Management Strategies

Introduction

Management strategies focus on utilizing the capacity of the transportation system more effectively, quickly responding to roadside incidents, and reducing the number of vehicles on the roadways. Such strategies typically focus on roadways with recurring or non-recurring traffic congestion. Historically, the City of Greensboro has been very proactive in implementing management strategies aimed at increasing the efficiency of the transportation system without adding additional capacity to the roadways. However, implementation of management strategies in the larger MPO area has been significantly less thorough and less systematic.

Concurrent with the development of the 2030 LRTP, the MPO has prepared its first Congestion Management System (CMS). As a result of Census 2000, the Greensboro MPO was designated a Transportation Management Area (TMA). Among the additional monitoring and reporting requirements for TMAs, is the development of a CMS. The CMS will be an initial step toward more systematic implementation of management strategies throughout the Greensboro Urban Area. The analysis and recommendations of the CMS have been closely coordinated with those of the LRTP, to ensure consistency in implementation.

Roadway Network Monitoring

The extent of management system implementation in the Greensboro MPO is similar to the network defined by the currently adopted thoroughfare plan. This network includes all interstates, expressways, principal and minor arterials, and streets in the central business district. This network totals 828 centerline miles and 2,080 lane miles of roadway.

The 2004-2010 editions of the state and metropolitan TIPs include projects to be complete by 2010 that will add 55 centerline miles and 330 lane miles, yielding a final network with 888 centerline miles and 2,400 lane miles. **Table 10.1** summarizes the centerline miles for both existing conditions and future conditions.

The Greensboro Urban Area MPO transportation system is currently monitored jointly by the Greensboro Department of Transportation and the

Table 10.1 — Centerline Miles for Existing and Future Conditions

Facility Type	Existing	Future	% Increase
Two-Lane Highways	387	400	3
Urban Arterials	257	277	8
Freeways	111	133	20
Multilane Expressways	51	51	—
Collectors	22	22	—
Total Centerline Miles	**828**	**883**	7

North Carolina Department of Transportation. Through the joint efforts of these agencies vehicle crash data, average annual daily traffic data, and peak hour traffic data are collected and maintained in databases for historical tracking.

Roadway Congestion Index

The roadway congestion index (RCI) is a useful measure to assess network efficiency and is most useful to compare transportation networks with varying characteristics from different metropolitan areas. The RCI is based on the ratio of principal arterial VMT per lane mile of principal arterial and the ratio of freeway VMT per lane mile of freeway. Additionally, the RCI is based solely on capacity and demand volumes.

In simple terms, the RCI is the ratio of daily traffic volume to the overall capacity of the network. An RCI less than one indicates a functioning network, while an RCI greater than one indicates a network with impeded traffic conditions. In the current year, the RCI for the Greensboro Urban Area MPO congestion management system network is approximately 1.49. The predicted RCI for the 2010 network is 1.00. Given these figures, it is expected that the future network for the City of Greensboro will more closely serve the needs of the driving public than the current network does.

Expansion of Transit Operations

In an effort to double transit ridership from 2 million annual trips to 4 million trips by 2008, the City of Greensboro has planned a major expansion to the transit system. The first stage includes local changes to the transit system, such as the inclusion of cross-town routes, shorter headways along routes, and a new downtown circulator service. In addition to these changes, new partnerships with local employers and universities will attempt to make transit a more viable option for typical single occupancy vehicle commuters.

In conjunction with local changes to the transit system, the Piedmont Authority for Regional Transportation (PART) will continue to further implement a regional transit system. This system will connect the stations of Greensboro, Winston-Salem, and High Point through regional bus lines. In addition to the regional routes, funds are programmed for five park and ride lots that PART will operate.

Advance Traveler Information System and Variable Message Signs

Providing advance travel information allows drivers to adapt their travel patterns and travel habits to more efficiently utilize system capacity. Traffic reports have long been included on television and

radio news broadcasts in the larger metropolitan areas. The Advance Traveler Information System (ATIS) in Greensboro allows drivers to view roadway network conditions prior to making a trip and to alter travel plans based on that information. Traffic cameras are located along I-40 from US 29 to NC 68, one of the most highly congested corridors in Greensboro. Traffic cameras, near the Greensboro Coliseum Complex show the effects of any special events that may be occurring.

Views from the traffic cameras are displayed on the City's website, and on City Cable Channel 13. In conjunction with the traffic camera views, a website detailing construction, lane closures, and traffic alerts provides information such as the location and duration of construction activities or alternative routes for special events. This information can help to reduce the negative traffic impacts of such roadway conditions. The City of Greensboro was the first city in the state to provide traffic camera coverage on television.

Variable message signs (VMS) are currently in use in several locations in the region. Two VMS signs are located at the Greensboro Coliseum to provide traffic information for special events. VMS signs also are located along the major interstate corridors in the GUAMPO area and are programmed to be installed along the entire length of the Urban Loop, the southern portion of which is now open to traffic. Variable message signs will inform drivers of adverse roadway conditions in the area and enable them to divert along an unimpeded corridor. In addition, VMSs will be able to direct drivers to special events in a more efficient manner, allowing high-speed corridors to continue to operate efficiently.

Updated Signal System

The current signal system for the City of Greensboro controls 413 signals, of which 361 are coordinated across 34 individual zones. This system exhibits many deficiencies and is scheduled to be replaced. In early 2002, the City of Greensboro completed a signal system replacement feasibility study. As a result of this study, installation of a new fiber-optic based signal system is programmed in the latest TIP for construction and implementation in 2008. The proposed system will build on the City's current capabilities by: expanding system coverage further out along congested corridors; upgrading the system interface to allow for more user-friendly operation; and upgrading field and system equipment to improve the reliability of the communications network and to allow for more advanced signal optimization strategies. The new system will be monitored from an expanded management center.

In addition to these base features, the study recommended implementation of advanced functionality if funding permits. Such features include: expansion of the use of roadside traffic cameras to provide traffic managers and the traveling public real-time images of the City's most congested intersections and corridors; use of adaptive control technologies on some of the most severely congested corridors, whereby signals automatically re-time themselves in response to changing traffic conditions; installation of variable message signs on City streets to alert motorists to traffic conditions similar to the manner in which these signs are used on the interstate facilities; and adding the capability to interface with transit automated vehicle locating systems and signal pre-emption functions. In total, these enhancements to the system will provide the public with more accurate and timely information in order to make more informed travel decisions, and will provide transportation managers with better information and additional tools with which to respond to situations.

Traffic Safety and Emergency Roadside Assistance

While crash data is not specifically incorporated into the analysis of existing or projected conditions, safety is always an important consideration in transportation planning. Biennially, the City of Greensboro undertakes a comprehensive study of safety within the City limits. The goal of this study is to identify those locations and corridors that experience unusual accident activity. Hazardous locations are identified using a Severity Index, an Equivalent Property Damage Only Rate, and a Fatal Crash Analysis. Once identified, these hazards are addressed through the Corridor Improvement Program, and requests for service from the public. Intersections deemed to be the least safe are studied, and spot safety improvements are identified. These recommendations serve as the basis for the biennial list of Safety Program Improvements.

Although emergency roadside assistance is perhaps one of the least technologically intensive strategies currently being implemented across the country, it is often the most obvious to the traveling public. Because it is one of the most obvious strategies, a successful emergency roadside assistance program offers a great opportunity for recognition in the public eye, which is vital when implementing such programs. Traffic congestion due to non-recurring events, such as traffic accidents and other roadside incidents (e.g., out of fuel or flat tire), can account for a substantial portion of travel delay.

NCDOT provides emergency roadside assistance through the Incident Management Assistance Patrol (IMAP) on all the interstates (I-40 and I-85) in the region, as well as US Route 29.

The task of the program is to provide motorists with assistance for minor incidents and to remove obstructions as quickly as possible thereby reducing the potential for further incidents and significant traffic delays. The current IMAP coverage for the region is shown in **Map 10.1**. While opinions vary on the impact of roadside incidents, it is widely accepted that quick response to those events is critical to both motorists' delay and safety.

Transportation Demand Management

Transportation demand management (TDM) focuses on reducing the number of single-occupant vehicles (SOVs) on the roadways primarily through programs that promote ridesharing in the workplace. TDM programs can be very useful in solving traffic problems in major activity centers. A few examples of TDM programs are carpooling, ridesharing and ride-matching programs and subsidized transit fare programs. Both of these programs can reduce not only the demand for employee parking, but vehicle miles traveled as well.

PART currently offers two programs aimed at decreasing SOVs. The RSVP program provides a driver and a minimum of eight passengers the use of a van for work commutes. As part of this program the driver must live at least 10 miles from their work place, collect the monthly fees from the passengers, and complete a daily mileage log. In return, the driver is allowed to ride the van at no cost and use the van for limited personal use. In addition to the RSVP program, PART offers a service matching people who have a desire to carpool with others who have similar destinations and work schedules. The success of these programs depends on a number of factors, including efficiency of the transit system, comparable travel times, accompanying guaranteed ride-home programs, and costs to the employee.

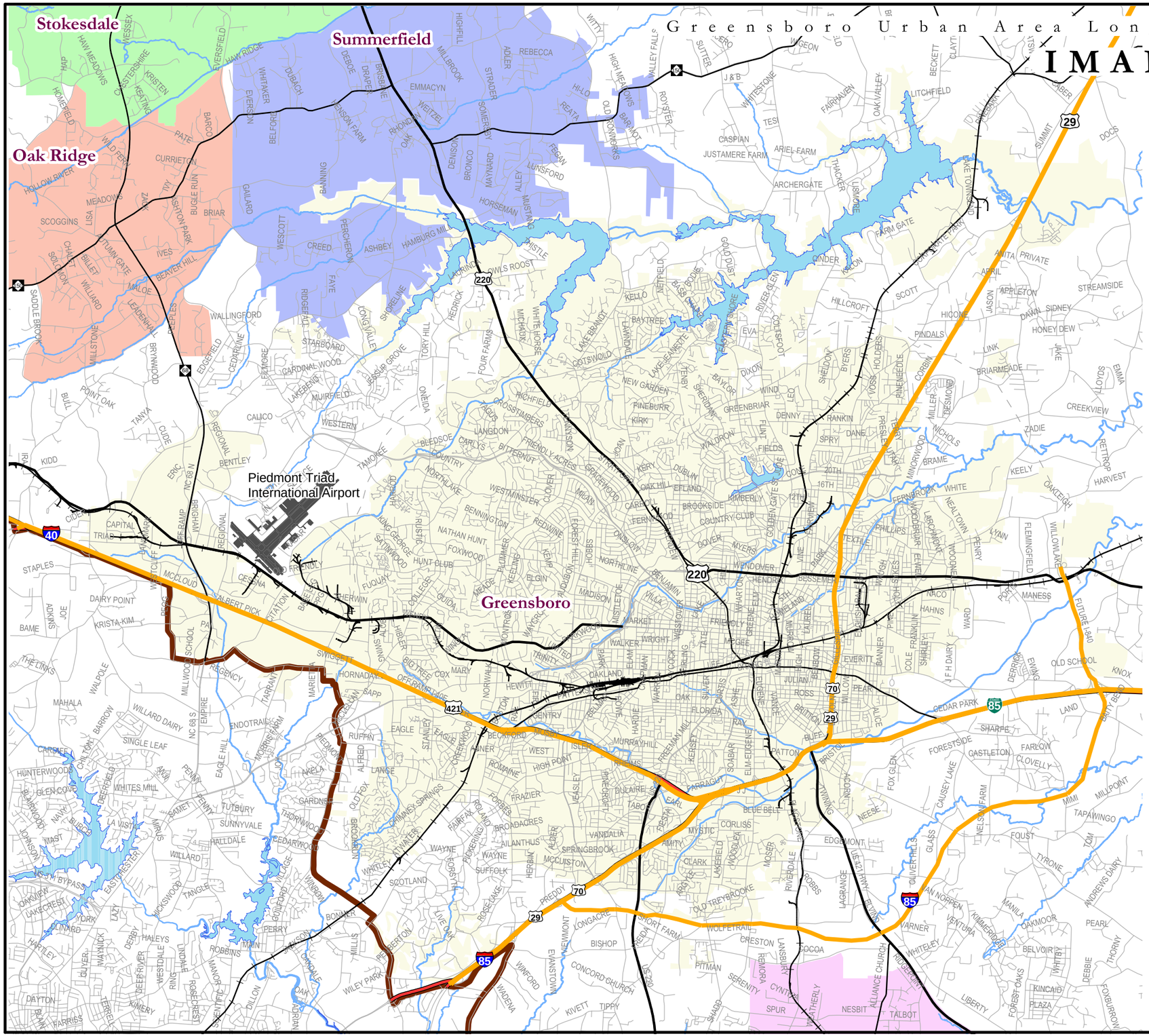
Other than expanded transit systems and park and ride lots, the Greensboro Urban Area MPO has not implemented any other TDM strategies to reduce the number of single occupant vehicles on the roads. Employer-based TDM strategies such as ridesharing and transit subsidy programs could at minimum address traffic congestion local to the employer sites. Telecommuting is another TDM strategy aimed at reducing vehicle demand on the transportation system. Another TDM strategy to consider is flexible work scheduling. While not reducing the overall vehicle demand on the transportation system, flexible work schedules can effectively spread the typical peak traffic demand over several periods reducing the vehicle trips during peak hours.

Greensboro Urban Area Long-Range Transportation Plan

IMAP Regional Coverage

(Incident Management Assistance Patrol)

Map 10.1



Legend

- Corridors with IMAP Coverage
- Interstates
- US Highways
- State Highways
- Railroad
- Study Area
- County Line

0 0.5 1 2 3 4 Miles

N W E S

August 26, 2004

Mapping prepared by Kimley-Horn and Associates, Inc. for the Greensboro Urban Area Long-Range Transportation Plan

Data Sources: Guilford County, the City of Greensboro, FEMA, the U.S. Census Bureau, KHA, and NCDOT

Access Management

The City of Greensboro completed an update to the Driveway Manual, which became effective on July 1, 2004. The local update dovetails with the recently completed update to the NCDOT Driveway Manual. These revisions aim to strike a reasonable balance between access and roadway capacity. Additionally, the City and state have engaged in the selective provision of access management measures, such as installing concrete median islands on five lane sections with a history of safety and/or congestion issues due to uncontrolled turns. As access management helps to maximize the investment in the road network, it is recommended that the City of Greensboro continue to make every effort to develop an appropriate access management policy.

Corridor Improvement Program

GDOT's Corridor Improvement Program provides for evaluating specific corridors for needed improvements, including updated signal timing plans, street-scaping and aesthetic features, pedestrian safety enhancements, and other upgrades. This program serves to develop more corridor specific operational strategies, as opposed to widening and new construction alternatives.

Alternate Modes

The City of Greensboro has made mobility and access for pedestrians and bicyclists a regional priority. Statements in the Greensboro Comprehensive Plan, the adoption of the Greensboro Walkability Policy, the Pedestrian Safety Program, and the Sidewalk Program show this commitment. The goal of these policies is to improve safety and awareness of pedestrians and bicycles through the provision of safe and accessible facilities throughout the City.

Value Pricing

Value pricing is a concept growing in consideration nationwide. Sometimes called "congestion pricing" or "peak period pricing," it calls for drivers to pay tolls during peak periods of traffic congestion. Tolls vary by the time of day and level of congestion. The intent is to encourage drivers to better manage their driving habits by driving during typical non-peak times or to use alternate routes or modes. The tolls that are paid can act as indicators of congestion and capital generators for future roadway improvements. A value pricing study is underway for I-40 in the Piedmont Region to consider the appropriateness of value pricing as a strategy to address congestion in the corridor.

Regional Freight Specific Planning

A number of transportation and private projects are expected to have a significant effect on the freight traffic throughout the GUAMPO and the Triad region. Planned interstate improvements are expected to facilitate significant increases in truck traffic, while the future FedEx hub at the Piedmont Triad International Airport will increase dramatically the number of air-freight trips into the region. Planned improvements to the rail infrastructure will provide additional capacity for more rail-freight trips into the Triad region.

To prepare for and efficiently manage the future freight traffic it is recommended that the region develop and adopt an Intermodal Management System (IMS) to meet the growing needs of freight transportation planning in the region. The benefits of an IMS include increased emphasis on freight planning, identification of modal conflicts, identification of transportation improvement specifically intended to improve freight traffic in the region, and involvement of the local and state freight industries in the regional planning process.

Effects of Recommended Management Strategies

The intent of all of these management systems is to provide the opportunity to more effectively utilize the regional surface transportation system for all users without the expense of adding system capacity through new road construction or widening of existing roads. While some strategies are aimed at managing the supply side of the transportation system, such as upgraded signal systems, advance traveler information system, and variable message signs, other strategies are aimed at managing the demand on the system. Transportation demand management strategies can reduce the demand placed on the transportation system if effectively implemented. The combined effect of these strategies is increased vehicle occupancy, reduced traffic demand in the typical peak hours, and reduced travel delay.

Strategy Implementation

The nature of the congestion will dictate which management strategy to implement. Effectiveness varies. Strategies such as ATIS are intended to have a regional effect. Others such as coordinated signal systems may only be useful for corridors. Still others, like spot safety project programs or employer specific TDM programs, are only aimed at reducing congestion in activity centers or intersections. Non-recurring congestion such as delays due to traffic accidents or special events can be addressed by emergency roadside assistance and a system of variable message

signs. There is no silver bullet that will solve all congestion problems, but all management strategies should be considered.

Summary Recommendations

Policies and programs have been successfully implemented to more efficiently manage the transportation system in the region. Improvements, however, can be made.

- Expand the system monitoring efforts to include the collection of peak hour vehicle travel speeds. Peak hour travel speeds are the true indicator of system efficiency.
- Develop a transportation demand management strategy (TDM) focusing on the larger employers in the region. Successful transportation demand management programs will reduce local parking demand and traffic congestion. TDM programs could focus on ridesharing and the use of transit.
- Accelerate funding to implement the regional signal system upgrade and construction of the traffic management center.
- Fund the advanced signal system functionality to allow for better traveler information and system management
- Accelerate funding to implement improvements to the local and regional transit system including the construction of park and ride lots.
- Update the congestion management system as the initial stage to every transportation plan update.
- Continue to collect roadway geometric data for new roads and expand traffic volume data collection to cover more of the congestion management system network. The coverage of data collection should be expanded in concert with the expansion of regional transportation planning priorities.
- Collect vehicle travel time data on roadways in the congestion management system network.
- Coordinate congestion management system development with the congestion and safety related intersection improvement programs of the City of Greensboro and NCDOT.

In addition to implementing new efforts, it also recommended that current efforts continue:

- Encourage NCDOT to continue the IMAP motorist assistance program on the existing interstates in the region and expand the system onto the new interstates as they open to traffic.
- Continue the joint efforts with NCDOT to monitor the regional transportation system.
- Continue expanding and enhancing the management systems that are already in place.