Introduction

The enactment of the Safe Accountable Flexible Efficient Transportation Equity Act – A Legacy for Users (SAFETEA-LU) in 2005 required Transportation Management Areas (TMAs) to develop and implement a Congestion Management Process (CMP). The Moving Ahead for Progress in the 21st Century Act (MAP-21) retained the CMP requirement for TMAs. This CMP effort represents an update to the FAMPO CMP that was adopted in November 2010 and will help FAMPO to:

- Identify congestion problem locations;
- Determine the cause(s) of these congested locations;
- Develop and evaluate alternative strategies to mitigate congestion; and
- Measure the progress of implemented strategies in reducing congestion.

This FAMPO CMP has been developed based on federal guidelines (*A Guidebook on the Congestion Management Process in Metropolitan Transportation Planning*, CSI, May 2007). Outputs of the CMP study will support the FAMPO transportation planning process through identification of strategies that promote efficient transportation system management and operation. In order to better integrate the urban and rural transportation planning programs in the George Washington Region, the FAMPO CMP includes all areas within the George Washington Regional Commission (Virginia Planning District 16) boundary.

A total of seven corridors have been identified in the George Washington (GW) Region to be the target of this CMP effort. The 2010 CMP targeted the first six of these corridors and this CMP includes the addition of the U.S. Route 301 corridor north of VA Route 3. These corridors are shown in Figure 1 and include all, or portions thereof, the following roadways within the GW Region:

- Interstate 95
- U.S. Route 1
- U.S. Route 17
- U.S. Route 301
- VA Route 3
- VA Route 2
- Route 610

Many of these corridors extend through the GW region and therefore travel through different environments and have varying geometric characteristics. For example, VA Route 3 traverses predominantly rural areas to the west and east of Fredericksburg, but within Fredericksburg, VA Route 3 provides access to more concentrated residential and commercial areas. In addition, the VA Route 3 cross-section varies along the corridor.

Accordingly, six of the seven CMP corridors were divided into sub-corridors based generally on their cross-sections and adjacent land uses. It was envisioned that each sub-corridor would lend itself to similar types of mitigation strategies.

Figure 1 – CMP Study Corridors

A set of performance measures was established to facilitate an identification of existing congested areas, as well as to provide a benchmark against which the effectiveness of the CMP can be assessed into the future.

The first performance measure that was used for the CMP is based upon travel speeds during weekday AM and PM peak periods to calculate ***Miles per Hour under Speed Limit***. Four ranges of this measure are reported: **1) 5 mph or less**, **2) 6 – 10 mph**, **3) 11-15 mph** and **4) greater than 15 mph**.

Whereas the previous CMP effort collected vehicle travel time and speed data utilizing travel time runs, this CMP update effort made use of INRIX vehicle probe data for all corridors except Route 610, for which INRIX data is not currently available. INRIX is a commercial vendor contracted by the I-95 Corridor Coalition to gather and disseminate real-time traffic flow data on interstate and major arterial roadways. This data is collected "24/7" using vehicle probe data. The specific data items that can be obtained relevant to this CMP effort included:

- *Speed* - the current estimated mean speed for the roadway segment in miles per hour.
- *Travel Time* - the current estimated time it takes to traverse the roadway segment in minutes.
- *Reference Speed* –the calculated "free flow" mean speed for the roadway segment in miles per hour (capped at 65 miles per hour). This attribute is calculated based upon the 85th-percentile of the observed speeds on that segment for all time periods, which establishes a reliable proxy for the speed of traffic at free-flow for that segment.
- *Average Speed* - the historical average mean speed for the roadway segment for that hour of the day and day of the week in miles per hour.

For the purposes of this CMP analysis, INRIX data from September 2013 was used to generate average vehicle speed data during typical weekday AM and PM peak periods for the entire month. This database is therefore much more robust than that used for the 2010 CMP effort, which relied more on "snapshots" of vehicle speeds on only several days of data collection. The month of September was chosen since that was the month during which the travel time runs were performed for the 2010 CMP, which enabled a comparison of 2013 vs. 2010 speeds along the CMP corridors.

A further benefit of using INRIX data is that it can be used going forward to monitor vehicle speeds into the future. As part of this overall CMP project, Parsons Brinckerhoff is developing a web-based mapping application that will be linked through the FAMPO website whereby people can obtain vehicle speed data, that is updated on a monthly basis, along the CMP corridors.

The second performance measure, ***volume-to-capacity (V/C) ratio***, is also a good indicator of corridor performance. This measure provides an indication of a roadways operating condition at the link, or roadway section, level. As this ratio reaches and exceeds a value of 1 (e.g., volume is equal to capacity), that means that roadway is operating at or over capacity, which is indicative of a congested condition. This measure is quantified by using data from the VDOT Statewide

Planning System (SPS) 2013 database to calculate and plot V/C ratios along each corridor.

It should be noted that since the V/C ratios are based on roadway link volumes and capacities, they do not necessarily reflect congested locations due to delay at intersections. For example, although a roadway link may show an acceptable V/C ratio, that doesn't necessarily mean that there is not a congestion problem caused by intersection delay. A good example of this is on Route 3 immediately east of Route 1 in the City of Fredericksburg. The V/C ratio data indicates that this road is under capacity, but in reality there are congestion hotspots that were identified on the basis of the INRIX speed data. A high V/C ratio indicates that roadway widening may be needed; whereas a congestion hotspot with an acceptable V/C ratio is indicative of an area with high degrees of intersection delay. This situation would suggest that a spot intersection or signal timing type of improvement is warranted.

Recognizing that transit service and ridesharing can support a CMP, ***transit ridership and vanpool/carpool usage*** are also reported for each of the CMP corridors. 2013 ridership data from Fredericksburg Regional Transit (FRED), 2013 data from VRE and current year GWRideConnect data on vanpools, carpools and commuter buses were used as the sources for this information. This information is provided at the overall corridor level; whereas, the other three measures are provided at the sub-corridor level.

The final performance measure that was used is the ***crash rate*** along the corridors. Data for crash rates along each corridor by milepost, as well as the average crash rate across Virginia for that type of roadway facility (i.e. an interstate for I-95, etc.), is available from VDOT. 2013 actual crash rate data is compared against 2012 statewide average crash rate data by roadway type to identify roadway sections that are exhibiting a higher than average crash rate. Crashes are a major cause of non-recurring congestion.

This initial section of the report is organized by corridor and provides an assessment of current conditions in the context of the performance measures described above. In addition, this section compares current conditions with those found during the 2010 CMP assessment, as well as summaries of planned improvement projects and projects completed since 2010.