6 Congestion Management Process

6.1 Introduction

6.1.1 Purpose of Chapter

This chapter provides the Congestion Management Process (CMP) element of the RFATS 2035 Long Range Transportation Plan. Additional detail about the CMP is available in the Congestion Management System (CMS) Plan, issued in 2004.

6.1.2 Relevance to the Transportation System and the Plan

Federal law requires a CMP in all urbanized areas with a population above 200,000. Although the RFATS Study Area itself does not fall within this category, it is considered part of the Charlotte-Mecklenburg urbanized area, which does fall within that category. RFATS conducts transportation planning for a portion of that area, and is therefore required to have a CMP.

A CMP is a continuous cycle of transportation planning activities, designed to provide decision-makers with better information about transportation system performance and the effectiveness of alternative strategies to deal with congestion. A CMP has four main components:

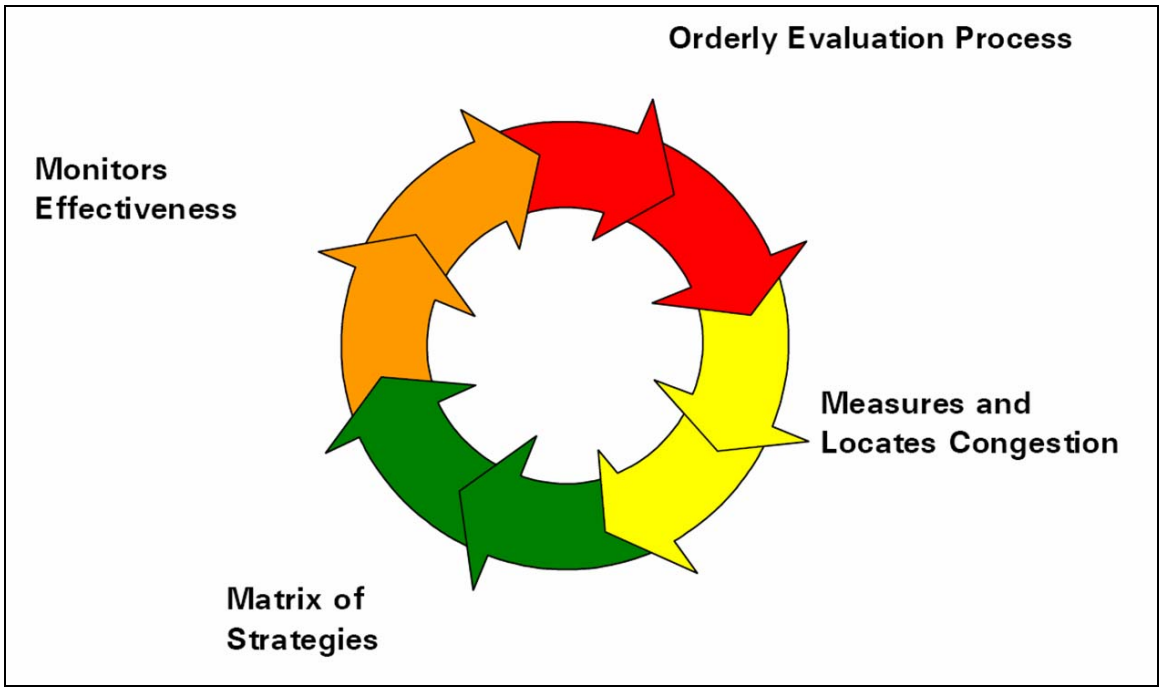
- Measurement and identification of congestion
- A matrix of congestion mitigation strategies
- Monitoring of effectiveness after implementation
- An orderly evaluation process.

Figure 6.1 shows these components, and highlights the fact that a CMP is not a one-time exercise but an ongoing process of planning, action and review. It is also a learning process. By monitoring the effectiveness of congestion mitigation strategies and evaluating their benefits in an orderly, consistent manner, planners and decision-makers can improve their ability to select the most cost-effective strategies appropriate to their specific local conditions and needs.

Both capacity increases and management of existing capacity can be used to manage congestion. The latter can often be more effective and cost-efficient. Increasing

attention is being paid to capacity management measures, as a result of financial and other constraints on capacity increases as well as new technologies.

Figure 6.1 The Congestion Management Process



Source: RFATS Congestion Management System Plan, 2004

6.2 Existing Conditions and Trends

6.2.1 National Conditions and Trends

Congestion management has long been, and still remains, an important element of the transportation planning process. In particular, highway schemes aimed at relieving congestion have traditionally been a major part of the process. However, congestion management has only recently been formalized as an explicit goal with Federal rules and guidelines, under the original term Congestion Management Strategy (CMS) and now the term Congestion Management Process (CMP).

The US Department of Transportation's approach to congestion management is given in the National Strategy to Reduce Congestion on America's Transportation Network (also known as the 'Congestion Initiative'). The strategy includes several major components:

- Congestion Relief Programs;
- Public Private Partnerships;
- Corridors of the Future;
- Technological and Operational Improvements;
- Border Congestion Relief; and

- Increasing Aviation Capacity.

It is important to note that both capacity *increases* and capacity *management* are part of the national strategy.

6.2.2 Statewide Conditions and Trends

The SCDOT Multimodal Transportation Plan comments that while South Carolina is fortunate to not have the extreme congestion problems of larger metropolitan areas and states, South Carolina is growing, and the problem is worsening. In 2006 there were approximately 64 South Carolinians for every lane mile of roadway in the state. By the year 2030, South Carolina's population is expected to increase by 27 percent. Assuming mode choices stay constant, this growth would require approximately 17,000 additional lane miles to be in place to keep congestion levels at the same level in 2030 as they were in 2006. In fact, 17, 000 lanes miles would build an eight-lane facility from South Carolina to California.

Using data from the Texas Transportation Institute's Urban Mobility Report, SCDOT estimated that $345 million was lost due to congestion within the state. This includes $7 million within the Catawba Council of Governments area, a figure which can broadly be seen as the cost of congestion within the RFATS Study area.

6.2.3 Conditions and Trends in the RFATS Study Area

The 2004 RFATS Congestion Management Strategy Plan was the first attempt by RFATS to engage in transportation planning that was structured according to Federal CMS guidelines. The 2004 plan therefore acknowledged that it would need to be expanded and/or refined in subsequent updates.

In particular, at the time of the 2004 plan, RFATS had not had the opportunity to develop a routine, systemwide evaluation program to collect data on the transportation system's performance. At that time, therefore, congested areas were simply identified from the regional travel demand model and from professional knowledge and expertise. The focus was primarily on identifying improvements to be made at underperforming intersections. From that exercise, a set of recommended intersection improvements was produced. These improvements have in turn fed into the list of projects as shown in the Highway Element of this LRTP.

The 2004 plan also recommended attention to a number of issues that should be the focus of future CMS (now CMP) development. The following sections describe the key issues and give an update on their progress.

6.3 Current and Future Issues

6.3.1 Congestion Monitoring Network

The 2004 plan recognized the importance of identifying the highways that should be monitored on a regular basis as part of RFATS congestion management planning. These would form the Congestion Monitoring Network (CMN). The recommended network (Figure 6.2 and Table 6.1) was made up of two categories of highway:

- Core CMN routes – those that are well established as major travel corridors in the RFATS area.
- Developing CMN routes – those that expected to become increasingly important for regional travel as growth and development within the RFATS region continues into the future.

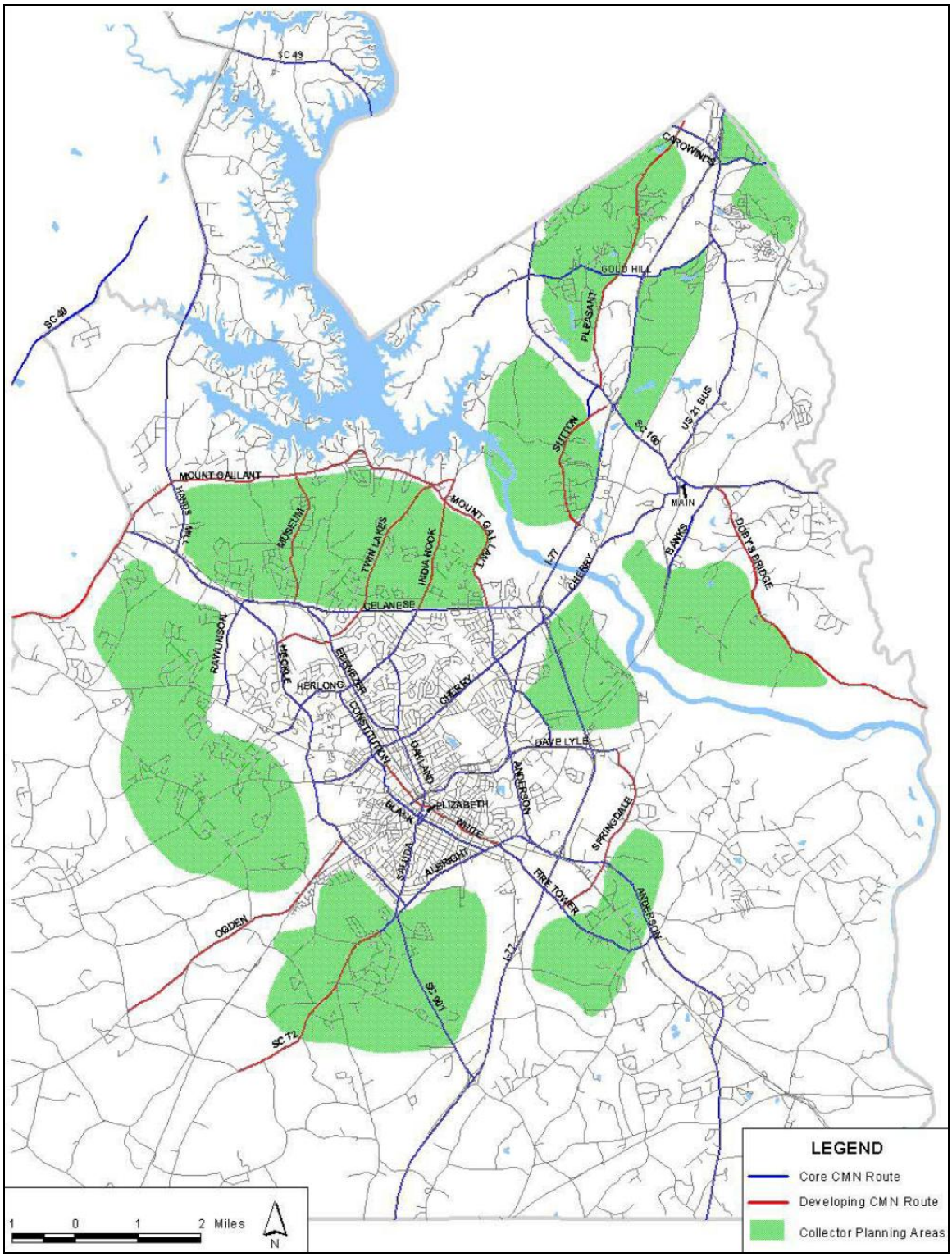
The RFATS Policy Committee has now adopted the CMN. The next step is to develop a monitoring program with performance measures.

Table 6.1: Congestion Management Network Routes

Core CMN Routes	Developing CMN Routes
Albright Road	Doby's Bridge Road
Anderson Road	India Hook Road
Banks Road	Mount Gallant Rd (north of Celanese Rd)
Black Street	Museum Road
Carowinds Boulevard	Ogden Road
Celanese Road	Pleasant Road
Charlotte Highway (SC-49)	Saluda Road
Cherry Road	Springdale Road
Constitution Boulevard	Sutton Road
Dave Lyle Boulevard	Twin Lakes Road
Fire Tower Road	White Street
Gold Hill Road	
Hands Mill Highway (SC-274)	
Heckle Boulevard	
I-77	
Mount Gallant Rd (south of Celanese Rd)	
Mount Holly Road	
Oakland Avenue	
Old Nation Road	
Old York Road	
Rawlinson Road	
Saluda Street	
Spratt Street	
Springhill Farm Road	
Tom Hall Street (SC-160)	

Source: RFATS Congestion Management System Plan, 2004.

Figure 6.2 Congestion Monitoring Network



Source: RFATS Congestion Management System Plan, 2004

6.3.2 Access Management

The 2004 plan recognized the potential benefits of access management. This is a process for providing and managing roadway access to land development, while preserving the safety and efficiency of traffic flow on surrounding roadways. It is achieved by managing the location, design and operation of driveways, median openings, and street connections to a roadway. It also incorporates specific roadway elements to mitigate access impacts, such as auxiliary lanes to remove turning vehicles from through traffic and raised medians to control left turns.

Access management also emphasizes the importance of maintaining a hierarchy of roadways, with greater control of access on roadways primarily intended to serve through traffic. Private access is directed to local and collector streets where feasible, and internal street systems and inter-parcel connections are promoted to improve overall accessibility. Access management can be carried out through roadway design, access permitting, subdivision or site plan review, and access management plans and regulations.

The 2004 plan also considered the potential role of Access Management Plans. These refer to a single corridor and provide for more specific treatment of its access management needs. They may be used to go beyond adopted spacing standards or to provide flexibility from standards in built-up areas.

6.3.3 Land Development Regulations

The 2004 plan referred to a wide range of land development regulations that can be used as a means of managing congestion or avoiding future congestion. These are issues for individual jurisdictions to address.

6.3.4 Optimizing the Efficiency of Urban Goods Movement

The 2004 plan recognized that there can be problems due to mixing trucks and passenger cars in an urban setting, usually because of inadequate physical design of roadways and intersections. Potential solutions include physical improvements and/or re-routing, as well as addressing parking/loading facilities. The plan reported that the City of Rock Hill had conducted truck routing studies in the past, and suggested that an update of these efforts should be considered. This might include addressing ways in which in-town truck traffic movements could be made optimally efficient.

6.3.5 Selected Examples of CMAQ Projects

The following projects are examples of current RFATS activities that make use of CMAQ funds.

- **Traffic Signal Controller Upgrades (City of Rock Hill)** – This project involves the replacement of obsolete controllers along four major arterials (Cherry Road; Celanese Road; Dave Lyle Boulevard; and Albright Road). Table 6.2 lists the intersections involved. The benefits to be realized by this project include travel time reduction, fuel cost savings, and lower overall vehicle emissions as well as achieving optimal traffic signal coordination.

- **Rail Yard Extension Project (City of Rock Hill)** – This project is designed to substantially reduce and/or eliminate extended grade crossing blockages by trains at Main and White Streets in Downtown Rock Hill. Specifically, this project will involve the construction of an additional side-track to allow trains to pull free of these streets prior to switching operations.

- **SC 160 / US 21 Intersection Upgrade (Town of Fort Mill)** – This project is a traffic flow improvement effort that will lessen congestion and therefore reduce excess vehicle idling by widening the westbound lane of SC 160 to include a turn lane with a straight right function to better facilitate the flow of traffic. Currently, there is no opportunity for westbound traffic on SC 160 to access northbound US 21, which creates extensive traffic queues at peak driving hours.

Table 6.2: Traffic Signal Upgrades Completed or Under Way

Ref.	Intersection Location	Project				
		N. Cherry Road	SCDOT upgrade	CMAQ 1	CMAQ 2	CMAQ 3
1	Main at Rawlinson					X
2	Main at Meadowlark					X
3	Main at The Crossing					X
4	Main at Herlong					X
5	Main at Heckle					X
6	Main at Cherry		X	X		
7	Main at Constitution				X	
8	Main at Black				X	
9	Main at Wilson					
10	Main at Dave Lyle			X		
11	Main at Oakland				X	
12	Main at Elizabeth				X	
13	Main at Albright			X		
14	Black at Albright			X		
15	Black at Elizabeth		X		X	
16	Black at Saluda		X		X	
17	Black at Oakland					X
18	Black at Hampton		X		X	
19	Black at Dave Lyle		X		X	
20	Black at Wilson		X		X	
21	Black at Hagin				X	X
22	Black at Allen				X	X
23	White at Stewart		X			
24	White at Laurel		X			
25	White at Wilson		X			
26	White at Dave Lyle			X		
27	White at Oakland		X		X	
28	White at Elizabeth			X		
29	White at Confederate		X		X	
30	White at Annafrel			X	X	
31	White at Jones			X	X	
32	White at Albright			X		
33	Anderson at Albright					X
34	Anderson at Princeton					X
35	Anderson at York Tech					X
36	Anderson at Dave Lyle					X
37	Anderson at Bird					X
38	Anderson at Mt. Gallant					X
39	Anderson at Eden Terrace					X
40	Eden Terrace at Mt. Gallant					
41	Eden Terrace at University					
42	Charlotte at North					
43	Charlotte at Eden Terrace					
44	Charlotte at Myrtle					

Ref.	Intersection Location	Project				
		N. Cherry Road	SCDOT upgrade	CMAQ 1	CMAQ 2	CMAQ 3
45	Charlotte at Sumter					
46	Charlotte at Wilson					
47	Charlotte at Hope				X	
48	Oakland at Ebenezer					
49	Oakland at Wilson					
50	Oakland at Union					
51	Oakland at Stewart					
52	Oakland at Myrtle					
53	Oakland at Eden Terrace					
54	Oakland at India Hook					
55	Oakland at Camden					X
56	Ebenezer at Dotson					
57	Ebenezer at Herlong					X
58	India Hook at Herlong					X
59	Herlong at Constitution					X
60	Herlong at Heckle					X
61	Constitution at Westerwood					
62	Cherry at Constitution		X	X		
63	Cherry at Camden		X	X		
64	Cherry at Oakland		X	X		
65	Cherry at Charlotte		X	X		
66	Cherry at Evergreen		X	X		
67	Cherry at Fire Station					
68	Cherry at Richmond		X	X		
69	Cherry at Patton		X	X		
70	Cherry at Deas	X		X		
71	Cherry at Ebinport	X		X		
72	Cherry at Mt. Gallant	X		X		
73	Cherry at Plaza	X		X		
74	Cherry at Anderson	X		X		
75	Cherry at Patriots Parkway	X		X		
76	Cherry at Riverview	X		X		
77	Cherry at Celriver	X		X		
78	Cherry at Home Depot	X		X		
79	Cherry at Grier Mcquire					
80	Celanese at Riverchase			X		
81	Celanese at Riverview			X		
82	Celanese at Mt. Gallant			X		
83	Celanese at Hilltop			X		
84	Celanese at India Hook			X		
85	Celanese at Twin Lakes					
86	Celanese at Bryant Blvd.					
87	Celanese at Museum					
88	Ebinport at India Hook					
89	Dave Lyle at Willowbrook					
90	Dave Lyle at Annafrel					
91	Dave Lyle at Gateway					

Ref.	Intersection Location	Project				
		N. Cherry Road	SCDOT upgrade	CMAQ 1	CMAQ 2	CMAQ 3
92	Dave Lyle at Mt. Gallant			X		
93	Dave Lyle at John Ross			X		
94	Dave Lyle at Tinsley Way			X		
95	Dave Lyle at I-77 South			X		
96	Dave Lyle at I-77 North			X		
97	Dave Lyle at Galleria			X		
98	Dave Lyle at Springdale			X		
99	Dave Lyle at Red River			X		
100	Dave Lyle at 161 Extension					
101	Heckle at Ogden					X
102	Heckle at Crawford					X
103	Heckle at Saluda					
104	Heckle at Albright					
105	Saluda at Albright					
106	Saluda at Johnston				X	
107	Hampton at Johnston				X	
108	Hampton at Pond					X
109	Pond at Whitner					
110	Ebenezer at Hollis Lakes					
111	Cherry at I-77 South					
112	Celanese at I-77 South					
113	Mt. Gallant at Museum					
114	Cherry at Heckle					
115	Heckle at Hollis Lakes					
116	Heckle at Rawlinson					
117	Sc 161/274 at Sc 901					
118	Celanese at Rawlinson					
119	Sc 161 at Pennington					
120	Sc 161 at Miller Pond					
121	Dave Lyle at Meeting					
	Project Complete	*100%*	*100%*	*98%*	*0%*	*0%*

6.3.6 Incident Management

RFATS and SCDOT staff maintain ongoing liaison regarding Intelligent Transportation Systems (ITS) deployment within the RFATS Study Area. Incident management is the key application of ITS to date. This was already in place at the time of the 2004 report, and has been incrementally enhanced since then.

SCDOT is responsible for providing incident management services. Incident management operations are conducted from the District 4 Traffic Management Center (TMC), where camera and radar operators monitor traffic conditions. I-77 through the RFATS study Area is monitored with 31 video cameras and 46 radar speed detectors. The latter are useful for incident management because incidents often cause noticeable

reductions in speed. The cameras also feed to the SCDOT website as information for drivers.

The State Highway Emergency Program (SHEP), now referred to as the Incident Response Program,. plays a important role in managing congestion on the I-77 Corridor. Under this program, SCDOT will respond to a variety of situations, including assisting with minor repairs to disabled vehicles; assisting with traffic control and incident management as well as providing first aid until emergency medical services arrive. This program primarily operates during rush hours and weekends, but is available any time circumstances dictate.

6.3.7 HOV / HOT Managed Lanes Study

The HOV / HOT Managed Lanes Study is a cooperative planning effort to examine the feasibility of high occupancy vehicle and high occupancy toll lanes on major freeways and roads in the greater Charlotte region. Specifically, this study will determine the technical, financial and institutional feasibility of dedicating lanes on major highways (in particular the I-77 corridor) for active traffic management.

This study has been undertaken because it is generally recognized that traditional approaches to addressing congestion, such as widening existing roads, is unlikely to adequately resolve current and future problems. Therefore, evaluating the incorporation of dedicated lanes that would be operated strategically to prevent congestion during peak driving periods is viewed as an appropriate management tool.

Specific study activities currently under way include identifying highway corridors that are suitable and/or accommodative of dedicated lanes; evaluating expected travel time reductions; improved people-carrying capacity; as well as estimating the capital, operating and maintenance costs associated with utilizing managed lanes. It should be noted that preparation of the final report outlining managed lane strategies, policies and actions is expected in March/April 2009.

Primary study partners include the North Carolina Department of Transportation; South Carolina Department of Transportation; Mecklenburg-Union Metropolitan Planning Organization; Gaston Urban Area Metropolitan Planning Organization; Rock Hill-Fort Mill Area Transportation Study as well as the Lake Norman and Rocky River Rural Planning Organizations.

6.4 Stakeholder Input

As described in the Public Involvement Element, stakeholders wanted to see improved traffic flow and congestion mitigation.

6.5 Summary and Recommendations

6.5.1 Summary of Key Points

- Both capacity increases and management of existing capacity can be used to manage congestion. The latter can often be more effective and cost-efficient. Increasing attention is being paid to capacity management measures, as a result of financial and other constraints on capacity increases as well as new technologies.
- The 2004 RFATS Congestion Management Strategy Plan was an important first step in developing a Congestion Management Process (CMP) for the RFATS Study Area.
- Progress so far includes adoption of a Congestion Management Network (CMN), identification of recommended intersection improvements as shown in the Highway Element, and traffic management along I-77.
- Further progress will need to be made, particularly to develop monitoring procedures and measures of effectiveness.

6.5.2 Recommendations

- RFATS should develop monitoring procedures and measures of effectiveness for the CMN.
- RFATS should study the role of urban goods movement in congestion. This should include updating earlier truck routing investigations and addressing ways in which in-town truck movements could be made more efficient.
- RFATS should assist local jurisdictions to review existing and potential land development and access management regulations.
- RFATS should consider adopting a policy of CMP screening for all proposed projects. This screening process would ensure that the full range of congestion management options (trip reduction, increased use of high-occupancy modes, optimization of highway system operations, and increased capacity) is considered during project development.
- RFATS should add a congestion management component to all corridor plans, sub-area plans and other special projects.
- RFATS should update the CMP on a four-year cycle.