The toolbox is presented below.

CMP Toolbox of Strategies



The "top-down" approach promotes the growing sentiment in transportation planning and the FHWA's direction to consider all solutions before recommending additional roadway capacity. The congestion management toolbox is presented in detail in the remainder of this section.

Transportation Demand Management Strategies

These strategies reduce single occupant motor vehicles, as the overall objective is to reduce miles traveled by automobile. The following TDM strategies, in no particular order, are available in the toolbox to potentially reduce travel in peak hours. Strategies include:

- **Congestion Pricing** — Congestion pricing can be static or dynamic. Static pricing requires higher tolls during traditional peak periods. Dynamic pricing allows toll rates to vary depending upon actual conditions. The more congested the road, the higher the cost to travel on it. Dynamic congestion pricing works best when coupled with real-time information on availability of other routes.
- **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 arrivals/departures. Flex-time allows employees to arrive and leave outside traditional commute periods. Compressed work weeks reduce the number of workdays per week, while increasing the number of work hours per day.
- **Telecommuting** — Telecommuting policies let employees work at home or a regional center instead of going into the office, all the time or some days per week.
- **Guaranteed Ride Home Programs** — These provide safety nets to people who carpool or take transit to work, so they can get home if emergencies arise.
- **Alternative Mode Marketing and Education** — Providing education on alternative transportation can increase demand for alternative modes. This strategy can include websites that compute directions and travel times for multiple modes of travel.
- **Safe Routes to School** — This federally-funded program helps communities invest in pedestrian and bicycle infrastructure around schools.
- **Preferential or Free Parking for HOVs** — This program provides an incentive for employees to carpool with preferred or free-of-charge parking.

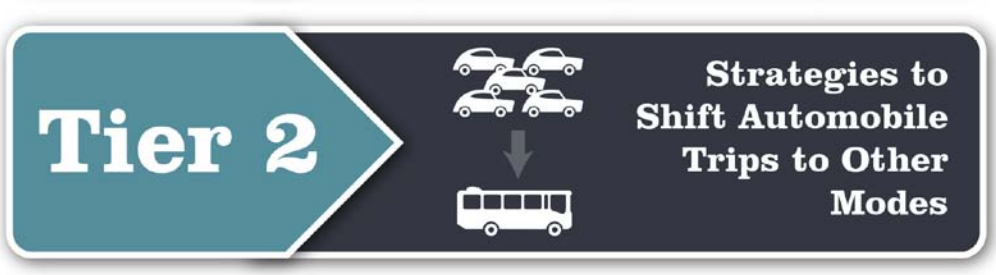
Land Use/Growth Management Strategies

The strategies in this category include policies and regulations that would decrease the number of auto trips and trip lengths while promoting transit and non-motorized transportation. Strategies include:

- **Negotiated Demand Management Agreements** — As a condition of development approval, local governments require the private sector to contribute to traffic

mitigation agreements. These typically set a traffic reduction goal (often expressed as a minimum level of ridesharing or a stipulated reduction in automobile trips).

- **Trip Reduction Ordinance** — These limit trip generation from a development. They spread the burden of reducing trips among existing and future developments better than Negotiated Demand Management Agreements.
- **Infill Developments** — This strategy uses infrastructure that exists, rather than building infrastructure on the fringes of the urban area.
- **Transit Oriented Developments** — This strategy clusters housing and/or businesses near transit stations in walkable communities, to reduce auto dependence.
- **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.
- **Mixed-Use Development** — This strategy allows many trips to be made without automobiles, since people can walk to restaurants and services.



Public Transit Strategies

Two types of strategies, capital improvements and operating improvements, are used to enhance the attractiveness of public transit services to shift auto trips to transit. Transit capital improvements generally modernize the transit systems and improve their efficiency; operating improvements make transit more accessible and attractive. The following strategies are included in the toolbox for consideration.

- **Transit Capacity Expansion** — This strategy adds new vehicles to expand transit services.
- **Increasing Bus Route Coverage or Frequencies** — This strategy provides better accessibility to transit to a greater share of the population. Increasing frequency makes transit more attractive to use.
- **Implementing Premium Transit**— Premium transit such as Bus Rapid Transit (BRT) 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.
- **Providing Real-Time Information on Transit Routes** — Providing real-time information on transit vehicle progress at stops, terminals, and/or on personal wireless devices makes transit more attractive.
- **Reducing Transit Fares** —This relatively easy-to-implement strategy encourages transit use, to the extent that high fares are a 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.
- **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.

Non-Motorized Transportation Strategies

Non-motorized strategies include bicycle, pedestrian, and trail facility improvements that encourage non-motorized transportation. Strategies include:

- **New Sidewalk Connections** — Sidewalk connectivity encourages pedestrian traffic.
- **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 roadways through re-striping.
- **Improved Bicycle Facilities at Transit Stations and Other Destinations** — Bicycle racks and bicycle lockers at transit stations and other destinations increase security.

Additional amenities, such as locker rooms with showers at workplaces provide further incentives for using bicycles.

- **Improved Safety of Existing Bicycle and Pedestrian Facilities** — Lighting, signs, striping, traffic control devices, pavement quality, curb cuts and extensions, median refuges, and raised crosswalks can increase bicycle and pedestrian safety.
- **Exclusive Non-Motorized ROW** — Abandoned rail rights-of-way and existing parkland can be used for bicycle trails, improving safety and reducing travel times.
- **Complete Streets** — Designing and operating the entire right-of-way can enable safe access for pedestrians, bicyclists, motorists, and transit users. Elements may include:
    - *Roadside Strategies* — provision of sidewalks, bicycle lanes, frequent pedestrian crossings, median islands, and accessible pedestrian signals encourage trips via walking or biking.
    - *Transit Strategies* — provision of exclusive bus lanes, transit priority, bus bulbs, and careful consideration of bus stop locations and design encourage users to make trips via transit.
    - *Roadway Design Strategies* — road diets and carefully placed curb extensions can decrease travel speeds on streets and encourage other modes of travel.

What is a road diet?

A road diet, also called a lane reduction, is a technique in transportation planning whereby the number of travel lanes and/or width of the road are reduced in order to achieve improvements.

Transportation Demand Management Strategies

These strategies are recommended to encourage High-Occupancy Vehicle (HOV) use.

- **Ridesharing**— In ridesharing programs, participants are matched with potential candidates for carpools and vanpools. This typically is arranged/encouraged through employers or transportation management agencies. These programs are more effective if combined with HOV lanes, parking management, guaranteed ride home policies, and employer-based incentive programs. In Central Florida, reThink is a service operated by the Florida Department of Transportation to promote commuter options.
- **High Occupancy Vehicle Lanes** — This increases corridor capacity while providing an incentive for single-occupant drivers to shift to ridesharing. These lanes are most effective as part of a comprehensive effort to encourage HOVs, including publicity, outreach, park-and-ride lots, rideshare matching services, and employer incentives.
- **Park-and-Ride Lots** — These can be used in conjunction with HOV lanes and/or express bus services. They are particularly helpful when coupled with alternatives such as carpool/vanpool programs, transit, and HOV lanes.
- **Employer-Landlord Parking Agreements** — Employers can negotiate leases so that they pay for parking spaces used only 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.
- **Parking Management** — This reduces free parking to encourage other modes of transportation. Options include reducing the 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.
- **Managed Lanes** — FHWA defines managed lanes as facilities in which operational strategies are implemented and managed (in real time) responding to conditions. Examples 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.

Intelligent Transportation Systems (ITS) Strategies

The strategies in ITS use new and emerging technologies to mitigate congestion while improving safety and environmental impacts. Typically, these systems have many components, including sensors, electronic signs, cameras, controls, and communication technologies. ITS strategies are sets of components working together to provide information and allow greater control and operation. Strategies include:

- **Dynamic Messaging** — Changeable message signs warn motorists of downstream queues; signs provide travel time estimates, alternate route information, and information on special events, weather, or crashes.
- **Advanced Traveler Information Systems (ATIS)** — These provide data to travelers, such as real-time speed estimates on the Web or over wireless devices. Transit vehicle schedule progress or alternative route options can also be included.
- **Integrated Corridor Management (ICM)** — This strategy, built on an ITS platform, coordinates network operations between facilities creating an interconnected system. A coordinated effort between networks along a corridor can effectively manage the total capacity to reduce congestion.
- **Transit Signal Priority (TSP)** — This strategy uses technology onboard transit vehicles or at signalized intersections to temporarily extend green time, allowing the transit vehicle to avoid stopping at a red light.

Transportation Systems Management Strategies

Transportation Systems Management (TSM) strategies identify operational improvements to enhance the capacity of the system. These strategies typically are used with ITS technologies. Strategies include:

- **Traffic Signal Coordination** — Signals can be: pre-timed and either isolated or synchronized; actuated by events (such as the arrival of a vehicle, pedestrian, bus or emergency vehicle); set to adopt a pre-defined phasing plan based on traffic conditions, or set to calculate an optimal phasing plan based on conditions.
- **Channelization** — This strategy optimizes the flow of traffic for turns, usually using concrete islands or pavement markings. Right-turn channelization islands hinder pedestrian movements and are not a preferred option.
- **Intersection Improvements** — Intersections can be widened and lanes re-striped to increase capacity and safety. This may include auxiliary turn lanes (right or left), widened shoulders, signal phasing changes, and turn lane extensions.

- **Bottleneck Removal** — This strategy removes or corrects short, isolated, and temporary lane reductions, substandard design elements, and other physical limitations that result in a traffic bottleneck.
- **Vehicle Use Limitations and Restrictions** — This strategy includes all-day or selected time-of-day restrictions of vehicles, typically trucks, to increase road capacity.
- **Improved Signage** — Improving or removing signage to clearly communicate location and direction information can help traffic flow.
- **Geometric Improvements for Transit** — This strategy includes providing transit stop locations that do not affect the flow of traffic, improving sight lines, and improving how buses and cars merge or diverge.
- **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, information kiosks, and amenities at transfer locations.
- **Goods Movement Management** — This strategy restricts delivery or pickup of goods in certain areas to reduce congestion.

Incident Management Strategies

- **Freeway Incident Detection and Management Systems** — This strategy addresses primarily non-recurring congestion, typically includes video monitoring and dispatch systems, and may include roving service patrol vehicles.

Access Management Strategies

- **Access Management Policies** — This strategy includes policies to regulate driveways and limit curb cuts and/or policies that require continuity of sidewalk, bicycle, and trail networks.

Corridor Preservation/Management Strategies

- **Corridor Preservation** —This strategy includes land acquisition techniques, such as full title purchases of future rights-of-way and purchase of easements, to plan proactively for future roadway capacity demands.
- **Corridor Management** — This strategy applies primarily in moderate- to high-density areas and includes strategies to manage corridor rights-of-way. The strategies range from land-use regulations to landowner agreements such as subdivision reservations, which mandate dedications of portions of subdivided lots that lie in the future right-of-way.

Strategies to add capacity are the most costly and least desirable and should be last resort for reducing congestion. The key strategy is to increase the capacity of congested roadways through additional travel lanes. Since trying to "build out of congestion" has not proved successful, capacity-adding strategies should be applied only after determining the demand and management strategies identified earlier are **not** feasible.

3.6.3 Safety Mitigation

MetroPlan Orlando's CMP also includes safety as a key component. Consistent with federal and state guidance, the CMP focuses on the Safety Emphasis Areas from the State Strategic Highway Safety Plan from 2012. Reducing crashes that occur on major roadways can reduce nonrecurring congestion. While the delay resulting from crashes cannot be determined easily, it contributes to delay on major roadways. In most cases, additional detailed study will be required to identify safety strategies for a specific location. However, potential strategies are identified for each of the emphasis areas in the Strategic Highway Safety Plan. Strategies below that may be used in the CMP are italicized.

Emphasis Area: Aggressive Driving

Aggressive driving, as defined by state statute, requires at least two of the following contributing causes: speeding, unsafe or improper lane change, following too closely, failure to yield right-of-way, improper passing, and failure to obey traffic control devices.

Potential Strategies

- Support and promote effective law enforcement efforts to reduce aggressive driving;
- Increase training and education on aggressive driving;
- *Identify initiatives within engineering to reduce instances of aggressive driving.*

Emphasis Area: Intersection Crashes

Crashes that occur at or within 250 feet of intersections are defined as intersection related.

Potential Strategies

- Increase safety of intersections for all users;
- Identify systemic intersection safety improvements, update the Intersection safety plan and encourage implementation at the local level;
- Promote improved access management at the state and local level;
- Consider safety in the planning/value engineering manual;

- Update policies, guidelines, handbooks, and training based on the Highway Safety Manual (HSM);
- Increase education programs to provide targeted information to drivers; and Increase targeted enforcement activities at high-crash locations and increase public education on intersection safety.

Emphasis Area: Vulnerable Road Users / Bicycles and Pedestrians

This area includes bicycle and pedestrian crashes, which represent a disproportionate share of fatal crashes.

Potential Strategies

- Increase awareness and understanding of safety issues related to these users;
- Increase compliance with traffic laws and regulations related to pedestrian and bicycle safety through education and enforcement;
- *Develop and use a systemic approach to identify locations and behaviors prone to pedestrian and bicycle crashes and implement multidisciplinary countermeasures;*
- *Encourage adequate funding levels for effective pedestrian and bicycle safety programs and initiatives;*
- *Promote, plan, and implement built environments (urban, suburban, and rural) that encourage safe bicycling and walking;*
- Support national, state, and local legislative initiatives and policies that promote bicycle and pedestrian safety.

Emphasis Area: Vulnerable Road Users / Motorcycles

The emphasis area addresses crashes involving motorcyclists.

Potential Strategies

- Collect and analyze data on motorcycle crashes, injuries, and fatalities and provide local and state agencies with data to make decisions that improve motorcycle safety in Florida;
- Manage motorcycle safety activities in Florida as part of a comprehensive plan that includes centralized program planning, implementation, coordination, and evaluation to maximize the effectiveness of programs;
- Promote personal protective gear and its value in reducing motorcyclist injury levels and increasing rider visibility;
- Ensure persons operating motorcycles on public roadways are specifically authorized to do so;
- Promote adequate rider training and preparation to new and experienced motorcycle riders by qualified instructors at state-approved training centers;
- Reduce alcohol-, drug-, and speed-related motorcycle crashes in Florida;
- Support legislative initiatives that promote motorcycle-related traffic laws and regulations;

- Ensure state and local motorcycle safety programs include law enforcement and emergency services components;
- Incorporate motorcycle-friendly policies and practices into roadway design, traffic control, construction, operation, and maintenance;
- Increase the visibility of motorcyclists;
- Develop and implement communications strategies that target high-risk populations and improve public awareness.

Emphasis Area: Lane-Departure Crashes

These crashes include running off the road, crossing the center median into an oncoming lane, and sideswipe crashes. Running off the road also may involve a rollover or hitting a fixed object. Head-on collisions are related to crashes involving departure from the roadway.

Potential Strategies

- Improve engineering practices to reduce lane-departure crashes, such as installing barriers and guardrails;
- Improve law enforcement practices to better capture data related to lane-departure crashes;
- Increase public education to reduce lane-departure crashes; and
- Partner with emergency responders to reduce severity of lane-departure crashes.

Emphasis Area: Impaired Driving

Originally focused on alcohol, the state has expanded the focus to include drug-impaired driving.

Potential Strategies

- Improve DUI enforcement;
- Improve prosecution and adjudication of impaired driving cases;
- Improve the DUI administrative suspension process;
- Improve prevention, public education, and training;
- Improve the treatment system (i.e., DUI programs, treatment providers, and healthcare providers);
- Improve data collection and analysis;
- Enhance impaired driving legislation.

Emphasis Area: At-Risk Drivers / Aging Road Users

Aging road users are a new emphasis area for 2012. For data purposes in this emphasis area, aging road users are defined as 65-year-olds and older.

Potential Strategies

- Manage and evaluate aging road user safety, access, and mobility activities to maximize the effectiveness of programs and resources;

- Provide the best available data to assist with decisions that improve aging road user safety, access, and mobility;
- Provide information and resources on aging road user safety, access, and mobility;
- Inform public officials about national, state, regional, and local policy and program initiatives that promote and sustain aging road user safety, access, and mobility;
- *Promote and encourage practices that support and enhance aging in place (i.e., improve the environment to better accommodate the safety, access, and mobility of aging road users);*
- *Enhance aging road user safety and mobility through assessment, remediation, and rehabilitation;*
- Promote safe driving and mobility for aging road users through licensing and enforcement;
- Promote the safe mobility of aging vulnerable road users (pedestrians, transit riders, bicyclists, and other non-motorized vehicles);
- Promote the value of prevention strategies and early recognition of at-risk drivers to aging road users and stakeholders;
- Bridge the gap between driving retirement and mobility independence (i.e., alternative transportation mobility options, public transportation, and dementia-friendly transportation).

Emphasis Area: At-Risk Drivers / Teen Drivers

Teen drivers are a new emphasis area for 2012. For data purposes in this emphasis area teen drivers are 15- to 19-year-olds.

Potential Strategies

- Expand the network to build recognition and awareness of teen driver safety and support the Florida Teen Safe Driving Coalition;
- Create a safe driving culture for teen drivers through outreach and education;
- Support initiatives that enhance safe teen driving-related traffic laws and regulations.

Emphasis Area: Distracted Driving

Distracted driving occurs when a driver allows any mental or physical activity to take the focus off driving. There are three main types of distraction: manual – taking your hands off the wheel; visual – taking your eyes off the road; and cognitive – taking your mind off driving.

Potential Strategies

- Increase public awareness and outreach programs on distracted driving;
- Encourage companies, state agencies, and local governments to adopt and enforce policies to reduce distracted driving in company and government vehicles;
- Support legislative initiatives that enhance distracted driving-related traffic laws and regulations;

- Support Graduated Driver's License (GDL) restrictions to reduce distracted driving behaviors in teen drivers;
- Increase law enforcement officer understanding of Florida traffic crash report distracted driving data collection;
- Educate law enforcement, judges, and magistrates on the existing laws that can be applied to distracted driving (careless driving);
- *Deploy high-visibility enforcement on distracted driving subject to appropriate/future legislation.*

Emphasis Area: Traffic Records

This addresses federal requirements and funding for traffic records. This emphasis area was meant to ensure traffic records aligned with the overall SHSP where possible and appropriate.

Potential Strategies

- Provide ongoing coordination in support of multiagency initiatives and projects which improve traffic records information systems;
- Develop and maintain complete, accurate, uniform, and timely traffic records data;
- Provide the ability to link traffic records data;
- Facilitate access to traffic records data;
- Promote the use of traffic records data;
- Use web-based crash database to measure the occurrence and change relating to the safety emphasis areas: aggressive driving, vulnerable users (cyclists, pedestrians, and motorcyclists), intersection crashes, lane departure crashes, impaired driving, at-risk drivers (teen and elderly), and distracted driving.

3.7 Step 7: Program and Implement Strategies

3.7.1 Project Identification and Implementation (Phase 3)

The congestion or safety mitigation strategies identified as having the greatest potential benefit are to be evaluated in detail based on committee or technical recommendations. During this phase, additional analysis of potential projects is undertaken to identify the specific improvement, implementation issues, and costs. Programs such as demand-reducing programs or policy changes are evaluated to identify recommended action items. Recommendations then are made for the projects or programs to be implemented. This may result in refocusing resources, such as existing rideshare programs or local maintenance crews (where possible), programming improvements in the local agency capital improvement programs, or using boxed funds controlled by the MPO. These finally may be identified as projects for implementation in future LRTPs. In summary, projects can be funded by any of the following means:

Funding for Project Implementation

1. Funded with Recurring Resources (Done In-House)
2. Dedicated CMP/M&O Funding
3. Other Funding Programs (Safety, Etc.)
4. High Priority Candidate Future Projects (LRTP)
5. Other Future Projects

3.7.2 Alternative Funding Options for Projects

Management and Operations projects are funded through MetroPlan using an allocation of SU funds, currently 20% of the overall SU funds after setting aside $500,000 per year for Road Rangers. The allocation of SU funds is shown in ***Figure 3-6.*** Each year, MetroPlan Orlando can determine the percentages to allocate to various types of improvements. If a change is made to the allocation percentages, it is not instantaneous. It becomes effective 5 years after the change is approved.

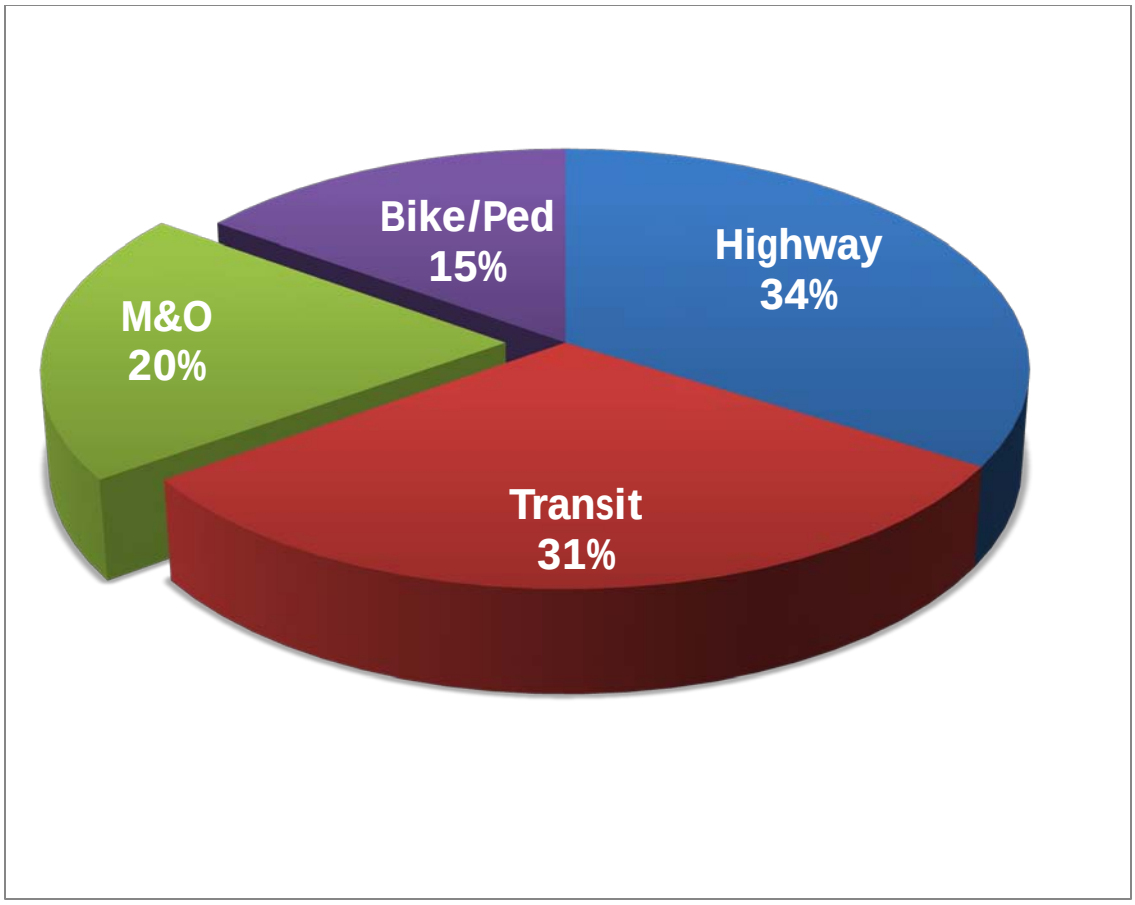


Figure 3-6: SU Funding Allocation

When compared to total state and federal dollars spent on transportation in the area, the overall amount is relatively small, with 20% of SU funds corresponding to approximately 2% of the total state and federal dollars spent. (Note that several funding sources must be spent on specific types of facilities where M&O projects are not eligible.) This comparison illustrates that the investment being made in M&O improvements is relatively small compared to the total dollars spent on transportation.

In addition to the state and federal funding, local governments often implement M&O type improvements. For example, many local governments devote resources to maintain their traffic signal system, improve intersections, and facilitate access to transit.

3.8 Step 8: Monitoring Strategy Effectiveness

The FHWA guidelines call for CMPs to include provisions to monitor the performance of strategies implemented to address congestion. Regulations require "a process for periodic assessment of the efficiency and effectiveness of implemented strategies, in terms of the area's established performance measures." This step helps determine whether operational or policy adjustments are needed to make the current strategies work better and provides information about how various strategies work to implement future approaches within the CMP study area.

Data collection and performance monitoring are ongoing with the various periodic assessments of roadway, transit, bicycle/pedestrian/trail, freight network performance in the planning area served by MetroPlan Orlando. However, this CMP also identifies the need for a process that supports an annual tracking of the effectiveness of implemented congestion mitigation strategies and the multimodal system as a whole. This annual process is described below.

Annual Congestion Management Process Report

As a key tool in the MetroPlan Orlando Congestion Management Process, an Annual Congestion Management Process Report will be developed in the interim years until the next CMP update. This report will track the effectiveness of the implemented strategies, to the extent possible with the available project level data, and conditions of the multimodal transportation system as a whole. The same set of quantifiable performance measures established for the MetroPlan Orlando CMP as described in section 3.3 of this report will be used to measure system performance at corridor and system levels. Where appropriate, performance evaluations may be undertaken for specific programs or projects implemented as part of the CMP. The content, commitment and schedule for preparing an Annual CMP Report will be determined by the Management and Operations (M&O) Subcommittee.

Transformational Projects

MetroPlan Orlando recently submitted an application to participate in the Integrated Corridor Management Deployment Grant. This is a federal program with a goal of optimizing the entire system, rather than optimizing individual networks. MetroPlan submitted an application for the I-4 corridor, which includes eight key elements:

1. Big Data Solution and Decision Support System
2. Active Data Driven Arterial Management System
3. Downtown Event Management, Signal Optimization, and Commuter Parking Management
4. Regional Pricing Strategies
5. Connected Vehicle Pilot
6. Freight Scheduling Decision-Support
7. Asset Management Decision-Support
8. Smart Phone Apps Development

The grant requests funding for planning and systems engineering for the following eight activities:

1. Project management and partner coordination
2. Develop final version of Concept of Operations
3. Develop ICM project management plan
4. Develop ICM system engineering management plan
5. Develop system requirements specifications
6. Develop ICM analysis, modeling and simulation plan

7. Develop implementation plan
8. Develop final report on Knowledge and Technology Transfer effectiveness

Once the initial planning and systems engineering is complete, MetroPlan Orlando will apply for a separate grant to implement, manage, and operate the system.

4.0 CONCLUSIONS AND RECOMMENDATIONS

A vibrant CMP can serve a valuable role in addressing the region's transportation needs in light of the following:

- Many corridors in the urban area have been built out to their maximum number of travel lanes
- Funding levels limit the large scale projects that can be planned and constructed
- Transportation safety continues to be a concern, especially the number of bicycle and pedestrian fatality crashes

A CMP can help the region improve transportation conditions. Key highlights of the MetroPlan CMP include:

- Completing a technical process each year to identify projects needed to reduce congestion and that are prioritized for funding in MetroPlan's Transportation Improvement Program.
- Routine meetings by the MetroPlan Orlando's Management and Operations (M&O) Subcommittee.

The components to be monitored for congestion include roadways, transit, bicycle/pedestrian/trail, TDM, and goods movement where:

- Roadways are monitored through annual LOS analysis using traffic counts and other related data constantly collected throughout the region.
- Crashes are monitored to help measure nonrecurring congestion.
- Transit performance is monitored continuously through various operating and capital plans.
- Bicycle/pedestrian/trail data are monitored and updated in city and county databases.
- Significant goods movement corridors are evaluated to address mobility needs of the goods movement providers.
- Data will be provided by FDOT to address metropolitan and statewide performance measurement reporting requirements of MAP-21.

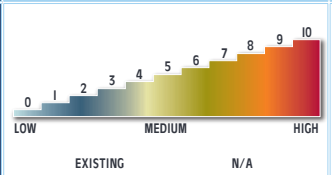
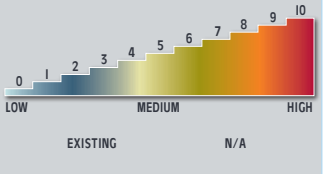
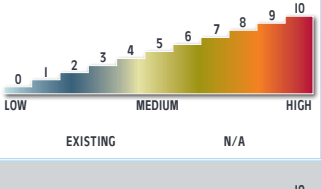
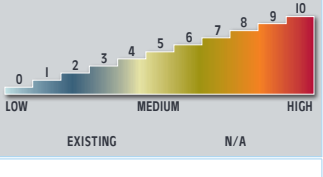
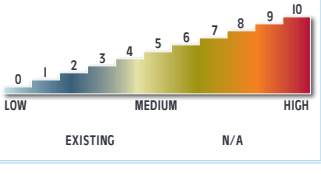
The MetroPlan Orlando CMP will make use of an Annual Congestion Management System Report to document the performance of the transportation system.

APPENDIX A:

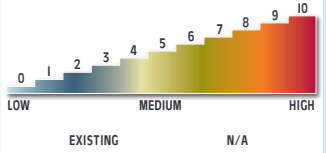
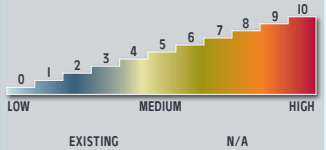
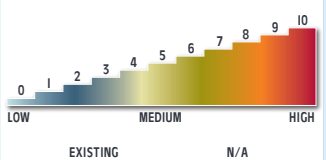
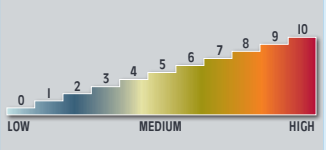
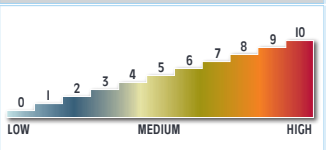
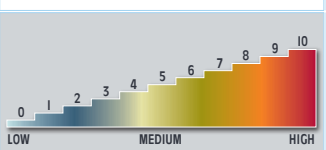
Congestion Mitigation Strategies Matrix

Congestion Mitigation Matrix

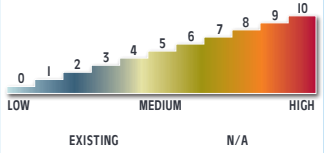
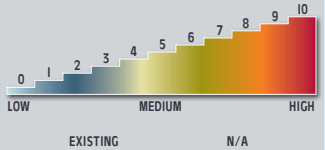
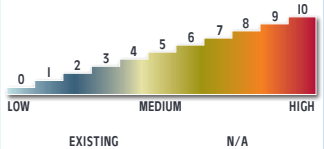
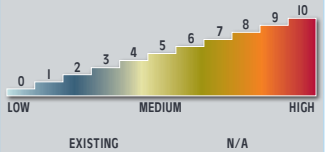
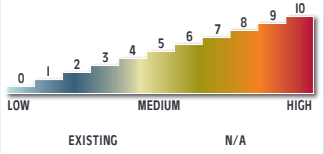
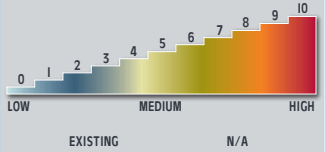
Corridor _____ From _____ To _____ Analyst _____ Date _____

Tier	Strategy #	Congestion Mitigation Strategy	Distribution of Trip Types: Regional Traffic	Regional Access	Local Access	Local Circulation	Potential Effectiveness	Recommendations/ Comments
Tier 1: Strategies to Reduce Person Trips or Vehicle Miles Traveled	1.01	**Congestion Pricing:** 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.						
	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.						
	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.						
	1.04	**Emergency 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.						
	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.						

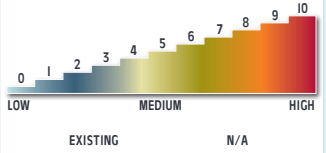
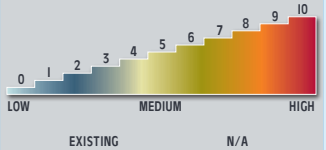
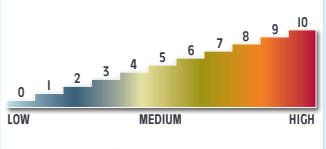
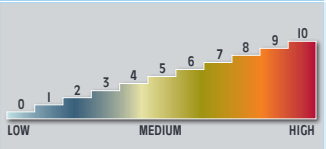
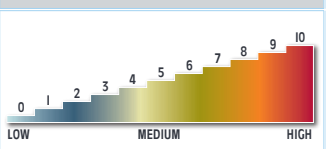
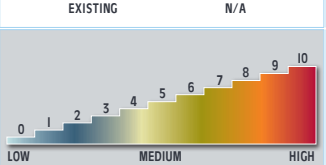
Congestion Mitigation Matrix

Tier	Strategy #	Congestion Mitigation Strategy	Distribution of Trip Types				Potential Effectiveness	Recommendations/ Comments
			Regional Traffic	Regional Access	Local Access	Local Circulation		
Tier 1: Strategies to Reduce Person Trips or Vehicle Miles Traveled	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.						
	1.07	**Preferential for Free Parking for HOVs:** This program provides an incentive for employees to carpool with preferred of free-of-charge parking for HOVs.						
	1.08	**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).						
	1.09	**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.						
	1.1	**Infill developments:** This strategy takes advantage of infrastructure that already exists, rather than building new infrastructure on the fringes of the urban area.						
	1.11	**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.						

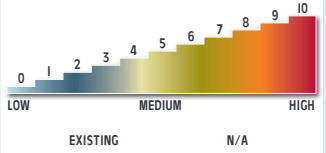
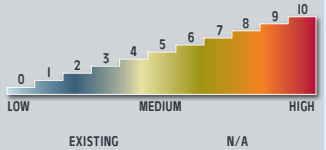
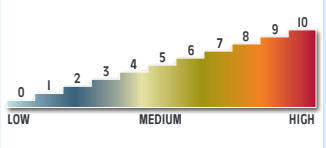
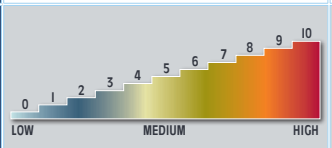
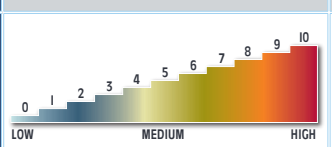
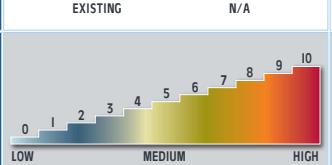
Congestion Mitigation Matrix

Tier	Strategy #	Congestion Mitigation Strategy	Distribution of Trip Types				Potential Effectiveness	Recommendations/ Comments
			Regional Traffic	Regional Access	Local Access	Local Circulation		
Tier One	1.12	**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.						
Tier 2: Strategies to Shift Automobile Trips to Other Modes	2.01	**Transit Capacity Expansion:** This strategy adds new vehicles to expand transit services.						
	2.02	**Increasing Bus Route Coverage or Frequencies:** This strategy provides better accessibility to transit to a greater share of the population. Increasing frequency makes transit more attractive to use.						
	2.03	**Implementing Premium Transit:** Premium transit such as Bus Rapid Transit (BRT) 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.						
	2.04	**Providing Real-Time Information on Transit Routes:** Providing real-time information on bus progress either at bus stops, terminals, and/or personal wireless devices makes bus travel more attractive.						
	2.05	**Reducing Transit Fares:** This relatively easy-to-implement 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.						

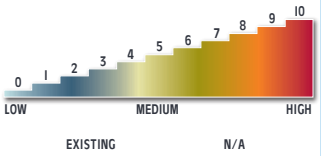
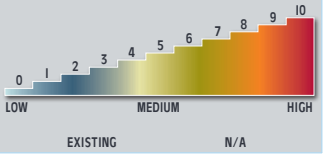
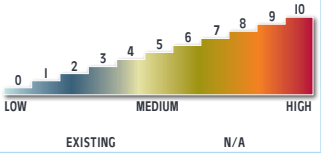
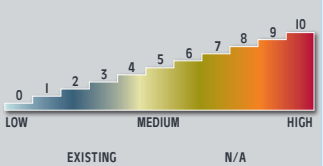
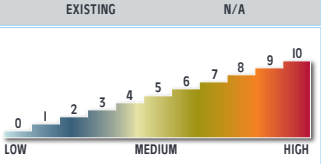
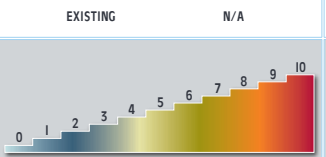
Congestion Mitigation Matrix

Tier	Strategy #	Congestion Mitigation Strategy	Distribution of Trip Types: Regional Traffic	Regional Access	Local Access	Local Circulation	Potential Effectiveness	Recommendations/ Comments
Tier 2: Strategies to Shift Automobile Trips to Other Modes	2.06	**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.						
	2.07	**New Sidewalk Connections:** Increasing sidewalk connectivity encourages pedestrian traffic for short trips.						
	2.08	**Designated Bicycle Lanes on Facilities or Routes:** Enhancing the visibility of bicycle facilities increases the perception of safety. In many cases, bicycle lanes can be added to existing roadways through restriping.						
	2.09	**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.						
	2.1	**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.						
	2.11	**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.						

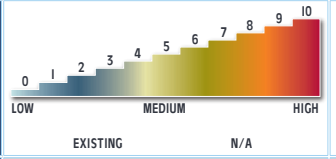
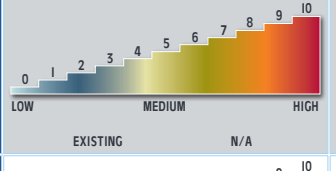
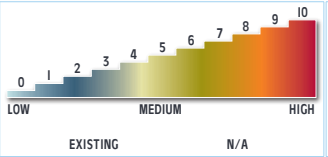
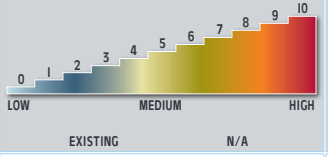
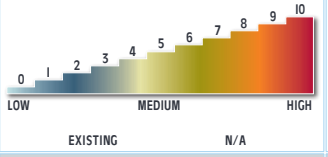
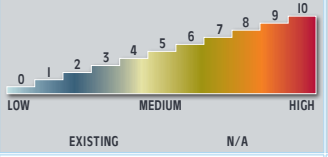
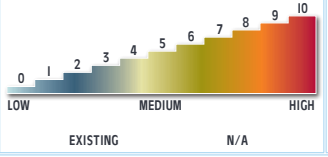
Congestion Mitigation Matrix

Tier	Strategy #	Congestion Mitigation Strategy	Distribution of Trip Types: Regional Traffic	Regional Access	Local Access	Local Circulation	Potential Effectiveness	Recommendations/ Comments
Tier 2	2.12	**Intermodal Enhancements:** Coordinating modes makes movement from one mode to the other easier. These enhancements typically includes 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.						
Tier 3: Strategies to Increase Vehicle Occupancy	3.01	**Ridesharing (Carpools & Vanpools):** In ridesharing programs, participants are matched with potential candidates for sharing rides. This is typically arranged/encouraged through employers or transportation management agencies, which 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.						
	3.02	**High Occupancy Vehicle Lanes:** This increases corridor capacity while at the same time providing an incentive for single-occupant drivers to shift to ridesharing. These lanes are most effective as part of a comprehensive effort to encourage HOVs, including publicity, outreach, park-and-ride lots, rideshare matching services, and employer incentives.						
	3.03	**Park-and-Ride Lots:** These lots can be used in conjunction with HOV lanes and/or express bus services. They are particularly helpful when coupled with other commute alternatives such as carpool/vanpool programs, transit, and/or HOV lanes.						
	3.04	**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.						
	3.05	**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.						

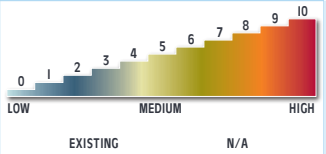
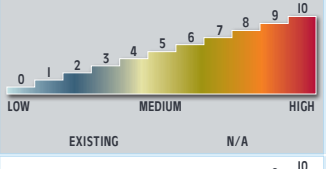
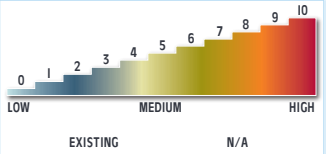
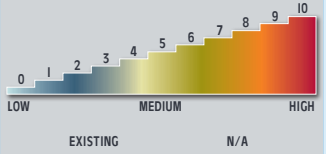
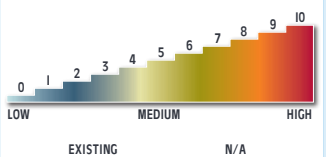
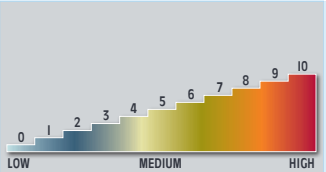
Congestion Mitigation Matrix

Tier	Strategy #	Congestion Mitigation Strategy	Distribution of Trip Types				Potential Effectiveness	Recommendations/ Comments
			Regional Traffic	Regional Access	Local Access	Local Circulation		
Tier 3	3.06	**Managed Lanes:** The Federal Highway Administration (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 the following: 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.						
Tier 4: Strategies to Improve Roadway Operations	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.						
	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.						
	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.						
	4.04	**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.						
	4.05	**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.						

Congestion Mitigation Matrix

Tier	Strategy #	Congestion Mitigation Strategy	Distribution of Trip Types: Regional Traffic	Regional Access	Local Access	Local Circulation	Potential Effectiveness	Recommendations/ Comments
Tier 4: Strategies to Improve Roadway Operations	4.06	**Channelization:** This strategy is used to optimize the flow of traffic for making left or right turns usually using concrete islands or pavement markings.						
	4.07	**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.						
	4.08	**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.						
	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.						
	4.1	**Improved Signage:** Improving or removing signage to clearly communicate location and direction information can improve traffic flow.						
	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.						
	4.12	**Goods Movement Management:** This strategy restricts delivery or pickup of goods in certain areas to reduce congestion.						

Congestion Mitigation Matrix

Tier	Strategy #	Congestion Mitigation Strategy	Distribution of Trip Types: Regional Traffic	Regional Access	Local Access	Local Circulation	Potential Effectiveness	Recommendations/ Comments
Tier 4: Strategies to Improve Roadway Operations	4.13	**Freeway 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.						
	4.14	**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.						
	4.15	**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.						
	4.16	**Corridor Management:** This strategy is applicable primarily in moderate- to high-density areas and 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.						
	4.17	**Complete Streets:** Routinely design and operate the entire right of way to enable safe access for all users including pedestrians, bicyclists, motorists, and transit Element that may be found on a complete street include sidewalks, bike lanes (or wide paved shoulders), special bus lanes, comfortable and accessible transit stops, frequent crossing opportunities, median islands, accessible pedestrian signals, curb extensions, and more.						
Tier 5: Strategies to Add Capacity	5.01	**Add General Purpose Travel Lanes:** Increase the capacity of congested roadways through additional general purpose travel lanes.						

APPENDIX A:

Congestion Mitigation Strategies Matrix