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# Transportation Planning Organization (TPO) Report



# Transportation Demand Management

**WRITTEN:**

JULY, 2009

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## **ACKNOWLEDGEMENTS**

The Chattanooga-Hamilton County Regional Planning Agency and Transportation Planning Division would like to thank all those from the various local governments and many others who helped contribute either by reviewing this document or by giving input.

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### **Federal and State Agencies**

The preparation of this report has been financed in part through grant[s] from the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA), U.S. Department of Transportation, under the State Planning and Research Program, Section 505 [or Metropolitan Planning Program, Section 104(f)] of Title 23, U.S. Code. The contents of this report do not necessarily reflect the official views or policy of the U.S. Department of Transportation.

This report was funded in part through grant[s] from the Federal Highway Administration and Federal Transit Administration], U.S. Department of Transportation. The views and opinions of the authors [or agency] expressed herein do not necessarily state or reflect those of the U. S. Department of Transportation.

This report was supported and funded in part through programs of the Tennessee Department of Transportation (TDOT) and Georgia Department of Transportation (GDOT). The views and opinions of the authors (or agency) expressed herein do not necessarily state or reflect those of the Tennessee Department of Transportation or Georgia Department of Transportation.

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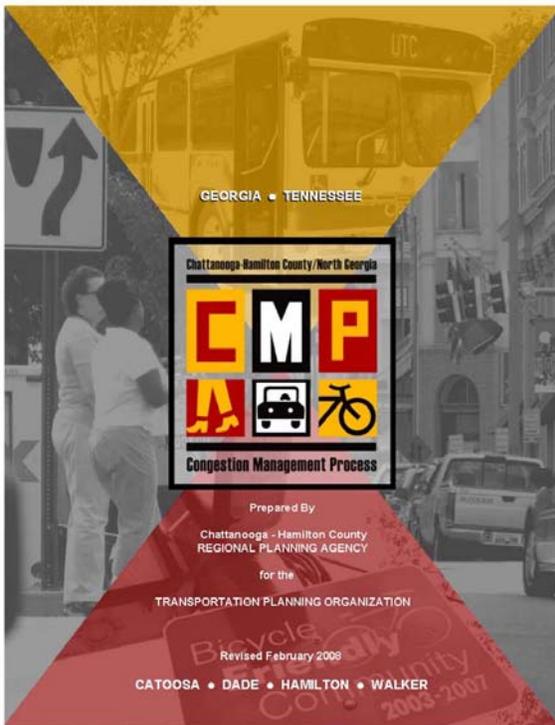
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## *Introduction*

**Transportation Demand Management (TDM)** is a list of various transportation strategies designed to encourage more efficient use of the existing transportation system. Individually, each strategy may only affect a small portion of travel time; however a combination of strategies can have a much larger cumulative effect. TDM is a key tool to reducing single occupancy vehicle travel as well as facilitating mobility options for area residents. It increases the efficiency of the transportation system through the promotion and facilitation of alternative modes of travel such as ridesharing, vanpooling, bicycling, and walking. TDM promotes alternative work schedules and telecommuting, which can shift and reduce demand on our transportation system.



The basic concept of TDM is to be able to use the current existing infrastructure as efficiently as possible so that future improvements are only necessary where there are no other options. This then leads to a situation where previous improvements can be shown to be more cost effective to the public. This study is designed to list and summarize as many TDM measures as possible, describe how other cities have implemented the measures, detail current conditions within the Chattanooga – Hamilton County / North Georgia Transportation Planning Organization (TPO) area and discuss the feasibility of implementing such options. TDM is a specific function of a **Congestion Management Process (CMP)**. The Chattanooga TPO has a CMP and this TDM document is intended to augment and expand upon the principles identified in the CMP. The cover page of the CMP document is provided to your left.

One very important element of TDM is to reduce the demand for the current transportation infrastructure especially during peak hours. Within the TDM framework it is important to determine all possible choices. To thoroughly evaluate potential TDM projects, four major types of commuter choices must be assessed. These are mode choice, time choice, location choice, and route choice. These choices determine how transportation infrastructure is used. In the United States, one major issue in planning and implementing TDM projects is the large percentage of Americans choosing the same mode (automobile) at the same time (rush hour) with the same general destination (downtown) on the same route (interstate or highway). If these choices were spread out then the demand for level of service during this high volume short window of time would decrease exponentially. One of the primary purposes of this study is to determine the feasibility of spreading out these four commuter choices on a daily basis such that we are not building solely for peak demand.

In addition to this report, the Chattanooga TPO is also conducting a study of various public transit modes, including passenger rail, and their feasibility. Also the State of Tennessee Department of Transportation is assisting the TPO in the finalization of the regional ITS architecture that will provide project recommendations to build on the recent interstate cameras and digital message boards. The City of Chattanooga Public Works is constantly reviewing lights in order to have the most evident traffic signalization possible.

A summary of previously adopted TDM strategies are included in the Chattanooga TPO's CMP. This Travel Demand Management study aims to take these current TDM strategies and research collected from the Metropolitan Planning Organizations (MPO) across the country to develop a comprehensive list of TDM measures. The final comprehensive list will then be evaluated for feasibility of implementation within the Chattanooga – Hamilton County / North Georgia TPO region.

## **Transportation Demand Management Measures**

### ***Rideshare Programs***

Cities across the country are becoming involved in rideshare programs of different types. Carpool and vanpool programs similarly consist of a group of individuals who drive to work together, most often, to reduce their financial cost of personal transportation. This has a positive effect on the environment, due to the decrease in pollution, and congestion, because there are fewer automobiles on the road thus emitting fewer emissions. **Carpooling** typically refers to a situation where one individual's car is used for a small group of people who are going to the same destination and who are leaving from places of origin which are relatively close to one another. **Vanpooling** is used to describe a situation when a larger vehicle, usually owned by a third party, is used to transport a larger group of people.

Carpool and vanpool groups can start and/or meet in a variety of different locations; however organized park and ride locations which have defined parking spots and locations are beneficial to getting the concepts into the community. It is however also important to note that research has shown that park and ride facilities without significant transit service and/or HOV cost/travel time savings incentives are not expected to be well used. Also park-n-ride locations close to the downtown corridor are not as desirable because there is not that much reduction in mileage that is seen for individuals who are traveling downtown thus reducing their likelihood to stop and meet others to drive into the central corridor.

While park and ride is an exciting concept, the correct identification of locations to place these sites is critical to the success of the program. Since the Chattanooga Area Regional Transportation Authority (CARTA) only operates within the city limits of Chattanooga, the better located suburban locations, outside the city limits, are not an option because CARTA does not provide service in these locations. The concept of park and ride is good; however it needs to be implemented on a complete regional level in order for the process to truly work.

Carpooling and vanpooling can be coordinated in a variety of different ways. This can be informal with a few friends or family. However, there are some innovative ideas that are taking shape across the country. A number of internet based sites will facilitate rideshare opportunities. The Chattanooga-Hamilton County urban area does not currently have a

rideshare program through its federally funded Metropolitan Planning Organization (MPO) and has not explored any rideshare or commuter choice options except to experiment with Facebook to enable individuals and groups to post rideshare opportunities.

There are however national websites that serve the Chattanooga region for rideshare postings. Craig's List and eRideShare.com are two such programs that Chattanooga TPO staff have identified. Craig's List in Chattanooga has an on-line classifieds website that offers an option for users to request and offer rideshare trips. Most of the postings on this web site are not for daily commute trips, but rather for long distance travel. The eRideShare.com is also a national website that essentially allows users very similar options as Craig's List, however there are much fewer listings for the Chattanooga area.

Although these national websites are regularly offered through the country, many of the MPOs throughout the country have taken it upon themselves to provide a more localized option for the citizens which they serve. In Birmingham, Alabama the MPO uses Facebook as a way to promote these programs in the highly organized program referred to as CommuteSmart.

The **CommuteSmart** program, sponsored by the Regional Planning Commission of Greater Birmingham, was created in 1999 to help alleviate traffic congestion and reduce air pollution in Jefferson and Shelby counties. CommuteSmart encourages individuals to change their commuting habits and educates them on cleaner modes of transportation. Some of these methods include carpooling, vanpooling, bicycling/walking, teleworking and transit. CommuteSmart is 100 percent federally-funded, and all CommuteSmart services are provided at no cost to local companies and their employees.

The CommuteSmart program, along with many other programs similar to it across the country, use **ridematching services** in order to pair the closest people in terms of where they live and work in order to have the most convenient carpool and vanpool services. Some of these organizations have someone directly on staff to coordinate such a program, while others use internet based options. The CommuteSmart program in Birmingham has a full-time director.

A program that has been successful in many cities which we do not have in Chattanooga is a **Guaranteed Ride Home (GRH)** program. This ensures a person who uses a rideshare program will have access to an appropriate means of transportation in the case of an unforeseen circumstance. These programs are often times also referred to as Emergency Ride Home programs. The intent is to overcome one of the barriers to selecting options other than single occupant driving by offering participants a low cost or no cost taxi ride if this is necessary. A GRH program may offer rides by taxi, company vehicle, private shuttle, auto rental, or transit. These rides may either be offered without cost to the participant or would require a small copayment. GRH programs may limit the number of trips offered to each participant over a certain time period, or the total dollar amount allowed for reimbursement. GRH programs may operate at the employer, municipal, or regional level.

Another innovative idea in TDM is **carsharing**. This is where a group of individuals or organizations will share the costs associated with car ownership. The majority of carsharing groups in the U.S. are membership based organizations, both profit and nonprofit, that give their membership access to a fleet of vehicles for short term use. The static expense of

owning and operating a personal vehicle is turned into a variable cost of user fees based upon time and miles driven. First appearing in Europe in the 1980s, carsharing began to make inroads into the U.S. market in the late 1990s. Carsharing is not only serving individuals. Businesses and governmental organizations are showing an increased interest in carsharing as a way to reduce their vehicle fleet costs. The Metropolitan Planning Organization in Chicago has been able to showcase and develop strategies for the successful implementation of carsharing. This process can be replicated throughout the United States. The success of carsharing organizations has shown that the program works best in urban areas with high population densities that support other modes of transportation including transit, walking, and bicycling. These other modes are critical to the success of carsharing since users can not be solely dependent on the carsharing vehicles for transportation.

Another potential program related to carsharing is for a large company to have a **flexshare car**. This could be used by an employee who normally commutes to work via the means of bicycle, transit, or vanpool who needs to use a automobile for an emergency errand during the day such as picking up a sick child at school.

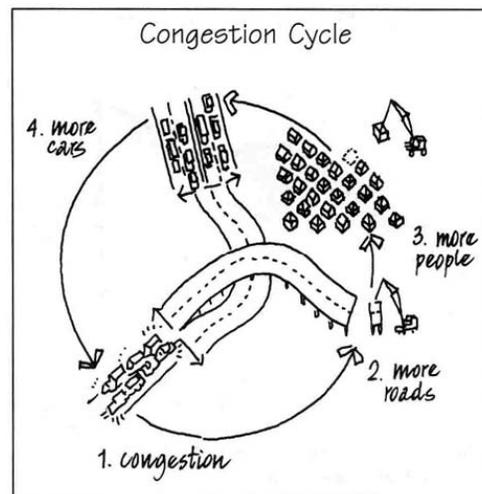
The fear of being stranded at some other destination than home is a significant fear for a number of people and in order for rideshare programs to be successful whatever specific plans are created must address this reality and provide as large of a safety net as possible to take care of any unexpected emergencies that could occur during the day.

### ***Bicycle and Pedestrian Programs***

While driving through the metropolitan region of Chattanooga, TN motorists will often encounter bicyclists. While this shift to bicycling as a mode of transportation is taking hold in many areas in the United States such as the Pacific Northwest, there are not many cities in the Southeast like Chattanooga which can boast such a strong bicycling community. Within the downtown corridor of Chattanooga the bicycle is often the fastest means of transportation from one point to another. While an automobile can travel at a higher rate of speed than a bicycle, high speeds are in many cases not possible due to congestion and stoplights within a downtown corridor. Also in a largely dense area, parking an automobile can be a significant problem while parking a bicycle is almost always not as time consuming.

Both bicycle and pedestrian programs are considered TDM measures because the more people walk and bike for transportation, the less they will use the automobile as their primary means of transportation. This is important because a motorist takes up more space on the current transportation system which in turn creates more congestion and often contributing to the cycle of congestion: more cars lead to wider roads which encourage more cars and the cycle will continue to repeat itself.

One concept that the Chattanooga area has been able to achieve with success is a Bicycle to Work program. Once a month, there is an



official bike to work event which is held on the South side of the Walnut Street Pedestrian Bridge. This program has created a high increase of groups informally bicycling to work together on a regular basis. Outdoor Chattanooga also sponsors a Street Smarts class that is designed to help bicyclists to better understand how to be safe while bicycling on the roadways. This class is very important due to the number of people who bicycle and who also do not know all of the rules of the road. Another program that is not currently in place, but is under heavy local consideration is a **bikeshare** program. This would allow citizens the ability to drive to work, however then when it was necessary to get from one point to the next within the city they could borrow a bicycle.

Bicycle and pedestrian programs help reduce air emissions associated with automobile transportation. Although exercise and social/recreation have consistently been cited as the most common reasons for bicycling and walking, most people in the United States use motor vehicles for their main mode of transportation (i.e., commuting, shopping, and personal business), particularly in suburban areas. While many people in suburban locations have accepted a lifestyle that does not include the possibility of bicycling they may not even think of this as a valid mode of transportation if they were to move to a more urbanized locale.

Currently across urban and suburban areas, private vehicles comprise 93 percent to 99 percent of trips taken for commuting purposes and 93 percent to 98 percent of trips taken for shopping purposes. Traffic congestion and air quality objectives would benefit from shifting low-occupancy vehicle trips of any purpose to bicycling or walking. In an urban and congested situation bicycling is a valid mode of transportation, however getting people to realize this concept is part of our challenge in transportation planning.

In the United States biking and walking are primarily used for recreation, exercise, and non-utilitarian travel. From a TDM perspective, bicycling and walking represent viable alternatives to most single occupancy vehicle trips. Each trip shifted from a single occupancy vehicle to a bicycle or to walking will result in a 100 percent reduction in vehicle emissions for that trip. Bicycle and pedestrian programs may include a wide array of elements amenable to a community's characteristics (e.g., topography, population, existing infrastructure) and the budget of the administering agency. Some common types of bicycle and pedestrian facilities include the following:

- Routes, lanes and multiuse paths
- Sidewalks and walkways
- Plans and maps
- Bicycle coordinators
- Racks and other storage facilities
- Ancillary facilities (showers and clothing lockers)
- Integration with transit
- Ordinances for bicycle parking (Some cities have ordinances that require a certain defined proportion of parking spaces at new developments be set aside for bicycle parking)
- Education, media and promotion (e.g., "bike to work" days)

Although government cannot devise a way to assure that citizens will walk small distances instead of driving, there are some techniques that can be used to encourage this type of behavior. Requiring new developments to install sidewalks is one such remedy. While this can sometimes be viewed by developers as an unnecessary expense, studies have shown that

when a community has a solid sidewalk network, the value of the homes in that neighborhood increases greatly. A quality pedestrian network entices people to walk which then reduces the demand on the road network from automobiles.

The promotion of high density residential in a mixed use format with limited commercial is important to create a walkable atmosphere. Many Americans have become accustomed to parking as close as possible to a store in a large parking lot where they have to drive from store to store. Mixed use zoning along with compact businesses allows citizens the ability to live in comfort while being able to shop, eat, and be entertained on a very local level where their automobile is only used for long distance trips.

The Chattanooga TPO is currently addressing the need to accommodate all modes of transportation during the planning and design stage for new and improved streets through a policy known as **Complete Streets**. The Chattanooga TPO held a Complete Streets workshop on Friday, May 15th 2009 where diverse group of people were in attendance.

### ***Pricing Strategies for Automobile Parking and Movement***

**Congestion pricing** is a relatively new transportation demand management concept that is often referred to as "value pricing." This concept which is still in the pilot program stage of development in the United States operates in one of two ways. It either provides a disincentive to driving on highly used roadways by imposing fees in congested areas that vary depending on location, time or vehicle occupancy, or it offers a priced alternative to a congestion roadway that enables the motorist to reach his or her destination more quickly. These fees are intended to reduce congestion and improve air quality by encouraging people to change their travel patterns by shifting to off-peak periods, less congested travel routes, higher occupancy vehicles, or a different mode of transport (e.g., public transit). There are several congestion pricing measures that may be implemented such as variable tolls, high occupancy vehicle (HOV) lane permits, vehicle miles traveled (VMT) fees, and parking fees. Depending on their scope, these policies may be used in three ways: facility pricing, regional network pricing, or cordon pricing, as described below.

**Facility pricing** is a mechanism in which the pricing measure is levied on one or several roadways that link residential areas to downtown commercial districts. Fees may be imposed on new or existing roads, but usually it is more politically acceptable to impose fees on new facilities because people would not view the policy as taking away a free service. In order for a pricing measure to be considered an application of facility pricing, the purpose of the measure must be to reduce congestion. Therefore, many existing toll roads are not appropriate examples because their purpose is largely to raise revenue. Toll roads may be viewed as congestion pricing mechanisms if the fees are structured in such a manner as to influence demand.

**Regional network pricing** refers to policies in which people are charged to travel on a network of similar roads (e.g., highways). Unlike facility pricing, network pricing applies fees on multiple roads going in many directions. This fee structure results in a more accurate fee for vehicle use than facility pricing because more of the trip is included within the boundary of the system. Fees may be collected from a series of toll booths along the network or from entrance and exit ramps on controlled access facilities.

**Cordon pricing** is a mechanism that charges vehicles that enter high-activity areas such as central business districts. Vehicles may enter an area via different types of roads. This policy is implemented by identifying congested areas and encircling them with one or more cordons (lines). Then, fees are collected from people who drive into the encircled region via toll booths, special area permits, or parking permits. Prices may vary by time of day, so that during typical peak congestion periods, people will be reluctant to enter the cordoned areas. Although this pricing measure has been successfully implemented in such countries as Singapore, Norway, and England, it has yet to be implemented in the United States.

**Parking management** is a way of administering the supply of available parking spaces. The goal is to limit and allocate the overall number of vehicle parking spaces in a particular area (e.g. a downtown commercial/retail district) which will in turn encourage single occupancy vehicle users to switch to other means of travel. Common forms of parking management include:

- Limiting total available parking
- Providing preferential parking for desired travel modes such as commuters or vanpools
- Setting minimum or maximum parking space ratios in zoning ordinances
- Implementing time limits on existing vehicle parking spaces

Offering parking incentives and discounts to vanpoolers can be a valuable alternative and a successful form of parking management. While many cities have tried to apply high occupancy vehicle (HOV) lanes, the ability to enforce this policy has been shown to be increasingly difficult. In many cities, this simply becomes the farthest most lane and many single occupancy drivers will use the lane as a passing lane. This of course is not the intended purpose of the lane. A parking management approach of reducing the price of parking in a downtown corridor for vanpoolers should be easier for cities to enforce and should also reduce single occupancy vehicles on the road. This may also be more politically popular than the increase in parking fees.

**Parking pricing** can be implemented by both governments and the private sector to encourage use of alternatives to single occupancy vehicles (SOVs), which in turn cuts vehicle miles traveled (VMT) emissions, and congestion-related pollution. Governments may implement pricing approaches, including:

- Imposing or increasing fees and surcharges for SOVs or long-term parkers in public parking facilities
- Giving price preferences to car and vanpoolers
- Taxing providers of parking
- Imposing parking pricing through regional regulations
- Tying funding (especially state government) allocations for road improvements to requirements of local trip reduction plans incorporating parking pricing and other demand management strategies

Private developers, employers, and transportation management associations also can play a role in pricing. These entities may take one of the following strategies:

- Removing, reducing or cashing out employer provided parking subsidies
- Reserving "early bird" or monthly discounts favoring long-term commuter parking

- Imposing parking pricing and discount parking for carpoolers where free parking prevails, or where carpoolers enjoy no price breaks (with or without government regulation)
- Developing parking regulations and pricing for commercial and retail mixed-use areas
- Managing and enforcing parking

### *Alternative Work Schedule Strategies*

Working alternative hours in an employment position is a way of addressing the problem of time choice on the current transportation system. In the United States, we have developed a system of dependence to the personal automobile due in part to the lack of public transit. This acceptance of the personal automobile leads us to continually use it as the means of transportation even when we know that there will be considerable automobile traffic during rush hour. There are many jobs which do require a person to work during the most popular work times, however there are many that do not. However since we are creatures of routine, these individual's employment is set at the same general time as everyone else.

Rush hour traffic due to relatively close times of employment is a huge problem that with alternative work times could be reduced significantly. Government can encourage private industry to adopt these policies by being an example for private enterprise. The problems of implementing such policies are that employees must make sure to not abuse this flexibility. Also, employers have to have a lot of trust in their employees to make sure that they are in fact working the times they say they do. However if government is going to promote these policies it is important that it takes the lead to make sure that the governmental organization does not appear hypocritical.

Work schedule changes or variable work hours can certainly be used as a TDM strategy which will in turn effectively reduce congestion and improve air quality. Work hour policies are determined by employers, who are therefore the key entity in making work schedule changes. Three implementation options—staggered work hours, flextime, and a compressed work week—are discussed below.

- **Staggered work hours** allow employees to begin work in intervals across the morning. Start times may be 15 minutes apart throughout the morning, and employees are required to work for eight hours from their start time. The goal of this transportation strategy is to spread a given amount of traffic over a longer period of time around peak periods, which reduces concentrations of ozone precursors.
- **Flextime arrangements** allow employees to select their arrival and departure times. These have much the same impact as more structured staggered work hours: reduced peak hour congestion and potentially reduced air pollution. More flexibility in scheduling may allow some employees to rideshare who would be unable to otherwise. The fact that fewer people are arriving at the same time may discourage some ridesharing as well. The first documented flextime program was established in 1967 in West Germany. Since then, flextime programs have become prevalent in many organizations around the world.
- **Compressed work weeks** allow employees to work more hours in fewer days than the usual eight hour per day schedule. The "4/10" work week is a common option in which employees work 10 hours per day over four days. Another common approach is the 9/80 work week which occurs over a 2-week period as follows: employees work seven 9-hour

days in a 2-week period, one 8-hour day and then receive one "free" day off every other week. Work schedule changes may improve air quality and reduce congestion. There will be fewer vehicle miles traveled across the work week and employees will be arriving and departing during non-peak periods, thus reducing concentrations of ozone precursors.

Due in part to the increase in technology in recent years it may in some cases not even be necessary for someone to come into the office at all. Telecommuting is a way of reducing vehicle miles traveled (VMT) by employees to and from work. It is defined as working at home or at an alternate location and communicating with the usual place of work using electronic or other means, instead of physically traveling to a more distant work site. VMT reduction leads to a drop in vehicle pollution emissions, and a drop in traffic congestion (which may result in further reductions in emissions).

The term "telecommuting" is often used interchangeably with "working from home." Running a business from a home office is not considered telecommuting. In addition, working for an employer from home is only one form of telecommuting. Another variation of telecommuting involves working at remote satellite centers that may be run by one company, or by several companies. A common misunderstanding is that telecommuting must involve a direct link between an employee's home computer and their company's computer at the office. In fact, telecommuting employees may work on a computer linked to their company, but may also work on a stand-alone computer, or perform work tasks which do not require a computer (e.g., reading or paper work).

Nationwide there are a number of industries that are developing unique concepts that help both the community and the company in dealing with congestion. Volkswagen is a company making a large imprint in the Chattanooga region and some of their recent decisions are interesting. The company has decided to schedule their shifts to coincide with the CARTA bus schedule. Also there will be a three-hour break between the two shifts in order to allow people who are driving their own vehicles to leave and for the next group to arrive. The coordination of CARTA service and the other parking services reduces the amount of demand for parking, which is also a transportation infrastructure demand reduction. Through efficient scheduling and organization Volkswagen has created a way to reduce the amount of parking spaces needed by approximately 2/3. This will save the company substantial money in construction costs.

### ***Information Technology***

While telecommuting certainly has high potential due to the rapid developments in technology, there are other ways in which technology can be used to reduce the demand on the transportation system. Knowing exactly what is occurring on the roadway before a motorist approaches an incident allows individuals the opportunity to take an alternate path.

Many larger cities in the United States now have the ability to show real time traffic reports through the internet. With recent advances in internet accessibility, such as the iPhone, it is now much easier to see where traffic jams are occurring before you are in the middle of the problem. While this technology is currently somewhat expensive for certain members of the general public, it does allow those who have the technology the ability to take alternative routes which in turn reduces the congestion problem slightly for everyone. As this technology becomes more mainstream and affordable, so will the effectiveness.

One example of real time traffic which has a lot of advanced functions is the website [www.511.org](http://www.511.org) which has been created for the San Francisco Bay Area. This site is run by an MPO and does an excellent job of showing numerous variables that could impact traffic conditions. The 511 internet site has more than just real time traffic information. There are Geographic Information System (GIS) map layers for construction, traffic incidents, events which might increase traffic, location of cameras, and current traffic congestion levels. The site also has information for regional transit, rideshare, and bicycling. Having this important multi-modal information on the same website interface makes implementation of these policies much more likely. Many cities across the country are adopting this type of model.

The Tennessee Department of Transportation is currently using some technology to their advantage for traffic congestion reasons. The website <http://ww2.tdot.state.tn.us/tsw/smartmap.htm> has a



significant amount of information pertaining to local conditions and is referred to as TDOT Smart Way. The official emblem is shown here. There are layers for incidents, construction, cameras, message signs, road condition, and traffic flow. Although Nashville has information pertaining to all of the layers, Chattanooga does not have any traffic flow or road conditions information available on the TDOT website as of July 2009. Adding these layers could be an area for potential improvement within the Chattanooga region.

The TDOT website is becoming more advanced, however there are many systems such as the one in San Francisco that have a much more advanced network which TDOT and the Chattanooga TPO could use to replicate into a system which integrates as much information as possible to give citizens the best information possible.

### ***Traffic Operations***

The following are a list of traffic operation concepts that can reduce the need for demand upon the current transportation system.

**High Occupancy Vehicle (HOV)** lanes are intended to maximize the person-carrying capacity of the roadway by altering the design and/or operation of the facility to provide priority treatment for HOVs. By providing two important incentives – reduced travel time and improved trip time reliability – HOV facilities encourage travelers to shift from low occupancy vehicles to HOV use. This shift should reduce vehicle trips, vehicle miles traveled (VMT), congestion, and associated emissions from these activities. In several regions, the scope of HOV facilities is being expanded to address regional problems of suburban mobility, congestion, and air quality. HOV facilities have been implemented throughout the United States. HOV lanes are typically open to buses and other vehicles with a minimum of two or three occupants, although some are exclusive to buses. Many types of HOV facilities exist. Some examples include:

- Separate roadways for exclusive HOV use
- Bypass lanes at metered freeway entrance ramps

- Lanes constructed within the freeway right-of way but physically separated (e.g., by a concrete barrier) from the general-purpose freeway lanes and dedicated for HOV use only
- **Concurrent flow lane** (i.e., a lane moving in the same direction of travel that is not physically separated from the general-purpose traffic lanes)
- **Contraflow lane** (i.e., a lane in the off-peak direction of travel, typically the innermost lane, designated for exclusive use by HOVs traveling in the peak direction. This lane is separated from the off-peak direction general-purpose travel lanes by some type of changeable demarcation, such as plastic posts or pylons). Other HOV facilities include queue bypass, bus streets, and bus tunnels. The most common form of HOV facilities are concurrent flow HOV lanes followed by exclusive HOV lanes in freeway rights-of-way. HOV facilities may involve adding entirely new capacity or reallocating existing capacity. Along with a range of physical options, HOV facilities have operative options such as full-time HOV-only use, peak time use, and reversing the direction of facilities during peak times.

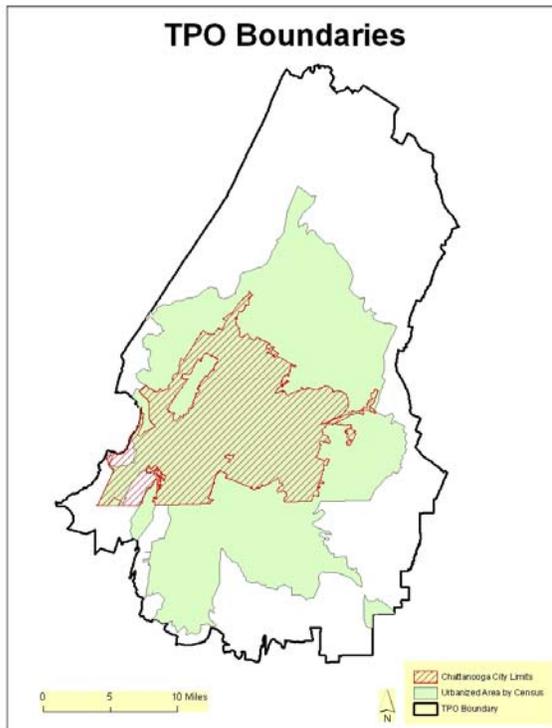
There are currently no HOV lanes in the Chattanooga region, however implementation of these lanes has occurred in Nashville and Atlanta. Since both of these metropolitan areas are larger than Chattanooga, a direct comparison of how they are working may not be reasonable, however without proper enforcement the HOV will become just an outside lane.

### ***Conclusion: What Ideas Might Work in Chattanooga***

Many of the ideas presented in this paper are universal in nature. While rideshare, bicycling, real-time traffic and alternative work hours can have an effect on any community, it is important to discuss how specifically these ideas might work in a given community. Chattanooga is defined as a Transportation Management Area (TMA) meaning in part that it is a relatively large MPO. However, Chattanooga is not as large as a city such as Chicago meaning that many research projects conducted in larger cities can be used in a smaller but similar format when funding is available to do so in the Chattanooga region.

It is very important to note that for the successful implementation of the TDM measures mentioned in this book, it must be an effort by the larger Metropolitan area and not just an effort by the City of Chattanooga. As the map shows, the metropolitan area is significantly larger than the City of Chattanooga meaning that there is significant population outside of the incorporated city limits of Chattanooga.

There is however no reason why programs such as an organized rideshare and GRH program should and can not be properly implemented into the community. If it is determined by public officials that one of the recommendations listed in this paper is to be implemented, there are examples throughout the country of successful programs from which the Chattanooga region could use as a guide in the implementation process.



While it is not feasible or necessary to have as many TDOT message boards detailing traffic conditions as there are in Nashville, there are some locations where a message board would be helpful. A couple of important examples would be the section of interstate where I-24 and I-59 are on the same path as well as the section of interstate where I-24 and I-75 are also conjoined. Another information technology recommendation is to include an integrated real time traffic website that includes bicycle and rideshare programs all on the same central location for the region. In order to maintain such a site it is integral to have funding for an individual or individuals to be able to update the website in a timely fashion. Old information is not at all valuable for websites in general; however it is essential to have updated information for real time traffic.

While the carsharing concept may seem odd to the average American at first, it is a policy idea which would both reduce cost and congestion. Many companies provide their executives a company car for transportation purposes. In an attempt to reduce both company cost in a difficult fiscal environment and congestion, rideshare requirements could be instituted. This would reduce company cost significantly as well as congestion. This could work well in a location such as Chattanooga which may not have the correct densities for mass transit.

The significant reduction of automobiles within the downtown core of Chattanooga is a real possibility. While the area may be mountainous, the main streets of Main, Broad, and Chestnut are flat making the conditions ideal for cycling. Within the downtown area, there are numerous locations where it is faster to bicycle than drive an automobile to and from a destination when the time of finding a parking place is included in the analysis. The potential designation of a bicycling zone, which would illustrate a defined area where the speed of bicycling is faster or equal to driving a car from place A to place B, would give individuals a defined area to use bicycles as not only a means of recreation, but transportation as well. These areas would effectively illustrate where bicycles are a valid means of transportation from strictly a travel time viewpoint.

A study demonstrating the exact locations where it is actually faster to bicycle than use an automobile within the downtown region of Chattanooga would be a very useful research project. While the reduction of gas prices, health benefits, and improved environmental concerns are positive factors that many citizens already know about, the reduced travel time inside downtown for bicycles is not that well understood. The time that it takes to locate and park a car is substantial and people do not usually include this in their thought process.

However, the number one reason why personal automobile traffic became very popular is the rapid rate of time that people can get from one place to another, not how fast they can drive down the road.

Since the number one reason to drive a car is to get places faster at your own convenience maybe other people will give bicycles a second look if they in fact realize that it could take them less time to use the bicycle as a mode of transportation in certain locations. While other factors are important, have we in the planning field actually been dancing around the most critical element to changing personal mode of transportation selection? After all, decreased travel time is why people started driving so much, but due to the problems of congestion and the large amount of space required to park a personal automobile, the bicycle is becoming a much more viable source of transportation within the urban core of the city. In essence, what is not thoroughly understood in the general public is the amount of time it takes to park a car in a congested downtown environment.

Although this report details the best TDM practices for the potential implementation in Chattanooga, there are certainly other ideas which have been evaluated. However the reality is that an increased number of commuter choices allows for an overall better result for the citizen. The automobile is not the solution to every transportation problem in every situation. In order to develop a better city framework for Chattanooga, as many multiple modes of transportation must be provided to allow individuals more freedom of movement. With this concept in mind, Americans and specifically citizens of Chattanooga can retain the freedom and independence that they crave, as well as create a better overall and more sustainable multi-modal transportation system.