Capital District
Transportation Committee

April 2007

New Visions 2030
Draft Metropolitan Congestion Management Process
A SAFETEA-LU Requirement

Background

The Congestion Management Process (CMP) is an update to the CDTC Congestion Management System (CMS) that has been in place and operational since 1995. This update is required by SAFETEA-LU (The Safe, Accountable, Flexible, Efficient, Transportation Act: A Legacy for Users). The CMP renews the CMS identification of critical congestion corridors, seven congestion management principles, and performance measures. It also describes the integration of operations and management into the CDTC planning process, another SAFETEA-LU requirement.

The CMP includes new performance measures, new data sources, and an updated ITS priority network developed by the Working Group B (which examined Expressway System Options); it introduces three new congestion management principles; it updates values for the New Visions performance measures; it updates the CDTC capacity thresholds; and it calls for further refinement of operations planning and performance measures to be developed by the recently established Regional Operations Committee.

Issues Explored

- **Operations and Management-** CDTC's commitment to incorporating operations and management was reviewed and reinforced.
- **ITS Priority Network-** The ITS priority network, updated by the New Visions Working Group B, was incorporated into the CMP.
- **New Performance Measures-** The Working Group B development of performance measures that monitor non-recurring delay was reviewed and incorporated**.**
- **New Congestion Management Principles-** Three new principles were added to bring the CMP up to date. Two new principles were developed based on Working Group B findings, and one new principle regarding roundabouts was developed. The CMP principles are attached; the new principles are #8, #9, and #10.

Summary of Findings

- The region is doing well incorporating congestion management into the New Visions Plan.
- CDTC's progress incorporating operations and management into the planning progress has been consistent with new guidelines in SAFETEA-LU. The CDTC Regional Operations Committee will serve an important role in integrating operations and management into the Congestion Management Process.

- Many of the products developed by Working Group B will be incorporated into the CMP. These include new principles, new data and performance measures, an emphasis on the importance of operations and management, and the update of the ITS priority network.

Performance Measurement (relevance to existing performance measures or proposed new performance measures (if applicable))

- Excess person hours of delay and excess vehicle hours of delay will continue to be an important measure of congestion. New data sources will be developed to monitor this measure. The New York State Department of Transportation MIST data (Management Information System for Transportation) is the most prominent new data source. Working Group B has analyzed the MIST data, and that work has been incorporated into the CMP. Other promising data sources are emerging, such as data potentially available from the NYSDOT TRANSMIT program.
- The CMS had already emphasized the importance of non-recurring delay. The CMP will continue that emphasis, but now with much better data sources for performance monitoring. The MIST data was used by Working Group B to develop a new performance measure called the Planning Time Index, a measure of reliability and predictability. This measure has been incorporated into the CMP. The CDTC Regional Operations Committee will continue to develop performance measures for operations and management.
- CDTC's core performance measures will continue to be incorporated into the Congestion Management Process. These values for these measures have been updated in the CMP for the 2030 Plan.

Policy/Budget Implications and/or Recommendations

The emphasis in the CMP on managing congestion by emphasizing operations and management and demand management (including transit, ridesharing, bicycle and pedestrian access) have important implications for the New Visions 2030 Plan. Operations and demand management are very cost effective investments that will represent a wise use of transportation budgets. Funding for operations and management will be an important priority in the New Visions 2030 Plan.

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.