2050 Puerto Rico
Plan de Transportación
Multimodal a Largo Plazo

Appendix: Chapter 6- Congestion Management Process (CMP)

What is a Congestion Management Process?

Congestion management is the application of strategies to improve transportation system performance and reliability by reducing the adverse impacts of congestion on the movement of people and goods. A congestion management process (CMP) is a systematic and regionally accepted approach for managing congestion that provides accurate, up-to-date information on transportation system performance and assesses alternative strategies for congestion management that meet state and local needs (Federal Highway Administration's (FHWA), 2011).

Some expected benefits from CM Process and derived strategies are the improvement of infrastructure capacity, environmental quality and livability and safety, to support sustainability, economic advancement, promote innovation and interagency collaboration, interdisciplinary integration and procure new financial opportunities.

The elements/actions of the CMP are to:

- Develop Regional Objectives
- Define CMP Network
- Develop Multimodal Performance Measures
- Collect Data/Monitor System Performance
- Analyze Congestion Problems and Needs
- Identify and Assess Strategies
- Program and Implement Strategies
- Evaluate Strategy Effectiveness.

Each of these elements is developed below.

Regional Objectives

The first element of a CMP is to consider the desired outcome, this includes the goals that the region wants to achieve. For this element is important to consider that it may not be realistic or desirable to try to eliminate all congestion at the same time, small steps may be the most feasible.

To define the objectives of the 2023 CMP, an analysis was conducted using the 2012 CMP objectives as a basis and comparing them with the goals and objectives of the 2050 LRTP and the TDM objectives. This analysis was made with the purpose of ensure the congruence of the objectives between the different planning and decision-making documents related.

The regional objectives for this CMP are mentioned below along with the correspondent objectives from other related plans as mentioned above:

- ***Reduce Congestion Intensity***, related to the 2050 LRTP GOAL A: To Improve Transportation System's Performance and the CMP 2012 objectives: to reduce traffic demand and to maximize existing capacity.
- ***Reduce and Provide Reliable Travel Times in the National Highway System (NHS)***, related to the LRTP GOAL A: To Improve Transportation System's Performance and the CMP 2012 objective: to provide reliable travel times.
- ***Promote Alternative Modes of Transportation and Intermodal Connectivity***, related to the LRTP GOAL B: Focus on the environment's sustainable development and GOAL C: Improve transportation

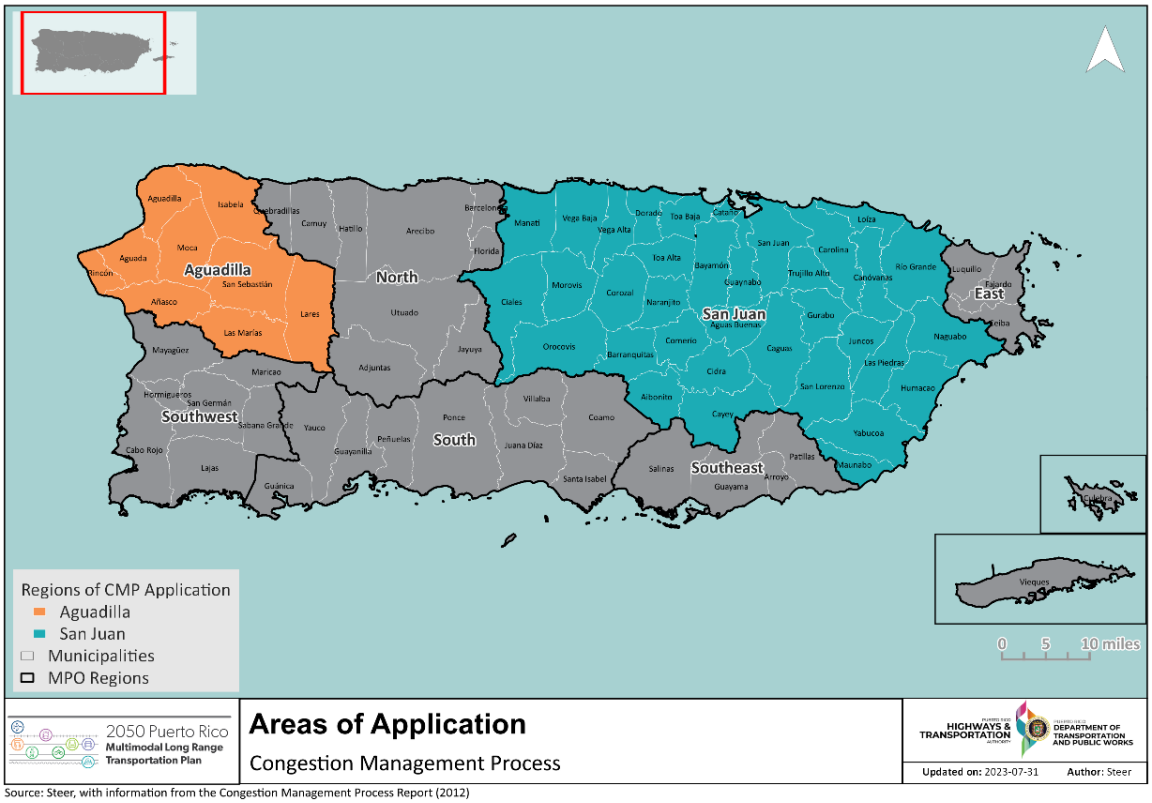
mobility and access for the people and for goods, the CMP 2012 objectives: to reduce traffic demand, to maximize existing capacity, and to improve intermodal connectivity, and the TDM objectives: Environmental Stewardship, Congestion Management and Promotion of Travel Options.

- ***Improve transportation system's safety and security***, related to the LRTP GOAL A: To Improve Transportation System's Performance, and the CMP 2012 objective: to improve travel safety.
- ***Reduce delay caused by incidents and emergencies***, related to the LRTP GOAL A: To Improve Transportation System's Performance, and the CMP 2012 objective: to reduce delay caused by incidents.
- ***Reduce transportation infrastructure's vulnerability for it to withstand extreme weather events through resilient infrastructure***, related to the LRTP GOAL B: Focus on the environment's sustainable development.
- ***Facilitate the efficient movement of freight***, related to the LRTP GOAL D: Reinforce Economic Growth.

Regional CMP Network

The CMP network involves the geographic boundaries or area of application and the system components/network of surface transportation facilities. As shown in the next map, this CMP will be initially applied at the metropolitan areas of San Juan and Aguadilla, as required by federal law for being the two metropolitan areas in Puerto Rico with populations over 200,000. Between San Juan and Aguadilla TMAs, this CMP covers the 50.3% of the island surface.

Figure 1: CMP Area of Application

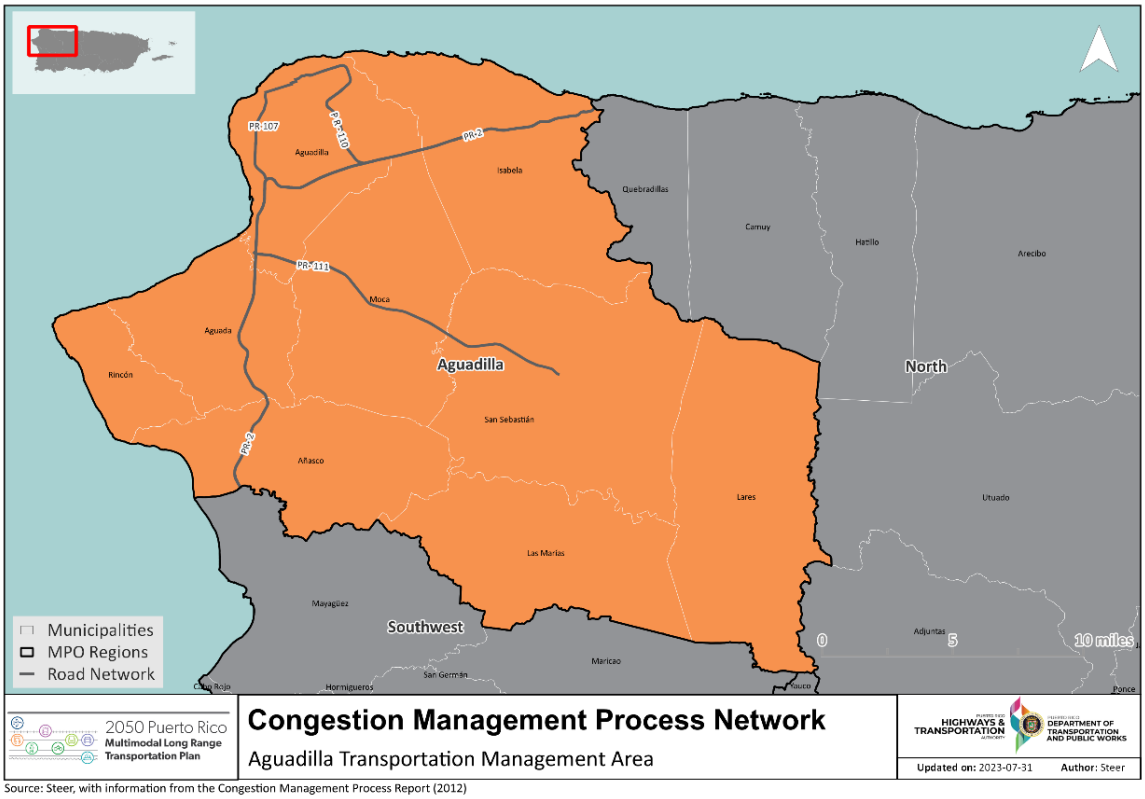


Source: Steer, with information from the Congestion Management Process Report (2012)

Regarding the system components/network of surface transportation facilities, the initial identified congestion management network is composed of selected segments of expressways, semi-expressways, arterials, multi-modal connectors, maritime routes, rail transit routes and bus routes. The following maps show the Congestion Management Network for the Aguadilla and San Juan Regions.

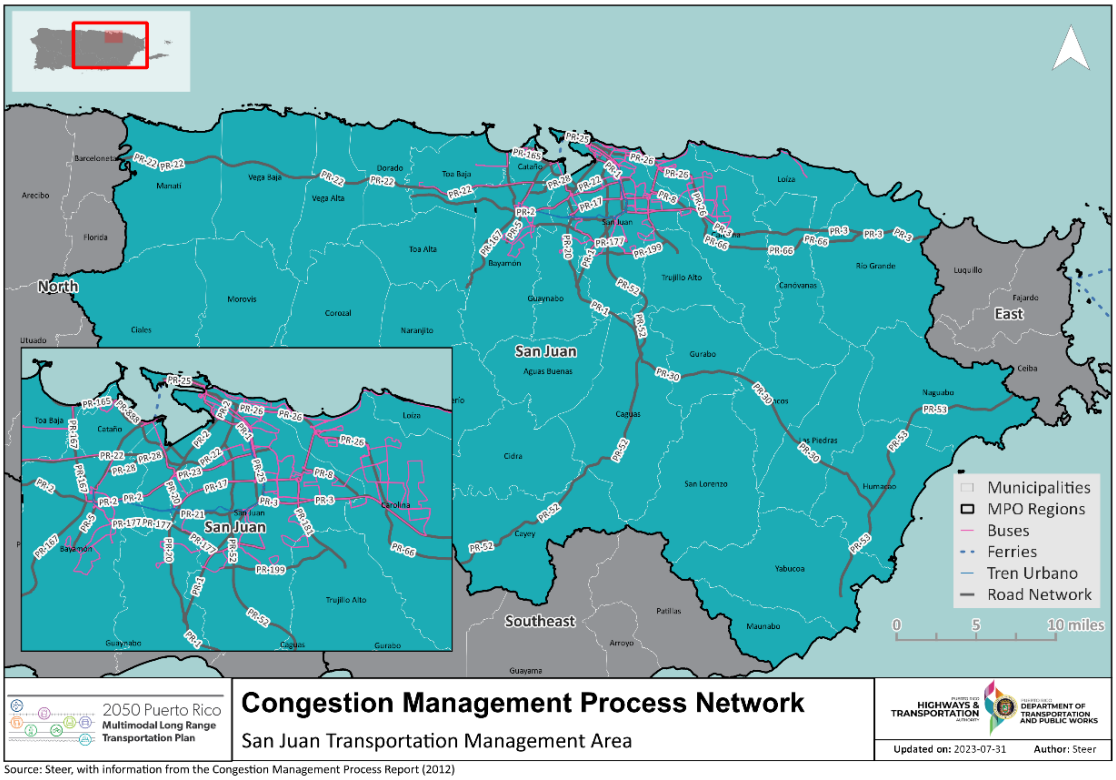
The following network was obtained from the Congestion Management Process Report (2012), performed by CMA for DTOP and corresponds to the PRHTA 2009 CMP network..

Figure 2: Congestion Management Network for the Aguadilla Region



Source: Steer, with information from the Congestion Management Process Report (2012)

Figure 3: Congestion Management Network for the San Juan Region



Source: Steer, with information from the Congestion Management Process Report (2012)

The following table has the details of the CMP Network.

Table 1: Congestion Management Network for San Juan Region

Type of Facility Expressways	Route / Segment Segment
PR-5	From PR-2 to PR-199
PR-18	Entire Route (from PR-22 to PR-1)
PR-20	Entire Route (from PR-1 to PR-2)
PR-22	From PR-26 to Municipality limit Manatí / Barceloneta
PR-26	Entire Route (from Intersection #5 (PR-1/PR-25) to Intersection (PR-3/PR-66))
PR-30	Entire Route (from PR-1 to PR-53)
PR-52	From PR-1 to Municipality limit Cayey / Salinas
PR-53	From Municipality limit Ceiba / Naguabo to PR-901 East of Yabucoa to PR-9914
	From PR-901 to PR-901 east of Maunabo (Emajague Sector)
PR-66	Entire Route (from PR-26/PR-3 to PR-3 (Canóvanas))
Semi-Expressways	**Segment**
PR-1	From Intersection #5 (PR-25/PR-26) to PR-35
PR-2	From PR-1 to PR-22
PR-5	From PR-2 to PR-22
PR-17	From PR-26 to PR-1
PR-181	From PR-17 to PR-894 / Vía Encantada St.
Arterials	**Segment**

Type of Facility	Route / Segment
PR-1	From Tanca St. to Intersection #5 (PR-25/PR-26 south of San Antonio Bridge)
	From PR-35 to PR-30
PR-2	From PR-26 to PR-1
	From PR-22 to PR-165
PR-3	From PR-1 San Juan to PR-26/PR-66
	From PR-66 (Canóvanas) to Municipality limit Río Grande / Luquillo
PR-5	From PR-165 to Barbosa Ave. (Cataño Pier area)
PR-8	Entire Route (from PR-17 to PR-3)
PR-17	From PR-1 to PR-19
PR-21	From PR-1 to De Diego Ave.
PR-23	From PR-25 to PR-2/PR-165
PR-25	Entire Route (from Recinto Sur St. / Fortaleza St. to PR-3)
PR-25R	From Norzagaray St. to PR-25 (De la Constitución Ave.)
PR-28	From PR-22 to PR-2
PR-165	From PR-22 to PR-167
PR-167	From PR-165 to PR-22
	From PR-199 to PR-5 (Desvío de Naranjito)
PR-177	From PR-52 to PR-833
PR-199	Entire Route (from PR-181 to Vía Real)
	(from PR-5 to PR-167)
PR-880	Entire Route (from PR-2 to TU Station Torrimar Station)
PR-888	From Destino St. to Barbosa Ave.
C Avenue	From PR-28 to PR-2
Colectora Central Main St./Ruíz Soter Ave.	Entire Route (from PR-2 to TU Station Jardines Station)
Ing. Salvador V. Caro Ave.	From PR-26 to Luis Muñoz Marín Int. Airport
Multi-modal Connectors	**Segment**
PR-1	From Tanca St. to Intersection #5 (PR-25/PR-26 south of San Antonio Bridge)
PR-5	From PR-2 to PR-22
	From PR-165 to Barbosa Ave. (Cataño Pier area)
PR-21	From PR-18 to De Diego Ave.
PR-28	From PR-22 to PR-2
PR-880	Entire Route (from PR-2 to TU Station Torrimar Station)
PR-888	From Destino St. to Barbosa Ave.
C Avenue	From PR-28 to PR-2
Colectora Central Main /Ruíz Soter Ave.	Entire Route (from PR-2 to TU Station Jardines Station)
Ing. Salvador V. Caro Ave.	From PR-26 to Luis Muñoz Marín Int. Airport
Maritime	**Segment**
Cataño Route	From Cataño Ferry Terminal to Pier 2 Old San Juan Ferry Terminal
San Juan Route	From Hato Rey Ferry Terminal to Pier 2 Old San Juan Ferry Terminal
Rail	**Route**
Tren Urbano	Entire Route (from Sagrado Corazón Station to Bayamón Station)
Buses	**Route**
C-43	From San Juan – Iturregui to Monserrate Ave. – Carolina
T-21	From TU Sagrado Corazón Terminal – San Juan to Covadonga Terminal – San Juan
T-41	From TU Piñero – San Juan to Iturregui – Carolina

Type of Facility	Route / Segment
M-1	From TU Sagrado Corazón Terminal – Barbosa Ave. (Capetillo Terminal) – San Juan

Source: Congestion Management Process Report (2012)

Table 2: Congestion Management Network for Aguadilla

Type of Facility	Road / Segment
Arterials	**Segment**
PR-2	From Municipality limit Quebradillas/Isabela to Municipality limit Añasco/Mayagüez
PR-107	From PR-2 to Rafael Hernández Airport
PR-110	From PR-2 to Rafael Hernández Airport
PR-111	From PR-2 to PR-125
PR-2R	From PR-2 to PR-111
Multi-modal Connectors	**Segment**
PR-107	From PR-2 to Rafael Hernández Airport
PR-110	From PR-2 to Rafael Hernández Airport
Local Streets for Airport Access	**Segment**
Borinquen Ave.	Only a few blocks on each local street are part of the CMP network
Ing. Orlando Alarcon Ave.	Only a few blocks on each local street are part of the CMP network
Crown Rd.	Only a few blocks on each local street are part of the CMP network
Guard St.	Only a few blocks on each local street are part of the CMP network
Wing Rd.	Only a few blocks on each local street are part of the CMP network
San Antonio Rd.	Only a few blocks on each local street are part of the CMP network

Source: Congestion Management Process Report (2012)

Multimodal Performance Measures

One key to the effectiveness of the CMP is the ability to adequately assess system performance by quantifying levels of congestion and providing an analytical framework to determine congestion trends. For this purpose, Performance Measures are the key measures that will define and measure congestion. These measures should relate and support the regional objectives developed on the first element.

Performance measures serve multiple purposes that intersect and overlap in the context of the CMP, including:

- To characterize existing and anticipated conditions on the transportation system;
- To track progress toward meeting regional objectives;
- To identify specific locations with congestion to address;
- To assess congestion mitigation strategies, programs, and projects; and
- To communicate system performance to decision-makers, the public, and MPO member agencies.

Performance measures can be used at two levels[1]:

[1] Referencing the Congestion Management Process Guidebook: "While not required in MPOs with populations below 200,000, the decision-making process represented by the CMP can still serve as a valuable approach at these smaller Metropolitan Planning Organizations (MPOs)."

- Regional Level – To measure performance of the regional transportation system, this refers to TMA level.
- Local/Corridor Level – To identify locations with congestion problems and to measure the performance of individual segments or system elements.

These Performance Measures below presented correspond to the different existing transportation plans identified on Table 3 of Appendix A. The following table describes the performance measures for this CMP.

Table 3: Congestion Management Performance Measures

Objectives	Performance Measures	Level of Application
Reduce congestion intensity	Volume-to-capacity ratio (V/C), for a segment	Local / Corridor
	Number or share of roadway miles operating at V/C ratio over 1.0	Regional
	Level of Service (LOS), for a segment or intersection	Local
	Number/share of roadway miles at LOS E or worse	Regional
	Average vehicle occupancy: Percent of non-single occupancy vehicle (Non-SOV) travel [23 CFR 490.707(b)]	Regional
	Average peak flow in vehicles per unit of time	Local
Reduce and provide reliable travel times in the NHS	Average Travel Speed	Local
	Travel time index/rate. (Ratio of peak-period to non-peak-period travel time)	Local
	Annual hours of peak-hour excessive delay (PHED) Per Capita [23 CFR 490.707(a)]	Regional
	Vehicle hours of delay (VHD)	Regional
Promote alternate modes of transportation and intermodal connectivity	Average transit occupancy rate	Regional
	Bus-bus, train-bus, and bus-train average transfer time in minutes	Regional
Improve transportation system's safety and security	Number of fatalities	Regional
	Number of fatalities (5-yr MA)	Regional
	Fatality rate (based on hundred million vehicle miles travelled or HMVMT)	Regional
	Number of serious injuries	Regional
	Number of serious injuries (5-yr MA)	
	Serious injuries rate (based on hundred million vehicle miles travelled or HMVMT)	Regional
	Non-motorized fatalities and serious injuries	Regional
Reduce delay caused by incidents and emergencies	Mean time for responders to arrive on scene after notification	CMP Freeways
	Mean incident clearance time	CMP Freeways

Objectives	Performance Measures	Level of Application
Reduce transportation infrastructure's vulnerability for it to withstand extreme weather events through resilient infrastructure	Percentage of transportation infrastructure damages due to a weather event	Regional
Facilitate the efficient movement of freight	Truck Travel Time Reliability (TTTR) Index [23 CFR 490.607]	Regional

*SHSP Goal 2023 Revised

Source: Steer, with inputs from Performance Measures of the Congestion Management Process Report (2012) and the Performance Measures of the 2050 Long-Range Multimodal Transportation Plan.

Data Collection/Monitor System Performance

This element of the CMP describes the data needed to support the performance measures and who is responsible to collect it. The data must be continuously collected to determine the evolution of the performance measures, therefore the congestion, and to analyze the level of accomplishment of the regional objectives.

The next table shows a list of the performance measures proposed for the CMP and the different measures needed to determine them.

Table 4: Measures Needed to Support the Performance Measures

Performance Measures	Measures
Volume-to-capacity ratio (V/C), for a segment	-Road capacity -Annual Average Daily Traffic (AADT)
Number or share of roadway miles operating at V/C ratio over 1.0	
Level of Service (LOS), for a segment or intersection	- Physical characteristics of the corridor -Free flow speed -Truck and vehicle distribution -Peak hour factor -Peak hour volume -Length of roadway
Number/share of roadway miles at LOS E or worse	
Average vehicle occupancy: Percent of Non-Single Occupancy Vehicle (Non-SOV) Travel [23 CFR 490.707(b)]	- Vehicle occupancy
Average peak flow in vehicles per unit of time	-Peak hour volume
Average travel speed	- Speed
Travel time index/rate (Ratio of peak-period to non-peak-period travel time)	-Free flow travel time -Peak period travel time -Length of roadway -Free flow speed -Congested speed
Annual hours of peak-hour excessive delay (PHED) per capita [23 CFR 490.707(a)]	-Travel times during 15 minutes or one (1) hour intervals -Length of roadway

Performance Measures	Measures
	-Hourly volume -Annual vehicle classification data -Vehicle occupancy factor
Vehicle hours of delay (VHD)	-Length of roadway -Free flow speed -Peak hour average speed
Average transit occupancy rate	-Ridership
Bus-bus, train-bus, and bus-train average transfer time in minutes	-Transfer time
Number of fatalities and 5-year moving average of the number of fatalities	-Number of fatalities
Fatality rate (based on hundred million vehicle miles travelled or HMVMT)	-Number of fatalities vehicle miles travelled
Serious injuries and 5-year moving average of the number of serious injuries	-Number of serious injuries
Serious injuries rate (based on hundred million vehicle miles travelled or HMVMT)	-Number of serious injuries vehicle miles travelled
Non-motorized fatalities and serious injuries	-Number of non-motorized fatalities -Number of non-motorized serious injuries
Mean time for responders to arrive on scene after notification	-Time of notification -Arriving time of responders
Mean incident clearance time	-Incident clearance time
Percentage of transportation infrastructure damages due to a catastrophic event	-Categorization of the transportation infrastructure before a catastrophic event - Categorization of the transportation infrastructure after a catastrophic event
Truck travel time reliability (TTTR) index [23 CFR 490.607]	-Truck travel time

Source: Steer

To monitor the performance measures described above, the following data needs to be constantly collected:

- **Traffic Counts**: Determines the number and class of vehicles that pass a given location during a certain amount of time, without the need to stop or slow down. The data collected is grouped at every 15 minutes or an hour, depending on the needs at the moment. This measure serves to monitor the changes in vehicular volume over time and to determine the Annual Average Daily Traffic (AADT).
- In Puerto Rico, these data are collected through the PRHTA. They have fixed traffic count stations that they monitor on a regular basis, and also, they implement new traffic count stations depending on the need at the moment. It is necessary to coordinate with the PRHTA to use this data as an input for the performance measures.
- **Vehicle Speed**: Measure vehicle speed. This data is collected through PRHTA and an agreement with a third party to make the data collection through an application. PRHTA do the corresponding

analysis to get the average travel speed by segments where the information is collected as needed. The data collected is grouped at every 15 minutes or every hour, depending on the needs at the moment. In addition, PRHTA has access to analytics webpage National Performance Management Research Data Set (NPMRDS). The NPMRDS provides travel time data for passenger, autos, and trucks that includes historical average travel time in five (5) minutes increments on a daily basis covering National Highway System.

- **Vehicle Occupancy Rates**: Number of passengers in a vehicle during a trip by a statistical sampling of vehicle occupancy rates during peak and off-peak periods.
- This data is not collected at the time in Puerto Rico, but it is necessary that PRHTA to collect it. There are different methodologies through which this data could be collected and that will be defined once the collection process starts.
- **Transit Data**: Transit service data including ridership reports and estimates of dwell time at high volume stations or bus stops. This data must be collected through PRITA.
- Law 123-2014 created the Puerto Rico Integrated Transit Authority (PRITA) and authorizes the PRHTA to transfer operations, assets, rights, obligations, and funds related to Tren Urbano (TU) and the transit programs including the Metropolitan Bus Authority (Autoridad Metropolitana de Autobuses, AMA), bus routes and the Maritime Transportation Authority (MTA) to this new Authority. Meaning that all those agencies incorporated will be reporting to PRITA.
- Regarding Público system, as it is individually operated by each driver, no systematic data collection is implemented. For purpose of reporting to the National Transit Database (NTD), a yearly sampling data collection effort is conducted. Apart from that, the Transport and Other Public Services Bureau ("Negociado de Transporte y Otros Servicios Públicos") must have information about the Público system service and performance.
- **Inventory of Transportation Facilities and Infrastructure**: Inventory of transportation facilities and infrastructure. Each new project, as well as damages due to weather conditions, will be registered to keep track of the progress and the conditions of the assets. This data is collected through PRHTA to create the Transportation Asset Management Plan (TAMP) and the Transit Asset Management Plan (TAM). Those plans are updated at a 4-year base. It is correspondent to the 78 municipalities in Puerto Rico.
- The TAMP describes the condition of the NHS pavements and bridges, identifies PRHTA's investment strategies to manage them for 10 years, and forecasts their condition based on those strategies.
  The TAM is used to assess the current condition of the assets owned by transit providers, and to support the long-term capital planning process.
- **Crash Reports**: Registered crashes with information such as severity, mean time for responders to arrive and mean clearance time. This is collected through the Commission for Traffic Safety and PRHTA at the Strategic Highway Safety Plan (SHSP) and the SHSP Annual Report.
- In Puerto Rico this data is collected through PRHTA by the Traffic Management Center (TMC) and the Transit Incident Management (TIM) altogether with the SEGURO Program. The Commission for Traffic Safety collects information and presents it through the Road Safety Observatory.
- The TMC is a center that performs remote monitoring and control functions for traffic signal systems and is fully operational for 16 traffic light systems on the PR-2 Highway from Hormigueros to Mayagüez. This system provides continuous communication and monitoring for the coordinated operation of traffic signals connected through the system which uses a series of sensors and video detector controllers to collect and analyze data from traffic traveling through an intersection to optimize its operation. This data is also stored for future analysis and to modify traffic signal timing

plans in the future once it is determined that an overhaul is needed. System also alerts operators in the event of component failures so that they can take corrective action to minimize the negative impacts these failures have on the transportation network. Provides incident management services and coordination with highway patrol program (SEGURO).

- TIM is part of the Intelligent Transportation System (ITS) project for the San Juan Metropolitan Area (SJMA) and consists of a planned and coordinated multidisciplinary effort to detect, respond to, and clear traffic incidents so that traffic flow can be restores as safely and quickly as possible. Effective TIM reduces the duration and impact of traffic incidents and improves the safety of motorists, accident victims, and emergency services.
  SEGURO is a free roadside assistance service offered by PRHTA to provide safety to the public and first responders in handling traffic incidents. This program aims to reduce the amount of time drivers are exposed to danger while involved in roadway incidents and is available on the following corridors[2]
  - **PR-52:** Luis A. Ferré Highway (km 0 to 30)
  - **PR-66:** Roberto Sánchez Vilella Highway
  - **PR-30:** Cruz Ortiz Stella Expressway
  - **PR-18:** Las Américas Expressway
  - **PR-1:** Luis Muñoz Rivera Expressway
  - **PR-2:** John F. Kennedy Expressway
  - **PR-26:** Román Baldorioty de Castro Expressway
  - **PR-20:** Martínez Nadal Expressway

The next table describes the stakeholders directly related to the data collection, implementation, and management.

Table 5: Stakeholders Related to Data Collection, Implementation and Management

Data	Stakeholder	Program / Area
Traffic Data	PRHTA - Traffic Data Collection and Analysis Office	National Highway System
	PRHTA - Traffic Engineering Office	Highway Performance Monitoring System
	PRHTA - Traffic Engineering Office	Traffic Safety
	PRHTA - Traffic Engineering Office	Intelligent Transportation System
		Traffic Signals
Bus Data	PRITA - Metropolitan Bus Authority First Transit	Regular bus routes
	PRITA - Metropolitan Bus Authority	Paratransit – Programa Llame y Viaje
	Municipalities PRHTA - Strategic Planning Office	Municipal bus routes and Paratransit programs
	PRITA - Metropolitan Bus Authority	Express bus routes (Metrobús)

[2] This corridos are the ones currently available by the time the CMP was updated, they may change in time.

Data	Stakeholder	Program / Area
	First Transit	
	PRITA - Metropolitan Bus Authority First Transit	TU Conexión
	PRITA - Metropolitan Bus Authority First Transit	Metro Urbano
	PRHTA - Strategic Planning Office Transport and Other Public Services Bureau	Públicos
Ferry	PRITA - Maritime Transportation Authority	Ferry services
Roads	Commission for Traffic Safety	Crashes
	PRHTA	Infrastructure conditions

Source: Steer

Congestion Problems & Needs

To identify the congestion management strategies, it is necessary to identify what the problems are, where they are located and what is causing them. This element of the CMP serves as a link between the data collection (Element 4) and strategy identification (Element 6).

There are different traffic analysis tools that are effective at identifying the potential causes of congestion. The Federal Highway Administration[3] has a guide for some of the available tools.

The 2050 LRTP presents a Puerto Rico travel demand model (the model), a PR CUBE model, also referred to as the Island-wide model, that includes the main island of Puerto Rico and the islands of Culebra and Vieques. Such model is a useful tool to identify problems and needs by the PRHTA or trained consultants.

On the other hand, there are reports/literature that are periodically updated identifying problems and situations related to congestion. These reports include the Strategic Highway Safety Plan (SHSP) and the Long-Range Transportation Plan (LRTP).

Some of the more common causes of congestion include:Capacity limitations

- Mix traffic route (transit)
- Geometric limitations
- Work patterns
- Event management
- Weaving sections
- Traffic signal, timing, and phasing
- Traffic control or movement priority
- Weather conditions
- Transit boarding procedures
- Transit driver influence

[3] Source: https://ops.fhwa.dot.gov/trafficanalysistools/index.htm

- Stop or terminal system
- Operations strategies
- Limited system maintenance
- Lack of access management
- Lack of enforcement
- Systems operability.

Identification & Assessment of Strategies

This element turns the data of Element 4 and the analysis of Element 5 into a set of recommended solutions to effectively manage congestion and achieve congestion management objectives.

When identifying the strategies, it's important to consider:

- The contribution to meeting the regional congestion management objectives;
- Local context;
- Contribution to other goals and objectives, such as safety, economic vitality, system preservation, and air quality; and
- The jurisdiction over CMP strategies. Implementing the CMP will typically rely on the actions of other governmental partners, therefore coordination and collaboration among multiple agencies is critical.

A wide range of strategies are available and can be broadly grouped into the following categories:

- **Demand Management Strategies:** provide travelers with more options and reduce the number of vehicles or trips during congested periods.
- **Traffic Operations Strategies:** getting more out of what we have, in terms of infrastructure.
- **Public Transportation Strategies:** Improving transit operations, improving access to transit, and expanding transit service can help reduce the number of vehicles on the road by making transit more attractive or accessible.
- **Road Capacity Strategies:** adding more base capacity to the road network, such as adding additional lanes and building new highways, as well as redesigning specific bottlenecks.

The next tables present different strategies to address specific conditions.

Table 6: Transportation Demand Management Strategies

Possible Cause or Symptom	Congestion Impact	Possible Strategy
Capacity limitations	Decrease travel time index/rate. (Ratio of peak-period to non-peak-period travel time)	- Implementation of traveller information systems
	Decrease volume-to-capacity ratio (V/C), for a segment Decrease number or share of roadway miles operating at V/C ratio over 1.0 Decrease mean time for responders to arrive on scene after notification Decrease mean incident clearance time	- Improvements in alternates reliving routes
	Decrease volume-to-capacity ratio (V/C), for a segment	- Apply congestion pricing techniques
	Decrease volume-to-capacity ratio (V/C), for a segment	- Apply variable parking pricing

Possible Cause or Symptom	Congestion Impact	Possible Strategy
	Decrease number or share of roadway miles operating at V/C ratio over 1.0	
Work Patterns	Decrease annual hours of peak-hour excessive delay (PHED) Per Capita [23 CFR 490.707(a)]	- Flexible work hours programs - Volunteer employer commute program
Event Management	Decrease mean time for responders to arrive on scene after notification	- Development of an event registry and action plan
	Decrease mean time for responders to arrive on scene after notification	- Application of Intelligent Transportation Systems for traveller information system
	Decrease mean time for responders to arrive on scene after notification	- Application of real-time signal controls
	Decrease volume-to-capacity ratio (V/C), for a segment Decrease number or share of roadway miles operating at V/C ratio over 1.0 Decrease mean time for responders to arrive on scene after notification	- Increase capacity by temporarily adding services (buses, boats)
Lack of enforcement	Decrease Level of Service (LOS), for a segment or intersection Increase Truck Travel Time Reliability (TTTR) Index [23 CFR 490.607]	- Restrict trucks delivery times (to night delivery) by laws or ordinances.

Source: Steer with information from the CMP 2012

Table 7: Traffic Operations Strategies

Possible cause or symptom	Congestion impact	Possible strategy
Capacity limitations	Decrease volume-to-capacity ratio (V/C), for a segment	- Conversion of HOV lanes to High Occupancy Toll (HOT) lanes
	Decrease average peak flow in vehicles per unit of time Decrease annual hours of peak-hour excessive delay (PHED) Per Capita [23 CFR 490.707(a)]	- Bus-only shoulder lanes
Mix traffic route (transit)	Decrease number/share of roadway miles at LOS E or worse Decrease average vehicle occupancy: Percent of non-single occupancy vehicle (Non-SOV) travel [23 CFR 490.707(b)] Decrease annual hours of peak-hour excessive delay (PHED) Per Capita [23 CFR 490.707(a)] Increase average transit occupancy rate	- Expansion of the dedicated bus lanes
Geometric limitations	Decrease volume-to-capacity ratio (V/C), for a segment Level of Service (LOS), for a segment or intersection Decrease number/share of roadway miles at LOS E or worse	- Reconfiguration of affected area by redesign and reconstruction (such as adding turning lanes)
	Decrease volume-to-capacity ratio (V/C), for a segment Decrease number or share of roadway miles operating at V/C ratio over 1.0	- Reconfiguration of affected area by laying out different pavement markings
Weaving Sections	Decrease Level of Service (LOS), for a segment or intersection	- Separation of weaving traffic from through traffic

Possible cause or symptom	Congestion impact	Possible strategy
	Decrease number/share of roadway miles at LOS E or worse	
	Decrease volume-to-capacity ratio (V/C), for a segment Decrease travel time index/rate. (Ratio of peak-period to non-peak-period travel time)	- Active control of merging traffic volume (ramp metering)
	Decrease Level of Service (LOS), for a segment or intersection Decrease number/share of roadway miles at LOS E or worse	- Extension of existing acceleration/deceleration lanes where possible
Traffic signal, timing, and phasing	Decrease number of fatalities Decrease fatality rate (based on hundred million vehicle miles travelled or HMVMT) Decrease serious injuries Decrease serious injuries rate (based on hundred million vehicle miles travelled or HMVMT) Decrease non-motorized fatalities and serious injuries	- Installation or repair of traffic detection devices and increased use in video detection devices
	Decrease Level of Service (LOS), for a segment or intersection Decrease number/share of roadway miles at LOS E or worse Decrease vehicle hours of delay (VHD)	- Improvement on traffic signal controller communications
	Decrease Level of Service (LOS), for a segment or intersection Decrease number/share of roadway miles at LOS E or worse Decrease vehicle hours of delay (VHD)	- Traffic signal optimizations for phase sequencing and timings
	Decrease Level of Service (LOS), for a segment or intersection Decrease number/share of roadway miles at LOS E or worse Decrease vehicle hours of delay (VHD)	- Implementation of signal progression technique on warranted corridors
	Decrease Level of Service (LOS), for a segment or intersection Decrease number/share of roadway miles at LOS E or worse Increase average Travel Speed Decrease vehicle hours of delay (VHD)	- Reconfiguration of traffic flow (change direction of traffic of roads or convert to one-way traffic)
	Decrease Level of Service (LOS), for a segment or intersection Decrease number/share of roadway miles at LOS E or worse Decrease vehicle hours of delay (VHD)	- Elimination of unnecessary traffic signals
	Decrease Level of Service (LOS), for a segment or intersection Decrease number/share of roadway miles at LOS E or worse Decrease vehicle hours of delay (VHD)	- Progressive reduction of traffic signal Police intervention as improvements become operational
	Decrease Level of Service (LOS), for a segment or intersection Decrease number/share of roadway miles at LOS E or worse Decrease vehicle hours of delay (VHD)	- Implementation of a traffic control command center for real-time signal management
	Decrease Level of Service (LOS), for a segment or intersection Decrease number/share of roadway miles at LOS E or worse	- Replacement of non-MUTCD compliant roadway signs (design, content, and location)
	Decrease Level of Service (LOS), for a segment or intersection Decrease number/share of roadway miles at LOS E or worse	- Installation of new signs were warranted
	Decrease Level of Service (LOS), for a segment or intersection Decrease number of fatalities Decrease fatality rate (based on hundred million vehicle miles travelled or HMVMT)	- Reconfiguration of pavement markings

Possible cause or symptom	Congestion impact	Possible strategy
	Decrease serious injuries Decrease serious injuries rate (based on hundred million vehicle miles travelled or HMVMT) Decrease non-motorized fatalities and serious injuries	
Traffic control or movement priority	Decrease Level of Service (LOS), for a segment or intersection Decrease number/share of roadway miles at LOS E or worse Decrease number of fatalities Decrease fatality rate (based on hundred million vehicle miles travelled or HMVMT) Decrease serious injuries Decrease serious injuries rate (based on hundred million vehicle miles travelled or HMVMT) Decrease non-motorized fatalities and serious injuries	- Upgrading of current traffic controls (i.e., stopped-controlled intersection to signalized intersection)
	Decrease Level of Service (LOS), for a segment or intersection Decrease number/share of roadway miles at LOS E or worse Decrease number of fatalities Decrease fatality rate (based on hundred million vehicle miles travelled or HMVMT) Decrease serious injuries Decrease serious injuries rate (based on hundred million vehicle miles travelled or HMVMT) Decrease non-motorized fatalities and serious injuries	- Roadway modification (via construction or pavement markings) to establish priority by design.
	Decrease Level of Service (LOS), for a segment or intersection Decrease number/share of roadway miles at LOS E or worse	- Continuous assessment program on work zone traffic control applications
	Decrease volume-to-capacity ratio (V/C), for a segment Decrease Level of Service (LOS), for a segment or intersection Decrease number/share of roadway miles at LOS E or worse	- Restricting turns at key intersections
	Decrease Level of Service (LOS), for a segment or intersection Decrease number/share of roadway miles at LOS E or worse	- Converting streets to one-way operations
Weather conditions	Decerease travel time index/rate. (Ratio of peak-period to non-peak-period travel time) Decrease annual hours of peak-hour excessive delay (PHED) Per Capita [23 CFR 490.707(a)]	- Implementation of traveller information systems
	Decrease number of fatalities Decrease fatality rate (based on hundred million vehicle miles travelled or HMVMT) Decrease serious injuries Decrease serious injuries rate (based on hundred million vehicle miles travelled or HMVMT) Decrease non-motorized fatalities and serious injuries Decrease percentage of transportation infrastructure damages due to a weather event	- Improvement of road visibility during weather events (pavement markings/lighting)

Source: Steer with information from the CMP 2012

Table 8: Public Transportation Strategies

Possible Cause or Symptom	Congestion Impact	Possible Strategy
Transit boarding procedures	Decrease number of fatalities Decrease fatality rate (based on hundred million vehicle miles travelled or HMVMT) Decrease serious injuries Decrease serious injuries rate (based on hundred million vehicle miles travelled or HMVMT) Decrease non-motorized fatalities and serious injuries	- Establishment and enforcement of bus front door boarding and rear door alighting procedures
	Increase Average transit occupancy rate	- Addition of low-floor buses and/or in combination with bus stops boarding platforms
Stop or terminal system	Decrease travel time index/rate. (Ratio of peak-period to non-peak-period travel time) Decrease bus-bus, train-bus, and bus-train average transfer time in minutes	- Implementation and improvement of traveller information systems for transit users
Operations Strategies	Decrease volume-to-capacity ratio (V/C), for a segment Decrease Level of Service (LOS), for a segment or intersection Decrease number/share of roadway miles at LOS E or worse Decrease travel time index/rate. (Ratio of peak-period to non-peak-period travel time) Decrease annual hours of peak-hour excessive delay (PHED) Per Capita [23 CFR 490.707(a)]	- Transit signal priority
	Decrease Level of Service (LOS), for a segment or intersection Decrease number/share of roadway miles at LOS E or worse Increase average transit occupancy rate	- Bus rapid transit
Capacity limitations	Decrease volume-to-capacity ratio (V/C), for a segment Decrease travel time index/rate. (Ratio of peak-period to non-peak-period travel time) Increase average transit occupancy rate	- Reserved travel lanes or rights-of-way for transit operators, including use of shoulders during peak periods - Volunteer employer commute program
	Increase average transit occupancy rate Decrease bus-bus, train-bus, and bus-train average transfer time in minutes	- More frequent transit or expanded hours of service
	Decrease travel time index/rate. (Ratio of peak-period to non-peak-period travel time) Decrease annual hours of peak-hour excessive delay (PHED) Per Capita [23 CFR 490.707(a)] Increase average transit occupancy rate Decrease average vehicle occupancy: Percent of non-single occupancy vehicle (Non-SOV) travel [23 CFR 490.707(b)]	- Expanding the transit network through new bus and rail services

Source: Steer with information from the CMP 2012

Table 9: Road Capacity Strategies

Possible Cause or Symptom	Congestion Impact	Possible Strategy
Capacity limitations	Decrease volume-to-capacity ratio (V/C), for a segment Decrease number or share of roadway miles operating at V/C ratio over 1.0 Decrease number/share of roadway miles at LOS E or worse Decrease number/share of roadway miles at LOS E or worse	- Implementation of HOV lanes
	Decrease number or share of roadway miles operating at V/C ratio over 1.0	- Removing bottlenecks
	Decrease volume-to-capacity ratio (V/C), for a segment Decrease number or share of roadway miles operating at V/C ratio over 1.0	- Center turn lanes
	Decrease volume-to-capacity ratio (V/C), for a segment	- Overpasses or underpasses at congested intersections

Source: Steer with information from the CMP 2012

It is important to have techniques that help to evaluate and select the strategies that are going to be implemented. There are tools and methods that help to assess the potential effectiveness of congestion management strategies, these tools include:

- Travel demand models
- Sketch planning tools
- Past experience or evaluations of strategies
- Analytical/deterministic tools (HCM-based)
- Traffic signal optimization tools
- Simulation models.

The analysis to be carried out with these tools is a general high-level analysis, since a more detailed analysis of potential strategies is included in corridor studies or at project-level studies.

Programmed & Implementation Strategies

It is important to transform the strategies identified on the previous section into implemented projects. For this, the strategies can be implemented/categorized in regional or local strategy.

Regional-level implementation consists of including the strategies into the Long-Range Transportation Plan (LRTP) and Transportation Improvement Program (TIP). One way to integrate the CMP into regional prioritization strategies is to use the CMP to prioritize the projects in the LRTP and/or TIP by developing a scoring process for selecting the projects with more impact. The CMP data can give weight to the importance of a specific projects. In this case, the CMP is being used in the prioritization process of the 2050 LRTP. The overall prioritization process considers different planning factors, with weighted value to prioritize the project and congestion reduction is one of them. However, further on this section (Table 10) contains a specific scoring process for the CMP, in case you want to prioritize the projects only taking into account the CMP objectives.

At local level, the strategies can be assessed by individual studies and implemented using a variety of funding sources. The Unified Planning Work Program (UPWP) presents the planning activities with federal funds by the state, municipalities, and agencies for the San Juan TMA, Aguadilla TMA and all Urbanized Areas Under 200,000 population. Is a two (2) year transportation planning work program detailing transportation planning, programs, and activities to be performed by the PRMPO where the funds are distributed in Program Administration and Planning Support activities, LRTP, Special Project Planning and Data Collection. This activities and projects will help and feed the information to be integrated into the CMP and then to the TIP and LRTP.

One way to integrate CMP at the local level is to set aside specific funding for congestion management projects. An MPO can establish a program to fund small congestion management projects and the CMP can be used to define criteria for the allocation of the funds. This approach is useful in areas where large projects compete for funding and smaller projects may have difficulty entering the competition.

As mentioned above, the process for prioritizing CMP projects is detailed below. For each objective, one or more criteria were defined to which a value must be assigned. The following table shows the breakdown of the objectives with their respective criteria and the description of the scores.

Each project must be assigned a score for each criterion, and these scores are added together to give the project rating. This rating allows the projects to be ranked according to their rating and to know which ones should be prioritized. The higher the score, the more the project should be prioritized.

Table 10: CMP Prioritization Criteria

Objective	Scoring Criteria	Assessment Scoring		Scoring Guidelines
		Points	Description	
Reduce Congestion Intensity	Single Occupant Vehicle (SOV) Travel	2	Project will reduce SOV travel or implement a transportation management strategy on one of the MPO's "congested corridors"	Project has significant ridesharing component (HOT lanes, PNR, etc.) or is a significant transit improvement in CMP-identified congested corridor. "Significant transit improvement" consistent with scoring in "Transit Ridership" category. Interstate and NHS system congested corridors are candidates for +2 as well.
		1	Project may reduce SOV travel on one of the MPO's "congested corridors"	Project has some more low-to-moderate transit improvements or introduces a new bikeway to a "congested corridor."
		0	Project has no impact on SOV travel on one of the MPO's "congested corridors"	
		-1	Project may increase SOV travel on one of the MPO's "congested corridors"	These would be projects that add roadway capacity in a congested, high transit ridership corridor.
	Vehicle Miles Traveled (VMT) Reduction	2	Project will reduce vehicle miles traveled (VMT)	These are significant transit improvements (see below for definition) or regional travel demand management / parking policies. Significant Roadway projects will not reduce VMT.
		1	Project may reduce vehicle miles traveled (VMT)	These are low-to-moderate transit improvements.

Objective	Scoring Criteria	Assessment Scoring		Scoring Guidelines
		Points	Description	
		0	Project has no impact on vehicle miles traveled (VMT) reduction	
		-1	Project may increase vehicle miles traveled (VMT)	Roadway projects that add capacity tend to increase VMT.
	Person Capacity	2	Project will add person capacity to the corridor	These are projects that include a significant ridesharing component, significant transit improvement, apply integrated-corridor management or ITS improvements, or roadway capacity improvement in a corridor with low transit ridership.
		1	Project may add person capacity to the corridor	These are projects that include a low-moderate transit improvement, a bicycle and pedestrian improvement, or a low-moderate roadway capacity improvement (signal coordination / timing improvements, turn lane additions, etc.).
		0	Project has no impact on person capacity	
		-1	Project may reduce person capacity to the corridor	Transit service reductions, or roadway capacity reductions in a corridor where transit ridership is not anticipated to increase significantly as a result.
	Activity Center Access and Reliability	2	Project will improve peak hour travel time or transit frequency to key activity center(s)	Use same metrics as "Peak Period Delay / Transit Travel Time" or transit frequency improvements to designated key activity centers. Key activity centers to be identified as: 1) TMA identified Mobility Hubs, 2) San Juan airport, 3) Convention Center District, 4) Aguadilla Airport
		1	Project may improve peak hour travel time or transit frequency to key activity center(s)	
		0	Project has no impact on peak hour travel time or transit frequency to key activity center(s)	
		-1	Project may degrade peak hour travel time or transit frequency to key activity center(s)	
	Congestion Intensity	2	Project will reduce the intensity of the congestion on the corridor	Congestion intensity is the relative severity of congestion that affects a corridor. It can be measured through indicators such as Volume-to-Capacity ratios or LOS measures that consistently relate the different levels of congestion experienced on roadways.
		1	Project may reduce the intensity of the congestion on the corridor	
		0	Project has no impact on the intensity of the congestion	
		-1	Project may increase the intensity of the congestion on the corridor	

Objective	Scoring Criteria	Assessment Scoring		Scoring Guidelines
		Points	Description	
Reduce and Provide Reliable Travel Times in the National Highway System (NHS),	Reduce and Provide Reliable Travel Times in the NHS.	2	Project will reduce peak period delay or transit travel time on the corridor	Major roadway capacity improvement projects, significant traffic signal upgrades, transit corridor improvements like Transit Signal Priority (TSP) and queue-jumping lanes.
		1	Project may reduce peak period delay or transit travel time on the corridor	Minor roadway capacity improvements or signal timing improvements.
		0	Project has no impact on peak period delay or transit travel time	
		-1	Project may increase peak period delay or transit travel time on the corridor	This would be traffic-inducing projects connected to the corridor (new freeway interchanges or new roadway connections) or capacity reductions.
Promote Alternative Modes of Transportation and Intermodal Connectivity	Multimodal Connectivity	2	Project will provide opportunities for linkages between modes or improves overall multimodal system connectivity	These projects should mimic "Mobility Hubs" definitions. They include (but are not limited to): improved transit stations / shelters, bike share infrastructure, pedestrian infrastructure that are in high development potential locations with frequent transit service.
		1	Project will improve or provide a transit way that connects to and extends one or more existing dedicated transit ways	Transit ways are a major capital project that creates or extends a busway or light-rail line that provides significant travel time benefits to transit (particularly compared to adjacent vehicular traffic) during peak period times and extend the system to main generator/attractor zones.
		0	Project would improve peak hour travel time or transit frequency	
		-1	Project will not impact peak hour travel time or transit frequency	
	Transit Ridership	2	Project will increase transit ridership in corridor	These are "significant" transit improvements that literature and experience elsewhere has shown to have a consistent increase in ridership. "Significant transit improvements" include (but aren't limited to): large increase in existing route service levels (e.g., going from 30-minute to 15-minute headways), increase exclusive bus lane network extension or introducing new modes to a corridor such as light-rail, bus rapid transit (BRT), or other capital improvements that improve bus services like TSP and queue-jumping lanes.
		1	Project may increase transit ridership in corridor	These are more "low-to-moderate" transit improvements such as moving from 20-minute to 15-minute headways, or extending an existing transit line by 1 - 2 miles, etc.
		0	Project has no impact on transit ridership in corridor	

Objective	Scoring Criteria	Assessment Scoring		Scoring Guidelines
		Points	Description	
		-1	Project may reduce transit ridership in corridor	Reductions in transit service levels likely the only way to score a project -1.
	Public Transportation Transfer Time	2	Project will improve public transportation transfer time	
		1	Project may improve public transportation transfer time	
		0	Project has no impact on public transportation transfer time	
		-1	Project may degrade public transportation transfer time	
	Alternative Modes of Transportation	2	Project will improve / promote alternative modes of transportation	Improve alternative modes of transportation and travel demand strategies by implementing and improving pedestrian access, bikes lanes, public transportation plan, recharge ports for electric vehicles, among other environmentally sustainable alternatives, that reduce motorized vehicles dependency and enhance alternative modes of transportation.
		1	Project may improve / promote alternative modes of transportation	
		0	Project has no impact on alternative modes of transportation	
		-1	Project may negatively impact alternative modes of transportation	
Improve Transportation System's Safety and Security	High-Crash Locations	2	Project will or may directly improve safety through improvements at a high-crash location	Projects could include elements that (while not present in existing condition): increase capacity but do not increase speeds or volumes, intersection improvements, install of raised medians, conversion of intersection to roundabout, install lighting where it currently does not exist, install bus bays, install bridge guard rails, install bridge shoulder, install dedicated bus lanes, lower posted speeds.
		1	Project will or may improve safety at a non high-crash location	Project could include demand management, transit, bike, or traffic diversion to a new corridor.
		0	Project has no impact on safety	
		-2	Project may introduce factors that could adversely impact multimodal safety at a high-crash location	Projects could include elements that: increase speeds, increase traffic volumes, non-supportive design features (counter to +2 elements).
Reduce Delay Caused by Incidents and Emergencies	Delay Caused by Incidents and Emergencies	1	Project may directly reduce the delay caused by incidents and emergencies	
		0	Project has no impact on the delay caused by incidents and emergencies	
		-1	Project may introduce factors that could adversely impact the	

Objective	Scoring Criteria	Assessment Scoring		Scoring Guidelines
		Points	Description	
			delay caused by incidents and emergencies	
Facilitate the Efficient Movement of Freight	Freight and Goods Movement	2	Project will improve travel time reliability or operations on a corridor identified on the National Highway Freight Network (Primary, Critical Urban, or Critical Rural Facilities)	Projects that could improve freeway operations and reliability include capacity improvements, active freeway management, Integrated Corridor Management, express route transit projects / park and ride, and traffic incident management programs.
		1	Project will improve travel time reliability or operations on a corridor that has a truck percentage >5% of average annual daily trips	
		0	Project has no detrimental impact on freight and goods movement	
		-1	Project may negatively impact the travel time reliability or operations on a corridor identified on the National Highway Freight Network or a corridor with a truck percentage >5%	

Source: Steer

Evaluation Strategies of Effectiveness

It is important to ensure that implemented strategies are effective at addressing congestion as intended, and to make changes based on the findings. Two general approaches used for this type of analysis are:

- **System-Level Performance Evaluation:** A regional analysis of historical trends to identify improvement or degradation in system performance, for this evaluation, will be helpful to use the performance measures, described on the CMP Element 3, applied at regional level; and
- **Strategy Effectiveness Evaluation:** A project-level or program-level analysis of conditions before and after the implementation of a congestion mitigation effort, will be helpful to use the performance measures, described on the CMP Element 3, applied at local or corridor level.

One approach to measure the effectiveness of a particular strategy is to make a study to examine the conditions before and after the implementation. Another approach is for the MPO to develop a guidance for evaluating strategies and requiring the local project sponsors to conduct the evaluation of their own projects and programs.

Negative findings may be useful for downplaying similar strategies in similar situations and positive findings can be used to encourage further implementation of the same strategy. The information learned from evaluating the strategies is the last step of the CMP and will be used to inform the TIP and LRTP.

At this point, the process will repeat itself, with the feedback from the strategies implemented, the regional objectives, performance measures, congestion problems and the assessment of strategies must be reviewed.

The following table describes some strategies for congestion management that have already been implemented in:

Table 11: List of San Juan TMA projects in STIP Short Term (2017-2020)

AC#	Description	Municipality
300124	Congestion Managed Lanes - Phase 5 - PR-30-San Juan (km 0.30 to km. 7.20) - reversible lane using reversible lane barrier system on PR-30 from Km. 0.30 to Km. 7.20	San Juan / Trujillo Alto / Caguas
520130	Congestion Managed Lanes -Phase 1 - PR-52 -San Juan (km.0.30 to km. 9.16) - Two additional lanes on the median of PR-18 and PR-52 from San Juan to Caguas. These lanes will be managed using dynamic tolling to provide a reliable travel time for users. These lanes will be reversible (AM northbound and PM)	San Juan / Trujillo Alto / Caguas
800508	Congestion Managed Lanes - Phase 4 - PR-52 /PR-30 - Caguas (km. 13.96 to km 16.63) - Improve the PR-52/PR-30 Interchange by providing a bridge interconnecting both roadways. The bridge will improve access from PR-1 to PR-52 northbound for all users and provide access from PR-30 to PR-52 (AM) and from PR-52 to PR-30 (PM) for users of the dynamic toll facility. This phase will also provide open road tolling at the Caguas Norte Toll Plaza. Unidad 1	San Juan / Trujillo Alto / Caguas
800542	L009999542: CONGESTION MANAGED LANES/DYNAMIC TOLL OPERATION PHASE IV-UNIT 2, PR-52 FROM KM 13.5 TO INT. PR-30/PR-1 Congestion Managed Lanes on PR-52 Phase 4 Unit 2, Caguas - Phase IV – Unit II: DTL Extension towards PR-30 by providing a grade separated interchange connecting PR-52 DTL with PR-30. Unidad 2	San Juan / Trujillo Alto / Caguas
800509	Congestion Managed Lanes - ITS (All Phases) - will provide ITS instrumentation for all phases of the Congestion Managed Lanes projects for the operation of the dynamic toll and traffic incident management.	San Juan / Trujillo Alto / Caguas
800510	Congested Managed Lanes - Noise Barriers - Vista Alegre Community, Borinquen Gardens, Parque Forestal, Berm- Residential Area, Quintas de San Luis, Berm-Villa Parana - will provide the noise abatement measures recommended as part of the environmental exclusion document prepared for the Congestion Managed Lanes project.	San Juan / Trujillo Alto / Caguas

Source: Steer with information from the STIP

Bibliography

Federal Highway Administration's (FHWA) *Congestion Management Process: A Guidebook* (2011).