

Congestion Management System (CMS)

Executive Summary

A. Purpose

TEA-21 requires States and larger MPOs to utilize a congestion management system as part of the planning process. The purposes of the CMS are:

- ?? To provide strategies that provide the most efficient and effective use of existing and future transportation facilities.
- ?? To manage congestion and enhance mobility in the region.
- ?? To provide an effective tool for decision-making.

B. Background

Congestion Management System (CMS) is a systematic process for managing congestion that provides information on transportation system performance and alternative strategies for alleviating congestion and enhancing the mobility of persons and goods. The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) established the CMS as an integral component of the metropolitan planning process. In 1996, the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) issued final regulations, which allowed states and local officials greater flexibility in determining the parameters for developing the CMS including performance measures and their acceptable levels.

Because the Transportation Efficiency Act of the 21st Century (TEA-21) requires a CMS in maintenance or nonattainment urbanized areas with populations over 200,000, the CMS has become an ongoing activity in the Richmond region for identifying, developing, evaluating, and implementing transportation strategies to reduce congestion and enhance mobility and safety throughout the region.

The Richmond Area MPO initiated the development of its first regional CMS program through a CMS Advisory Task Force. The Task Force goal was to develop the CMS, fulfilling the Interim Final Rule requirements by the October 1, 1995 deadline. The CMS Advisory Task Force made recommendations for adopting the CMS boundary, highway network, parameters for evaluation, and strategies to consider for implementation. The MPO approved its first regional CMS in October 1997. In July of 1999, the MPO approved the CMS update. This update documented changes that have occurred since the approval of the 1997 CMS.

C. Area of Application

The MPO study area boundary serves as the boundary for the CMS roadway network. Under federal requirements, the study area for the Richmond Area must, at a minimum, encompass both the existing urbanized area and the contiguous area expected to be urbanized during the period covered by the 2023 Long-Range Transportation Plan. It must also cover areas designated as part of the nonattainment/maintenance area for ozone air quality standards. To ensure that the plan covers all urbanized areas, all areas expected to urbanize by 2023, and the regions ozone nonattainment/maintenance area, the study area has been defined to include Hanover County, Henrico County, Town of

Ashland, City of Richmond, a majority of Chesterfield County, and portions of Charles City, Goochland, New Kent, and Powhatan Counties.

D. CMS Network **Highway Network**

The National Highway System (NHS) provides the foundation for the CMS highway network in the Richmond region. The NHS routes serve facilities that are considered to be of national importance to the transportation network, such as ports, airports, intermodal facilities, and strategic defense facilities. All interstates and expressways are included in the NHS as well as selected non-limited access controlled principal arterials. These routes include portions of State Routes 60, 360, and 250; and 33 (Staple Mills Road), 197 (Laburnum Avenue), 156 (Airport Drive), and Parham Road.

There are also other routes in the CMS highway network that are not part of the NHS. These include facilities that are parallel to the interstate highway system and routes that connect two interstate facilities. These facilities are an important part of the CMS network since they are used for emergency routing of interstate traffic when needed (e.g., an accident on an interstate highway may block all through traffic in one or both directions, major interstate construction requiring rerouting of traffic, etc.) The non-NHS corridors include:

- ?? U.S. 1: From VA 54 in the Town of Ashland to the south urban area boundary in Chesterfield County
- ?? U.S. 250: From Parham Road to the west MPO study area boundary in Goochland County
- ?? U.S. 301: From I-295 to U.S. 1
- ?? U.S. 60: From East New Kent County MPO study area boundary to 14th Street in the City of Richmond
- ?? U.S. 60: From Powhatan County MPO study area boundary to VA 288.
- ?? U.S. 360: From Rt. 627 (Pole Green Road) to I-295
- ?? U.S. 360: From I-295 to southwest Chesterfield County MPO study area boundary
- ?? VA 5: From US 60 (Main St) to the Charles City MPO study area boundary

If a facility does not fall into the NHS or non-NHS category, but has been identified as a congested facility, consideration may be given to include that facility in the CMS. However, the proposed facility is subject to approval by the CMS Advisory Committee.

Regional Transit Network

Public transit can provide for congestion relief, therefore, the entire transit network will be considered part of the CMS. Nearly all bus routes operate by the Greater Richmond Transit Company (GRTC) travel along some portion of the CMS highway network.

Major emphasis is placed on routes, which travel significant distances (at least 5 miles) along the network.

Two AMTRAK stations (Richmond and Ashland) are also on the transit network. Construction is also underway for the Main Street Station in downtown Richmond, which is also on the transit network.

Chesterfield will be expanding GRTC bus service with vans that would travel along three routes on the CMS network (Routes 1, 10 and 60). The plans would also establish park-and-ride lots and an express service to carry commuters to and from downtown Richmond.

Other Regional Modes

Other regional components of the network include:

- ?? Port of Richmond (*Commerce Road, Connector Road, and Deepwater Terminal*)
- ?? Richmond International Airport (*VA Route 156, Airport Road South, and Fox Road*)
- ?? CSX Railroad Company
- ?? Norfolk Southern Railroad Company
- ?? Bicycle Facilities on Highway Network

E. Performance Measures

Performance measures are a central element of the Congestion Management System and should provide the basis for identifying the amount, severity, and exact locations of congestion problems in a region. Performance measures can also be used to identify causes of congestion and to evaluate the effectiveness of strategies which are implemented.

The final rule requires that the State and MPO cooperatively identify performance measures that will provide the measure of the extent of traffic congestion in the metropolitan planning area. The CMS parameters selected by the MPO and VDOT evaluate existing and future congestion on the regional network. These performance measures provide a means for the MPO and VDOT to evaluate the effectiveness of congestion reduction and mobility enhancement strategies for the movement of people and goods. Both VDOT and the MPO are required to monitor and assess strategy effectiveness based on the parameters identified and adopted.

The following congestion performance parameters are used in the CMS:

- ?? **Volume-to-Capacity (V/C) Ratios-** V/C is a conventional level of service measure for roadways, comparing roadway demand (vehicle volumes) with roadway supply (carrying capacity). This measure is used to determine existing and future capacity deficiencies and to alert transportation providers to areas where traffic mitigation measures should be considered.

?? **Vehicle Occupancy Rates (VOR)**- The VOR is the performance component that is used to evaluate the efficiency of moving people as compared to moving vehicles. Traffic observers collect car occupancy data for various locations around the region. This data consist of counts of the actual number of vehicles and the actual number of occupants in each vehicle in a given lane. VOR data will be used to monitor the success of CMS strategies that support ridesharing activities.

?? **Speed/Travel-time Data**- Travel time-based measures provide credible estimates of system performances and reliability by examining how efficiently persons and vehicles can move through the transportation system. These measures can also be used to validate other system planning tools and is particularly useful because the traveling public easily understands speed and time.

F. Data Collection and Monitoring Plan

The data collection and monitoring plan is the mechanism for collecting the data needed to evaluate the performance measures as well as to track congestion over a period of time. Data collected for this CMS includes V/C ratios on the highway network, vehicle occupancy counts at pre-selected survey stations, and travel and speed data using the Global Positioning System (GPS) on selected arterials. The frequency of the collection effort will depend on the data. For example, V/C ratios and vehicle occupancy counts will be collected every three years consistent with the Long-Range Transportation Plan. Travel and speed data using the GPS will be collected annually.

G. CMS Strategies

In 1996, the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) issued final regulations, which allowed states and local officials greater flexibility in determining the parameters for developing the CMS including performance measures and their acceptable levels. In addition, the rule outlines the following five categories of strategies that should be considered in the CMS:

- ?? Transportation demand management measures
- ?? Traffic operational improvements
- ?? Public transportation improvements
- ?? Intelligent transportation systems
- ?? Additional capacity where necessary

TEA-21 requires, in an MPO that is a nonattainment area for air quality and/or a TMA, that these strategies receive consideration as congestion management techniques. Ideally, these strategies would be analyzed during the planning process. As the long-range transportation plan and the TIP are developed by the MPO, input from the strategy analysis would lead to appropriate investment decisions.

H. Implementation of Strategies

In the Richmond region, many CMS strategies are currently being implemented and/or being planned for implementation in the future. Although strategies have been identified by various means such as task forces, committees, or in the UWP, the TIP and Long-Range Transportation Plan remain as the main avenues for implementation.

The TIP documents decisions by the MPO, state/regional agencies, and local governments for funding transportation projects and programs including CMS projects. Congestion relief projects are an important component of the TIP submission. CMS strategies are evaluated within the planning process through the CTAC, TAC and MPO for inclusion in the transportation plan and the TIP/STIP. The planning process is the focal point for consideration of other factors, such as the Clean Air Act requirements, growth management, high capacity transit, travel reduction, economic and environmental factors, funding and social factors. The planning process coordinates the strategic recommendations of the CMS into the transportation plan. The planning process also leads to decisions on which projects are programmed for implementation. Compliance with the requirements that the MPO planning process include a CMS is addressed during FHWA/FTA certification reviews.

The CMS supports long-term transportation goals established by the planning process and provides guidance on how these goals can be achieved through strategies to alleviate congestion. As a result, the CMS provides long-term benefits to the planning process through project implementation. The long-range plan is used to determine if any of the long-term congestion segments are controlled or eliminated by long-range projects or programs.

The CMS process will operate on a three-year cycle, consistent with the long-range transportation planning process.

I. Evaluation of the Effectiveness of Implemented Strategies

Once a congestion reduction strategy has been implemented, continued monitoring efforts are necessary to evaluate whether the implemented strategy has been effective. The objective is to assess its effectiveness on both the specific congestion problem and the system as a whole. The VDOT travel forecasting model, vehicle occupancy surveys and travel-speed data are important tools to assess an implemented strategy's success in reducing region wide congestion. Based on the data collected, other tools may be used to determine a strategy's success in relieving congestion at a specific site or along a corridor. Benefits may include decrease delay, reduced travel time, reduction in accidents, etc.

J. Recommendations for Future CMS

1. Re-activate the CMS Task Force to update the process. This CMS report is based on the 1995 CMS Advisory Task Force's recommendations for adopting the CMS boundary, highway network, parameters for evaluation, and strategies to consider for implementation. This group should be reestablished to revisit and reevaluate decisions made regarding the CMS in the region. Also consideration should be given to expand this group to include more stakeholders.
2. Establish measurable goals and objectives for the CMS in order to better monitor and evaluate progress in addressing congestion. Goals could include but not be limited to:
 - ?? Reducing congestion on the interstate system by a certain percentage.
 - ?? Setting a target Vehicle Occupancy Rate (VOR) for the region.
 - ?? Maintaining or improving average speeds on arterials.
 - ?? Setting goals for vehicle distribution during peak hours.

These goals could be easily measured by the performance indicators (V/C ratios, vehicle occupancy counts, speed and travel time runs using the GPS) already in place.
3. Because of the positive effect that transit has on reducing congestion, implement all of the transit projects identified in the 2023 Long-Range Transportation Plan.
4. Consider other transportation alternatives than building new roads and major widening projects on the interstate and arterial systems. Analyses show that congestion will continue on interstates and arterials even with planned highway improvements. The region has already studied and reviewed other measures such as ITS strategies and Arterial Access Management. It is important that these strategies are adopted in local ordinances and plans so that they may be implemented. Also consideration should be given to High Occupancy Vehicle Lanes on arterials. This measure increases the person-carrying capacity on the arterial and defers the need to widen the road.
5. Continue to support Ridefinders, Inc. to promote ridesharing activities. Ridesharing can reduce commute costs, energy consumption per passenger, highway congestion and air pollution. Evidence exists to show that well-conceived and aggressively promoted TDM measures can decrease peak period traffic over the short-term by as much as 10 to 15 percent.
6. Provide for more congestion studies, transportation demand analysis, growth pattern analysis, and data collection activities as part of the Unified Work Plan. This will result in a more detailed CMS for the region.

Richmond Area MPO Long-Range Transportation Plan

Goals, Objectives, and Plan Recommendations

- Goal 1: To develop a balanced transportation system that serves the needs of our diverse population.
- Objective A. As the backbone of the regional transportation system, the continued support of the highway network is a priority, with emphasis on maximizing the efficiency and safety of the regional roadway network.
 - Objective B. To ensure over the twenty-year life of the plan that the MPO works towards an 82.5% –17.5 % split of funding with 82.5% going to roadway improvements and 17.5% to transportation alternatives. Each year the TIP should reflect a change toward the 82.5-17.5 split.
 - Objective C. To aggressively pursue funding sources for all modes of transportation.
 - Objective D. To expand, at a rate equivalent to our annual growth rate in disabled population, our specialized transportation services, once existing capacity on available systems has been absorbed.
 - Objective E. To work with local governments within the MPO jurisdiction to encourage each locality within five years adopt the recommendations of the Virginia Department of Transportation (VDOT) *Regional Pedestrian and Bicycle Study*.
 - Objective F. Within five years, ensure that all Greater Richmond Transit Company vehicles and facilities in use within the MPO jurisdiction have adequate provisions for bicycle storage/transportation (i.e. bikes on buses).
- Goal 2: To increase transportation planning efforts in the alternative transportation area so that increased emphasis is placed on transit, non-motorized, and commuter transportation options.
- Objective A. To tie transportation funding to local government comprehensive plans giving priority to those projects which help achieve compact and/or infill development goals.
 - Objective B. To expand the existing commuter assistance program (*Ridefinders*) by providing experimental program dollars, including subsidy programs, in an effort to obtain an annual 2% growth rate in the use of alternatives to the SOV.

Objective C. To charge *Ridefinders*, with support from the *Greater Richmond Chamber of Commerce*, to work with five local employers that employ 500 or more employees, to develop peak spreading programs (i.e. alternative work hours) and reduced work-related trip making programs (teleworking, home dispatch) so that peak-period traffic volumes are maintained at levels lower than the annual growth rate of the region.

Goal 3: To educate local residents, MPO decision makers, and local elected officials that it is impossible to “build our way out of congestion.”

Objective A. To conduct a seminar for the MPO, Technical Advisory Committee, Citizens Transportation Advisory Committee, local elected officials and citizens on the costs and benefits associated all transportation modes and urban sprawl, including the limited dollars available to complete requested projects.

Objective B: To conduct one media event annually concurrent with adoption of the annual TIP to show how and why projects were selected and the costs associated with them.

Objective C: To develop a public awareness campaign and promote through local media outlets, civic groups, civic associations and social service agencies describing the costs and transportation options that are being provided through the long-range plan and TIP process.

Objective D: Through *Ridefinders* and *Greater Richmond Chamber of Commerce*, sponsor, promote and participate in an annual alternative transportation event in which MPO members and other elected officials use alternative transportation modes to reach a predetermined location to proclaim they have used this alternative because they realize that we as a region cannot build our way out of congestion.

Goal 4: To support the efforts of the port facilities along the James River, airport and rail service providers to expand existing facilities.

Objective A. To support the Capital Region Airport Commission in seeking grant and other state and federal funds over the next ten years to develop expanded airport facilities.

Objective B. During the twenty year life of the plan, assist in upgrading and/or enhancing other airports in the region, both public and private, by identifying non-MPO funding sources so that private planes can be

diverted from the limited capacity runway at Richmond International Airport.

- Objective C. To adopt an MPO resolution and annually reaffirm the resolution to encourage the development of a statewide passenger rail plan to implement high-speed rail and higher speed rail passenger services in the Richmond region.
- Objective D. To assist the Capital Region Airport Commission, the port facilities along the James River, and rail service providers in seeking non-MPO source federal, state, and grant funds to improve cargo and commodity movement so that internal freight movement volumes on roadways can be reduced by 10% during the twenty year life of the plan.
- Objective E. To assist all port facilities along the James River in seeking state and federal funds to improve the James River Navigational Channel to enhance the efficient movement of goods and commerce on the river.
- Objective F. To encourage long distance through shipment of goods to utilize multiple modes of transportation such that through truck traffic is reduced by 15%

Goal 5: To develop a planning and programming process that protects and enhances the quality of life in the Richmond region for all segments of the regional population.

- Objective A: Continue to include public involvement, community, jurisdictional and regional values, and environmental justice concerns when proposing and funding transportation plans and projects.
- Objective B: To maintain the region's efforts in integrating air quality goals and attainment in the formulation of regional transportation plans, policies, and decisions.
- Objective C: To continue to strengthen transportation linkages between employment centers lacking an adequate labor supply with neighborhoods suffering from unemployment above regional levels, such that the neighborhood residents may fill those labor supply needs. To communicate these transportation linkages to state and local social service agencies who identify and train local residents to fill available positions at employment centers.

Goal 6: Develop a framework for intergovernmental coordination that promotes regional cooperation and regional prosperity when addressing transportation issues within the Richmond region.

Objective A: To plan and program transportation resources equitably between localities in a way that achieves overall economic development strategies contained in local government comprehensive plans giving priority to those areas which are in identified activity centers.

Objective B: To annually develop a list of regional high congestion locations and target funds to address those locations in the annual TIP and Long-Range Transportation Plan.

Objective C: Develop within two years, an ITS working committee to identify and implement Intelligent Transportation System (ITS) technologies that mitigate traffic congestion in the Richmond region.

Objective D: Conduct an annual seminar with local planning departments and planning commissioners to discuss current and future land use plans and their impact on other jurisdictions and the regional transportation network.

Objective E: To design the regional transportation network to support the Governor's commitment to the Chesapeake Bay 2000 agreement that calls for a reduction in harmful sprawl by 30% in the year 2010 (measured from the baseline established in the Chesapeake Bay 2000 agreement), including protecting water quality and mitigating noise and visual impacts.

Highway Element Plan Components

There are five recommendations to improve the efficiency and effectiveness of the highway system in the Richmond region over the next twenty years.

- ? ? *Select appropriate projects for federal/state/local funding through the year 2023.*
- ? ? *Develop a low cost, simple prioritization process to assist in the creation of the MPO's top priority projects.*
- ? ? *Work towards local and regional land use/transportation planning by promoting as a regional body, amendments to the Code of Virginia to provide local governments the authority to approve or disapprove development requests based on the adequacy of the surrounding transportation facilities.*
- ? ? *In the next LRTP update, expand the consideration and impacts of building new or expanded roadways and public transportation services to meet Environmental Justice Requirements.*
- ? ? *Consider ITS, TDM, TSM, and Access Management measures along with other options to compensate for increased congestion.*

Public Transportation Element Plan Components

There are eight recommendations to improve the efficiency and effectiveness of transit system service and performance over the next twenty years.

- ? ? *Develop a list of transit projects that will serve the Richmond area for the next twenty years and assist in meeting the air quality, environmental justice, and requirements mandated by federal transportation regulations and the Chesapeake 2000 agreement.*
- ? ? *Continue to expand the Greater Richmond Transit Company into a "one-stop" agency for all forms of transportation. In addition, increase regional coverage and improved headways on existing routes.*
- ? ? *Examine ways in which new revenue streams can be developed as a dedicated funding source for regional public transportation services in the Richmond region.*
- ? ? *Develop a low cost, simple prioritization process to assist in the creation of the MPO's regional priority projects.*
- ? ? *Ensure transfers from one mode to another mode are seamless throughout the Richmond Region so that residents can make personal trips via multiple modes as efficiently as they would by using one mode.*

- ? ? Begin the analysis and planning for light rail and commuter rail by examining population density, corridor availability, future areas of population growth targeted for compact/in-fill development, and existing connections between modes.*
- ? ? Prepare for changing regional demographics by developing and elderly and disabled transportation network that can serve our projected large elderly and disabled population.*
- ? ? Improve Richmond's linkages with communities and regions to the north, south, east, and west by aggressively pursuing high-speed rail service and higher-speed rail service.*

Transportation Demand Management Element Plan Components

The following ten recommendations are intended to improve transportation demand management strategies/programs in the Richmond region.

- ? ? Expand Ridefinders into a "one stop" regional commuter transportation information source that continues to facilitate and broker TDM services.*
- ? ? Implement through Ridefinders, a regional alternative transportation marketing program that is developed by a local marketing/advertising firm and implemented by a professional media buyer.*
- ? ? Undertake an educational outreach program for employers, jurisdictions and private citizens on the benefits and costs of TDM strategies.*
- ? ? Local jurisdictions, the MPO, and the Greater Richmond Chamber of Commerce should follow the lead of Ridefinders and develop closer working relationships with major employers so that they can assist the employer in developing TDM programs (including teleworking and Commuter Choice) at employment sites.*
- ? ? Strengthen existing pool matching activities and vanpool creation activities with private providers.*
- ? ? Within the next five years, examine roadway facilities that may be candidates for HOV lanes.*
- ? ? Upon completion, carefully review and consider partial or full adoption of the VDOT funded Regional Bicycle and Pedestrian Plan.*
- ? ? Develop, in association with local colleges and universities, a series of regional events to foster the idea of land use planning as a long-term TDM strategy.*

?? Better recognize the efforts of the region's Employers and Employee Transportation Coordinators (ETCs) by recognizing their achievements at the jurisdictional and regional level, not just through Ridefinders.

?? Strongly support Park and Ride Lot Development in the Region.

Intermodal Element Plan Components

There are five recommendations to improve intermodal transportation in the Richmond region over the next twenty years.

?? VDOT should be requested to meet with a group of representatives from the trucking industry to review design standards and hear their concerns.

?? Re-establish and recharge the MPOs Intermodal Committee to facilitate public/private partnerships for such issues as funding, environmental/economics trade-offs, and development of additional intermodal opportunities in the Richmond region.

?? Develop an intermodal rail facility in the Richmond/Petersburg Metropolitan Statistical Area (MSA).

?? Work with the intermodal task force and environmental groups to study and facilitate the widening and deepening of the James River Navigation Channel. In addition, examine the costs and benefits of barge travel along the James River as a way of shipping goods manufactured in Richmond to other markets.

?? Improve smaller county airports to divert private plane traffic from Richmond International Airport so that cargo carrying and scheduled passenger airline service capacity of RIC is expanded.