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# THE METROPOLITAN CONGESTION MANAGEMENT PROCESS

## May 29, 2007

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## EXECUTIVE SUMMARY

This document describes the Metropolitan Congestion Management Process (CMP) for the Capital District.

The CMP is an update to the CDTC Congestion Management System that has been in place and operational since 1995. The CMP has been prepared as part of the preparation of the New Visions 2030 Regional Transportation Plan (RTP). The congestion management principles continue to be supported in the New Visions 2030 Plan. New data has been evaluated, and congested locations have been identified and prioritized by extent and severity at the corridor and municipal levels. Congestion management strategies were examined in corridor, community-level and regional planning efforts. Congestion priorities guided the programming of significant amounts of federal funds in the Transportation Improvement Program (TIP).

An important update to the CMP is the incorporation of data from the New York State Department of Transportation's MIST data (Management Information Systems for Transportation), which allows new performance measures of reliability to be used.

The remainder of this report is divided into eight sections which describe the components of CDTC's Congestion Management Process. A description of what is discussed in each section is presented below.

**Section 1** describes the Capital District context and the relationships between the CMP, the Regional Plan, the Transportation Improvement Program (TIP), and project implementation. In the structure that CDTC will use, the CMP provides for data collection and interpretation; the plan focuses on outreach, visioning and establishing principles; the programming process concentrates on priority setting; and project implementation consists of detailed scoping, design and implementation. Of course, all of these aspects of the planning process are interrelated. The outreach, principles and visioning from the regional plan are vital to the management systems. The TIP and project implementation must be integrated with the CMP.

**Section 2** describes CDTC's long range plan effort, entitled "New Visions", and how the outreach and visioning of New Visions supports the CMP.

**Section 3** describes the CDTC programming process. TIP development includes broad public outreach, screening criteria for project consideration and improved technical evaluation using multimodal performance measures.

**Section 4** describes the components of the Congestion Management Process, as well as the goals of the CMP.

**Section 5** presents CDTC's congestion management principles. These principles call for consideration of demand management, cost effective operational actions, incident management, land use management and corridor protection. They describe the special conditions under which significant physical highway expansions are appropriate for congestion management; and they call for capacity expansions as part of infrastructure projects only when such expansions can be shown to have benefits comparable to other capacity projects in the TIP.

**Section 6** describes the Congestion Management Process performance measures and the methodology used to directly measure, estimate or forecast these measures.

**Section 7** describes the data collection and performance monitoring that will support the Congestion Management Process. Extensive data collection practices are already in place in the Capital District, and future data sources are anticipated. Data collection efforts are expected to be expanded in the future.

**Section 8** summarizes CDTC's treatment of congestion management at all stages of planning, programming and project implementation.

## SECTION 1
## BACKGROUND AND RELATIONSHIPS

### Background

The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 defined each urbanized area over 200,000 population as a Transportation Management Area (TMA); and required MPOs (within TMA's) to have a Metropolitan Congestion Management System (CMS), developed in cooperation with the state. SAFETEA-LU (the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users) continues this requirement, while renaming the CMS as the Congestion Management Process.

Further, "In a TMA designated as non-attainment area for ozone or carbon monoxide pursuant to the Clean Air Act, Federal funds may not be programmed for any project that will result in a significant increase in the carrying capacity for SOVs (i.e., a new general purpose highway on a new location or adding general purpose lanes, with the exception of safety improvements or the elimination of bottlenecks), unless the project is addressed through a congestion management process…"

### Capital District Context

Urban development in the Capital District has its origins in the largely independent development of its four central cities -- Albany, Troy, Schenectady and Saratoga Springs. The triangle formed by Albany, Troy and Schenectady provided ample room between cities for suburban development through the 1960's and 1970's. Radial suburban development has been modest in all directions except to the north, along I-87 (the Adirondack Northway) into Saratoga County.

The resulting urban development is scattered. Albany, as the largest municipality, houses less than 95,000 residents. Ten other cities or towns have at least 20,000 residents. There are several city and suburban employment centers with employment of 3,000 to 15,000 each. Only the Albany central business district, with approximately 40,000 employees, is a major downtown trip destination.

Growing amounts of congestion are evident in the Capital District today, but current congestion does not represent a major threat to economic vitality or to the overall quality of life for residents. Congestion is generally confined to intersection delay, midblock delay on certain two-lane suburban arterials, and erratic, but increasingly-frequent breakdowns of freeway flow. Highway congestion faced by transit vehicles is found in the same locations listed above. Highway congestion experienced by freight transportation parallels that experienced by auto users. Congestion *caused* by deliveries and other freight transportation is not a major concern.

While congestion is an important issue, surveys in the Capital District have indicated there are many other issues the public views as more important. The following statements are inferred from the 2001 National Household Transportation Survey (NHTS), for New York State MSA's

with population between 500,000 and 1,000,000 which includes Syracuse and the Capital District.
17 % of travelers have a significant concern about congestion
22% have a significant concern about “not knowing about traffic tie-ups or construction”;
32% have a significant concern about “rough pavement or potholes”;
19% have a significant concern about “lack of walkways or sidewalks”
34% have a significant concern about “speeding drivers”
25% have a significant concern about “large trucks”
34% have a significant concern about “distracted drivers”
32% have a significant concern about “drunk drivers”
39% have a significant concern about “aggressive drivers”
19% have a significant concern about “worry about being in an accident”
39% have a significant concern about “gasoline price”

An October 2004 survey in the Albany NY metropolitan area conducted by the Siena Research Institute of Siena College found that 71% of residents are satisfied with the quality of life offered by the community in which they live; only 39% experienced traffic congestion lasting more than 15 minutes over the previous two weeks; while 41% do not feel that speed limits are adequately enforced in their area. According to the Siena survey, 83% of Capital District respondents favored the use of public funds to create parkland and protect farmland; 64% supported greater funding for sidewalks, bike lanes, paths and crosswalks over building new highways; and 68% supported greater funding for trains, buses and light rail over building new highways.

In 1997, CDTC initiated a cooperative effort with the State University of New York at Albany' Center for Social and Demographic Analysis. The effort attaches questions regarding public assessment of the transportation system to a broader survey of attitudes regarding job prospects, general well-being and the like. In so doing, CDTC is able to gather opinions of transportation in the context of other issues. The products of the survey are thus more likely to be representative of the public's attitudes than either a survey solely focused on transportation or public comments at an open house or hearing.

CDTC uses the survey as a yardstick to measure the success of the planning, programming and project development efforts in the region. As such it is helpful in considering the success of the New Visions plan and public attitudes towards the actions taken as a result of the plan.

The original New Visions plan contained an emphasis on providing a balanced transportation system characterized by the acceptance of modest increases in congestion (the net increase after accounting for committed projects) in exchange for improvements in transit, bike, pedestrian access; overall reliability; and reduced social and environmental impacts. The broad goal for transportation service is to "maintain or improve overall service quality from 1996 conditions" and "enhance the quality of life in the region."

The SUNYA survey confirms that the public judges that the plan's implementation in the first few years is generally on target. Of the several questions asked, consider the following:

1. Regarding congestion, 57.5% of respondents in 2000 said that congestion affects their life "a lot" (13.6%) or "somewhat" (43.9%). These values are not significantly different in a statistical sense from the 1997 response, in which 63.5% said that congestion affects their life "a lot" or "somewhat".

2. Similarly, the differences in responses in 1997 and 2000 for questions about congestion affecting where respondents live, where they work, when they work or where they shop are not significantly different.

3. In contrast, the positive response to a broad question regarding the "quality of the highway system" demonstrated a statistically significant improvement from 1997 to 2000. In 1997, 59.0% rated the quality of the highway system as good or excellent. In 2000, 71.4% rated the quality of the highway system as good or excellent.

4. In addition, support for transit service is reflected in the surveys. Each year from 1997 to 2000, between 93.2% and 96.2% of respondents said that CDTA's bus service is very valuable or somewhat valuable. (The year to year differences are not statistically significant.)

The CDTC Route 5 Corridor Study examined ways land use policies can support multiple strategies for improving transportation in the corridor. A survey was conducted of over 14,000 residents and business owners in the corridor asked the question:

> Would you be willing to accept traffic levels and congestion roughly as they are on Route 5 now if we could improve transit, walking, biking, landscaping, attractiveness and safety?

The respondents overwhelmingly (81%) answered "yes" to this question. Many in their written comments recognized that congestion was a problem, but felt that if a trade off was necessary to achieve the other objectives mentioned in the question, it would be a worthwhile trade off. An additional 10% answered "not sure", while 10% answered "no". Some who answered "not sure" or "no" stated that they believed that transit and signal timing improvements would relieve congestion; in other words that a trade off would not be necessary; but that making the corridor more walkable and attractive was very important.

It can be concluded that while congestion is a concern for Capital District residents, it is not the most important concern among transportation and quality of life issues.

The survey findings are consistent with extensive public input received for the New Visions Plan, Linkage Studies, and other studies.

**Relationships**

There have been many representations of the relationships among the regional plan, the Transportation Improvement Program and the CMP. Figure 1 represents a structure that provides a focused approach to the five items listed above. In this structure, the management systems provide for data collection and interpretation; the plan focuses on outreach, visioning and establishing principles; the programming process concentrates on priority setting; and project implementation must be integrated with the managements systems, vision and priorities.

Figure 1 is intended to indicate that the CMP is the most logical location for data collection and basic interpretation of system performance. This information then feeds the plan development and short range programming process. The most appropriate location for outreach is during the regional transportation plan development; outreach in the TIP process is important, but is most valuable only if the basic dialogue has occurred regarding the underlying vision, principles, commitments and intentions of the metropolitan area.

In practice, the various components – the CMP, the plan, and the TIP -- are not so easily differentiated. The "interpretation" shown in Figure 1 for the CMP cannot be viewed in isolation from the fundamental visioning and principle-setting exercises of the plan development. *Indeed, CDTC's extensive efforts in developing its "New Visions" next-generation regional transportation plan indicates that the flow of policy from the plan to the data collection process is as important, perhaps more important than the flow of information from the CMP to the plan.* As a result, CDTC's Congestion Management Process documentation discusses the plan development and program development processes as an integral part of the CMP.

Further, CDTC's TIP project implementation has led to greater attention toward better incorporation of project design activities into the overall planning process, yet more progress is needed. Project designers need to be more fully exposed to the decision process that led to programming the project; this is essential if these designers are going to be sensitive to the multiple objectives (congestion relief, access management, demand management, bike and pedestrian accommodation, aesthetic treatment) of the kinds of capital projects that derive from an integrated planning process. It is expected that projects that are programmed with federal funding on the CDTC TIP should be developed and designed in a way that is consistent with the CDTC New Visions Plan and the CMP.

It should be noted that the broad visioning exercise contained in the regional transportation plan development cannot and should not be limited to subjects of the CMP. Issues such as metropolitan land use policy (for example, urban reinvestment philosophy or the conscious acceptance of congestion to minimize urban sprawl) and public transportation access policy (such as providing transit service to all areas above a certain density) are not clearly captured by the CMP if they are not directly designed to address congestion, safety, infrastructure condition or other CMP subjects.

## Figure 1

## CDTC's Perspective on the Aspects of the MPO Planning Process

| Management Systems | Regional Plan | Short-Range Program (TIP) | Project Implementation |
|---|---|---|---|
| INFORMATION (Data Collection) | → | → | |
| INTERPRETATION (Analytic Procedures) | → | → | |
| | OUTREACH | → | |
| | VISION, PRINCIPLES COMMITMENTS AND INTENTIONS | → | |
| | | PRIORITY SETTING | → |
| | | GENERAL SCOPING | → |
| | | | DETAILED SCOPING |
| | | | DESIGN |
| | | | IMPLEMENTATION |

## SECTION 2
## PLAN DEVELOPMENT: NEW VISIONS

The CDTC New Visions Plan is based on extensive public participation: the original plan was developed over three years, with nine task forces, three structured conferences, and over 30 public presentations. Strong land use recommendations were developed including urban reinvestment. The Plan found a suburban and urban consensus to encourage town and city land use planning and that transportation investment should follow land use plans and corridor studies. The CDTC Linkage Program has been a successful effort to implement the Plan's recommendation for land use and transportation planning. So far, 55 Linkage Studies in 30 communities have been completed. Public process essential in linkage studies; the public process in the Linkage Program has confirmed CDTC's regional vision for land use.

The New Vision Plan says that transportation investments will encourage:

- Urban reinvestment, infill development
- Mixed use, transit oriented development
- Land use plans and corridor studies
- Community Context Sensitive Design-NYSDOT
- Regional and community quality of life
- Protection of urban, suburban and rural character
- Investing in community planning
- Investment in cities, urban areas, "urban service area"
- Investments in pedestrian, bicycle and transit access, community quality, land use design are supported in the New Visions Plan

Important features of the New Visions Plan include:

- It is guided by Planning and Investment Principles
- The plan establishes a congestion project budget, which guides the selection of projects for the TIP
- Performance Measures and Objectives were evaluated, developed with public input
- Congestion is one of many performance measures, but trade-offs are necessary: transit access, flexibility, regional development/land use patterns/quality of life
- The CDTC CMS is integrated with the New Visions Plan
- Program balance is defined in the plan, not by give-and-take at the TIP table.

TIP budget is reviewed at start of TIP development. Majority of funds are reserved for categories under-represented relative to plan's budget. For congestion management, commitments to a regional incident detection and freeway and arterial management system are among the significant commitments of the New Visions Plan.

Performance measures are an important part of the New Visions Plan (See Figure 2.) These performance measures consciously focus attention on those measures that are most relevant to the community as a whole. These performance measures are not intended to produce a next-generation transportation plan that emphasizes travel time to the exclusion of other issues.

Instead, use of this list of measures will provide for an informed discussion of such wide ranging actions as fixed guideway transit options, transfers of jurisdiction of highway between local and state government, programs to eliminate vertical and horizontal obstructions to truck traffic and standards for driveway spacing on arterials.  Each of these actions and others will be measured based on its contribution to the core measures shown in Figure 2.

## Figure 2: Core System Performance Measures

### Transportation Service

Access: What travel alternatives exist? *(% of person trips within a defined non-auto (walk, bike, transit) to auto time difference[1]; % of person trips with a travel time advantage for non-drive-alone modes (including carpools); # or % of major freight movements with modal alternatives[2])*

Accessibility: How much time does travel take? *(travel time between representative locations, including major intermodal facilities; peak vs. non-peak, by quickest mode)*

Congestion: What is the level of exposure to traffic congestion? *(excess delay: recurring, non-recurring by mode [auto, transit, freight, bike, pedestrian][3])*

Flexibility: Can the system respond to unexpected conditions? *(reserve capacity on system[4]; percent of person trips that could be accommodated by modes other than auto in an emergency[5]; # of corridors with reasonable alternatives during closure or disruption[6]; amount of risk associated with fixed capacity investment[7])*

### Resource Requirements

Safety: What are the safety costs associated with transportation? (*estimated societal cost of transportation accidents)*

Energy: How much energy is consumed in providing, maintaining and using the transportation system? *(equivalent gallons of fuel/day for transportation capital, maintenance, operation and use)*

Economic Cost: How much does the transportation system and its use cost, in addition to safety and energy costs? *(Annualized capital, maintenance, operating and [monetary] user costs for transportation system; value of commercial time in travel)*

### External Effects

Air Quality: What is the effect of the transportation system on air quality? *(Daily emission levels (HC and NOx); air quality attainment status)*

Land Use: How does the transportation system affect land use? *(Amount of open space; dislocation of existing residences and businesses; land use - transportation compatibility index[8]; community quality of life measure[9])*

Environmental: How does the transportation system affect important environmental features? *(Impacts on sensitive areas [wetlands, parklands, historic areas, archaeological sites); noise exposure index[10]])*

Economic: How does the transportation system support the economic health of the region? *(Narrative discussion of economic-activity supporting or constraining features of transportation system)*

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[1] Maximum acceptable time difference is approximately 15 minutes; up to 20 minutes for longer trips.
[2] While choice of mode for freight movement is largely decided by cost factors, availability of alternative modes is a measure of access.
[3] Person hours used for all values except for truck traffic, for which vehicle hours are more relevant.
[4] Reserve capacity is defined by corridor and is modally-weighted.
[5] Maximum value derived from access value (see footnote 1), further constrained by non-auto system capacity (bus capacity, etc.).
[6] Reasonable alternatives for personal travel during closure/disruption of a highway include transit (on alternative routes) or parallel highways; reasonable alternatives for freight are primarily parallel highways. Modal alternatives for freight are captured under access.
[7] Risk is defined as the "opportunity cost" of over or under-investing in a capital project if projections prove incorrect. Examples include loss of needed rights-of-way; building capacity predicated on unrealized future demand; or construction of under-sized facilities.
[8] Index captures the level of traffic intrusion in residential areas, defined as daily traffic divided by average residential driveway spacing. Compatibility between arterial and local access function is defined as daily traffic divided by average commercial driveway spacing.
[9] Measure is a combination of quantitative and qualitative factors that reflect community quality of life by subregion (central cities, inner suburbs, outer suburbs, small cities and villages, rural areas). See Technical Report series for more information.
[10] Index is the product of $dB_a$ and number of households in areas in which $dB_a$ exceeds accepted thresholds.

# SECTION 3
# PROGRAM DEVELOPMENT

Figure 1 indicates that the focus of short-range program development is priority-setting. That is, the TIP discussion should not be the place for initiating policy discussion of new candidate actions -- this should have occurred in the plan development. Neither should the TIP process be the place for identifying the severity of existing or projected transportation problems -- this should take place in the CMP.

CDTC has established guidelines for funding of different types of projects in the New Visions Plan based on making comparable progress across different program areas.

Every project that meets the minimum requirements (screening criteria) is fairly evaluated. The merit evaluation procedure uses the best available information from CDTC's models, from corridor studies, and from project sponsors. Wherever possible, measures that cut across modes, such as relative cost effectiveness, are used. The qualitative benefits of projects are directly incorporated into this merit evaluation procedure. This merit evaluation emphasizes different project attributes, although the same criteria are used, for the following project types:

Bridge projects;
Pavement projects;
Transit Support projects;
Safety projects;
Bicycle and Pedestrian projects;
Community Compatibility and Economic Development projects; and
Mobility and Congestion Relief projects.

During TIP project selection, the New Visions Plan comparable progress guidelines are used to determine what funding level for CMS projects would be consistent with the Plan. Then, constrained by the money available, submitted CMS projects compete with each other, based on the project evaluation fact sheet (example shown in Figure 3). The CDTC STEP Model is used to evaluate all project applications for the TIP. The project is also evaluated with respect to the CMS critical corridors. The evaluation fact sheet makes appropriate reliance on quantitative information (emission reductions, travel time and accident savings and the like) but also makes full account of the fact that not all projects' merit can be measured quantitatively.

The steady, comparable progress policy used in TIP project selection is based on an implementation budget that reflects our CMS principles. Specifically, the New Visions plan emphasizes land use planning, TDM, and operations/ITS over traditional widening. These are directly connected to the adopted CMS principles. The CMS/Plan/TIP connections have led to CDTC’s significant investment in ITS/TMC/HELP projects, the Linkage Program and TDM.

**FIGURE 3**
**SAMPLE PROJECT EVALUATION FACT SHEET**

| | |
|---|---|
| PROJECT TITLE | ____________________ |
| LOCATION | ____________________ |
| DESCRIPTION | ____________________ |
| PURPOSE | ____________________ |

| | | |
|---|---|---|
| 2007-2012 PROJECT COST (Federal Share) ($M) | | ______ |
| POST 2007-2012 COST | | ______ |
| ANNUALIZED COST ($1000/yr) | | ______ |

| | | |
|---|---|---|
| TRANSPORTATION SYSTEM AND USER SAVINGS | | |
| Total System and User Savings ($1000/yr) | | ______ |
| Safety Benefits ($1000/yr) | _____ | |
| Travel Time Savings ($1000/yr) | _____ | |
| Energy and User Cost Savings ($1000/yr) | _____ | |
| Life Cycle Cost Savings ($1000/yr) | _____ | |
| Benefit/Cost Ratio | | ______ |

| | |
|---|---|
| CONGESTION RELIEF | |
| Daily Excess Vehicle Hours of Delay Saved | ______ |
| Daily Excess Vehicle Hours Saved / $ M annual (/ $M initial) | ______ ( ) |

| | |
|---|---|
| AIR QUALITY | |
| Hydrocarbon Emission Reductions | ______ |
| Hydrocarbon Emission Reductions / $ M annual (/ $M initial) | ______ ( ) |

NOISE REDUCTION:

RESIDENTIAL TRAFFIC:

COMMUNITY AND ECOLOGICAL DISRUPTION:

ACCESS TO THE PUBLIC TRANSPORTATION SYSTEM:

MODAL INTEGRATION:

PROVISION OF ALTERNATIVE MODES:

SYSTEM LINKAGE:

ECONOMIC DEVELOPMENT:

OTHER:

## SECTION 4
## COMPONENTS OF THE CONGESTION MANAGEMENT PROCESS

CDTC's success in improving its TIP process and in revising the regional transportation plan have provided a basis for articulating a Congestion Management Process that will more fully feed the TIP and plan processes in the future.

Federal rule making indicates that a formal Congestion Management Process should provide for the following:

1. Definition of area of congestion.
2. Establishment of objectives and performance measures.
3. Data collection and system monitoring.
4. Identification and evaluation of proposed strategies.
5. Implementation of strategies.
6. Evaluation of the effectiveness of implemented strategies.

To create a structure that will allow the Capital District to both avoid future congestion and mitigate existing congested conditions, CDTC's Congestion Management Process comprises the following elements:

1. Congestion Management Goals
2. Congestion Management Principles (from the regional plan)
3. Performance Measures
4. Identification of Critical Congestion Corridors
5. Data Collection and Performance Monitoring
6. Congestion Management Planning, Programming and Project Implementation

**Congestion Management Goals**

While the federal rules do not require a statement of congestion management goals, it is difficult to identify the appropriate performance measures or evaluation strategies without stating their purpose.  Goals are therefore important to CDTC's Congestion Management Process.

Against the backdrop of steadily increasing congestion across the nation and within the Capital District, congestion management in the Capital District could be declared successful if a combination of land use and transportation actions, programs and investments is able to provide future mobility levels comparable to those present today.  Two goals are established to direct efforts and to help measure success.

> *Support growth in economic activity and maintain the quality of life in the Capital District by limiting the amount of "excess" delay encountered in the movement of people, goods and services*
>
> *Make contributions to the avoidance and mitigation of congestion on all modes by implementing demand management programs <u>first</u>, before performing capacity*

*expansions. Reducing single occupant vehicle travel can be accomplished by encouraging telecommuting and programs that reduce the need for travel, balancing travel demand by time of day, encouraging use of transit, ridesharing, pedestrian and bicycle modes, improving operational efficiencies and achieving complementary transportation and land use systems.*

It must be noted that the ability of the Capital District to achieve these goals depends not only on the good faith and cooperation of all parties but also on the availability of resources. Congestion management actions will compete for limited resources with needed infrastructure renewal projects, safety improvements, economic development and other highway and non-highway projects that do not have a congestion focus. It is in the context of CDTC's Regional Transportation Plan and Transportation Improvement Program that the priorities among competing needs are set and the ability to achieve competing goals is determined. It must also be noted that congestion avoidance and mitigation resulting from implementation of demand management strategies will not necessarily fill the void between "congestion" and "mobility" and consequently additional, more capital intensive programs will have to be considered for implementation if these goals are to be realized.

## SECTION 5
## CONGESTION MANAGEMENT PRINCIPLES

Exploration of congestion issues and the menu of alternative actions years has led CDTC to follow certain principles in relationship to congestion avoidance and mitigation. These principles are included as policy in CDTC's New Visions Plan. They can be stated as principles which will guide the selection of actions. Comparable principles related to other subjects (such as infrastructure repair, the role of transit, bicycle and pedestrian accommodations, etc.), are also incorporated into the New Visions Plan.

CDTC's adopted congestion management principles are:

1. **Management of demand is preferable to accommodation of single-occupant vehicle demand growth.** All things equal, actions that shift demand from single occupant vehicles to other modes, shift travel to uncongested periods of the day or reduce the need for travel are preferred over actions that accommodate the desire to travel without constraints. Demand management actions have both a spillover and a cumulative effect not present with physical actions. Demand management actions taken to relieve congestion in one corridor spill benefits over to other corridors by simultaneously moderating demand in those corridors, as well. Over a period of time, a cumulative benefit comes from the development of a critical mass of transit usage to support higher level transit service, from creating momentum for voluntary accommodation of pedestrian and bicyclists in new development design, or from establishing acceptance for innovative work schedules and telecommuting. These benefits are not present in actions that accommodate unconstrained single-occupant auto travel.

2. **Cost-effective operational actions are preferable to physical highway capacity expansion.** Historic financial constraints and categorical funding programs have perhaps provided resources more readily for capital investment than for continuous operational improvements. In the Capital District, a third of the 400 intersections analyzed by CDTC staff over the past four years had congested conditions that would respond to low cost signal timing and lane striping changes. Where applicable, these operational actions are many times more cost-effective than physical expansion.

3. **Land use management is critical to the protection of transportation system investment.** Development in the Capital District in coming years is expected to add significant traffic pressures along existing two-lane and four-lane arterials. Unconstrained development is likely to add to the number of driveways serving isolated developments. This will result in a deterioration in the through capacity and operating speed of these arterials, will aggravate the existing difficulty in effectively serving suburban development with transit and will frustrate any attempts to create safe travel opportunities for pedestrians and bicyclists. It will also frustrate efforts at efficient goods movement and local delivery. Without careful treatment, the land available for development along these arterials can support an amount of development that will far exceed the ability of these roads to handle through traffic (which is their primary

function), local land access and effective accommodation of transit, bicycle and pedestrian modes.

4. **Capital projects designed to provide significant physical highway capacity expansion are appropriate congestion management actions only under certain conditions.** These are the following:

   a. "Critical" levels of congestion are currently present or are expected to be present under short-range (no greater than ten year) forecasts;

   b. Demand management actions, such as instituting formal carpool, vanpool, flex-time, staggered work hour and telecommute programs and encouragement of transit usage, walking and bicycling; and operational actions are not expected to reduce congestion from "critical" levels;

   c. Demand management (including appropriate application of non-auto actions) and operational actions are incorporated into the design of the physical expansion to minimize expansion requirements and maximize the service life of the improvement;

   d. New development and/or existing trip generators contribute appropriately to the cost of the action (including the demand management and other non-construction aspects);

   e. A land use management program or agreement exists to provide reasonable assurance that the new capacity created will be effectively managed and preserved; and,

   f. The expansion is considered to be consistent with regional, county and local land use and development plans.

   Projects primarily intended to serve through traffic or designed to serve statewide purposes are not subject to these criteria.

5. **Significant physical highway capacity additions carried out in the context of major infrastructure renewal are appropriate only under certain conditions.** In cases such as the replacement of a bridge, long-lasting decisions about capacity expansion often must be reached long before critical congestion levels are reached and before local demand management actions are in place. In order to assure consistency of these decisions with the overall Congestion Management Process, it is necessary to revise traditional design policies and procedures. Traditionally, facilities have been designed sufficient to accommodate projected demand at acceptable levels-of-service throughout the physical design life of the facility. For a bridge structure, for example, this involves designing to accommodate traffic projections for a date thirty years beyond the expected date of completion of the project. Variance from this policy has been granted primarily

in situations in which there are practical impediments to full accommodation of future demand.

The revised design approach reaches a determination of facility design through a risk assessment (tradeoff analysis) that focuses on the opportunity cost of selecting alternative designs.

Assuming that it is a given that an infrastructure project is a priority at a given location, the risk assessment focuses on several factors:

a. Incremental costs and benefits of designs which add capacity to accommodate future traffic, relative to less-accommodating designs;

b. The projected amount of time that will lapse before a given design with greater capacity would be expected to have annual benefits sufficient to return an incremental benefit/cost ratio comparable to other *capacity* projects included in the TIP;

c. The additional expense involved in providing the incremental capacity at that later date, rather than during the initial project;

d. The degree of uncertainty present regarding future demand forecasts; and,

e. The compatibility of the additional capacity with regional, county and local land use plans.

In these cases, capacity expansions can be considered consistent with the congestion management process under the following conditions:

a. The risk assessment indicates that, even with effective operational and demand management actions, critical congestion is likely to occur at the location;

b. The combination of time lapse until a competitive incremental benefit/cost ratio is reached and the additional expense of providing the capacity later points to doing the work now; and,

c. The capacity expansion is compatible with regional, county and local land use plans.

In all cases, the desirability of the expansion must be fairly clear before the investment is made.

6. **Incident management is essential to effective congestion management**. While most congestion management actions are directed at recurring congestion, congested corridors experience significant "non-recurring" congestion due to accidents, vehicle breakdowns and similar incidents. This experience is most severely felt on limited access, high speed

facilities operating at very high traffic densities. Minor incidents can generate significant delays. Effective incident detection and management can save as much time and operating cost as major investments in physical expansion.

7. **Corridor protection and official street mapping are necessary to preserve options**. Long-range congestion management must include protection of corridors for possible future transportation use. This includes protection of options for future provision of sidewalks, bicycle paths, transit connections, service roads and/or new collector or arterial highways. Opportunities for protection are presented in the context of development approval, transportation project design, in conjunction with utility right-of-way creation or revision and during review of proposed abandonment of transportation facilities (such as a rail line.) Official action, through land acquisition or street mapping are minimal at present, and expanded use of these tools must be considered. Not all congestion management actions can be implemented immediately; options for future action must be preserved whenever possible. A risk assessment must be conducted to determine the merit of preserving a particular corridor.

8. **Any major highway expansion considered by CDTC will include a management approach.** Expressways which experience congestion in the Capital District experience both recurring congestion and incident related or non-recurring congestion. Adding new lanes may reduce recurring congestion, but will not prevent incident related delay. A management approach would include such features as a managed lane or managed toll. Examples of managed lanes include HOT lanes (High Occupancy Toll), which allow carpools and transit service to use premium service lanes and allow other users to pay for premium service lanes. Managed tolls can allow higher tolls for commuters during peak periods and lower tolls for through traffic. A managed approach gives flexibility to the system, and can be adapted as conditions change, either for incidents or special vacation travel peaks, or over a longer term to accommodate regional growth. Major highway expansion refers to adding through lanes to an expressway for several miles or more.

9. **In project development and design, other performance measures, such as pedestrian, bicycle and transit access, community quality of life, and safety will be considered along with congestion measures.** Trade offs among performance measures will be necessary in many projects. Congestion measures do not have higher priority than other New Visions performance measures. There are times when LOS E or LOS F should be accepted, especially when community context or cost makes it inappropriate to widen the roadway or add lanes at an intersection.

10. **The New York State Department of Transportation guidelines for roundabouts will be used for all CDTC federal aid projects that involve intersection improvements.** General objectives for intersection design are:

    a. To provide adequate sight distances.
    b. To minimize points of conflict.
    c. To simplify conflict areas.
    d. To limit conflict frequency.

e. To minimize severity of conflicts.
f. To minimize delay.
g. To provide acceptable capacity for the design year.
h. To accommodate transit stops, if they exist, and to provide safe stops.
i. To provide safe pedestrian crossings.

Roundabouts are frequently able to address the above objectives better than other intersection types in both urban and rural environments and on high- and low-speed highways. Thus, when a project includes reconstructing or constructing new intersections, a roundabout alternative is to be analyzed to determine if it is a feasible solution based on site constraints, including ROW, environmental factors, and other design constraints. Exceptions to this requirement are where the intersection:

a. Has no current or anticipated safety, capacity, or other operational problems.
b. Is within a well working coordinated signal system in a low-speed (<80km/h) urban environment with acceptable accident histories.
c. Is where signals will be installed solely for emergency vehicle preemption.
d. Has steep terrain that makes providing an area, graded at 5% or less for the circulating roadways, infeasible.
e. Has been deemed unsuitable for a roundabout by the NYSDOT Roundabout Design Unit.
f. Would unduly interfere with transit operation of a major bus route by forced bus stop relocations away from an intersection destination with a high volume of riders.

When the analysis shows that a roundabout is a feasible alternative, it should be considered the preferred alternative due to the proven substantial safety benefits and other operational benefits.

Note: A feasible alternative is a reasonable solution that meets the objectives in a cost effective and environmentally sound manner. The preferred alternative is the feasible alternative that the implementing agency is leaning toward recommending for design approval. The preferred alternative can change if a new feasible alternative is identified and as the feasible alternatives are evaluated during preliminary design.

## SECTION 6
## PERFORMANCE MEASURES

Because the CDTC CMP is integrated with the New Visions Plan, all of the New Visions performance measures are included in the CMP, including congestion measures. CDTC experience since the approval of the New Visions plan has reaffirmed public support for consideration of multiple objectives in planning and project development and design. The NYSDOT "context sensitive solutions/design" initiative has also indicated the importance of considering community objectives in planning and project development and design. The continuing evidence of traffic growth makes it more difficult and more important to treat congestion reduction as one objective that must be balanced with the attainment of other objectives in project design and program development.

During the development of New Visions 2030, Working Group B identified the importance of performance measures that evaluate the impacts of non-recurring delay; that is, delay that is related to incidents, special events, seasonal vacation travel and weather conditions. There is an increasing consensus 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.

Therefore, performance measures that measure non-recurring delay have been added to the CMP. A CDTC Regional Operations Committee has been formed to further develop these performance measures and evaluate the performance of Intelligent Transportation Systems (ITS), incident management, and operations systems in the Capital District. Operational and management strategies will be developed and evaluated to improve the performance of existing transportation facilities, to relieve vehicular congestion, to maximize the safety and mobility of people and goods, and to integrate multimodal solutions. The work of the CDTC Regional Operations Committee will be an important component of the CDTC Congestion Management Process.

### Congestion Performance Measures

CDTC's Congestion Management Process uses the concept of "excess delay" in the identification of congestion. Excess delay is defined as follows:

> *While all travel experiences some amount of delay (relative to free-flow speeds), excess delay is the amount of time spent at a given location that exceeds the maximum amount of time that is generally considered "acceptable."*
>
> *For auto travel, excess delay is defined as the amount of time spent at an intersection or along a highway segment in Level-of-Service (LOS) "E" and "F" conditions that exceeds the maximum LOS "D" time.*

CDTC has used the STEP Model to estimate excess delay and to identify critical congestion corridors in the Capital District. These critical corridors are listed in Table 1.

**Table 1**
**Year 2000 Critical Congestion Corridors**
**in the CDTC Congestion Management Process**

| **Transportation Corridor** | **Municipalities** |
|---|---|
| Northway (I-87)/FRA | Guilderland-Clifton Park |
| New Karner Road/Vly Road | Guilderland-Colonie |
| Wolf/ASR/Maxwell/SCR/Osborne/Everett | Colonie |
| NY 85/New Scotland Ave | Bethlehem, Albany |
| Balltown Road | Niskayuna, Clifton Park |
| Washington Ave/Fuller Rd | Albany,Colonie,Guilderland |
| I-787 | Albany, Menands, Watervliet |
| WSR/ASR/Wade/SCR | Town of Colonie |
| NY 50/Freeman's Bridge Road | Scotia, Glenville |
| NY 7 | Troy, Brunswick |
| Guilderland/Heldeberg/Curry/Crane | Schenectady, Rotterdam |
| NY 5 (Central Avenue) | Albany, Colonie T., Colonie V. |
| US 20 | Albany, Guilderland |
| I-90 | Albany |
| NY 7 | Colonie, Niskayuna |
| US 9 | Albany, Colonie, Halfmoon |
| NY 7 | Schenectady, Rotterdam |
| Downtown Albany | Albany |
| NY 146 | Clifton Park, Halfmoon |
| Union/Eastern/McClellan/Brandywine | Schenectady |
| NY 443 | Albany, Bethlehem |
| Glenridge/Maple/Alplaus | Glenville |
| I-890/NYS Thruway (Exit 25) | Rotterdam |
| NY 2 | Colonie |
| New Scotland/Hackett/Whitehall | Albany, Bethlehem |
| US 4 /Washington Ave | Rensselaer, Troy, North Greenbush |
| US 9/NY 50/Downtown Saratoga Springs | Saratoga Springs |
| NY 9W | Albany |
| US 4/NY 32 | Cohoes, Waterford |

## Refinement of CMS Performance Measures

Excess delay was measured for the CDTC Congestion Management System using system level estimates from the CDTC STEP Model based on volumes and theoretical capacities. Working Group B recognized that such a system level approach was not adequate for evaluating expressway needs for several reasons.

1. Theoretical highway capacities derived from the Highway Capacity Manual are routinely exceeded on many Capital District highways. Driving behavior and highway geometry affect traffic operations in ways that can not be predicted in the regional highway model.
2. 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 is more effective in reducing delay than is predicted by the regional model.
3. 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.

Working Group B had the opportunity to use an extensive data set that has become available in the last several years. This data set is called MIST (Management Information System for Transportation). It provides speed and volume data on each lane of expressway segment every fifteen minutes throughout the year. The MIST data set was used to summarize and evaluate congestion at nineteen locations on I-87, I-90, I-787 and Alternate Route 7. The data was used to develop supplemental performance measures for the CDTC Congestion Management System and to help evaluate expressway operational needs and appropriate strategies and solutions. The results of the MIST data analysis of delay are shown in Maps 1 through 4. For more detailed explanation, see the New Visions Working Group B report, “Expressway System Options”.

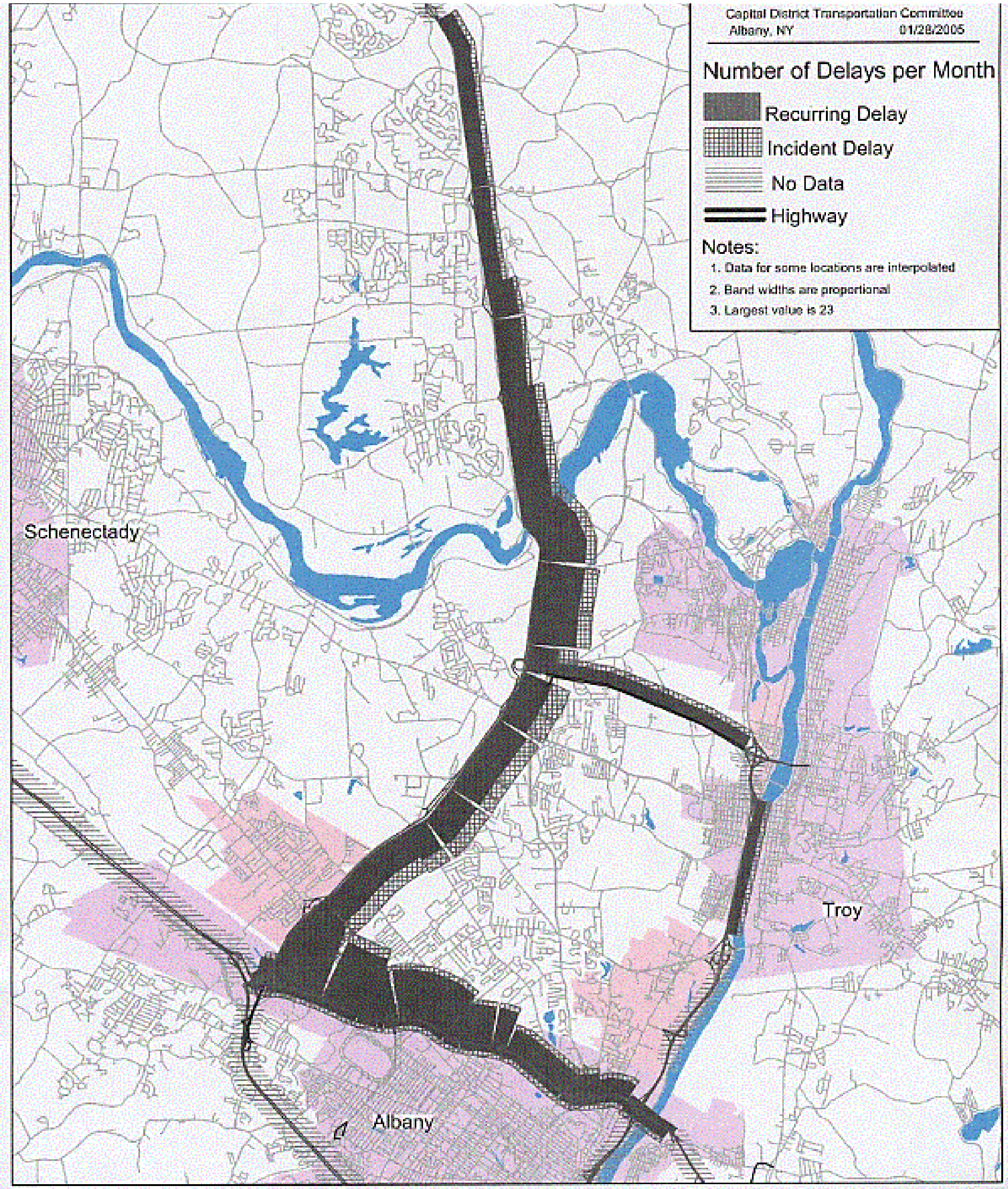
The STEP Model will continue to be used to estimate excess delay for non-expressway recurring delay. However, data sources for excess delay, such as the MIST data and speed and delay studies will be integrated when possible. Additional data sources are expected through ITS sources in the coming years, such as the NYSDOT TRANSMIT program.

## Measuring Non-recurring Delay: the Planning Time Index

It has been suggested that 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. The Texas Transportation Institute (TTI) developed a measure called the “planning time index” to approximate predictability and reliability of a highway.

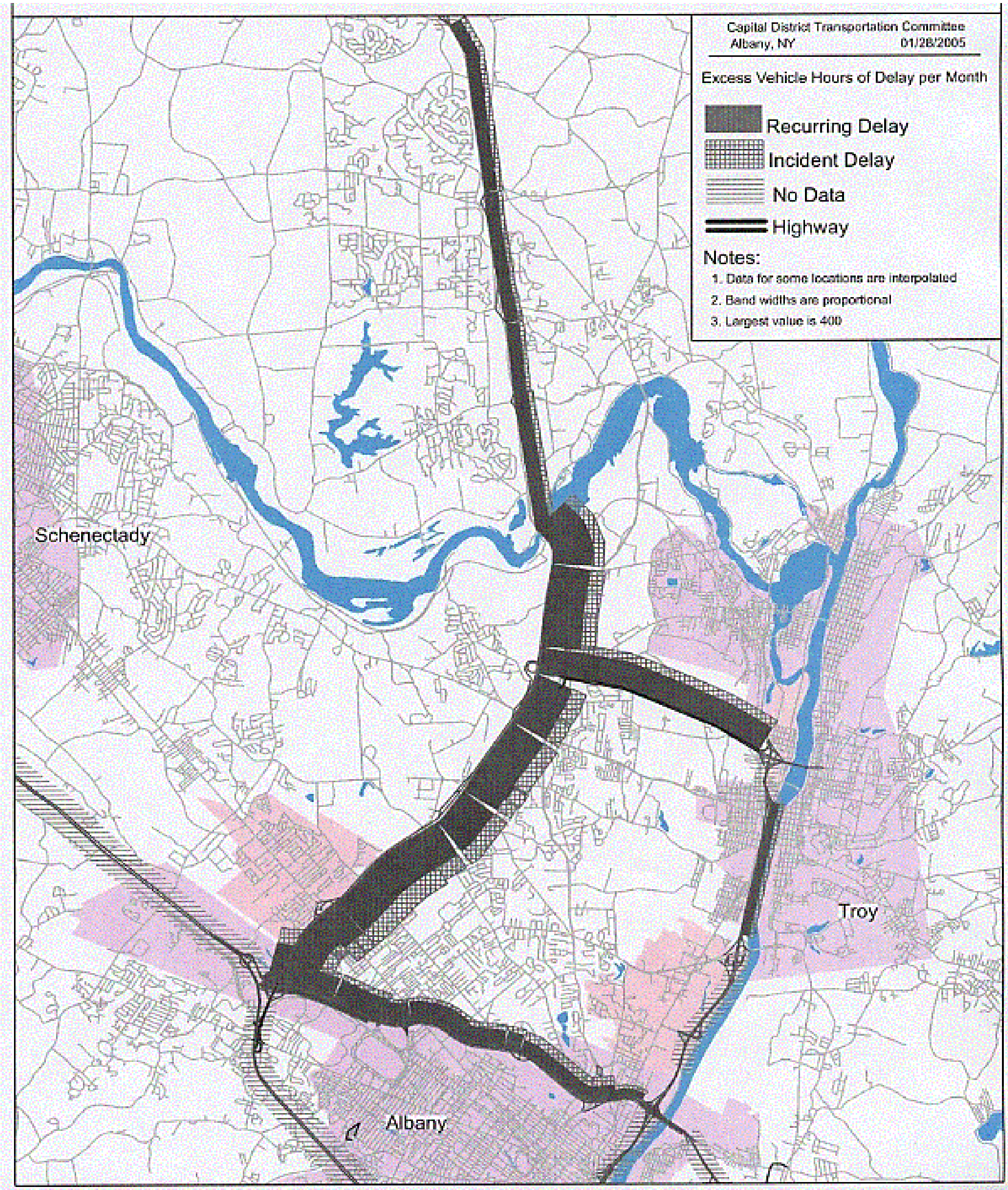
## MAP 1

## PM Peak Traffic Delays in 2003 by Type of Delay



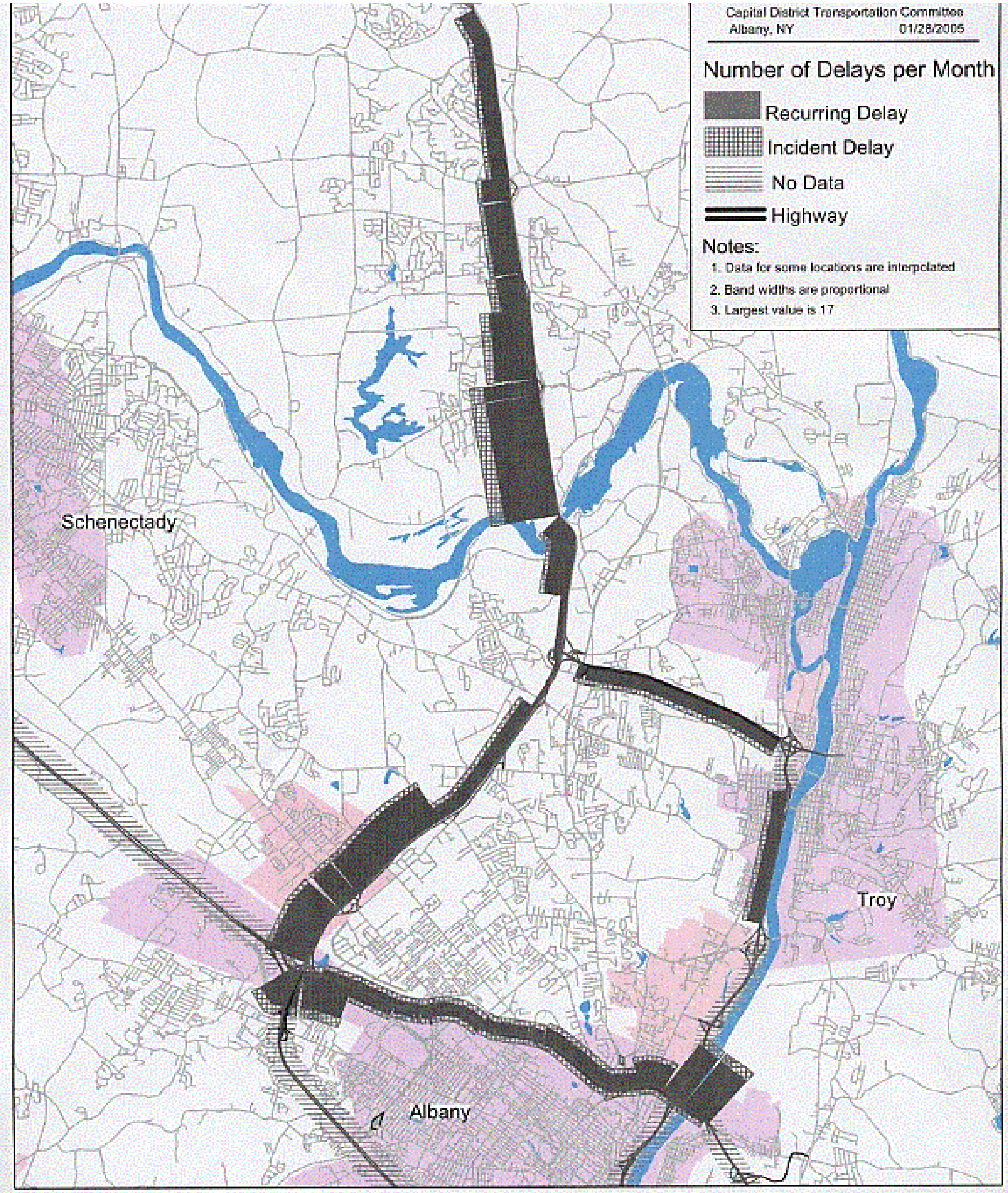
# MAP 2

## PM Peak Excess Vehicle Hours of Delay in 2003 by Type of Delay



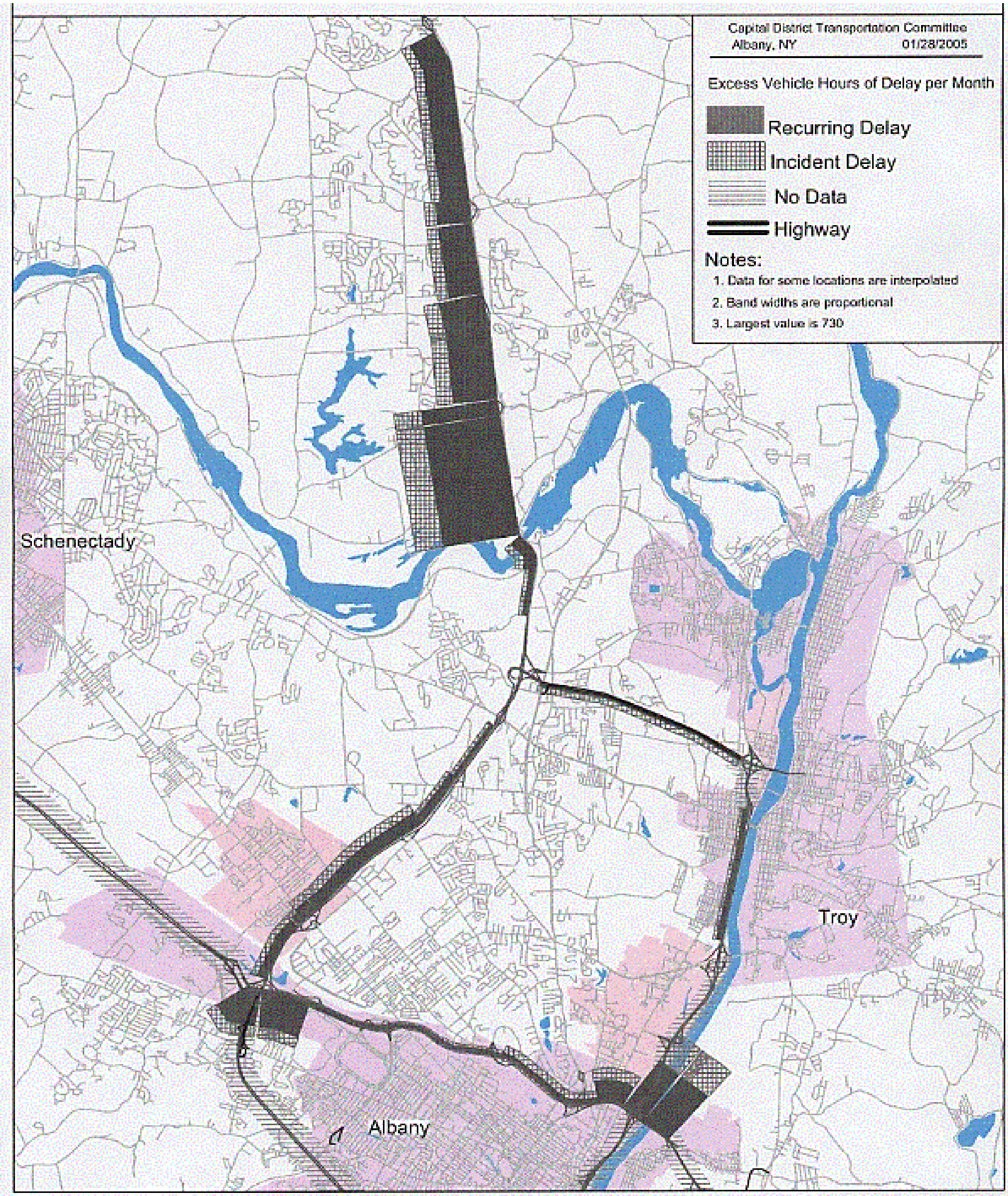
# MAP 3

## AM Peak Traffic Delays in 2003 by Type of Delay



## MAP 4

## AM Peak Excess Vehicle Hours of Delay in 2003 by Type of Delay



The planning time index gives a ratio of driving time on one of the slowest traffic days to driving time at 55 miles per hour.[11] To understand what this index means, consider the following:

- *A value of more than 1.0 indicates how much longer the trip would take on the worst days.*
- *A value of 1.0 means that traffic almost never gets slower than 55 miles per hour.*
- *A value of less than 1.0 means that traffic is faster than 55 miles per hour, even on the worst days.*

For example, a planning time index of 1.5 means that a trip which takes one hour in free flow traffic would take one and a half hours on average once every twenty days during the peak period. So if a traveler wanted a 95% chance of arriving on time, he or she would have to plan on leaving one half hour earlier than when there was no congestion. However, if a one hour trip had a planning time index of 1.1, the traveler would only have to leave 6 minutes early to have a 95% chance of being on time.

Planning time indices were calculated on Capital District expressway segments for AM and PM peak periods using the MIST data. Indices were calculated based on an entire year of data for 2003, and separate indices were calculated for summer and winter travel. For I-90 and I-87, an overall index was developed based on multiple MIST data collection locations. For I-787 and Alternate Route 7, the index was based on only one data collection location on each of these facilities. These facility wide index values are illustrated in Maps 5 and 6.

The facility level indices indicate that the highest planning time index value is 2.27, which occurs on I-90 in the westbound direction in the AM peak during the winter. This high value is likely due to the high traffic volumes near the Patroon Island Bridge and the geometry of I-90 near the bridge compounded by poor driving conditions due to weather.

The values on I-87 indicate that travel in the off-peak direction is very reliable, with travel speeds almost always at or greater than the speed limit. 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. The maps indicate that unreliability in the morning occurs north of the Twin Bridges, and in the afternoon unreliability occurs predominantly south of the bridges.

For I-90, westbound travel in both the AM and PM peaks is less reliable than eastbound travel. However, the maps indicate that in the morning, the main reliability issue is approaching the Patroon Island Bridge, while in the afternoon, the biggest problem is I-90 traffic approaching the Northway.

For I-787 and Alternate Route 7, reliability is better than for I-90 and I-87, based on the data available. However, it should be noted that only one data collection location was available for each of these facilities. Overall, the largest reliability problems were measured on the Northway. Based on the planning time index, the Northway stands out as a problem compared to the other

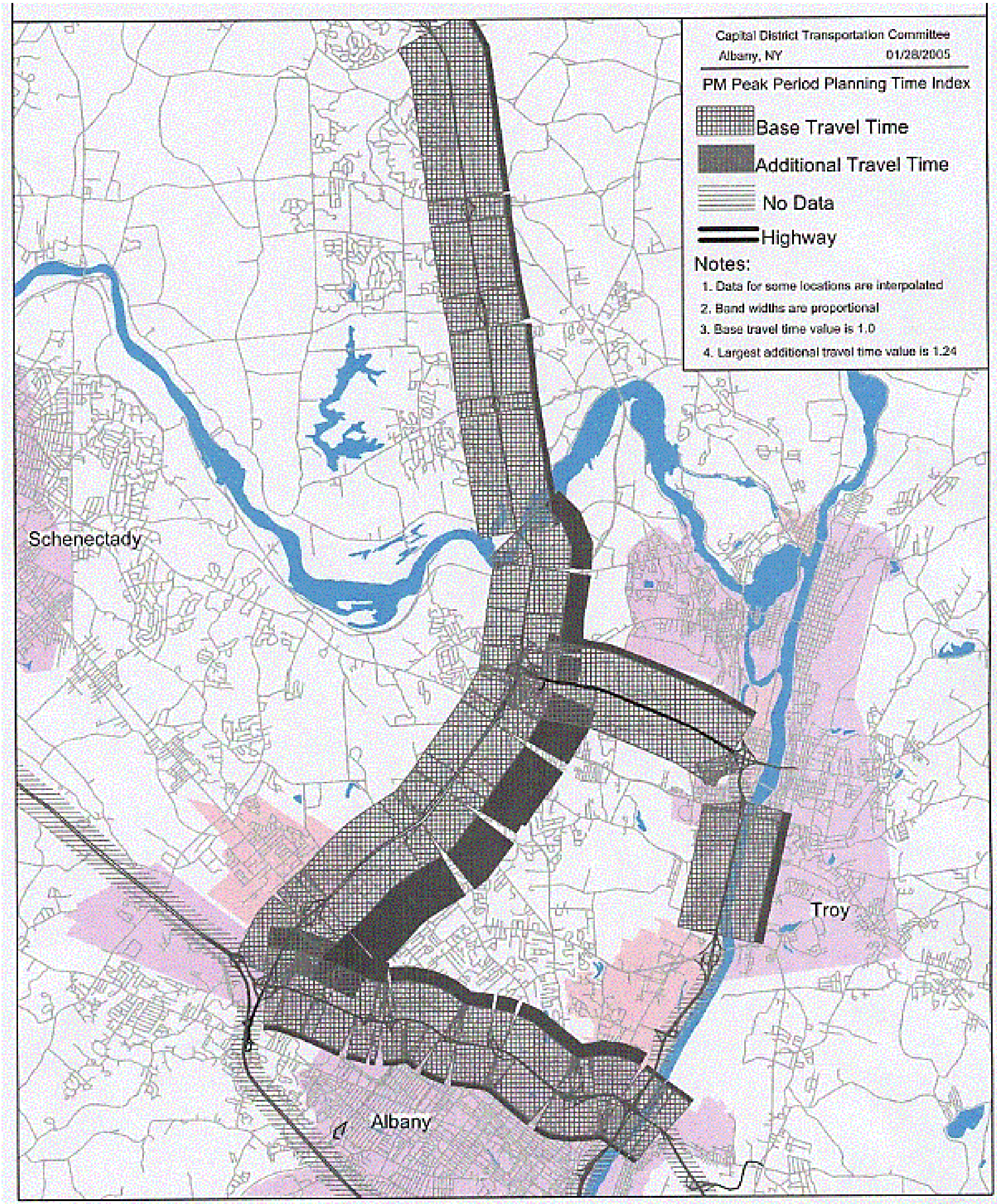
[11] In order to calculate the planning time index, the speed of traffic on a day that is slower than 95 percent of traffic days during a particular season or year is used. This represents the 95th percentile worst traffic speed. The travel time that corresponds to this speed is divided by the travel time that corresponds to 55 miles per hour driving speed.

facilities.  The contrast between the Northway and the other facilities is more pronounced for reliability than it is for measures of delay.

CDTC will work with the Regional Operations Committee to further refine the delay measures and develop measures that can be used to assess the effectiveness of operational and management strategies.  Examples of such measures could include frequency of incidents, duration of incidents, response times for emergency service vehicles and HELP services. Although measures of non-recurring delay and the effectiveness of operational and management strategies cannot be easily modeled for 2030 conditions given state of the art travel models, it is most valuable to consider these measures for current conditions and for CMP planning, since non-recurring delay represents the most severe and intolerable delay.

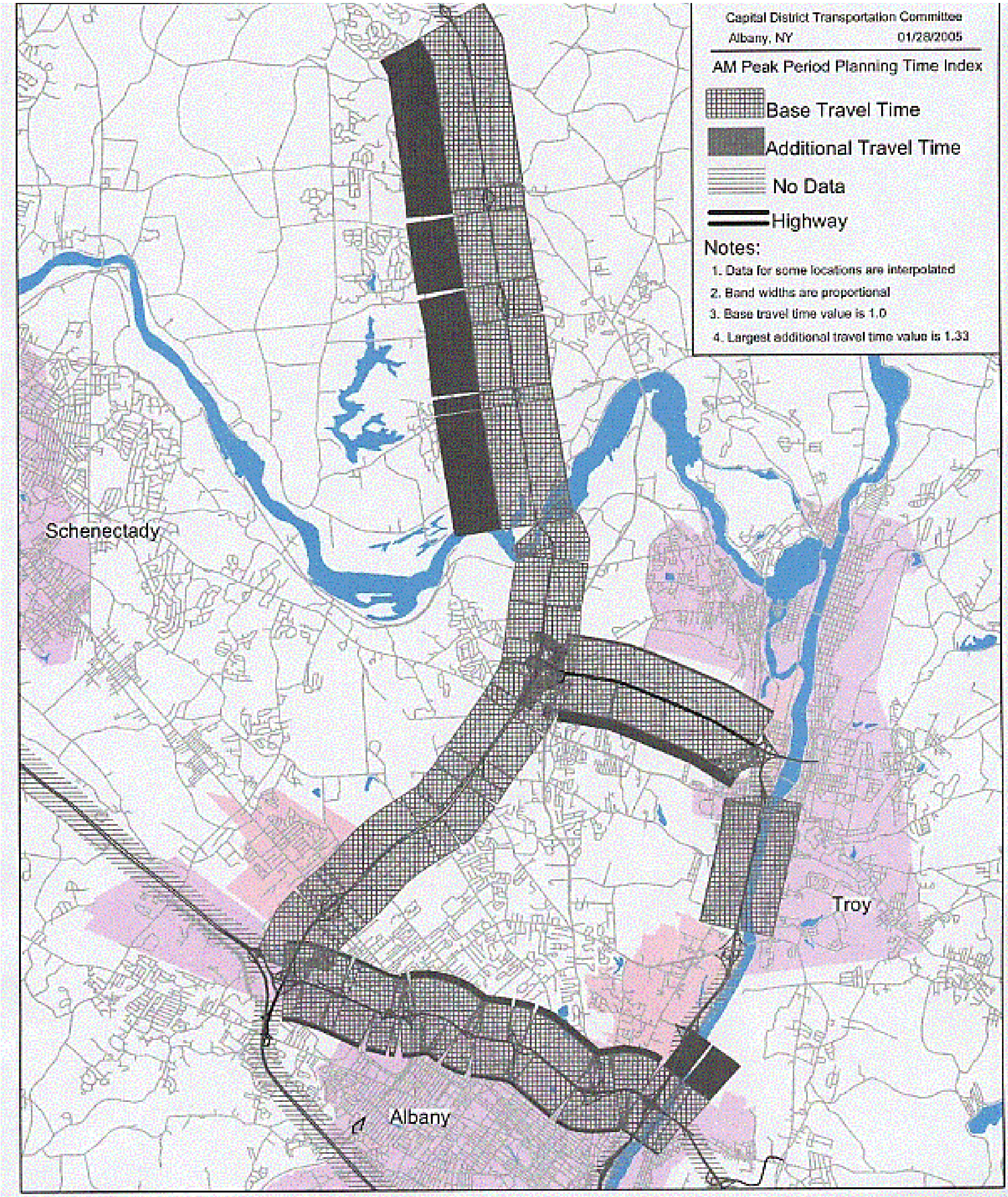
# MAP 5

## PM Peak Period Planning Time Index in 2003



## MAP 6

## AM Peak Period Planning Time Index in 2003



**Other Measures of Effectiveness**

Excess delay is the primary measure of congestion. Many other measures of effectiveness can be articulated that are related to congestion. Table 2 provides a set of comprehensive performance measures for the Congestion Management Process that are consistent with the performance measures defined for CDTC's New Visions. Access, accessibility, and system flexibility are important measures which encourage consideration of alternatives to single occupant vehicle (SOV) travel. Safety and air quality measures can be improved with congestion management and will be considered in developing congestion management actions. Demand management strategies which reduce single occupant vehicle travel are called for in the CMP goals, and monitoring of demand management performance measures is essential. Finally, the integration of land use with transportation strategies and investments has been recognized as an important tool for congestion management, and therefore land use performance measures are part of the Congestion Management Process.

# Table 2
## New Visions System Performance Measures
## Summary of Existing and Future Conditions

| Selected Core Measures | | 2000 Conditions | 2030 New Visions Plan With "Status Quo" Development | Qualitative Summary 2030 Plan Impacts | 2030 Alternative Futures: Concentrated Growth Values | Concentrated Growth Qualitative Summary | Trend Hyper Growth Values | Trend Hyper Growth Qualitative Summary | Concentrated Hyper Growth Full Big Ticket Values | Concentrated Hyper Growth Full Big Ticket Qualitative Summary | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Transportation Service** | | | | | | | | | | | |
| ACCESS | Percent of PM Peak Hour Trips Transit Accessible | 17.2% | 15.2% (2015) | ✕✕ | na | ✔ | na | ✕✕✕✕ | na | ✔✔✔ | * |
| | Percent of PM Peak Hour Trips With Transit Advantage | 0.37% | 0.33% (2015) | ✕✕ | na | ✔ | na | ✕✕✕✕ | 5.4% | ✔✔✔✔ | * |
| | Percent of PM Peak Hour Trips Accessible by Bicycle | 28.9% (1995) | 26.4% (2015) | ✕ | na | ✔ | na | ✕✕✕✕ | na | ✔✔✔ | * |
| ACCESSIBILITY | Travel Time between Representative Locations by Quickest Mode; see Table 3; Sample Time: State Office Campus to Northway Exit 10 (minutes, PM Peak) | 36.4 | 47.4 | ✕✕✕ | 39.4 | ✕ | 64.5 | ✕✕✕✕ | 31.7 | ✔✔ | * |
| CONGESTION | PM Peak Hour Recurring Excess Person Hours of Delay | 6,605 | 10,878 | ✕✕✕✕ | 7,837 | ✕✕ | 20,066 | ✕✕✕✕ | 16,379 | ✕✕✕✕ | * |
| | Excess Person Hours of Peak Hour Delay Per PMT x 1,000 | 3.1 | 4.5 | ✕✕✕ | 3.5 | ✕✕ | 7.0 | ✕✕✕✕ | 6.3 | ✕✕✕✕ | * |
| | Excess Person Hours of Peak Hour Delay Per person x 1,000 | 8.3 | 12.6 | ✕✕✕✕ | 9.0 | ✕ | 19.6 | ✕✕✕✕ | 16.0 | ✕✕✕✕ | * |
| FLEXIBILITY | Reserve Capacity on the Urban Expressway and Arterial System (PM Peak Hour Vehicle Miles of Capacity) | 1,255,211 | 1,179,184 | ✕ | 1,238,211 | ✔ | 1,062,471 | ✕✕ | 1,128,345 | ✔✔ | * |
| | | | | | | | | | | | |
| **Resource Requirements** | | | | | | | | | | | |
| SAFETY | Estimated Annual Societal Cost of Transportation Accidents, Millions of Dollars ($M) | New safety performance measures are under development | | | | | | | | | |
| ENERGY | PM Peak Hour Fuel Consumption (thousands of gallons) | 91 | 97 | ✕ | 89 | ✔ | 118 | ✕✕ | 105 | ✕ | * |
| ECONOMIC COST | Annual Vehicle Ownership and Operating Costs for Autos and Trucks, Millions of Dollars ($M) | $2,239 | $2,544 | ✕✕ | $2,360 | ✕ | $3,029 | ✕✕ | $2,726 | ✕ | * |
| | Other Monetary Costs of Transport: Highway and Transit Facilities and Service, Parking Facilities, Environmental Damage, Millions of Dollars ($M) | | | ✕✕ | | ✕ | | ✕✕✕ | | ✕✕ | * |
| **External Effects** | | | | | | | | | | | |
| AIR QUALITY | PM Peak Hour Hydrocarbon (HC) Emissions (kg) | 3,136 | 459 | ✔✔✔✔ | 431 | ✔✔✔✔ | 585 | ✔✔✔✔ | 519 | ✔✔✔✔ | * |
| | PM Peak Hour Nitrogen Oxide (NOx) Emissions (kg) | 3,666 | 378 | ✔✔✔✔ | 351 | ✔✔✔✔ | 446 | ✔✔✔✔ | 403 | ✔✔✔✔ | * |
| LAND USE | Residential Use Traffic Conflict: Miles at LOC "E" or "F" | 82.4 (1990) | 126.2 (2015) | ✕✕✕✕ | na | ✕✕✕ | na | ✕✕✕✕ | na | ✕✕✕ | * |
| | Arterial Land Access Conflict: Miles at LOC "E" or "F" | 29.9 (1990) | 49.5 (2015) | ✕✕✕✕ | na | ✕✕✕ | na | ✕✕✕✕ | na | ✕✕✕ | * |
| | Dislocation of Existing Residences and Businesses | | | ✕ | | ✕ | | ✕ | | ✕ | * |
| | Community Quality of Life- Factors that reflect community quality of life in the central cities, inner suburbs, outer suburbs, small cities and villages, and rural areas. | Trends include warning signals. Proactive strategies will be required to impact trends. | | ✕ | | ✔ | | ✕✕✕✕ | | ✔✔ | |
| ENVIRONMENTAL | Number of Major Environmental Issues to be Resolved to Implement Existing Commitments | | 21 | ✕ | 21 | ✕ | 21 | | 21 | | |
| ECONOMIC | How does the transportation system support the economic health of the region? | Transportation makes possible much of the region's economic activity. | | ✕ | | ✔ | | ✕✕✕✕ | | ✔✔ | |

**Table 2 (continued)**

| | |
|---|---|
| ✔ ✔ ✔ ✔ | Positive impact greater than 50%, 2030 relative to 2000. |
| ✔ ✔ ✔ | Positive impact between 25% and 50%. |
| ✔ ✔ | Positive impact between 10 and 25%. |
| ✔ | Positive impact less than 10% or not quantified. |
| | Negligible impact expected. |
| ✕ | Negative impact less than 10% or not quantified. |
| ✕✕ | Negative impact between 10 and 25%. |
| ✕✕✕ | Negative impact between 25% and 50%. |
| ✕✕✕✕ | Negative impact greater than 50%, 2030 relative to 2000. |
| * | Indicates impact has been quantified. |

Notes:

1. Performance measure values were not calculated for the "no-build" scenario because the Plan assumes it would be unreasonable to do less than the actions and policies called for in the Plan. However, the table illustrates a range of outcomes based on alternative growth futures. Big ticket Initiatives are assumed in the Concentrated Hyper Growth scenario; however, the big ticket initiatives are unfunded in the New Visions 2030 Plan.
2. Recurring delay refers to delay experienced under normal traffic conditions, without incidents or unusual weather conditions.
3. Non-recurring delay refers to delay that results from incidents, weather conditions, or special events.
4. Excess delay refers to the amount of delay that occurs at level of service "E" or "F".
5. Trips are considered transit accessible if the trip can be made in a reasonable time, relative to the auto travel time (door to door). Year 2000 number interpolated from 1990 and 2015 estimates developed by the CDTC Mode Choice Model; 2030 Plan with Status Quo growth extrapolated from 1990 and 2015 estimates. Trips are considered to have a transit advantage if they can be made faster by transit than by auto (door to door).
6. Year 2000 number interpolated from 1990 and 2015 estimates developed by the CDTC Mode Model; 2030 Plan with Status Quo growth extrapolated from 1990 and 2015 estimates. For Concentrated Hyper Growth, it was assumed that transit service on the Northway would have a travel time advantage over auto users. Trips are considered to be accessible by bicycle if they are within a reasonable distance by routes that can be traveled by bicycle.
7. Hydrocarbon and Nitrogen Oxide emissions are derived from the MOBILE6 emissions model based on levels of vehicle travel, speed and congestion by link.
8. Residential Traffic Conflict: Miles at Level of Compatibility (LOC) "E" or "F" refers to the number of miles of major arterials with this rating. The LOC index was developed based on an inventory of residential driveways on major arterials and traffic volumes. LOC "E" or"F" ratings occur at arterial segments with frequent residential driveways and higher traffic volumes.

## Table 2 Notes (continued)

9. Arterial Land Access Conflict: Miles at Level of Compatibility (LOC) "E" or "F" refers to the number of miles of major arterials with this rating. The LOC index was developed based on an inventory of commercial driveways on major arterials and traffic volumes. LOC "E" or "F" ratings occur at arterial segments with frequent commercial driveways and higher traffic volumes.

## Table 3
## Accessibility: Travel Time (In Minutes) Between Representative Locations In The Capital District By Quickest Mode

| | PM Peak Hour | | | | |
|---|---|---|---|---|---|
| | **2000 Base** | **2030 Base** | **2030 Base concentrated** | **2030 Hyper dispersed** | **2030 Hyper concentrated** |
| **Albany CBD to Troy CBD** | 19.0 | 21.2 | 19.7 | 24.2 | 24.2 |
| **Albany CBD to Schenectady CBD** | 30.8 | 33.9 | 32.2 | 38.6 | 38.2 |
| **Troy CBD to Schenectady CBD** | 31.7 | 33.3 | 32.5 | 35.5 | 35.2 |
| **State Office Campus to Exit 10 of the Northway** | 36.4 | 47.4 | 39.4 | 64.5 | 31.7 |
| **Selkirk Yards to Saratoga Springs** | 69.2 | 81.4 | 71.9 | 103.0 | 69.4 |
| **Saratoga Springs to Selkirk Yards** | 54.2 | 55.9 | 54.6 | 58.6 | 56.5 |
| **Amtrak Station to NY 20 / NY 155** | 20.3 | 21.5 | 20.8 | 23.3 | 23.0 |
| **NY 20 / NY 155 to Amtrak Station** | 18.4 | 19.3 | 18.9 | 21.2 | 19.6 |
| **Wolf Road to NY 443/Cherry Avenue** | 18.8 | 18.6 | 18.0 | 20.2 | 19.3 |
| **Albany County Airport to North Greenbush (NY 4 / NY 43)** | 17.4 | 18.8 | 17.8 | 20.4 | 19.5 |
| **Albany County Airport to Schenectady County Airport** | 29.1 | 33.7 | 31.1 | 41.2 | 36.5 |

## SECTION 7
## DATA COLLECTION AND PERFORMANCE MONITORING

### Data Collection

Extensive data collection practices are already in place in the Capital District. The New York State Department of Transportation has a number of continuous count locations in the area and, working with CDTC, has established a three-year coverage count process to maintain current traffic volume information on the federal-aid system. Further, many of the counties and municipalities conduct ongoing traffic volume studies of county and local roads. These are forwarded to CDTC, which maintains a comprehensive traffic count file.

CDTC completed a three-year intersection analysis process under contract to the New York State Energy Office. The process allowed for collection of AM and PM peak period traffic counts, vehicle classification and operational data for approximately 400 intersections.

The Capital District Transportation Authority (CDTA) has implemented a full passenger count monitoring program, allowing identification of ridership levels by route, location and bus trip. Upstate Transit maintains a similar data base for its commuter services into Albany county.

Some of these data require a more explicit collection schedule in order to support CDTC's Congestion Management Process. Further, the identified performance measures imply collection of certain data not currently available. Table 3 presents a list of all important data and a proposed collection schedule.

The CMP calls for continued intersection counts, improved transfer of transit data to the formal CMP data base, routine vehicle occupancy counts, and regular household travel surveys among other items.

### The Capital District Transportation Management Center

Funding for the Capital District Transportation Management Center is a major commitment in CDTC's TIP. The TMC is a source of extensive data on traffic volumes, speeds, and incidents that are being incorporated into the CMP.

Traffic data is collected by the New York State Department of Transportation (NYSDOT) through the Management Information System for Transportation (MIST) for a number of locations on I-87 and I-90 as well as one location each on I-787 and Alternate Route 7. This system provides traffic count and speed and incident data for every 15-minute interval throughout the year. This system was implemented in Capital Region in 2000 and collects data from loops embedded in the pavement.

The system has data collection loops from the Thruway Exit 24 to Exit 10 on Northway (I-87) and Thruway Exit 24 to Exit 8 on I-90. There is one data collection loop on I-787, between Exits 7 and 8 (north of Route 378), and one loop on Alternate Route 7 at Miller Road. Some of the ramps to and from I-87 and I-90 are also covered. The MIST system provides an opportunity to analyze the traffic patterns and growth over the years for important segments of expressways in the Capital Region.

Emerging technologies hold promise for even more extensive data collection through the TMC. One such technology is the TRANSMIT system, which can monitor speeds of vehicles on different segments of the expressway system. While the TRANSMIT system is in place, further work needs to be done to harvest the data for planning purposes. Another promising technology (not yet in use) is the use of cell phones to monitor travel speeds on all roads in the system.

**Using the Regional Transit Development Plan for Transit Operations Analysis, Policy Development and Marketing**

Transit service is an important part of congestion management. Monitoring transit data and performance will provide the opportunity to evaluate the effectiveness of transit service and develop actions to increase transit ridership.

CDTA has prepared a Regional Transit Development Plan (TDP) which examined existing transit service, ridership and cost details and profiled CDTA riders. The TDP made a number of recommendations to make the CDTA system more effective and useful. The TDP also developed a series of "performance" tests that will be used by CDTA to monitor and modify routes on an annual basis. CDTA is now in the process of implementing the TDP. The CDTC MPO recognizes the importance of transit information, operations and service. Further integration of transit operations into the CMP will be explored by the Regional Operations Committee.

**Collection of Auto Occupancy Data**

The Congestion Management Process's Goal for reducing single occupant vehicle travel can be accomplished by various demand management strategies, including those that increase ridesharing. Auto occupancy data provides an important indication about the effectiveness of ridesharing programs and will assist CDTC in developing strategies to encourage ridesharing.

CDTC has historically recognized the importance of collecting auto occupancy data, first collecting it in the late 1970's, and has included it as a component of the UPWP data collection task. Further work needs to be done to monitor auto occupancy.

**Inventory of Arterial Residential and Land Use Conflict Data**

The Arterial Management Task Force developed two indices of arterial conflict. These two measures are described in Table 2, New Visions System Performance Measures. The Residential Use-Traffic Compatibility Index is based on traffic volume and residential driveway spacings; the Arterial-Land Access Compatibility Index is based on traffic volume and commercial driveway spacings. With both indices, conflict increases as traffic volume increases and as distance between driveways decreases.

In order to calculate the values of the arterial conflict indices, CDTC conducted an inventory of residential driveway spacing and commercial driveway spacing on major arterials in the Capital District. This inventory will be updated periodically. In addition, as new development occurs, data will be maintained on miles of arterials with service roads, driveway consolidation and corridor management actions, and on new development built with pedestrian and transit-oriented design.

**Performance Monitoring**

Speed and delay studies were conducted before and after the Route 5 Corridor “Best Bus” project, and before and after the Exit 12 project. This approach will be used more extensively in the future.

The data collection efforts listed in Table 4 will provide either direct or indirect measurement of transportation system performance and management system performance.

Values for many of these measures will be estimated using CDTC's regional travel model structure (the Systematic Traffic Evaluation and Planning [STEP] model). CDTC will maintain a current flow representation of travel on the model as well as future forecasts of travel. Using the excess delay definitions and equations provided earlier in the discussion of performance measures, post-processors will be used with STEP model data to generate values for excess delay, congested corridors and bicycle and pedestrian accessibility. The measurements of excess delay will be used with NYSDOT's "Generic Project Cost Estimation Procedure" to estimate the highway construction costs to limit congestion with and without management actions.

Most of this structure is already in place at CDTC, and has been used in recent New Visions efforts and in evaluation of projects for the Transportation Improvement Program.

**TABLE 4**

**DATA COLLECTION SYSTEM**

| DATA ITEM | CURRENT COLLECTION FREQUENCY | DESIRED COLLECTION FREQUENCY |
|---|---|---|
| **Traffic Volumes and Classification** | | |
| Freeway Segments | 3 years (some continuous) | continuous |
| Cordon and Screen lines | 3 years | 3 years |
| Other Arterials | 3 years | 3 years |
| Other Collectors | as needed | 3 years |
| Local Roads | as needed | as needed |
| Major Signalized Intersections | as needed | 3 to 4 years |
| Other Intersections | as needed | as needed |
| | | |
| **Roadway Characteristics** | | |
| Number of lanes, width | no schedule | when changes occur |
| Traffic control | with intersection counts | with intersection counts |
| Changes in bicycle and pedestrian accommodation | not collected | when changes occur |
| | | |
| **Pedestrian Counts** | with intersection counts | with intersection counts |
| | | |
| **Travel Speed** | | |
| Speed and delay: major arterials | as needed | 3years |
| Frequency and extent of incident delays | not collected | daily |
| | | |
| **Vehicle Occupancy** | | |
| Cordon and Screen lines | no schedule | 2 years |
| With DMV accident data | 1991-1993 available | annually |
| | | |
| **Transit Ridership** | | |
| CDTA by route, bus trip | daily | daily, summarize annually |
| CDTA by demographic group | annual | annual |
| Upstate transit by route, trip | daily | daily, summarize annually |
| Other transit by route | upon request | annual |
| | | |
| **Park-and-Ride Lot Usage** | | |
| Vehicles at designated lots | completed 2006 | 5 years |
| Satisfaction Survey | completed 2006 | 5 years |

(Table 4 continued)

| DATA ITEM | CURRENT COLLECTION FREQUENCY | DESIRED COLLECTION FREQUENCY |
|---|---|---|
| **Commuter Register Usage** | | |
| New Commuter Register entries | monthly | monthly |
| Carpools formed | annual | annual |
| Average carpool trip length | annual | annual |
| | | |
| **Arterial Management** | | |
| Traffic signal spacing: major arterials | partial inventory, being updated | when changes occur |
| Driveway spacing (frequency):major arterials | 1994-95 inventory | when changes occur |
| | | |
| **Land Use Changes** | | |
| Building permit activity | monthly | monthly |
| New development | not collected | annually |
| New development built with Pedestrian | | |
| and Transit Oriented Design | not collected | annually |
| New development with Service Roads, | | |
| Driveway Consolidation and | | |
| Corridor Management Actions | not collected | annually |
| Closing or elimination of activity | not collected | annually |
| | | |
| **Goods Movement** | | |
| Truck volumes as a percent of travel | with traffic counts | with traffic counts |
| NYSDOT/SUNY commodity flows | ongoing | ongoing |
| | | |
| **Journey-to-Work Information** | | |
| Mode of trip | 10 years (Census) | 5 years |
| Time of day of trip | 10 years (Census) | 5 years |
| Origin-Destination information | 10 years (Census) | 5 years |
| Demographics of commuter | 10 years (Census) | 5 years |
| | | |
| **Travel Behavior, All Purposes, National Transportation Household Survey** | | |
| Mode of trip | 5 to 10 years | 5 years |
| Trip purpose | 5 to 10 years | 5 years |
| Time of day | 5 to 10 years | 5 years |
| Occupancy | 5 to 10 years | 5 years |
| Trip chaining | 5 to 10 years | 5 years |
| Demographics of traveler | 5 to 10 years | 5 years |

## SECTION 8
## CONGESTION MANAGEMENT PLANNING, PROGRAMMING AND PROJECT IMPLEMENTATION

Congestion management attention is required at all stages of the planning, programming and project implementation process. Different attention is demanded at each stage. CDTC's treatment of congestion management at each stage of the process is described below.

### Statewide Planning

**1. Policy Investigation:** Some policy issues are most appropriately examined at the state level. These include consideration of statewide policies with respect to growth management or with respect to capping the growth in vehicle travel, establishment of state goals or mandates for Corporate Average Fuel Efficiency (CAFE) and provision of statewide policies on the construction of general purpose lanes and applicability of High Occupancy Vehicle lanes.

**2. Resource Estimation:** Because of the predominance of state and federal funds in the mix of resources available for congestion management, short-range and long-range resource estimation is best performed at the state level.

**3. Statewide Balance:** New York is not a homogeneous state. With regard to transportation needs, the issues facing the New York metropolitan area are quite different from those facing the Capital District. As a result, discussions that strike a delicate balance in allocations of resources by region or in transportation investment policy that may differ by region must be carried out at the state level.

**4. Statewide Implementation Planning for Air Quality**: Implementation strategies to meet the Clean Air Act requirements must also be considered primarily at the state level.

### Regional Planning

**1. Needs Assessment**: Identification of overall system performance and congestion management needs is best performed at the metropolitan level. The needs assessment will be conducted in the context of other needs (safety, infrastructure, access and economic development).

**2. Priority Setting**: Priority among the various congestion management needs is also best considered at the metropolitan level. Using established critical congestion thresholds, regional monitoring and projection will place congestion pressures in a given location in a proper context and provide an initial indication of candidate congestion management strategies.

**3. Modal Function**: Consideration of transit options as an alternative to highway expansion is severely constrained when focused upon a single corridor. In the Capital District, existing transit use is so limited that transit options cannot be considered alternatives to but rather complementary actions in addition to highway work. The only planning context in which to explore significantly-changed roles for transportation modes is the regional context. CDTC will explore regional examination of the appropriate long-term roles and functions for transit, bicycle and pedestrian travel.

**4. Regional Highway System Review**: Examination of compatibility of the transportation and land use systems, along with review of long-range options for system connections and additions is best performed at the regional level. This exercise will provide guidance about possible corridors which should be protected for possible future transportation use.

**5. Development of Regional Strategies**: Regional planning efforts will also focus on development and evaluation of congestion management strategies that would be applied at the regional level. These include examination of regional demand management initiatives, pricing strategies, land use management efforts and the like.

**6. Clean Air Considerations**: Primary examination of emissions and of attainment status relative to National Ambient Air Quality Standards for Ozone will be performed at the regional level. Congestion management strategies may be significant to maintenance of air quality standards.

**7. New Visions**: The CDTC New Visions Plan gives long-range directions for transportation policy and investment in the Capital District. The Plan has involved many dozens of interested parties and outside experts in exploring technological changes, demographic shifts and appropriate transportation policy. The New Visions Plan is integrated with the Congestion Management Process.

**Sub-regional Planning**

**1. Reference to Regional Data and Priorities**: Sub-regional examination of congestion needs will be carried out in the context of regional data and priorities. CDTC's limited planning resources will be devoted to the highest priority locations. Further, efforts will be taken to assure that, along with examination of alternative growth scenarios in the sub-area, actions will be examined that are warranted based on regional forecasts of population and employment growth, income change and development shifts.

**2. Use of Established Principles**: The principles described earlier will guide the examination of congestion management actions. This includes formal practices which result in consideration of significant highway expansion only when consistent with the principles. It also includes provision for appropriate private contributions to needed demand management, systems management and highway construction actions.

**3. Continued Integration of Land Use and Transportation**: CDTC has entered into contractual arrangements with several municipalities to undertake a cooperative land use and transportation analysis under the CDTC Linkage Program. These have led to recognition of the interrelationship between land use and traffic and have resulted in a greater sense of local responsibility for implementing congestion management actions. These efforts will be continued.

**3. Incremental Alternatives Development**: CDTC practices incremental alternatives development practices. That is, alternative sets of actions to address congestion are developed from the least costly demand management and systems management actions up through a range of physical construction alternatives. Each increasingly-costly alternative is required to demonstrate an incremental benefit that exceeds its incremental cost. This practice reinforces the established principles.

**4. Consideration of Multiple Objectives**: Sub-regional studies will be guided by goals and objectives that focus attention not only on congestion, but also on safety, access, economic development and environmental needs. Consideration of multiple objectives in the context of sub-regional and corridor studies will assure that congestion management actions receive appropriate attention.

**5. Exploration of New Solutions**: Innovative solutions will be sought in the context of sub-regional and corridor studies. With the time and attention of local officials focused on congestion issues in an area, it is possible to identify non-traditional actions which may be cost-effective and which may contribute to the congestion management goals. These solutions will be actively sought.

## Transportation Improvement Program Development

**1. Outreach**: CDTC has established practices to assure a broad outreach to all units of government and other interested parties. This open process will be continued repeated for a future major updates to the Transportation Improvement Program. This outreach and open TIP development process helps to assure that the pool of candidate TIP projects is robust and includes innovative proposals, that evaluation techniques are unbiased and that resource allocation to competing needs are well considered. The outreach effort will help assure appropriate treatment of congestion management actions as well.

**2. Screening Criteria**: The TIP process includes a screening stage. At a minimum, every project is required to meet three requirements: **consistency** with the Long Range Plan and the CMP component of the Long Range Plan, local land use management, the plans of adjacent jurisdictions and the ISTEA mandated factors; **financial reasonableness**; and **project specific** eligibility and justification. Pre-conditions relevant to congestion management are: the presence of local community support, demonstration of existing congestion (for highway capacity work), and commitments to local land use management (in the case of highway widenings). These criteria reinforce the regional planning process and assure that projects evaluated for funding meet the principles described above.

**3. Evaluation Process**: CDTC's TIP project evaluation process is one of the strongest among MPOs in the nation. It is supported by CDTC's significant data base and forecasting tools, and has been refined through over a decade of application. Two significant features are relevant to the congestion management process:

a. The evaluation process includes quantitative measurement of mobility and infrastructure projects. Measurement includes ten-year forecasts of excess delay reductions; cost-effectiveness of excess delay reductions; emission reductions; cost-effectiveness of emission reductions; travel time, safety and operating cost impacts; overall benefit-to-cost ratio; and consideration of CDTC priority networks for infrastructure, expressway management and ITS, goods movement, transit and bicycle and pedestrian improvements. The process has been refined to allow comparison of the mobility value of infrastructure projects on the same terms as congestion relief projects. The process led to recognition of the cost-effectiveness of several demand management and systems management actions.

b. The programming decision is based upon a fact sheet containing narrative descriptions of project effects on such factors as access to public transportation, provision of alternative modes, system continuity and consistency with land use plans. TIP participants are encouraged to focus on these narrative factors as much as on the quantitative measures. The fact sheet is shown as Figure 3. This assures fair consideration of all projects.

**4. Program Balance**: CDTC's TIP process includes a deliberate effort to assure program balance by geographic area, mode, and project type. The balance between mobility, infrastructure and other project types in the final TIP is based upon a goal of making "reasonable" progress in each of these areas. Toward this end, CDTC sought a geographic balance in the program and gave consideration to projects with regional benefits, gave consideration to projects that demonstrated multimodal solutions, and emphasized those projects with greatest projected emissions reductions. Projections for future infrastructure conditions are placed side-by-side with projections for future congestion conditions. CDTC is committed to seeking balance -- not pursuing aggressive infrastructure efforts at the expense of congestion, and not allowing a major congestion-relief effort to threaten infrastructure and other conditions.

**Project Development**

**1. Cooperative Scoping Effort**: The New York State Department of Transportation is committed to a cooperative project scoping effort among NYSDOT, CDTC staff and appropriate CDTC participants. This effort is designed to assure that the project design is consistent with the project description used when the project was evaluated for TIP inclusion.

**2. Project Reassessment Thresholds**: CDTC and NYSDOT will develop thresholds for project reassessment. These thresholds will describe the conditions under which a revised project scope (resulting from project development work) warrants reassessment of TIP status. Scopes will be compared against the project description used when the project evaluated for TIP inclusion. Scope or cost changes that exceed certain thresholds will not be reviewed merely for acceptance of the changes, but will be removed from the TIP for comparison against other candidate projects. This practice will assure that projects that are implemented have acceptable indications of cost-effectiveness and scope and will assure that actions are consistent with stated principles.

**3. Paradigm Review**: The project development and design process has been directed traditionally by formal engineering standards and practices. CDTC and NYSDOT will review these practices to identify appropriate changes to the design paradigms. Principle #5 stated earlier, regarding capacity expansion in the context of infrastructure replacement, demonstrates one specific design paradigm that has warranted review. Others that warrant review are: policies toward driveway consolidation in conjunction with highway repair or improvement and policies toward advanced purchase of right-of-way for further expansion.

**4. Multi-modal Consideration**: In the course of project development and design, NYSDOT is committed to full examination of needs and contributions of other modes. This includes consideration of bicycle and pedestrian accommodations, transit service opportunities and design considerations, and freight transportation requirements.

5. **Regional Corridor Management Initiative**: An 80/20 challenge grant program is included on the TIP for municipalities to undertake necessary land use and regulatory efforts to implement new site design, arterial management, zoning and planned development district and public-private financing regulations. In order to implement this initiative NYSDOT has offered to include a community-directed consultant effort for corridor management as a project phase in a wide range of highway projects, including those which are primarily highway repair in nature. This has resulted in initiation of studies in several communities and an increase in NYSDOT-community communication on land use issues.

**Program Implementation for Ongoing Congestion Management Activities**

**1. Regional Ridesharing Program**: CDTC initiated a regional rideshare program in January 1991. The program initially took the form of a bi-monthly tabloid that contains advertisements or "listings" for carpool partners. The Commuter Register was distributed to almost 400 locations within the Capital District, and surrounding area, including places such as supermarkets, office buildings and libraries. The publication also contained transit information, along with articles regarding transportation issues pertinent to the Capital District, car-care tips and tips on how to form a successful carpool. In January 1996, a guaranteed ride home program was launched. The guaranteed ride home program is available to all persons who carpool, walk, ride a non-CDTA bus or bicycle to work three or more days per week.

In 1999, the Commuter Register transitioned from a bi-monthly tabloid to an internet based program. Listings by those interested in carpooling are submitted via an on-line form or by telephone. Links to transit schedules and fares, including the area’s private transit carriers, are provided on the Commuter register home page. Links to information about park-and-ride lots also reside on the home page.

About 1900 people have "listed" their carpool ad in the Commuter Register since its inception. Over 315 people have listed since the register became an internet based program. Over the life of the program, it is estimated that 560 carpools have been formed. The average one-way commute distance of a successful carpool is 28 miles and the average duration is nearly 2.8 years. The program has resulted in the elimination of over 19 million VMT since the service began in 1991.

2. **Transportation Demand Management (TDM) Initiative**: A $5.6 M five year project has been established to allow for a financial partnership with employers in providing transit, ridesharing and trip reduction incentives. Several TDM programs have been funded with this set aside. Two significant pilot transit pass subsidy programs were funded with the program. Over 3.6 million miles of travel were reduced as a result of these two bus pass subsidy programs. Smaller bus pass subsidy programs have recently begun with similar success. Data collected from these pilot programs have been used to initiate dialogue NYS regarding the benefits of TDM programs in an attempt to spearhead a program for NYS employees working in the Capital District.

3. **Coordination with Transportation Service Providers**: Ongoing coordination with transportation service Providers through the CDTC Planning Committee, and the Regional Operations Committee.

4. **Arterial Management and Integration of Land Use and Transportation**: CDTC's cooperative land use and transportation analysis studies under the Linkage Program continue to lead to the implementation of congestion management actions at the local level. These efforts will be continued.

5. **CDTC Regional Operations Committee**: Given the expense and difficulty of adding capacity, and given the high demand for arterial and expressway usage that is forecast to continue to grow in the Capital District, it is clear that strategic investments in operational improvements will continue to be important to the future of the Capital District. ITS investments, including incident management and traveler information systems, will make the Capital District more accessible and will be important for maintaining the quality of travel. Analysis of future traffic growth and future conditions further underscores the importance of ITS and operational investments to provide important benefits to the traveling public. CDTC will work with the Regional Operations Committee to refine integration of operations and management improvements into the CDTC planning and programming process.

6. **Operational Improvements and Intelligent Transportation System Priority Network:** The CDTC New Visions Plan identifies priority networks for bike, pedestrian, transit, ITS, goods movement and infrastructure improvements. One purpose of the priority networks is to help set priorities for TIP project selection. Another purpose is to give guidance for project development to make sure that individual projects address important needs on each priority network. For example, if a bridge replacement project takes place on the ITS priority network, the ITS needs at that location should be carefully reviewed and given special consideration to determine if an ITS component could be efficiently incorporated into the project.

The identification of priority networks makes the most efficient and effective use of available resources. The largest impact will be seen by directing funding to the functionally most significant part of the transportation system.

The identification of priority networks does not imply that improvements off the defined networks are not warranted or desirable. Flexibility is required in interpretation, so long as the basic message -- these are important facilities -- is not lost.

In developing the New Visions Plan, the Expressway Management Task Force identified a network of expressway and arterial facilities as the platform for the regional ITS. There should be centrally coordinated traffic control and/or guidance along these facilities. The logic is that advising travelers of preferable alternatives *before* they enter the most congested areas and facilitating smooth flows along the alternatives can keep overall traffic conditions from worsening. The regional ITS priority network contains:

- priority expressways;
- arterials representing their immediate alternatives (ordinarily either parallel to or connecting the expressways);
- their secondary alternatives (which entail more surface street travel); and
- other arterials that are strategically important because they are important travel corridors, although they are not viewed as alternative routes for expressway travelers.

New Visions 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 will have direct benefits to expressway travel, especially by providing alternate routes during expressway incidents. Access management and physical improvements will be required for this to be effective. Nonetheless, ITS benefits from signal coordination, transit signal priority, or other improvements will also provide significant benefits to normal daily arterial function.

The ITS initiative includes a major effort to coordinate signal timing on major city and suburban arterials. Transit-friendly application of that technology will include designing the operation of the signal system to achieve multiple objectives. Rather than optimizing signal timing for maximum traffic flow, signal system design can be developed that allows for efficient traffic progression at travel speeds that are compatible with pedestrian, bike and transit movements. This may provide for a win/win outcome. Even modest improvements in basic signal timing will show important results. Implementation of signal coordination along arterial corridors will improve traffic flow for autos as well as for transit using Transit Signal Priority (TSP). Successful implementation of signal coordination along the Route 5 corridor in Albany, Colonie, Village of Colonie, Niskayuna and Schenectady has demonstrated the value of ITS for arterial performance. For routes that parallel expressways, ITS holds the promise of allowing the signal coordination and timing plan to be changed by the TMC to facilitate diverted traffic during an incident.

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.

The updated ITS priority network is described in Table 5 and is illustrated in Map 7.

# TABLE 5

## ITS Priority Network Facilities

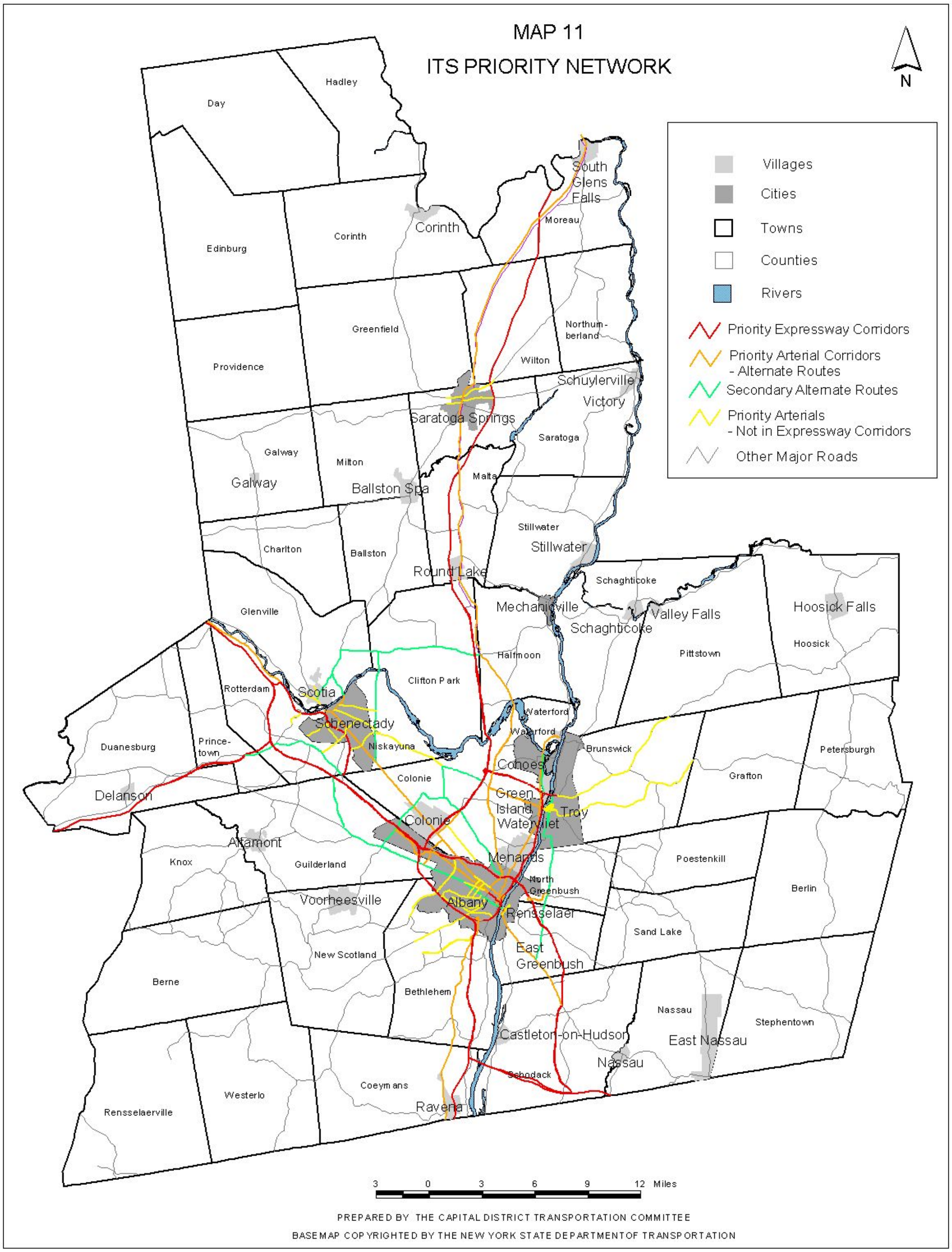
| **Priority Expressway Corridors** | **Centerline Miles** |
|---|---|
| Northway (I-87): US 20 to Interchange 15 near term;<br>extend to Lake George for longer term | 31.3 near term<br>68.3 long term |
| Thruway (I-87/I-90): Albany/Greene County line to Schenectady/ Montgomery County line; Berkshire Spur (21A to B1) | 44.9 |
| I-88: Thruway Interchange 25A to Schenectady County Line | 14.5 |
| I-90: Thruway Exit 24 to Berkshire Spur | 19.3 |
| I-787: Thruway Interchange 23 to Alternate Route 7 | 8.7 |
| I-890: End to End | 7.8 |
| Alternate Route 7: Northway to I-787 | 3.6 |
| | |
| **TOTAL MILEAGE** | **167.1** |
| | |
| **Priority Arterial Corridors – Immediate Alternate Routes for Expressways** | |
| NY 2: I-787 to US 9 | 4.0 |
| NY 5: Downtown Albany to Downtown Schenectady | 16.0 |
| US 9: Downtown Albany to Warren County Line | 50.5 |
| US 9/20: Downtown Albany to I-90 Interchange 11 | 7.0 |
| NY 32: Downtown Albany to Waterford (US 4) | 9.3 |
| Erie Boulevard: NY 5 to Freeman’s Bridge Road | 1.2 |
| Fuller Road: US 20 to NY 5 | 1.9 |
| Washington Avenue: Central Avenue to NY 155 | 7.6 |
| Wolf Road: NY 5 to Albany Shaker Road | 2.0 |
| I-90 Exit 8 Connector (NY 43): I-90 to US 4 | 1.3 |
| US 9W: I-787 to Greene County Line | 11.4 |
| NY 5S from I-890 to Montgomery County Line | 5.86 |
| | |
| **TOTAL MILEAGE** | **118.1** |

## TABLE 5 (continued)

| **Secondary Alternate Routes for Expressways** | **Centerline Miles** |
|---|---|
| US 4: US 9/20 to NY 7 | 10.4 |
| NY 7: I-890 to I-88 | 5.7 |
| US 20: Downtown Albany to NY 155 | 7.6 |
| US 20/NY 146: NY 155 to Thruway Interchange 25 | 5.7 |
| NY 50: NY 5 to Glenridge Road | 3.4 |
| NY 146: US 9 to Glenridge Road | 6.1 |
| NY 155: US 20 to Watervliet Shaker Road | 4.0 |
| Albany Shaker Road: NY 7 to US 9 | 7.7 |
| NY 7: I-87 to Albany Shaker Road | 3.2 |
| Balltown Road: NY 5 to Glenridge Road | 6.7 |
| Freeman's Bridge Road: Erie Boulevard to NY 50 | 1.7 |
| Glenridge Road: NY 50 to NY 146 | 2.1 |
| Watervliet Shaker Road: New Karner Road to Albany Shaker Road | 1.3 |
| NY 787 Cohoes Arterial: NY 7 to Route 32 | 2.6 |
| | |
| **TOTAL MILEAGE** | **68.2** |
| | |
| **Priority Arterials Not in Expressway Corridors** | |
| | |
| NY 2 in Troy and Brunswick | 10.3 |
| NY 7 in Troy and Brunswick | 9.1 |
| NY 7: Albany Shaker Road to I-890 | 6.6 |
| NY 32: US 9W to Elm Avenue | 3.6 |
| NY 85: I-90 to NY 140 | 4.6 |
| NY 443: Downtown Albany to Elm Avenue | 5.7 |
| Broadway/Partition Street/East Street: US 20 to Amtrak Station | 0.3 |
| Arterial corridors with a density of more than two traffic signals per mile | 50.0 |
| | |
| **TOTAL MILEAGE** | **90.2** |

# MAP 7

# ITS PRIORITY NETWORK



# APPENDIX

## Excess Delay Thresholds

| Roadway Type | Approximate LOS D Threshold | Approximate LOS E Capacity |
|---|---|---|
| **Surface Arterial and Collector Roadway** (each direction) | | |
| Single Lane | 1,000 vph | 1,300 vph |
| Single Lane (with managed left turns) | 1,250 vph | 1,625 vph |
| Two Lane Undivided | 2,500 vph | 3,120 vph |
| Two Lane Divided with Flush Median | 2,800 vph | 3,500 vph |
| | | |
| **Expressway** | | |
| Limited Access (Undivided), volume per lane | 1,600 vph | 1,840 vph |
| Limited Access (Divided), volume per lane | 1,875 vph | 2,250 vph |
| | | |

Notes:

1. Thresholds for surface arterials and collector roadways would apply to calculation of excess delay. Lower thresholds should be considered desirable for local streets in residential areas, where consistency between design, function and context are more important than capacity issues.
2. Thresholds for single lane surface arterials and collector roadways assume left turns are not managed. "Managed left turns" refers to either a raised median with left turns allowed only at left turn pocket lanes; left turn lanes at intersections; or roundabouts; or to a flush median. As the numbers indicate, higher quality access management, such as the presence of a median left turn lane, provides for a higher threshold. For a three lane facility (one lane in each direction with median turn lane), using a LOS D capacity of 1250 and LOS E capacity of 1625 in each direction would be consistent with CDTC STEP Model practice. Microsimulation has been used in specific cases to assist in determining acceptable mid block movements in the context of a system of traffic signals.
3. The thresholds used in this table should not be used as justification for widening a road. Careful consideration of the CDTC Congestion Management System and sensitivity to the land use context would be necessary in any decision to add capacity. Other ways of managing traffic, land use and development must be considered. There are times when LOS E or LOS F has to be accepted, especially when community context makes it inappropriate to widen or add lanes at an intersection.
4. Expressways include functional classes of "Principal Arterial Expressways" and Interstates.