PLANNING FOR INCREASING TRUCK TRAFFIC

The recent rapid growth in truck volumes, and the accompanying challenges, have fostered a widespread recognition that smooth and efficient movement of goods (as well as people) is essential for economic well-being. In the Intermodal Surface Transportation Efficiency Act (ISTEA, enacted in 1991) and the Transportation Efficiency Act for the 21st Century (TEA-21, enacted in 1998) Congress placed new emphasis on freight movement, and specifically included freight among the required planning factors under TEA-21. As a result, the infrastructure needs that are associated with trucking are increasingly being studied and planned in a long-term context, rather than simply handled with quick-fix reactions to increasing truck traffic.

The general process for public-sector transportation planning is detailed in the Code of Federal Regulations, Title 23, Chapter 1, Part 450 (9, p. 2). The process starts by identifying future transportation improvement needs, followed by the adoption of a long-range (20-year) plan with strategies to meet these needs. Every 2 years, the projects funded for near-term implementations are included in a Transportation Improvement Program (TIP) or Statewide Transportation Improvement Program (STIP). Once the TIP or STIP is approved, projects can move to the implementation stage for design and construction.

TEA-21 emphasizes that states and MPOs should consider projects and strategies that "increase the accessibility and mobility options available to people and freight and enhance the integration and connectivity of the transportation system, across and between modes, for people and freight" (9, p. 27). In response to TEA-21, many state DOTs and MPOs have developed statewide freight plans or addressed freight issues generally in their long-range plans. Some have specifically identified freight projects as part of the TIP or STIP development process. Many agencies have also undertaken studies of improvement needs to address specific truck-related challenges.

This chapter describes the types of planning activities that are being undertaken and documents the current level of application of these types of planning activities in the states. In reviewing these activities, it is important to remember that the planning process is ongoing; plans and programs need to be regularly updated to keep up with the rapidly evolving needs for freight transportation.

PLANNING ACTIVITIES

Planning for trucks can range from broad-level statewide plans, to localized facility or land-use planning, to the forecasting of truck volumes to help determine future infrastructure needs. Sometimes the planning is purely for goods movement, whereas other times goods movement is addressed as part of a comprehensive transportation planning process. Planning usually involves an inventory of existing facilities and the documentation of current conditions, and often the products of the planning will include recommendations for short-term programming of improvements as well as identification of long-term improvement needs.

The survey asked state DOTs and MPOs to indicate the extent to which their agencies have been involved in nine different types of planning activities. This section describes those activities as well as others specifically listed by respondents.

Freight Planning for the State, Region, or Corridor

One category of planning consists of activities that plan for freight movement over a large area—a state, a metropolitan region, or a major transportation corridor. Planning at this scale may include elements such as goals and policies related to goods movement and how it should be accommodated, a long-term plan of facilities to handle goods movement, or a program of needed infrastructure improvements to facilitate goods movement. In some cases, this type of goods movement planning occurs as one component of a multimodal system or corridor plan.

Survey respondents were asked to indicate the extent to which they have developed each of the following to address the effects of increasing truck traffic at this scale:

- A freight or goods movement plan for the state or metropolitan area,
- A system plan for freight or goods movement facilities,
- A corridor freight or goods movement plan,
- A freight or goods movement element of a multimodal system plan, or
- A freight or goods movement element of a multimodal corridor plan.

Freight Planning for Localized Areas

The second category of planning activity involves more detailed planning for a localized area. One type is the planning of intermodal facilities to improve the efficiency of freight transfers between modes. Another type is planning for development in areas that will attract heavy volumes of truck traffic—areas with truck terminals, warehousing, and industrial uses.

Survey respondents were asked to indicate the extent to which their agencies have addressed the effects of increasing truck traffic through (1) intermodal facility planning or (2) land-use planning for truck-related uses.

Goods Movement Forecasting

The third category of planning activity involves forecasting future flows of goods or future volumes of trucks, to help determine how much freight activity the transportation system will need to accommodate. Survey respondents were asked to indicate the extent to which their agencies have developed freight forecasts or truck forecasts to help them address the effects of increasing truck traffic.

Other Types of Planning

Additionally, survey respondents had the opportunity to cite other planning activities being undertaken to address the effects of increasing truck traffic. These activities included

- Interstate highway reconstruction;
- Truck safety—weight enforcement;

- Truck parking studies; and
- Sizes, weight, and combinations.

STATE OF THE PRACTICE

This section provides two types of perspectives on the state and MPO planning activities for dealing with increasing truck traffic. First, it uses the results of the survey to summarize the level of engagement in the nine types of planning activities described in the previous section. Then it highlights the types of content contained in some of the plan documents that were supplied by survey respondents, to provide more specific insight into what the current state of the planning practice includes.

State Planning Activities

The responses of state DOTs to Question 2 are summarized in Table 3. Among the large-area planning activities, statewide freight planning is the most common-either alone or as part of a multimodal state transportation plan. That is, 60% (15 of 25) of the responding states have developed a state freight plan, and more than 50% (14 of 26) have developed a freight element of a multimodal plan. The two plans are not mutually exclusive; therefore, when the survey results are reviewed individually, it is found that 19 of the 28 responding states are undertaking either a freight plan or a freight element of a multimodal plan. Freight planning at the corridor level is being, or has been, undertaken by most of the responding states (14 of 26), and development of a freight system plan by only one-third (8 of 24). Notably, the majority of these efforts are not yet complete. Only five of the responding states have completed their own statewide goods movement plan, only four

reanised activities—state befariments of Transfortation										
DOT Responses to Question 2*	No planning of this type	Discussed but not undertaken	Undertaken in support of another agency	Under way but not complete	Completed	% Under way or complete				
(a) Freight/goods movement plan (for state or metropolitan area)	3	7	2	8	5	60				
(b) System plan for freight/goods movement facilities	6	10	0	6	2	33				
(c) Corridor freight/goods movement plan	5	7	0	11	3	54				
(d) Freight/goods movement element of multimodal system plan	4	5	0	12	4	64				
(e) Freight/goods movement element of multimodal corridor plan	7	4	0	10	3	54				
(f) Intermodal facility planning	6	5	1	10	3	56				
(g) Land-use planning for truck-related uses	11	9	1	3	1	20				
(h) Freight forecasts	3	8	1	8	4	54				
(i) Truck forecasts	3	5	1	9	7	68				

 TABLE 3

 PLANNING ACTIVITIES—STATE DEPARTMENTS OF TRANSPORTATION

*Has your agency undertaken planning activities to address the effects of increasing truck traffic? Notes: Survey data (28 states responding).

MPO Responses to Question 2*	No planning of this type	Discussed but not undertaken	Undertaken in support of another agency	Under way but not complete	Completed	% Under way or complete
(a) Freight/goods movement plan (for state or metropolitan area)	3	3	0	1	1	25
(b) System plan for freight/goods movement facilities	2	4	0	1	1	25
(c) Corridor freight/goods movement plan	2	1	0	2	2	57
(d) Freight/goods movement element of multimodal system plan	1	2	0	3	2	63
(e) Freight/goods movement element of multimodal corridor plan	2	2	0	2	2	50
(f) Intermodal facility planning	2	2	2	1	1	50
(g) Land-use planning for truck-related uses	4	2	2	0	0	25
(h) Freight forecasts	3	3	0	1	1	25
(i) Truck forecasts	2	2	0	2	1	50

 TABLE 4

 PLANNING ACTIVITIES—METROPOLITAN PLANNING ORGANIZATIONS

*Has your agency undertaken planning activities to address the effects of increasing truck traffic? Notes: Survey data (8 MPOs responding).

have completed a state multimodal transportation plan with a freight element, only three have completed freight studies at a corridor level, and only two have completed freight system plans.

Of the localized freight planning activities intermodal facility planning is the most common, with a majority of the responding states (14 of 25) engaged in this activity. Only 20% (5 of 25) report being involved in land-use planning for truck-related uses, which is more likely to be an activity to be undertaken at the local level of government. As with the large-area planning activities, relatively few states have completed these plans.

Of the *overall* planning activities identified in the survey, truck forecasting is the most common among states, with 68% (17 of 25) engaged in this activity and 28% (7 of 25) having completed the forecasting. Most states (13 of 24) are also undertaking freight forecasting.

Metropolitan Planning Activities

The responses of MPOs to Question 2 are summarized in Table 4. With only eight MPOs responding it is difficult to make generalizations about truck-related planning at the MPO level; however, the responses can provide insight into which planning activities are more often undertaken.

The most common planning activity has been development of a freight component of the metropolitan area transportation plan; a majority of the MPOs are undertaking (or have completed) one. Planning activities undertaken by at least one-half of the MPOs include corridor freight planning, intermodal facility planning, and truck forecasting.

Summary of Survey Results

Overall, the survey results lead to two important conclusions about the current practice of planning for trucks.

- The most common planning efforts involve areawide and corridor-level goods movement planning, intermodal facility planning, and truck forecasting.
- At this time, only a minority of these planning activities has been completed; therefore, the process of planning for truck and freight movements is still in its relative infancy.

Case Studies of Truck and Freight Planning

This section presents case studies of planning activities directed toward accommodating increasing truck traffic. These examples were selected to indicate the types of planning activities being undertaken in a range of geographic areas across the United States. Case studies involving project implementation are presented in chapter five. In addition to the references, a bibliography lists other studies and plans pertaining to planning for increasing truck traffic.

Accommodating Truck Traffic on Texas Highways: Survey Results

The Texas DOT (TxDOT) conducted a survey of its various organizational units to (1) determine what actions are being undertaken at the district level to mitigate the negative impacts associated with increasing levels of truck traffic on the state highway system and (2) identify any processes or procedures that should be changed to better accommodate increasing truck traffic (10). Reported actions being undertaken fall into the following categories: pavement type selection, pavement design and construction, pavement management and maintenance, geometric design elements, highway planning, work zone safety, bridges and structures, traffic control devices, intelligent transportation systems (ITS), and truck parking and storage area improvements.

Suggested actions fall into the following categories: finance, truck weight monitoring and enforcement, geometric design standards, operations, truck parking and rest areas, pavement design and construction, and truck routes.

The TxDOT report conclusions, based on collective consideration of responses to the questionnaire, are summarized as follows:

- Stronger and more durable pavement structures are needed.
- Attention to preventive maintenance programs is becoming more important.
- There is an urgent need for shoulder-widening projects.
- Design guidelines for two-lane facilities with intermittent passing lanes are being implemented in several locations where traffic volumes do not justify construction of a four-lane facility.
- A significant number of responses indicated a need for dedicated truck lanes, especially through congested urban areas.
- Truck traffic volume is increasing faster than available levels of funding for transportation system preservation and improvement.

In addition, the TxDOT is spending \$1.5 million to develop a Statewide Analysis Model, which will provide better understanding of the "big picture" of truck movements for future planning.

Report on the Status of the Recommendations of the Florida Freight Stakeholders Task Force

The Florida Freight Stakeholders Task Force, organized in 1998, consists of more than 60 members, who represent private-sector transportation providers, industry groups, state and local governments, MPOs, and academia. The Task Force was charged with prioritizing freight-related projects for fast track funding, as well as with developing recommendations for the 2020 Florida Statewide Intermodal Systems Plan (11).

In November 1999, the Task Force recommended that the following seven specific actions be taken:

1. Establish the Florida Strategic Freight Network as part of the Intermodal Systems Plan.

- 2. Adopt the Freight Task Force process for prioritization and selection of future projects.
- 3. Fund future research and planning studies.
- 4. Conduct a Florida International Trade and Port Strategy Study.
- 5. Establish a Florida Freight Advisory Council within the Florida DOT.
- 6. Establish Freight Mobility Committees in the largest MPOs.
- 7. Create a Florida Freight Project Investment Bank.

The report documents the progress on these recommendations during the first year after their adoption. The Florida Strategic Intermodal System is a comprehensive planning effort that has been initiated, partly as a result of the Task Force recommendations (12).

Truck Stop and Rest Area Parking Study

The Connecticut DOT conducted its study (13) to determine the current and anticipated demand for rest areas and parking for trucks, as well as to identify measures that should be considered to address undesirable conditions.

The study estimated current demand for truck parking and the projected demand in the year 2020 and found that the existing parking supply is 1,200 spaces fewer than the current demand and 1,600 spaces fewer than the future demand. It evaluated seven options for addressing the demand for truck parking including doing nothing, enforcing current policies and practices, identifying opportunities to reduce truck traffic on highways, using ITS communications to display the status of available parking, reconfiguring existing public rest areas for additional truck parking spaces, expanding existing public rest areas for additional truck parking spaces, and constructing new facilities for additional truck rest area parking.

The study found that only the last two options would effectively address existing and future truck parking demands. It recommended that the Connecticut DOT coordinate with regional planning agencies and municipalities where expansion of existing rest area parking or construction of new facilities is considered viable.

Delaware Valley Regional Planning Commission: Freight Projects in the Transportation Improvement Program

In recent transportation legislation (both ISTEA and TEA-21), the federal government has stipulated that goods movement be included as a primary factor in transportation planning. The Delaware Valley Regional Planning Commission (DVRPC), the MPO for the Philadelphia metropolitan area, has sought to proactively address freight transportation needs through long-range transportation planning, transportation improvement programming, and conduct of technical studies. Because there is no special funding category for freight-related improvement projects, DVRPC has incorporated freight improvement needs into the TIP through the involvement of the Delaware Valley Goods Movement Task Force (DVGMTF), a broad-based advisory committee of public- and private-sector freight experts who provide input to the planning and programming functions. The Planning Subcommittee of the DVGMTF is specifically charged with identifying freightrelated projects and introducing them into the programming process. Tables published on the DVRPC website highlight the adopted TIP projects that portend the greatest benefits for freight movement (*14*).

National Highway System Connectors to Freight Facilities in the Delaware Valley Region

DVRPC conducted a study of important roadway connections between the National Highway System and 12 key intermodal freight terminals (15). The study includes an inventory and assessment of physical and traffic operating conditions along the connectors and presents recommendations to improve deficiencies along the network. The recommendations include improving signing, providing auxiliary lanes or new traffic signalization at intersections, completing or reconfiguring interchanges, constructing new access roadways, and undertaking additional studies.

The report provides cost estimates for the recommended improvements and identifies potential funding sources to implement them. It also estimates truck-trip generation as an indicator of activity levels for the purpose of establishing priorities.

1998 California Transportation Plan: Statewide Goods Movement Strategy

The California DOT developed the Statewide Goods Movement Strategy as a component of the California Transportation Plan (16). Its goal is to serve as the state's policy and action blueprint for improving the transportation system for goods movement.

The strategy identifies 10 strategic policies to direct the state's response to maintaining and improving the system and articulates goals and objectives for long-term improvement of the system. Accordingly, the strategy recommends 34 high emphasis routes as the initial system focus of the strategy, with a subset of 10 routes as the highest focus priority.

A series of action alternatives was identified for possible implementation, and 42 action items are identified, along with the responsible agency and time frame (shortterm versus long-term). The action items fall into seven categories.

- 1. Capacity constraints and network development;
- 2. Design restrictions and network improvements;
- 3. Operational improvements;
- 4. Safety and maintenance improvements;
- 5. New technology development and implementation;
- 6. Funding, programming, and planning enhancements; and
- 7. Policy, regulatory, and institutional improvements.

Freight Facilities and System Inventory in the New York Metropolitan Region

The New York Metropolitan Transportation Council created this inventory report for major freight facilities and systems as part of implementing the region's intermodal management system (17). The purpose of the report is to describe the current condition of major freight transportation facilities and systems, to assist in identifying bottleneck locations and generating improvement strategies.

The report includes chapters on air freight, marine facilities, railroads, and truck facilities. The truck facilities chapter addresses important issues affecting the trucking industry, describes the trucking industry in the New York metropolitan region, describes selected regional truck terminals, discusses major trucking related regulations, and presents the outlook for changes in the trucking industry. In August 2001, an annual update was published, including revised contact names and changes to the system.

Freight and Goods Transportation System Update

The Washington State DOT undertook the Freight and Goods Transportation System (FGTS) update project to identify the extent of the state's freight and goods network, comply with state legislation, comply with federal requirements under the Highway Performance Monitoring System, provide policy makers with the data required to make decisions concerning the FGTS, and supply an additional tool for protecting and enhancing the economic vitality of the state. The study updated the previous version conducted in 1998 (*18*) and did the following:

- Used traffic data to estimate freight tonnage carried by each state highway;
- Identified strategic freight corridors, based on freight tonnage criteria;

- Quantified growth in freight movement since previous measurements (1994 and 1996); and
- Suggested that future updates enhance existing systems to include information on origins and destinations as well as commodity groups of shipments.

Freight Mobility System Improvement Project

The Freight Mobility System Improvement Project (19) was initiated in 1998 in Washington State with the goal of reducing by 20% waste and delay in the state's freight system. The project involved a diverse array of interests in freight movement, including government (state, county, and city), ports, and industry (trucking companies, labor, manufacturers, freight forwarders, shipping lines, and terminal operators). The project's objectives included

- Creating a common understanding of the freight mobility system and how well it currently functions;
- Clarifying customer needs and identifying performance measures to meet those needs;
- Envisioning alternative approaches for freight mobility improvement, with emphasis on noninfrastructure issues;
- Identifying at least two high-priority projects; and
- Working in cross-functional task groups.

Three areas in the supply chains surface as top priorities for improvement based on their contribution to delays: terminal-gate operations, in-state transit and delivery, and out-of-state transit and delivery. The team members addressed the first two problems (they believed that they had limited ability to affect out-of-state processes) by identifying the root causes of the problems and recommending solutions to address those causes. They also evaluated the overall communication system and identified the need for feedback throughout the supply chain. Finally, they identified tasks needing to be undertaken in subsequent projects.

I-880 Corridor Truck Access Study

The Metropolitan Transportation Commission (Oakland, California) commissioned the I-880 Corridor Truck Access Study (20) to identify the most important physical, operational, or institutional issues affecting the movement of trucks in western Alameda County. The study focused on identifying and assessing trucking-related issues on the arterial streets connecting to I-880 or serving as parallel routes to that freeway. The study examined truck routing, access issues, deficiencies (both on-street and off-street) that cause operational problems on arterial streets, and off-street conditions that affect parking and loading and unloading of trucks.

The study used technical analysis and surveys of government and trucking companies to identify six categories of issues most affecting truck mobility in the corridor. The issues included (in priority order): truck parking, designation of truck routes, specific intersections and freeway ramps, land-use incompatibility, truck stops, and information. The study recommended actions to be considered by various levels of government (local, county, regional, and state) to address the specific issues identified in these categories.

Nevada Intelligent Transportation System/Commercial Vehicle Operations Business Plan

The mission of the Intelligent Transportation System/Commercial Vehicle Operations (ITS/CVO) program is to use cost-effective methods and technologies to streamline state regulatory, enforcement, and motor-carrier practices, while increasing safety and productivity for states and carriers. The Nevada Highway Patrol commissioned this project to provide guidance for the state's CVO program.

The business plan (21) was developed following the FHWA guidelines for developing a state plan. It provides a baseline inventory of existing CVO programs in Nevada, identifies the mission and vision for the Nevada CVO program, identifies and ranks the ITS/CVO priority projects for funding and implementation, and details the focus for future CVO projects.

Review of the Effectiveness, Location, Design, and Safety of Passing Lanes in Kansas

The Kansas DOT commissioned this study, conducted by researchers at Kansas State University, to develop location and design guidelines for passing lanes (22). This effort

- Studied the operation and safety of existing passing lanes in the state;
- Studied the highway network to determine which two-lane rural highway segments operate at a level of service below acceptable levels;
- Ranked those highway segments in regard to priority;
- Identified key planning issues including passing lane lengths, spacing, configurations, and geometric elements; and
- Recommended guidelines for passing lane site identification, signing, pavement markings, and location.

SR-60 Truck Lane Feasibility Study

The Southern California Association of Governments commissioned this feasibility study to evaluate the benefits,

costs, and impacts of constructing exclusive truck lanes along a 35-mi segment of the State Route 60 freeway from Los Angeles east to Ontario (23). The freeway currently carries a daily truck volume of more than 20,000 in some locations and this is projected to more then double by 2020. State Route 60 is identified in the association's adopted 2001 Regional Transportation Plan as one of four highways planned to include exclusive truck lanes by 2025.

The study includes an inventory of the existing highway and its geometric characteristics, adjacent land uses, and traffic conditions, including truck volumes. It identifies appropriate geometric characteristics for an exclusive truck lane facility and presents alternatives (at-grade and elevated) for constructing it. The study evaluates these alternatives in terms of cost-effectiveness and effects on the environment and adjacent developments, and evaluates opportunities for revenue collection through tolling. The study concludes that truck lanes are feasible in the corridor, although the cost would be substantial. Furthermore, it recommends a preferred concept for developing the truck lanes while minimizing effects in each segment of the corridor.

This selection of case studies highlights the types of truck-related planning activities being undertaken by state DOTs and MPOs. Information about these and other freight-related planning efforts can be found on many of the state DOT and MPO websites.