SUMMARY

The Capital District Transportation Committee is in the midst of an update to its official New Visions regional transportation plan. The update will extend the horizon to 2030 and address emerging issues. In January 2004, CDTC established five "working groups" to help the staff analyze in parallel the subjects requiring further study (as identified by the Quality Region Task Force) and to guide the documentation of the analysis. Working Group B was charged with investigating and documenting "Expressway System Issues and Options". Working Group B was made up of representatives from CDTC staff, NYSDOT Region 1, NYSDOT Main Office, CDTA, the New York State Thruway Authority (NYSTA), and one Quality Region Task Force member. This report summarizes the research, analysis and findings by Working Group B.

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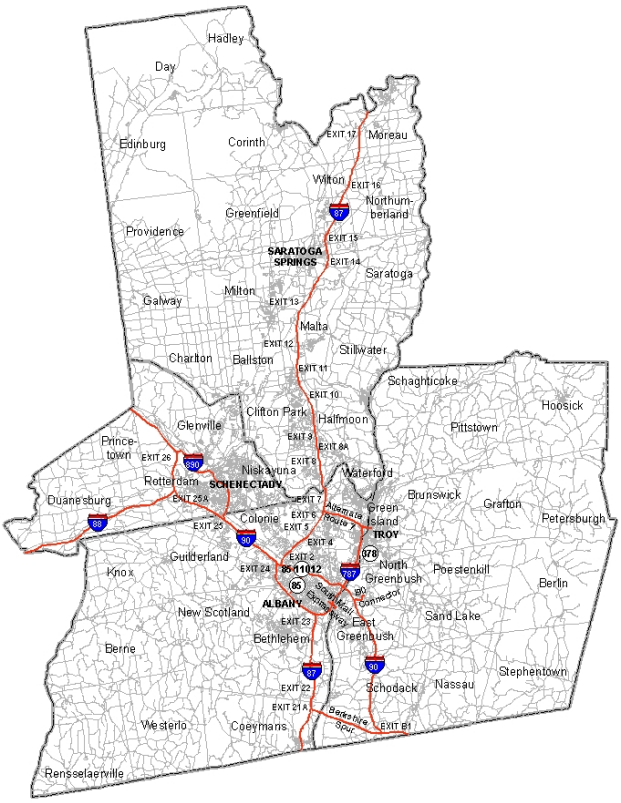
Working group members representing the New York State Department of Transportation and the New York State Thruway Authority were asked for detailed data regarding current infrastructure needs and attendant costs. NYSDOT, NYSTA and CDTA also provided a detailed inventory of the current ITS infrastructure and planned additions to that infrastructure.

For the purpose of the Working Group B effort, the "expressway system" is defined as the entire interstate system, Alternate Route 7, NY 85 from I-90 to the NYS Thruway, the I-90 Phase I Connector and the South Mall Expressway/Dunn Memorial Bridge. The Expressway System in the Capital District consists of approximately 730 lane miles of pavement and 230 bridges and structures. Portions of the Northway and I-90 carry well over 100,000 vehicles per day. The NYS Thruway carries over 75,000 vehicles per day between Exits 24 and 25. Intelligent Transportation Systems (ITS) in place, such as Variable Message Signs, Highway Advisory Radio, Transmit, the Information Exchange Network, the HELP Patrol and EZ-Pass help the system run smoothly in spite of high daily volumes.

"Expressway" System in the Capital District



The portion of the NYS Thruway located in the Capital District is 50 years old and has never been reconstructed, just rehabilitated and repaired. The same holds true for much of the expressway system that is within

NYSDOT's jurisdiction. Three quarters of the bridges on the expressway system are over 30 years old, and 13 percent of those are 45 years old or older. The average pavement surface rating on expressways is about a 7 (out of 10). The average bridge condition on NYSDOT bridges is about a 6 and the average condition of NYS Thruway bridges is just over 5 (out of 9). Clearly, volume, age and condition data indicate that the expressway system will need constant repair if it is to continue to carry the thousands of vehicles per day that it currently does. The cost over the next 30 years, to maintain (repair, rehabilitate and replace in-kind) this expressway system (including the NYS Thruway) and to maintain the intelligent transportation system (ITS) technologies that are currently in place within NYSDOT, NYSTA and CDTA, is in excess of $3.2 *billion* dollars (in 2004 dollars), or $109 million dollars per year. Expressway expenditures programmed in the current 2005-2010 Transportation Improvement Program amount to $77.8 million per year. A two percent per year and five percent per year inflation rate brings annual needs estimates to $182.6 and $387.9 million in 2030; respectively.

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It is expected that travel will continue to increase over the next 30 years, as more and more people gain access to personal vehicles and the elderly have high mobility expectations. As highway traffic volumes grow and congestion occurs, drivers change their behavior in complex ways to avoid congestion. These vary from finding alternate routes to changing hours of travel to avoid the most congested periods. The result is that equilibrium is established that prevents peak hour volumes from increasing, but may lead to a longer congested peak period.

There is a growing recognition that incident related, unpredictable delay is more severe and more unacceptable than "recurring delay". Delay resulting from an accident or bad weather may be more severe and more disruptive to traveler's schedules than regular congestion. The regional model does not predict when incident delay occurs and is not the best tool to assess the magnitude of incident related delay. In addition, the set of strategies to deal with incident related delay is different than traditional methods.

CDTC analyzed MIST (Management Information System for Transportation) data supplied by NYSDOT for the Working Group B effort in an attempt to qualify and quantify how the expressway system processes daily traffic during the peaks and during incidents and to help evaluate expressway operational needs and appropriate strategies and solutions. MIST data provide a wealth of information on traffic counts, speed & incidents for 15 minute intervals by lane for sections of the Northway, I-787, I-90 and Alternate Route 7. According to the MIST findings, problem locations include the Twin Bridges, the Patroon Island Bridge, I-90 from the Patroon Island Bridge to the Thruway toll booths, I-87 NB during the PM peak from Exit 1 to Twin Bridges and on Alternate Route 7 WB during PM peak. There are

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consistent delays in the PM peak, on Fridays (especially in the summer), and more incident delays in the winter. However, travel speeds, on average, during the am and pm commute, are generally over 50 mph, which compared to other metropolitan areas, is not that bad. These average speed data, however, do not reflect the phenomena that drivers often face-- traveling 65mph, slowing down to 10mph, going back up to 50 mph and so on.

When congestion is predictable, it is generally considered to be more tolerable, because commuters can adjust their schedules to arrive on time. When congestion is unpredictable, for example because of unpredictable incidents that have significant impact on travel time, the congestion can be more frustrating and unacceptable. That is, on those days when incidents do occur, they are far more disruptive to schedules than regular congestion. It has been observed nationally that some expressway corridors are more sensitive to incident disruption than others, and are therefore more unpredictable. Using MIST data, staff calculated a "Planning Time Index" which is a measure of predictability and reliability. The index identifies how much extra time on average, one would have to build into their schedule to ensure getting to their destination on time during the peak. This index accounts for both average recurring and incident related delay. Planning time indexes are shown below:

- **I-87:** PM peak NB: 1.66 AM peak SB: 1.46
- **I-90:** PM peak WB: 1.37 AM peak WB: 1.55
- **I-787:** PM peak NB: 1.26
- **Alt Rt-7:** PM peak WB: 1.20 AM peak EB: 1.34

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These numbers indicate that in the morning commute on I-87 for example, one would have to add 46 percent more time than their free flow commute time to ensure getting to work on time 95 percent of the time. In other words, if a commute is generally 30 minutes in free flow conditions, one would have to plan for a 44 minute travel time (30 * 1.46) to be almost certain of arriving to work on time. So, for example, while average delays on the Northway and I-90 in the City of Albany are somewhat comparable, the Northway is much less reliable than I-90.

The Northway peak directions (AM southbound and PM northbound) have reliability issues, with the PM northbound travel being more unreliable than the AM southbound travel.

Using the MIST analysis, CDTC's STEP model and the inventory developed for the Working Group B paper, Working Group B identified implications of growth on expressways. In general, the Northway and I-90 are already at capacity in the peak direction (AM and PM) which means that there will be little or no traffic growth in peak hour because physically the expressways can't fit more (vehicle headways or spacing are at minimum levels). Consequently, traffic growth will be forced onto parallel routes (e.g. Route 9) and peak periods will become longer. In addition, some locations which appear to have reserve capacity will not experience peak hour growth because upstream expressway sections are already oversaturated and can not meter traffic to down stream locations any faster.

Two future growth scenarios were analyzed. The first scenario is the basic CDRPC scenario while the second is

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a basic "what if" scenario based on potential hyper-growth in the region. CDRPC growth estimates are based on historic trends which point toward a one quarter percent per year growth in population. The hyper-growth scenario is based on US population growth projections of one percent per year.

CDTC staff modeled future demand and found that five lanes in each direction on I-87 would fill up in the year of opening, conventional widening would result in continued significant congestion and that widening would not eliminate incidents, which create the worst congestion. Under the hyper-growth scenario, even seven lanes in each direction would be inadequate to carry Northway traffic at a good level of service. Seven lanes, however, is practically problematic and would create massive environmental and right of way impacts.

One of the conclusions of the analysis performed for the Working Group B effort is that there is no capital improvement such as widening that can eliminate daily recurring congestion in the peak periods. Working Group B also concluded that ITS, incident management and operational improvements represent the most effective strategies for expressway congestion management.

Given this conclusion, Working Group B updated the ITS priority network. Although this network is primarily developed around the expressway system, the role of ITS on the arterial system could not be ignored. Some ITS improvements to arterials which parallel the expressways would have direct benefits to expressway travel, especially by providing alternate routes during expressway incidents. However, ITS benefits from signal coordination, transit signal priority, or other improvements would also provide significant benefits to normal daily arterial function.

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Recommended updates to the ITS priority network include:

- Extending coverage on the Northway to Exit 15 for the near term, and to Lake George for the long term;
- Extending coverage of the Thruway to the CDTC boundaries for the near term and to Amsterdam for the long term;
- Extending parallel routes for the Northway and Thruway: Route 9 to the Warren County line; Route 9W to the Greene County line; and Route 5S to the Montgomery County line.
- Extending coverage of I-88 to the Schenectady County line;
- Adding several priority arterial corridors not in expressway corridors, including Route 7 from Albany Shaker Road to I-890, and arterial corridors in the cities of Albany, Schenectady, Troy and Saratoga Springs.

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The concept of a managed lane also holds promise for operational improvements and demand management and should be seriously considered for the Northway. Managed lanes are highway facilities that include operational strategies that are used to manage traffic flow in a way that can respond to changing traffic conditions in real time.

Examples of managed lanes include high occupancy vehicle (HOV) lanes, bus rapid transit (BRT) lanes, bus and truck only lanes, clean air and/or energy efficient lanes, high-occupancy toll (HOT) lanes (with tolls that vary by traffic conditions and type of traffic) and alternating HOV/HOT lanes. When lanes are managed, preference can be given to carpooling vehicles, bus rapid transit and through traffic; tolls can vary by time of day and can be increased as demand increases to ensure premium service. If a managed lane is added to the Northway, traffic would be diverted from parallel routes, which would provide overall system benefits. National practice suggests that a managed lane should be added by widening, not by replacing a general purpose lane with a managed lane. This means that those who choose not to use the managed lane will be dealing with a level-of-service that is not worse than before the managed lane is constructed. In the short term, the function of the general use lanes may improve somewhat, and all users can value the option of using a managed lane occasionally when the need outweighs the cost and/or perceived inconvenience.

It is possible that CDTC would consider adopting a policy that states that if any capacity is added to the expressway system it will be provided by adding managed lanes.

Further analysis will be needed to determine the net capital and operating costs of providing managed lanes. Working Group C research indicates that a HOT lane would cost about $10 million per lane mile for construction and about $.500 million per year to operate. In addition to cost, one of the variables to consider in deciding about a managed lane on the Northway, for example is the level of growth that could be reasonably expected on the Northway and other Capital District expressways. If growth continues on the Northway corridor, further consideration will be given to this concept. It is possible that CDTC would consider adopting a policy that states that if any capacity is added to the expressway system it will be provided by adding managed lanes.