

NCHRP

SYNTHESIS 314

NATIONAL
COOPERATIVE
HIGHWAY
RESEARCH
PROGRAM

Strategies for Managing Increasing Truck Traffic

A Synthesis of Highway Practice

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NCHRP SYNTHESIS 314

Strategies for Managing Increasing Truck Traffic

A Synthesis of Highway Practice

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Research Sponsored by the American Association of State Highway and Transportation Officials
in Cooperation with the Federal Highway Administration

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Systematic, well-designed research provides the most effective approach to the solution of many problems facing highway administrators and engineers. Often, highway problems are of local interest and can best be studied by highway departments individually or in cooperation with their state universities and others. However, the accelerating growth of highway transportation develops increasingly complex problems of wide interest to highway authorities. These problems are best studied through a coordinated program of cooperative research.

In recognition of these needs, the highway administrators of the American Association of State Highway and Transportation Officials initiated in 1962 an objective national highway research program employing modern scientific techniques. This program is supported on a continuing basis by funds from participating member states of the Association and it receives the full cooperation and support of the Federal Highway Administration, United States Department of Transportation.

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The program is developed on the basis of research needs identified by chief administrators of the highway and transportation departments and by committees of AASHTO. Each year, specific areas of research needs to be included in the program are proposed to the National Research Council and the Board by the American Association of State Highway and Transportation Officials. Research projects to fulfill these needs are defined by the Board, and qualified research agencies are selected from those that have submitted proposals. Administration and surveillance of research contracts are the responsibilities of the National Research Council and the Transportation Research Board.

The needs for highway research are many, and the National Cooperative Highway Research Program can make significant contributions to the solution of highway transportation problems of mutual concern to many responsible groups. The program, however, is intended to complement rather than to substitute for or duplicate other highway research programs.

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The members of the technical committee selected to monitor this project and to review this report were chosen for recognized scholarly competence and with due consideration for the balance of disciplines appropriate to the project. The opinions and conclusions expressed or implied are those of the research agency that performed the research, and, while they have been accepted as appropriate by the technical committee, they are not necessarily those of the Transportation Research Board, the National Research Council, the American Association of State Highway and Transportation Officials, or the Federal Highway Administration of the U.S. Department of Transportation.

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FOREWORD

*By Staff
Transportation
Research Board*

Highway administrators, engineers, and researchers often face problems for which information already exists, either in documented form or as undocumented experience and practice. This information may be fragmented, scattered, and unevaluated. As a consequence, full knowledge of what has been learned about a problem may not be brought to bear on its solution. Costly research findings may go unused, valuable experience may be overlooked, and due consideration may not be given to recommended practices for solving or alleviating the problem.

There is information on nearly every subject of concern to highway administrators and engineers. Much of it derives from research or from the work of practitioners faced with problems in their day-to-day work. To provide a systematic means for assembling and evaluating such useful information and to make it available to the entire highway community, the American Association of State Highway and Transportation Officials—through the mechanism of the National Cooperative Highway Research Program—authorized the Transportation Research Board to undertake a continuing study. This study, NCHRP Project 20-5, “Synthesis of Information Related to Highway Problems,” searches out and synthesizes useful knowledge from all available sources and prepares concise, documented reports on specific topics. Reports from this endeavor constitute an NCHRP report series, *Synthesis of Highway Practice*.

The synthesis series reports on current knowledge and practice, in a compact format, without the detailed directions usually found in handbooks or design manuals. Each report in the series provides a compendium of the best knowledge available on those measures found to be the most successful in resolving specific problems.

PREFACE

This report of the Transportation Research Board will be of interest to local, regional, state, and federal officials, as well as to other transportation professionals and the public that work with them, in dealing with the challenges of increasing truck traffic. The report documents recent efforts by transportation organizations that construct, operate, and manage the transportation system. In many cases, plans and strategies have been developed without precedent to provide guidance in determining effective strategies. This synthesis identifies truck-related challenges, planning activities for goods movement being undertaken, truck management strategies being considered, factors that have influenced the selection of particular strategies, and benefits expected from selected strategies. The types of projects being implemented most frequently include pavement improvement or rehabilitation, climbing lanes, lane restrictions, and weigh-in-motion. Primary factors driving the selection of these projects include potential benefits and public acceptance.

Information was derived from a survey of state departments of transportation (28 responses) and metropolitan planning organizations (8 responses), supplemented by a review of available literature.

A panel of experts in the subject area guided the work of organizing and evaluating the collected data and reviewed the final synthesis report. A consultant was engaged to collect and synthesize the information and to write this report. Both the consultant and the members of the oversight panel are acknowledged on the title page. This synthesis is an immediately useful document that records the practices that were acceptable within the limitations of the knowledge available at the time of its preparation. As progress in research and practice continues, new knowledge will be added to that now at hand.

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This study was managed by Donna Vlasak, Senior Program Officer, who worked with the consultant, the Topic Panel, and the Project 20-5 Committee in the development and review of the report. Assistance in project scope development was provided by Stephen Maher and Jon Williams, Managers, Synthesis Studies. Don Tippman was responsible for editing and production. Cheryl Keith assisted in meeting logistics and distribution of the questionnaire and draft reports.

Crawford F. Jencks, Manager, National Cooperative Highway Research Program, assisted the NCHRP 20-5 Committee and the Synthesis staff.

Information on current practice was provided by many highway and transportation agencies. Their cooperation and assistance are appreciated.

STRATEGIES FOR MANAGING INCREASING TRUCK TRAFFIC

SUMMARY

Increasing truck traffic poses many challenges for the transportation organizations that construct, operate, and maintain the transportation system. As such challenges have increased in importance, public agencies have begun to develop plans and implement strategies to address them. In most cases, these plans and strategies have been developed without the precedents that provide guidance in determining effective strategies.

The objective of this synthesis is to document the current state of the practice of these agencies contending with the challenges of increasing truck traffic. To do so, the synthesis used a survey of state departments of transportation (DOTs) and metropolitan planning organizations (MPOs) to identify the specific challenges being addressed, planning activities being undertaken, management strategies being considered, factors influencing the selection of particular strategies, and benefits and costs of selected strategies. Responses were received from 28 states and 8 MPOs.

State DOTs and MPOs are facing a broad array of challenges attributable to increasing truck traffic. These include traffic congestion, transportation system deficiencies, safety, infrastructure deterioration, intermodal connections, environmental impacts, quality of life, economic development, and losses in productivity. The challenges that are most prevalent for state DOTs include congested urban highways, insufficient truck parking, and pavement deterioration. The challenges that are most prevalent for MPOs include congestion, environmental issues (air quality and noise), and economic issues (transport costs and productivity).

DOTs and MPOs are undertaking a wide range of planning activities for dealing with truck traffic, including large-area freight planning (state, region, or corridor), local-area freight planning (intermodal facilities or truck-related land use), and goods movement forecasting. Relatively few of the planning efforts have been completed, and those that have are largely in response to federal mandates, indicating that planning for goods movement is still in its early stages of evolution.

Similarly, DOTs and MPOs have considered a wide range of potential strategies for managing increasing truck traffic, including improved highway design, special roadway facilities for trucks, operational improvements, intelligent transportation systems, improved signing, regulatory changes in allowed vehicle size or configuration, enhanced enforcement and compliance, and investments in alternative infrastructure.

All survey respondents are studying and implementing some types of management strategies for dealing with truck traffic. The types of projects being implemented most frequently include pavement improvement or rehabilitation, climbing lanes, lane restrictions, and weigh-in-motion. Expected benefits of these projects primarily include improvements in

safety, reductions in congestion, and increases in productivity. Potential benefits and public acceptance are among the primary factors considered in selecting such projects.

The more controversial strategies, which have been considered but rejected in some states, include changes in vehicle size or configuration limits, special roadway facilities for trucks, restrictions on lane usage or time of day, enhanced enforcement, and improvements in alternative infrastructure. Not all strategies are appropriate in all situations, and consideration must be given to public opinion, project cost, likely benefits, and ease of implementation.

INTRODUCTION

BACKGROUND

In urban and rural areas throughout the United States, truck traffic is increasing. Media reports document problems with truck traffic and vehicle crashes involving large trucks. Even casual observers recognize that there are more trucks on the road, and travel statistics indicate the growing magnitude of this situation. Since 1970, truck travel in the United States, as measured in vehicle-miles of travel (VMT), has increased by 216% (1), whereas the population has increased by only 33% (2) and overall vehicle travel (total VMT) has increased by 137% (3). Meanwhile, highway system capacity (measured in lane-miles of freeways and arterial roads) has increased by only 18% since 1980 (pre-1980 statistics are not available) (4).

Forecasts of future freight flows indicate that this growth trend will continue. The volume of domestic freight is projected to increase by 87% between 1998 and 2020, whereas the volume of international freight is projected to increase by 107% during the same period (5). The rapid increase in truck traffic is being influenced by dramatic changes in the global economy, consumer demand, and logistics practices over the past 20 to 30 years as reflected in the following trends:

- Ever-increasing urban populations demand more and more consumer goods, which are increasingly imported from foreign countries. Goods are delivered to distribution centers and then to retail outlets by truck.
- Retail outlets increasingly rely on computerized inventory tracking, enabling them to minimize on-hand inventories, but necessitating more truck trips to deliver the needed consumer goods.
- Distribution of parts, finished goods, and other commodities is done by truck for virtually all shipments of less than 500–600 mi, owing to lower shipping costs and greater flexibility.
- Manufacturers have reduced costs by lowering inventories and relying instead on just-in-time delivery. Such a system not only increases the volume of truck movements but also gives trucking an increasingly critical role in the logistics chain.

These and other trends have led to the rapidly growing volume of trucks using the roadway systems in the United States.

Increasing truck traffic poses many challenges for the transportation organizations that construct, operate, and maintain the transportation system, including

- Safety hazards, especially where heavy trucks are mixed with light-duty vehicles;
- Rapid deterioration of infrastructure, as increasing numbers of heavy vehicles reduce the useful life of pavement;
- Degradation of the environment resulting from more emission of pollutants into the atmosphere, particularly of pollutants such as particulate matter associated with diesel truck engines;
- Inefficient intermodal and multimodal freight connections, especially where activities such as loading and unloading and queuing spill truck traffic onto public roadways. (Note: in this report, the term “intermodal” is used specifically in reference to the transfer of containers, and “multimodal” is used more generally in reference to any transfer of goods during the transport process, either between different modes or between vehicles of the same mode.);
- Impediments to economic development, especially in areas where public opposition has arisen to truck-intensive developments (such as manufacturing, warehousing, truck terminals, intermodal yards, and related uses) that nearby residents perceive as a nuisance or blight;
- Public concerns about truck noise and emissions affecting residential areas; and
- Losses in productivity due to congestion, which can delay critical shipments, increase costs, and affect manufacturing schedules or shipping deadlines.

Transportation organizations are increasingly faced with the dilemma of (1) needing to accommodate trucking to foster economic development and sustain the quality of life associated with the consumer economy, while (2) dealing with a public that is increasingly vocal in its demands that truck traffic, truck noise, and truck-related development be eliminated or minimized wherever possible. In addition, since September 11, 2001 (9/11), security has become a high-priority concern. However, security issues are not reflected in the synthesis results because the survey responses were completed before 9/11.

The growing importance of these challenges has caused public agencies to begin addressing this poorly understood component of transportation system planning, namely the movement of goods. Many states have begun to develop plans for how to accommodate the movement of goods; many states have also begun to study and implement strategies intended to overcome the various challenges. In most cases,

these plans and strategies have been developed without precedent to provide guidance in determining effective strategies.

SYNTHESIS OBJECTIVE

The objective of this synthesis is to document recent efforts by agencies throughout the United States to manage increasing truck traffic and present the current state of the practice in dealing with the challenges of increasing truck traffic. To accomplish this the synthesis identifies

- Truck-related challenges being reported by transportation agencies,
- Planning activities for goods movement being undertaken at the state and metropolitan level,
- Truck management strategies being considered by the agencies,
- Factors that have influenced the selection of particular strategies, and
- Benefits expected from the selected strategies.

The information presented in this synthesis is based on responses received from a nationwide survey, supplemented by a review of available literature. The survey was submitted to the department of transportation (DOT) in each of the 50 states and to the metropolitan planning organizations (MPOs) responsible for transportation planning in 23 of the largest metropolitan areas in the country. Responses were received from 28 of the 50 states and from 8 of the 23 MPOs contracted.

SYNTHESIS ORGANIZATION

This synthesis is organized to provide a progression of information. It begins by identifying the problem,

continues with a discussion of possible solutions, identifies the solutions currently being applied, and finally draws conclusions and makes suggestions for future applications and research.

Chapter two explains the types of challenges resulting from increasing truck traffic and reports on the perceived magnitude of those challenges.

Chapter three approaches problem solving from the standpoint of planning. It describes the types of planning activities that could be undertaken to address challenges caused by trucking and reports on the types of planning activities that are actually under way.

Chapter four identifies a broad range of potential management strategies that have been identified, studied, recommended, or implemented. It also details the types of challenges for which these strategies are being considered.

Chapter five focuses specifically on those strategies selected for implementation and presents the reasons for their selection and the expected benefits. It also presents the strategies that have been considered but rejected, as well as the factors influencing the decision to eliminate them from consideration.

Chapter six presents the conclusions of the report, including suggestions for the practical application of the information and recommendations for further research.

Three appendices are provided. The survey questionnaire is presented in Appendix A, a list of survey respondents is provided in Appendix B, and a summary of the survey responses is given in Appendix C.

CHALLENGES OF INCREASING TRUCK TRAFFIC

Increasing volumes of truck traffic create many types of challenges for transportation agencies, which vary from state to state and from region to region. This chapter first identifies the types of challenges and problems that can be caused by increasing truck traffic, and then reviews current conditions being experienced in the states to ascertain which challenges are more prevalent and likely to be faced by agencies as they deal with increasing truck traffic. This discussion is based on the responses received from the survey. Because the survey did not define the term “truck,” the responses reflect the varying perceptions and perspectives of agencies throughout the country.

TYPES OF CHALLENGES

The types of challenges reported by agencies primarily include those related to the transportation system itself (operations, capacity, safety, and maintenance). However, they also include challenges related to broader social categories, including the environment and the economy. For the purpose of identifying the specific types of challenges and evaluating their frequency of occurrence, this report uses nine categories. In the post-9/11 world, security represents a tenth category of challenge—perhaps one of the most important—but security-related issues are not included in the responses because the survey was conducted before these events. Each category is briefly defined, followed by a list of the specific challenges that survey respondents attributed to increasing truck traffic.

Traffic Congestion

Increasing volumes of trucks can cause or exacerbate traffic congestion, especially because trucks use more highway space than automobiles and because they have slower rates of acceleration and deceleration. Truck-related congestion is most likely to occur in areas with heavy truck volumes or where trucks constitute a high percentage of the traffic stream. Congestion can occur in several types of locations.

- Bottleneck locations, especially near areas with concentrated truck activity—such as terminals, ports, and border crossings;
- Urban streets;
- Urban highways; and
- Intercity roads and highways.

Transportation System Deficiencies

Increasing volumes of trucks can accentuate functional obsolescence and operational changes in the transportation system, such as

- Substandard geometrics—Large trucks can have difficulty maneuvering safely and efficiently on roadways with substandard geometrics (such as narrow lanes, small-radius curves, or curb returns) and in work zones where the operational problems of narrow lanes are compounded by the need for weaving maneuvers. The problems caused by these geometric shortcomings are magnified as traffic or truck volumes increase, when trucks unable to maneuver effectively impede other traffic.
- Insufficient truck parking—Federal regulations restrict the number of consecutive hours that truck drivers are permitted to operate their vehicles; therefore, truck drivers require parking for resting and eating, as well as for refueling. Areas designated specifically for truck parking are limited, and the rest and service areas provided along highways may not have sufficient parking for the volume of trucks desiring to use them. Commercial development is prohibited within the rights-of-way of Interstate highways, so parking is often available only at off-highway truck stops, which are often inconvenient for truck drivers.
- Inadequate directional signing—Truck drivers often drive on roads that are unfamiliar to them, delivering goods to and from locations which they may not visit frequently. These drivers depend on good directional signing to help them reach their destinations (or highway access ramps) easily. Without adequate signing, these drivers may take unnecessary and circuitous detours before they reach their destination.

Safety

Nationwide statistics indicate that total crash rates for large trucks are lower than for passenger vehicles, although fatal crash rates are higher (Figure 1). In 2000, large trucks were involved in 212 total crashes per 100 million vehicle-miles (MVM) and 2.2 fatal crashes per 100 MVM, whereas passenger vehicles were involved in 245 total crashes per 100 MVM and 1.3 fatal crashes per 100 MVM (6). Increasing volumes of truck traffic can be expected to increase the

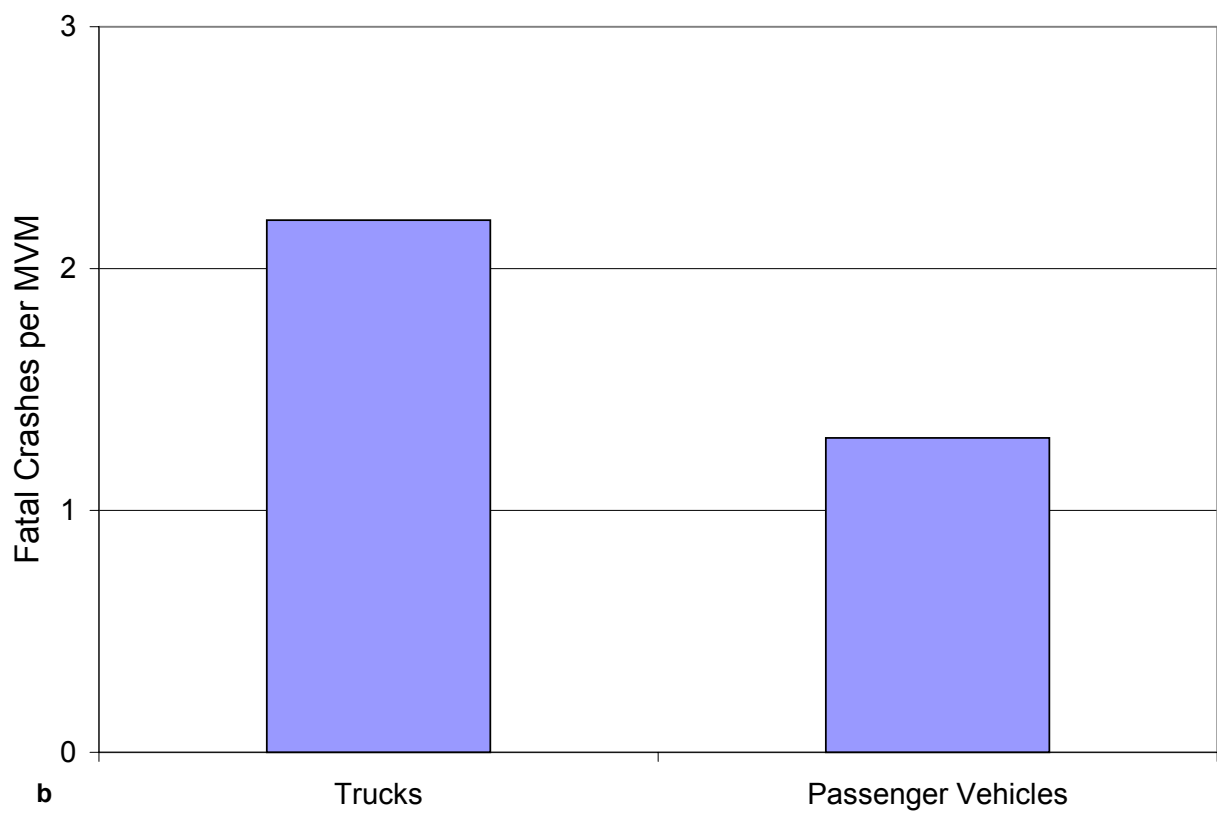
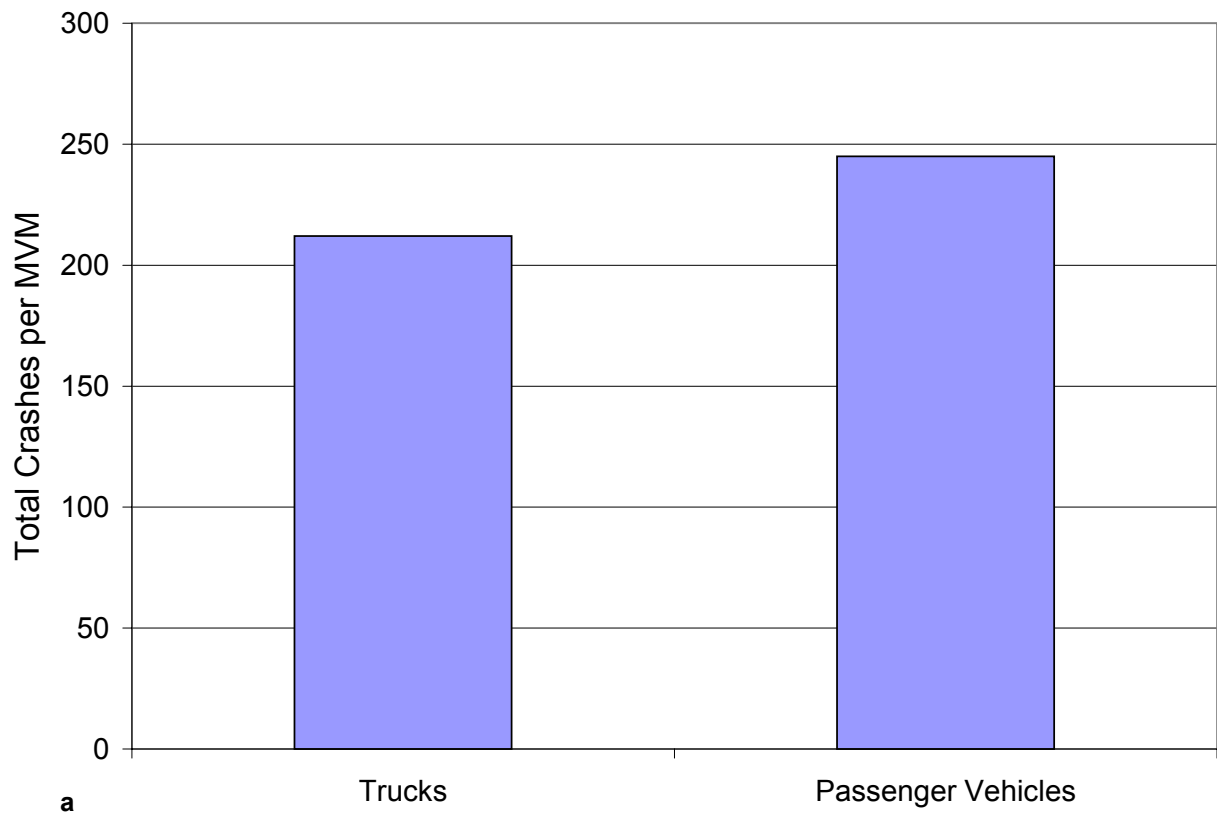


FIGURE 1 Year 2000 nationwide: (a) total crash rate; (b) fatal crash rate. MVM = million vehicle-miles.

number and severity of crashes, thereby reducing the level of safety on highways and streets.

For the sake of differentiating between crashes that relate solely to trucks and those that involve vehicle conflicts (truck–automobile or truck–truck), the survey used two categories of crashes when considering the issue of safety: (1) truck crashes (single vehicle) and (2) multivehicle crashes.

Infrastructure Deterioration

The sheer size and weight of trucks puts a great strain on the highways and bridges that they traverse, resulting in more rapid deterioration of pavement and structures as truck volumes increase. To differentiate between the challenges of pavement damage and structural damage, the survey used two categories: (1) pavement deterioration and (2) bridge structure deterioration.

Multimodal Connections

The rapid increase in the volume of freight moving through the transportation system places particular strains on the critical points in the shipping chain where goods are transferred from one mode to another, or from one truck to another. Inefficient operations, inadequate size, or ineffective design, often attributable to adapting available facilities instead of designing new ones, cause strains at key transfer points that can delay time-sensitive deliveries, impair the economic chain, or spill excess truck traffic onto the adjacent roadway system. For purposes of problem identification, the modal connection issues are separated by mode.

- Rail–truck connectivity,
- Air–truck connectivity,
- Water–truck connectivity, and
- Truck–truck connectivity.

Environmental Impacts

Trucks can create significant impacts on the environment, especially in terms of air pollution and noise, and increasing truck volumes can exacerbate these impacts. Diesel truck engines emit more nitrogen oxides, reactive hydrocarbons, and particulate matter per mile of travel than automobile internal combustion engines (7). As a result, a substantial increase in truck volumes can affect public health by contributing to degraded air quality either regionally or locally, where trucks pass close to sensitive receptors such as homes or schools. Increasing truck volumes also increase noise levels in adjacent areas, because trucks

generate substantially more noise than automobiles. High levels of truck noise are particularly undesirable near residential neighborhoods, schools, parks, and other locations where there are high levels of outdoor activity. Specific environmental challenges addressed in the survey include air quality (emissions) and noise.

Quality of Life

Addressing the effects of trucks on the quality of life poses a serious dichotomy for public agencies. On the one hand, it is desirable to accommodate and optimize truck movements: the distribution of goods by truck makes it possible and economical for U.S. consumers to obtain the food and other commodities they desire when they wish to have them. On the other hand, the quality of life for nearby residents can be impaired when trucks travel in areas where they are not intended or desired to be. For example, trucks may take shortcuts through residential communities to avoid congested arterials, or because of regulations that force them off a nearby highway. In addition, trucks may be parked in residential areas because they are driven home at night or because there is insufficient parking space for a truck in the area where they would prefer to park. In either case, the community residents are faced with the noise and emissions of trucks that do not properly belong on community streets.

Thus, agencies are often faced with complaints about the negative effects of trucks on the quality of life, even while trucking is essential to local economic success and the overall quality of life (8). In the survey, quality-of-life issues focus on the localized impacts: (1) trucks driving through residential communities and (2) trucks parking in residential areas.

Economic Development

Increasing movement of freight brings associated pressures to develop land for freight-related uses. Industrial uses are constructed to manufacture and assemble the goods demanded by the public. Warehouses and terminal facilities are developed to store and transfer the goods in the distribution process. Such uses in turn spawn the need for nearby suppliers and support uses. Problems may occur if these uses are located adjacent to other types of uses with which they are not compatible. For example, residential areas would not be considered compatible with industrial and terminal uses, owing to the noise and other impacts they impose on the neighboring environment. Another type of challenge may occur if development of freight-related uses discourages other types of uses—which the locality and residents consider more beneficial—from locating in the area. These challenges are categorized as: (1) incompatible:

land uses and (2) truck-related uses that discourage desirable development.

Losses in Productivity Due to Congestion

The potential impact on the economy has been frequently cited as a challenge associated with traffic congestion, as trucks inefficiently spend time in slow-moving traffic, perhaps even missing critical delivery deadlines as a result. The increasing use of just-in-time delivery means that a larger share of truck movements are time sensitive, and even though shippers plan their schedules to account for recurring congestion, they cannot always allow enough slack to account for traffic incidents or unusual delays. With delays, and the need to accommodate them, transportation costs may rise and productivity across the supply chain fall. These challenges are characterized as (1) increased transport costs and (2) productivity loss.

CURRENT CHALLENGES

The preceding discussion was intended to portray the types of potential challenges that are associated with increasing truck traffic. Some are the direct result of increasing volumes of truck movements, whereas others are caused by larger forces operating on the economy or transportation system, but which are linked with increasing truck traffic.

To ascertain the truck-related challenges being faced in the United States today, the survey asked DOTs and MPOs to identify whether they are facing the challenges described previously, as well as the breadth (localized or widespread) and severity (moderate or serious) of each challenge.

State Challenges

The responses of 28 state DOTs are summarized in Table 1. The issues identified most often (by 26 of the 28 states responding) as challenges (either moderate or serious) are congested urban highways and insufficient truck parking.

The other most-often cited challenges (either moderate or serious) are congested urban streets (cited by 25 of the 28 responding states), pavement deterioration and bridge structure deterioration (23 states), congested intercity roads (22 states), and noise (22 states). Each challenge described in the previous section was identified as such by at least eight of the responding states, indicating that all of these issues are being faced in various locations throughout the United States.

The challenges most frequently cited as serious (cited by 12 of the 28 responding states as either localized or widespread) include

- Congested urban highways (widespread—4 states; localized—8 states);
- Congested intercity roads (widespread—2 states; localized—10 states); and
- Air quality (widespread—2 states; localized—10 states).

In most of the states, these are considered localized challenges.

The challenge most frequently reported as widespread (cited by 15 of the 28 responding states as either serious or moderate) is pavement deterioration. Other widespread challenges include bridge structure deterioration (cited by 12 states) and insufficient truck parking (12 states). Most of the states consider these widespread challenges as moderate rather than serious.

The challenges most often cited as being both serious and widespread are pavement deterioration (6 of 28 states) and multivehicle crashes (5 of 28 states).

These results lead to the following conclusions about truck-related challenges in the states:

- Virtually all responding states are already facing at least some of the challenges discussed earlier in this chapter.
- All of the challenges are currently being encountered in some of the states.
- The challenges that are most problematic (frequently cited as both serious and widespread) include congested urban highways, insufficient truck parking, and pavement deterioration.
- Generally, problems of congestion and infrastructure deterioration are most often cited as serious or widespread challenges, whereas those pertaining to economic development and quality of life are least cited as serious or widespread challenges.

Metropolitan Area Challenges

The responses of the eight MPOs are summarized in Table 2. The smaller number of responses makes it more difficult to identify clear trends and differences between the various issues. However, there are clear differences in perspective when these results are compared with those of the states, reflecting the different responsibilities of an MPO.

The truck-related challenge being faced by all eight responding MPOs is noise. The challenges cited by seven of the eight include congested roadways (urban streets, urban

TABLE 1
CHALLENGES ATTRIBUTABLE TO INCREASING TRUCK TRAFFIC—STATE DEPARTMENTS OF TRANSPORTATION

Question 1: DOT Responses*	0 Not Studied	1 Minor Issue	2 Moderate Localized	3 Serious Localized	4 Moderate Widespread	5 Serious Widespread	2+3 Localized	4+5 Widespread	2+4 Moderate	3+5 Serious
(a) Congestion										
Bottlenecks near terminals, ports, border crossings, etc.	2	4	11	7	1	2	18	3	12	9
Congested urban streets	2	1	14	7	2	2	21	4	16	9
Congested urban highways	1	1	9	8	5	4	17	9	14	12
Congested intercity roads	0	5	8	10	2	2	18	4	10	12
(b) Transportation System										
Substandard geometrics	1	8	7	6	3	1	13	4	10	7
Insufficient truck parking	0	1	9	6	7	4	15	11	16	10
Inadequate directional signing	0	13	10	1	1	0	11	1	11	1
(c) Safety										
Truck crashes (single vehicle)	1	7	11	4	2	1	15	3	13	5
Multivehicle crashes (especially auto-truck)	1	11	6	2	1	5	8	6	7	7
(d) Infrastructure										
Pavement deterioration	0	3	6	3	9	6	9	15	15	9
Bridge structure deterioration	0	3	6	5	10	2	11	12	16	7
(e) Environment										
Air quality (emissions)	1	7	7	10	0	2	17	2	7	12
Noise	0	5	12	4	4	2	16	6	16	6
(f) Intermodal Connections										
Rail/truck connectivity	3	7	9	2	1	4	11	5	10	6
Air/truck connectivity	5	9	6	3	2	2	9	4	8	5
Truck/truck connectivity	5	11	4	5	1	1	9	2	5	6
Water/truck connectivity	6	9	5	4	0	3	9	3	5	7
(g) Quality of Life										
Trucks driving through residential communities	2	8	8	6	3	0	14	3	11	6
Trucks parking in residential communities	3	12	7	3	2	0	10	2	9	3
(h) Economic Development										
Incompatible land uses	3	10	3	5	3	2	8	5	6	7
Trucks that discourage “desirable” development	5	12	4	1	1	2	5	3	5	3
(i) Losses in Productivity Due to Congestion										
Increased transport costs	5	6	7	3	0	4	10	4	7	7
Productivity loss	8	5	5	4	1	2	9	3	6	6

*What challenges attributable to increasing truck traffic is your agency facing?

Notes: Survey data (28 states responding).

highways, and intercity roads), substandard geometrics, air quality, incompatible land uses, and increased transport costs. All of the challenges were cited by at least half (four) of the MPOs. Those cited the least often were bridge structure deterioration and trucks parking in residential areas.

The most serious challenge (cited by five MPOs as either localized or widespread) is congested urban highways. Among challenges considered serious by four of the eight MPOs are congestion bottlenecks, substandard geometrics, insufficient truck parking, trucks driving through residential areas, and incompatible land uses. None of the MPOs considered single-vehicle truck crashes as a serious challenge.

The most widespread challenges to the MPOs are air quality and increased transport costs, which were cited by seven of the eight (as either serious or moderate). Addi-

tional issues most often cited as widespread challenges are productivity losses (six MPOs) and pavement deterioration (five MPOs).

None of the quality-of-life or economic development issues were considered as widespread by any of the MPOs.

The issue cited most often (by three of the eight MPOs) as being both serious and widespread is congested urban highways.

SUMMARY OF CURRENT CHALLENGES

Numerous types of challenges associated with increasing truck traffic are already being addressed at the state and metropolitan level, and virtually all states and metropolitan

areas are grappling with some types of truck-related issues. The most prevalent issue reported in survey responses from both states and metropolitan areas is congested urban highways. At the state level, the other most prevalent is-

ssues are insufficient truck parking and pavement deterioration. At the metropolitan level, the other most prevalent issues are environmental (air quality and noise) and economic (transport costs and productivity).

TABLE 2
CHALLENGES ATTRIBUTABLE TO INCREASING TRUCK TRAFFIC—METROPOLITAN PLANNING ORGANIZATIONS

Question 1: MPO Responses*	0 Not Studied	1 Minor Issue	2 Moderate Localized	3 Serious Localized	4 Moderate Widespread	5 Serious Widespread	2+3 Localized	4+5 Widespread	2+4 Moderate	3+5 Serious
(a) Congestion										
Bottlenecks near terminals, ports, border crossing, etc.	2	0	1	2	1	2	3	3	2	4
Congested urban streets	1	0	3	1	1	2	4	3	4	3
Congested urban highways	1	0	1	2	1	3	3	4	2	5
Congested intercity roads	1	0	3	1	1	2	4	3	4	3
(b) Transportation System										
Substandard geometrics	0	1	2	3	1	1	5	2	3	4
Insufficient truck parking	2	0	1	4	1	0	5	1	2	4
Inadequate directional signing	1	1	2	1	2	1	3	3	4	2
(c) Safety										
Truck crashes (single vehicle)	2	0	2	0	4	0	2	4	6	0
Multivehicle crashes (especially auto-truck)	2	0	1	2	3	0	3	3	4	2
(d) Infrastructure										
Pavement deterioration	1	1	0	1	3	2	1	5	3	3
Bridge structure deterioration	2	2	1	1	1	1	2	2	2	2
(e) Environment										
Air quality (emissions)	1	0	0	0	5	2	0	7	5	2
Noise	0	0	4	1	2	1	5	3	6	2
(f) Intermodal Connections										
Rail/truck connectivity	1	1	3	1	2	0	4	2	5	1
Air/truck connectivity	1	1	3	1	2	0	4	2	5	1
Truck/truck connectivity	2	0	3	1	2	0	4	2	5	1
Water/truck connectivity	1	2	2	0	2	1	2	3	4	1
(g) Quality of Life										
Trucks driving through residential communities	2	0	2	4	0	0	6	0	2	4
Trucks parking in residential communities	4	0	1	3	0	0	4	0	1	3
(h) Economic Development										
Incompatible land uses	1	0	3	4	0	0	7	0	3	4
Truck uses that discourage “desirable” development	2	0	3	3	0	0	6	0	3	3
(i) Losses in Productivity Due to Congestion										
Increased transport costs	1	0	0	0	5	2	0	7	5	2
Productivity loss	2	0	0	0	5	1	0	6	5	1

*What challenges attributable to increasing truck traffic is your agency facing?

Notes: Survey data (8 MPOs responding).

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

TABLE 3
PLANNING ACTIVITIES—STATE DEPARTMENTS OF TRANSPORTATION

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

*Has your agency undertaken planning activities to address the effects of increasing truck traffic?

Notes: Survey data (28 states responding).

TABLE 4
PLANNING ACTIVITIES—METROPOLITAN PLANNING ORGANIZATIONS

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	3	1	50

*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 freight-related 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 (short-term 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 than 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 ele-

vated) 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.

POTENTIAL MANAGEMENT STRATEGIES

The case studies of planning activities in chapter three provide some insights into the types of specific strategies being pursued to manage increasing truck traffic. The strategies range from design enhancements and capacity improvements, to systems technology innovations, to regulatory policies. These strategies are as varied as the challenges they are designed to address. The purpose of this chapter is to identify the range of potential management strategies being considered and the types of challenges to which the various strategies apply.

POTENTIAL STRATEGIES

Potential strategies have been grouped into eight categories. The following discussion identifies specific strategies considered within each category. Tables 5 and 6 show the degree of implementation as reported by the responding state DOTs and MPOs, respectively.

Improved Highway Design

Improvements in highway design include upgrades implemented at specific locations and changes to the design standards used for future highway improvements. Strategies to improve highway design include

- Improved highway geometrics,
- New or upgraded structures,
- New or improved pavements, and
- Modified design standards.

More than 50% of the responding states (13 of 24) report that they are improving highway geometrics, upgrading structures (11 of 21), and improving pavement (14 of 23) in response to increasing truck traffic, with pavement improvement the most commonly implemented strategy. In addition, more than one-third of the states (8 of 21) report that they have modified design standards in response to increasing truck traffic. MPOs typically report a lower involvement with highway design improvements (2 to 3 of the 8 respondents), because this is usually a state responsibility.

Roadway Facilities for Trucks

In some locations, truck volumes or operational requirements may justify physical separation of trucks or com-

mercial vehicles from light-duty traffic (automobiles). The survey asked respondents whether the following types of roadway facilities have been studied or implemented:

- Dedicated roads for trucks or commercial vehicles,
- Special use lanes for trucks or commercial vehicles,
- Truck climbing lanes, and
- Dedicated truck ramps.

Some survey respondents identified other types of roadway facilities that have been implemented, including a truck route system, truck escape ramps, and designated parking or rest areas.

Climbing lanes for trucks are a common practice: more than 75% (20 of 26) of the states responding to the survey have climbing lanes. The other types of roadway facilities are much less common. Approximately 20% are developing special use lanes (6 of 26) or dedicated ramps (5 of 24), and only 1 state of 25 reports approval of a dedicated road for trucks (this is Edgewater Road in New York). In addition, although not part of the survey responses, Massachusetts has implemented the South Boston Bypass as a dedicated road for commercial vehicles. MPO responses indicate the same general order of frequency, although fewer MPOs are involved with truck roadway facilities because state DOTs are primarily responsible for highway improvements.

Operational Strategies

Operational strategies address the management and use of the available infrastructure. Survey respondents were asked whether the following strategies have been implemented for truck traffic:

- Lane restrictions,
- Time-of-day restrictions,
- Roadway restrictions or prohibitions,
- Parking restrictions or prohibitions,
- Incident management, and
- Improvements in intermodal operations.

Other operational strategies identified through survey responses included weight restrictions on bridges, congestion pricing, express truck lanes through toll plazas, and restriction of truck operations during peak travel time for loads requiring permits.

TABLE 5
POTENTIAL STRATEGIES—STATE DEPARTMENTS OF TRANSPORTATION

DOT Responses to Question 3*	Not considered	Identified, but not studied	Studied, but eliminated	Approved, but not implemented	Implemented, or being implemented	% of states in which approved or implemented
(a) Improved Highway Design						
Improved highway geometrics	4	7	0	3	10	54
New or upgraded structures	5	5	0	2	9	52
New or improved pavement	4	5	0	1	13	61
Modified design standards (geometric/structural/pavement)	6	7	0	0	8	38
(b) Roadway Facilities						
Dedicated roads for trucks or commercial vehicles	15	8	1	1	0	4
Special use lanes for trucks or commercial vehicles	7	10	3	3	3	23
Truck climbing lanes	3	3	0	2	18	77
Dedicated truck ramps	13	6	0	2	3	21
(c) Operational Strategies						
Lane restrictions for trucks	5	2	2	1	15	64
Time-of-day restrictions for trucks	12	5	2	1	3	17
Restriction of prohibition of trucks on some roads	8	2	0	1	15	62
Truck parking restrictions/prohibitions	6	3	0	2	13	63
Improved incident management	5	1	0	4	15	76
Improved intermodal operations	4	7	0	7	4	50
(d) Intelligent Transportation Systems						
ITS strategies to facilitate truck flow on roads	2	8	0	4	11	60
Intelligent warning devices	4	5	0	7	8	63
Weigh-in-motion	0	4	0	6	18	86
(e) Signing						
Improved warning signing	2	7	0	3	13	64
Improved directional or informational signing	3	7	0	3	9	55
(f) Vehicle Size and Configuration						
Increased size or weight limits	9	6	4	0	7	27
Reduced size or weight limits	12	8	1	1	4	19
Allow triple trailers on roadways	11	3	6	1	6	26
(g) Enforcement/Compliance						
Additional inspection stations	5	7	2	2	7	39
Additional truck inspections	5	5	2	3	9	50
Electronic screening	4	3	0	4	15	73
Enhanced enforcement or remove noncompliant trucks	5	4	0	2	12	61
Enhanced enforcement of operator hours	8	3	1	2	7	43
(h) Alternative Infrastructure Investments						
Improvements in port/shipping infrastructure	10	5	0	5	5	40
Improvements in air freight infrastructure	11	4	1	4	5	36
Improvements in rail infrastructure	8	4	0	7	5	50

*Has your agency evaluated or implemented specific strategies to address the effects of increasing truck traffic?

Notes: Survey data (28 states responding).

With the exception of time-of-day restrictions, operational improvements are being implemented by most of the responding states, with incident management the most common strategy (19 of 25 states). Time-of-day restrictions have not been applied extensively: less than 20% (4 of 23) of the states have imposed such restrictions. MPO involvement in operational strategies varies according to their areas of responsibility. However, incident management is by far the most common (with six of seven MPOs reporting involvement in incident management).

Intelligent Transportation Systems

ITS are systems that use information, communication, sensor, and control technologies to improve transportation system efficiency and safety. The U.S.DOT has developed a national ITS program plan that includes seven major elements—those most likely to be implemented by public agencies to enhance highway operations and safety for trucks fall into the categories of commercial vehicle operations (ITS/CVO) and Advanced Vehicle Control and Safety

TABLE 6
POTENTIAL STRATEGIES—METROPOLITAN PLANNING ORGANIZATIONS

MPO Responses to Question 3*	Not considered	Identified, but not studied	Studied, but eliminated	Approved, but not implemented	Implemented, or being implemented	% of MPOs which have approved or implemented
(a) Improved Highway Design						
Improved highway geometrics	4	0	1	2	1	38
New or upgraded structures	4	0	1	2	1	38
New or improved pavement	5	0	1	1	1	25
Modified design standards (geometric/structural/pavement)	5	0	1	1	1	25
(b) Roadway Facilities						
Dedicated roads for trucks or commercial vehicles	6	2	0	0	0	0
Special use lanes for trucks or commercial vehicles	4	2	1	1	0	13
Truck climbing lanes	6	0	0	0	2	25
Dedicated truck ramps	6	1	0	1	0	13
(c) Operational Strategies						
Lane restrictions for trucks	6	2	0	0	0	0
Time-of-day restrictions for trucks	4	2	1	0	0	0
Restriction of prohibition of trucks on some roads	5	0	0	1	2	38
Truck parking restrictions/prohibitions	6	1	0	0	1	13
Improved incident management	1	0	0	1	5	86
Improved intermodal operations	2	2	0	2	1	43
(d) Intelligent Transportation Systems						
ITS strategies to facilitate truck flow on roads	1	1	0	1	3	67
Intelligent warning devices	2	0	0	1	3	67
Weigh-in-motion	3	0	0	1	4	63
(e) Signing						
Improved warning signing	4	0	0	2	1	43
Improved directional or informational signing	3	2	0	2	1	38
(f) Vehicle Size and Configuration						
Increased size or weight limits	7	0	1	0	0	0
Reduced size or weight limits	7	1	0	0	0	0
Allow triple trailers on roadways	7	0	0	0	0	0
(g) Enforcement/Compliance						
Additional inspection stations	8	0	0	0	0	0
Additional truck inspections	8	0	0	0	0	0
Electronic screening	5	0	0	2	1	38
Enhanced enforcement or remove noncompliant trucks	6	0	0	1	1	25
Enhanced enforcement of operator hours	8	0	0	0	0	0
(h) Alternative Infrastructure Investments						
Improvements in port/shipping infrastructure	4	0	0	3	1	50
Improvements in air freight infrastructure	3	0	0	3	2	63
Improvements in rail infrastructure	4	1	0	2	1	38

*Has your agency evaluated or implemented specific strategies to address the effects of increasing truck traffic?

Notes: Survey data (8 MPOs responding).

Systems (AVCSS). (For additional information, refer to the U.S.DOT ITS website at: <http://www.its.dot.gov/>.)

ITS/CVO elements include information systems, networks, sensor systems such as weigh-in-motion, technologies such as brake testing equipment, border crossing systems, and the components of intelligent commercial vehicles. ITS/CVO user services include commercial vehicle electronic clearance (including weigh-in-motion and PrePass), automated roadside safety inspection, onboard safety monitoring, commercial vehicle administrative processes, hazardous materials incident response, and freight mobility (24). Most states have devel-

oped ITS/CVO plans, such as the Nevada plan described in chapter three, within the framework of the nationwide initiative sponsored by the FHWA, and are instituting information systems and communications networks that support commercial vehicle operations. These networks are known as Commercial Vehicle Information Systems and Networks (CVISN).

AVCSS technologies include motorist warning systems (for example, detecting when a truck is moving too quickly to negotiate an upcoming curve and then flashing a warning beacon) and collision avoidance systems.

The survey question focused on implementation of three types of ITS elements related to roadway operations and safety.

- Strategies to facilitate truck flow,
- Intelligent warning devices, and
- Weigh-in-motion—devices to communicate truck identity and weight information electronically to enable the truck to bypass roadside weigh stations.

Other ITS strategies reported by survey respondents include on-line vehicle registration and automatic vehicle identification.

ITS strategies are popular among states for addressing truck-related challenges, largely because of their cost-effectiveness and the federal initiative, including guidance and funding, to plan and implement these systems. Of the responding states, 60% (15 of 25) have implemented or approved ITS strategies to improve truck flow; 63% (15 of 24) have implemented or approved intelligent warning devices; and 86% (24 of 28) have implemented or approved weigh-in-motion. Actual implementation is highest for weigh-in-motion, with 64% (18 of 28) reporting that implementation is complete or under way. Responding MPOs report equally high involvement (4 or 5 of 8) with ITS strategies, so these improvements can be considered some of the most popular current methods for managing certain aspects of increasing truck traffic.

Signing

Two types of signing improvements are particularly relevant to managing increasing truck traffic.

- Improved warning signs, used to warn drivers of safety hazards; and
- Improved directional or information signs, to help drivers reach a destination or find a location.

More than half of the responding states (12 of 22) have improved informational or directional signing in response to the increasing volume of truck traffic, and almost two-thirds (16 of 25) have improved warning signs. There is less involvement of MPOs in improvements because roadway signing is primarily the purview of the state DOTs or local agencies.

Vehicle Size and Configuration

Increasing the size or load limits permitted on state highways has been discussed by some states as a means of accommodating greater volumes of freight with the same number of trucks. However, some states are moving in the

opposite direction, lowering size or weight limits in specific locations, usually in response to a potential safety hazard, infrastructure deficiency, or community impact. Specifically, in such instances, three types of changes are usually considered

- Increases in size or weight limits,
- Decreases in size or weight limits (instances reported in the survey responses involve imposition of size or weight restrictions in specific locations), and
- Allowing triple trailers on highways.

Diversion of trucks from the federal and state highway system onto local roads not designed to handle truck traffic (usually overloaded trucks that are avoiding weigh stations) was also identified as an issue in the survey responses.

Relatively few states have implemented such changes, however, largely because of constraints imposed by federal law. Minimum weight limits on the Interstate system and minimum trailer lengths on the National Network were established in the Surface Transportation Assistance Act of 1982. Also, ISTEA (1991) established a freeze on longer combination vehicle operations, which prohibits the expansion of such vehicles. Less than 30% of the states (7 of 26 responding) have increased size or weight limits or allowed triple trailer combinations on highways. Almost 20% of the states (5 of 26) have implemented regulations in the opposite direction, reducing size or weight limits in some locations. MPOs have been essentially uninvolved in vehicle size and configuration, because these concerns are the responsibility of the state government.

Enforcement and Compliance

Enforcement of existing laws and regulations is often viewed as an effective means of ensuring safety and protecting infrastructure investments. Some of the significant enforcement challenges include trucks that exceed weight limits and excessively damage pavement, trucks that fail to meet equipment standards, and drivers who exceed limitations on hours of operation. In addition, technological advancements have led to electronic screening procedures for improving the efficiency of enforcement. Specific improvement strategies in this category include

- Additional inspection stations,
- Additional truck inspections,
- Electronic screening,
- Enhanced enforcement to remove noncompliant trucks, and
- Enhanced enforcement of operator hours.

Almost three-fourths of the states (19 of 26) are using electronic screening as part of their enforcement and

compliance efforts. One-half of the states (12 of 24) have increased the number of inspections being conducted, and approximately 40% (9 of 23) have added inspection stations. More than 60% (14 of 23) have stepped up enforcement to remove noncompliant trucks, whereas 43% (9 of 21) have increased enforcement of operator hours.

Because enforcement and compliance are the responsibility of state and local governments, MPOs have been essentially uninvolved in these activities, although some have supported electronic screening and enforcement of operator hours regulations.

Investments in Alternative Infrastructure

The increasing volume of truck traffic has led almost half of the states to explore investment in alternative types of goods movement infrastructure. Three types of alternative infrastructure can be used to reduce the amount of trucking: (1) waterborne, (2) air freight, and (3) rail.

Improvements being recommended or implemented include safety and capacity improvements in freight rail corridors, new or improved intermodal transfer facilities, port freight shuttle trains, and improved airport ground access. The greatest number of responding states (12 of 24, or 50%) look to rail to take some of the freight handled by trucks, whereas approximately 40% are pursuing improvements for waterborne transportation (10 of 25) and air freight (9 of 25). MPOs report greater levels of involvement in improvements to air freight (5 of 8, or 63%) and ports and shipping infrastructure (4 of 8, or 50%) than in rail improvements (3 of 8, or 38%).

APPLICATION OF STRATEGIES TO CHALLENGES

Survey respondents were asked to identify the primary challenges addressed by each of the improvement strategies as identified previously (multiple responses were allowed). This section discusses the respondents' perception of the relationship between the improvement strategies and the challenges being addressed (definitions and descriptions of the challenges are provided in chapter two). The relationship between improvement strategies and challenges identified by state DOTs is shown in Table 7, and MPO responses are provided in Table 8. Because of the limited number of MPO responses to this question, this discussion focuses on the responses of the state DOTs.

Strategies to improve highway design are all perceived to be significantly directed to improve safety, although each type of design improvement has additional benefits.

- Highway geometric improvements are overwhelmingly directed to improve safety, and secondarily to provide congestion relief.
- Improvements to structures address both safety and deteriorating infrastructure.
- Pavement improvements primarily address infrastructure needs, with improved safety a secondary objective.
- Changes to design standards address issues of both infrastructure and safety.

Development of roadway facilities for trucks (whether dedicated roads, special lanes, climbing lanes, or dedicated ramps) is perceived as being primarily directed to improving safety and reducing congestion. Interestingly, more respondents considered climbing lanes and truck ramps to be primarily directed to safety issues rather than to congestion relief, whereas respondents consider dedicated roads and special lanes as addressing both safety and congestion.

Operational strategies cover a diverse array of improvements, and the respondents perceive that the challenges being addressed are as follows:

- Lane restrictions for trucks and improved incident management primarily address safety, and secondarily address congestion.
- Time-of-day restrictions primarily address congestion, and secondarily address safety.
- Truck restrictions on roads primarily address safety, and secondarily address infrastructure deterioration and congestion.
- Truck parking restrictions primarily address safety, and secondarily address congestion and quality of life.
- Improved intermodal operations primarily address congestion and intermodal connections, and secondarily address economic development, safety, and transportation system issues.

ITS improvements are perceived to primarily address safety and congestion issues. In addition to addressing safety and congestion, some of the specific strategies are significantly directed to other challenges.

- Strategies to facilitate truck flow also address transportation system deficiencies and losses in productivity.
- Intelligent warning devices also address transportation system deficiencies.
- Weigh-in-motion also addresses transportation system deficiencies and infrastructure deterioration.

Signing improvements are overwhelmingly perceived as being directed to improving safety. They are also perceived as reducing congestion and addressing transportation system deficiencies.

TABLE 7
RESPONDENT PERCEPTIONS OF CHALLENGES BEING ADDRESSED BY POTENTIAL STRATEGIES—STATE DEPARTMENTS
OF TRANSPORTATION

DOT Responses to Question 3*	Congestion	Transportation System	Safety	Infrastructure	Environment	Intermodal Connections	Quality of Life	Economic Development	Losses in Productivity
(a) Improved Highway Design									
Improved highway geometrics	10	6	21	7	4	4	1	1	2
New or upgraded structures	6	9	17	15	2	3	0	2	3
New or improved pavement	3	8	12	18	2	2	0	1	4
Modified design standards (geometric/structural/pavement)	5	7	13	12	2	3	2	2	0
(b) Roadway Facilities									
Dedicated roads for trucks or commercial vehicles	8	2	7	3	2	2	3	4	0
Special use lanes for trucks or commercial vehicles	12	5	11	7	2	0	3	5	2
Truck climbing lanes	16	6	21	4	2	0	2	1	2
Dedicated truck ramps	5	2	9	2	2	2	0	4	1
(c) Operational Strategies									
Lane restrictions for trucks	14	3	18	5	3	0	4	1	0
Time-of-day restrictions for trucks	9	1	5	1	3	0	1	0	2
Restriction of prohibition of trucks on some roads	9	4	13	11	5	2	6	1	1
Truck parking restrictions/prohibitions	7	5	13	2	3	3	6	1	1
Improved incident management	16	5	17	3	4	2	4	4	5
Improved intermodal operations	8	6	6	4	2	8	2	7	4
(d) Intelligent Transportation Systems									
ITS strategies to facilitate truck flow on roads	14	9	17	3	3	4	1	5	8
Intelligent warning devices	11	7	17	2	2	1	1	0	2
Weigh-in-motion	11	11	16	13	2	0	1	2	11
(e) Signing									
Improved warning signing	5	6	22	1	2	1	1	1	0
Improved directional or informational signing	9	7	16	1	3	3	1	2	3
(f) Vehicle Size and Configuration									
Increased size or weight limits	4	6	11	7	1	0	0	6	7
Reduced size or weight limits	2	4	14	7	2	1	1	2	3
Allow triple trailers on roadways	3	6	13	4	2	1	2	5	5
(g) Enforcement/Compliance									
Additional inspection stations	2	3	17	7	1	0	3	1	0
Additional truck inspections	2	2	20	6	2	0	2	0	0
Electronic screening	7	7	18	4	2	1	2	3	5
Enhanced enforcement or remove noncompliant trucks	1	1	19	6	1	0	2	1	0
Enhanced enforcement of operator hours	1	1	13	2	0	0	1	1	1
(h) Alternative Infrastructure Investments									
Improvements in port/shipping infrastructure	7	9	3	5	1	9	1	7	4
Improvements in air freight infrastructure	7	9	3	4	1	9	1	7	3
Improvements in rail infrastructure	8	10	2	6	2	9	1	8	4

*Primary challenges being addressed by the strategy.

Notes: Survey data (28 states responding).

Policies on vehicle size and weight—whether increasing or decreasing the measurements—are perceived as being directed primarily to improving safety. Secondarily, these strategies are used to address transportation system deficiencies, infrastructure deterioration, economic development, and losses in productivity.

Strategies to improve enforcement and compliance are overwhelmingly perceived as being directed toward improving safety. Most such strategies are perceived secondarily to address infrastructure deterioration.

Although the smaller number of respondents indicates that the linkage is weaker than the other strategies, investments in alternative types of infrastructure are perceived to address several of the challenges.

- Transportation system deficiencies,
- Intermodal connections,
- Congestion, and
- Economic development.

Significantly (with the exception of investments in alternative infrastructure), safety problems are perceived as

TABLE 8
RESPONDENT PERCEPTIONS OF CHALLENGES BEING ADDRESSED BY POTENTIAL STRATEGIES—METROPOLITAN
PLANNING ORGANIZATIONS

MPO Responses to Question 3*	Congestion	Transportation	Safety	Infrastructure	Environment	Intermodal Connections	Quality of Life	Economic Development	Losses in Productivity
(a) Improved Highway Design									
Improved highway geometrics	3	0	3	1	0	1	0	2	2
New or upgraded structures	1	1	2	2	0	2	0	2	2
New or improved pavement	0	0	2	1	0	1	0	1	1
Modified design standards (geometric/structural/pavement)	0	0	2	0	0	2	0	1	1
(b) Roadway Facilities									
Dedicated roads for trucks or commercial vehicles	1	0	2	0	0	0	0	0	0
Special use lanes for trucks or commercial vehicles	3	1	4	0	1	0	0	2	2
Truck climbing lanes	2	1	3	0	0	0	1	0	0
Dedicated truck ramps	1	1	2	0	1	0	0	1	1
(c) Operational Strategies									
Lane restrictions for trucks	0	0	1	0	0	0	0	0	0
Time-of-day restrictions for trucks	0	0	0	0	0	0	1	0	1
Restriction of prohibition of trucks on some roads	0	0	1	0	0	0	2	0	0
Truck parking restrictions/prohibitions	0	0	0	0	0	0	0	0	0
Improved incident management	5	1	5	0	0	0	0	0	1
Improved intermodal operations	2	2	1	2	0	3	0	2	2
(d) Intelligent Transportation Systems									
ITS strategies to facilitate truck flow on roads	3	1	2	0	0	2	0	3	1
Intelligent warning devices	3	1	1	0	0	1	0	1	2
Weigh-in-motion	2	1	3	0	0	1	0	2	2
(e) Signing									
Improved warning signing	2	0	0	0	0	0	1	0	0
Improved directional or informational signing	1	1	0	0	0	0	1	0	1
(f) Vehicle Size and Configuration									
Increased size or weight limits	0	0	0	0	0	0	0	0	0
Reduced size or weight limits	0	1	1	1	0	0	0	0	0
Allow triple trailers on roadways	0	0	0	0	0	0	0	0	0
(g) Enforcement/Compliance									
Additional inspection stations	1	0	1	0	0	0	0	0	0
Additional truck inspections	1	0	1	0	0	0	0	0	0
Electronic screening	1	0	1	0	0	0	0	0	1
Enhanced enforcement or remove noncompliant trucks	1	0	1	0	0	0	0	0	0
Enhanced enforcement of operator hours	1	0	1	0	0	0	0	0	0
(h) Alternative Infrastructure Investments									
Improvements in port/shipping infrastructure	1	1	0	1	0	1	0	3	2
Improvements in air freight infrastructure	1	1	0	1	0	2	0	3	3
Improvements in rail infrastructure	2	1	0	1	0	1	0	3	2

*Primary challenges being addressed by the strategy

Notes: Survey data (8 MPOs responding).

being the predominant challenges addressed by truck-related improvement strategies. Congestion and infrastructure deterioration are the next most important challenges being addressed.

It is important to note that, in each improvement category, one or more of the strategies addresses each type of challenge associated with increased trucking. It

can therefore be concluded that each type of improvement strategy can address more than one truck-related challenge, and a particular challenge can be addressed by more than one type of improvement strategy. In each case, the specific details of the challenge, combined with local conditions and preferences, should determine the preferred strategy for addressing a truck-related challenge.

STRATEGIES SELECTED FOR APPLICATION

The discussion of potential management strategies in chapter four identified the number of states that have implemented (or approved for implementation) the various strategies, as well as the number of states in which certain strategies have been studied but eliminated. This chapter provides more information about the current state of the practice. It starts with a discussion of strategies that have been implemented or approved for implementation, including information on expected benefits and factors that have influenced their selection. It concludes with a discussion of strategies that have been studied but rejected in some states, including information on the primary factors that led to their elimination.

STRATEGIES SELECTED FOR IMPLEMENTATION

The survey asked respondents to provide additional project information for each strategy implemented or recommended for implementation, including project description, cost, expected benefits, and factors influencing the selection. The responses to this question were varied, with project descriptions ranging from general strategy descriptions to specifically named projects. Cost information was provided for only a small percentage of the projects, and descriptions of expected benefits were mostly portrayed in terms of the general types of benefits and not specific quantification of evaluation criteria. The specific information provided by each state DOT or MPO is reproduced in Appendix C.

To provide a useful synthesis discussion of the current state of the practice, the project information has been summarized in two tables. Each of the projects was assigned to its respective strategy (using the strategy list from chapter four). Table 9 summarizes the number of identified projects and expected project benefits, and Table 10 identifies the primary factors behind the selection of the various strategies. The summary of projects in this chapter is based on the survey responses provided by the state DOTs, because the MPO responses were limited and appeared to largely duplicate the projects identified by the states.

Table 9 shows the number of projects identified for each strategy. The most frequently cited types of projects include improved pavement, climbing lanes, lane restrictions, and weigh-in-motion. Interestingly, a significant number of project investments in alternative infrastructure

were cited, indicating that the approaches to addressing goods movement issues are frequently multimodal and intermodal. The following list of projects reported by the responding states provides the reader with a sample indicating the type and range of projects that have been either recommended or implemented to address the challenges associated with trucks:

- SR-60 dedicated truck lanes (California);
- Alameda Corridor rail improvements (California);
- Automatic Vehicle Identification System (Honolulu International Airport, Hawaii);
- Truck use left lane restrictions (Idaho);
- Variable message sign in advance of weigh station to indicate open or closed status (Kansas);
- US-50 Emporia to Newton passing lanes (Kansas);
- Early warning ramp hazard devices (Maryland);
- All new or rebuilt ramps and intersections use 70–75-ft design vehicle (Minnesota);
- Truck restrictions on I-35 East St. Paul (Minnesota);
- Joplin Prototype Project (electronic screening) (Missouri);
- Allowed additional group axle weights for overweight vehicles (Nebraska);
- Portway International/Intermodal Corridor (New Jersey);
- Red Hook Container Barge system (New York/New Jersey);
- Edgewater Road dedicated truck route (New York);
- Fifteen projects to improve pavement, geometrics, and structures (Oregon);
- Memphis Super Terminal (Tennessee);
- Improvements at Ports of Entry (ITS, signing, size, and weight) (Utah);
- FAST Corridor (*Freight Action Strategy* for Seattle–Tacoma–Everett) (Washington); and
- Improved incident management during road closures with ITS (Wyoming).

Three of these projects are described in the following section as case studies of cooperative multi-agency multifaceted freight transportation improvement programs that are being implemented.

Alameda Corridor (California)

The Alameda Corridor is a 20-mi double-track main-line rail line that connects the Ports of Los Angeles and Long

TABLE 9
IMPLEMENTED OR APPROVED PROJECTS AND EXPECTED BENEFITS—STATE DEPARTMENTS OF TRANSPORTATION

DOT Responses to Question 5*	No. of Projects Identified	Expected Benefits								
		Congestion	Transportation System	Safety	Infrastructure	Environment	Intermodal Connections	Quality of Life	Economic Development	Productivity
(a) Improved Highway Design										
Improved highway geometrics	7	1	0	1	0	0	0	0	0	1
New or upgraded structures	5	2	0	1	1	0	0	0	0	1
New or improved pavement	13	1	0	1	1	0	0	0	0	1
Modified design standards (geometric/structural/pavement)	1	1	0	1	0	0	0	0	0	0
(b) Roadway Facilities										
Dedicated roads for trucks or commercial vehicles	1	0	0	0	0	0	0	0	0	1
Special use lanes for trucks or commercial vehicles	1	1	0	1	0	0	0	0	0	1
Truck climbing lanes	10	9	0	6	0	0	0	0	0	0
Dedicated truck ramps	0									
(c) Operational Strategies										
Lane restrictions for trucks	9	6	0	5	2	0	0	0	0	0
Time-of-day restrictions for trucks	1	1	0	1	0	0	0	0	0	0
Restriction of prohibition of trucks on some roads	6	1	0	2	2	0	0	2	0	0
Truck parking restrictions/prohibitions	2	1	0	2	0	0	0	0	0	0
Improved incident management	6	4	1	3	0	0	0	1	0	1
Improved intermodal operations	2	0	0	0	0	0	1	0	0	0
(d) Intelligent Transportation Systems										
ITS strategies to facilitate truck flow on roads	7	2	0	1	0	0	0	0	0	1
Intelligent warning devices	4	0	0	2	0	0	0	0	0	0
Weigh-in-motion	11	4	3	2	2	0	0	0	0	4
(e) Signing										
Improved warning signing	5	1	0	5	0	0	0	0	0	0
Improved directional or informational signing	6	2	0	3	0	0	0	0	0	1
(f) Vehicle Size and Configuration										
Increased size or weight limits	2	0	0	0	0	0	0	0	0	1
Reduced size or weight limits	1	0	0	1	1	0	0	0	0	0
Allow triple trailers on roadways	2	0	0	0	2	1	0	0	0	2
(g) Enforcement/Compliance										
Additional inspection stations	3	0	0	1	0	0	0	0	0	0
Additional truck inspections	4	0	0	2	0	0	0	0	0	0
Electronic screening	5	1	1	3	0	0	0	0	0	2
Enhanced enforcement or remove noncompliant trucks	4	0	0	3	0	0	0	0	0	0
Enhanced enforcement of operator hours	3	0	0	1	0	0	0	0	0	0
(h) Alternative Infrastructure Investments										
Improvements in port/shipping infrastructure	4	2	1	0	0	0	0	0	0	1
Improvements in air freight infrastructure	2	1	1	0	0	0	0	0	0	1
Improvements in rail infrastructure	6	2	1	2	0	0	0	2	0	3

*Projects and expected benefits.

Source: Survey data (28 states responding).

Beach with the intermodal rail yards southeast of downtown Los Angeles and feeds the transcontinental rail network to the east (25). The project involved complete grade separation of the rail line from the street system (including construction of a 10-mi long, 33-ft deep trench in the mid-corridor section) and improvements to Alameda Street, thereby eliminating traffic conflicts at approximately 200 street-level crossings and enabling trains to travel more quickly along the corridor.

Oversight of the corridor design and construction was provided by the Alameda Corridor Transportation Authority,

a joint powers agency consisting of seven members representing the Ports of Los Angeles and Long Beach (two representatives each), and the cities of Los Angeles and Long Beach and the Los Angeles County Metropolitan Transportation Authority (one representative each). One-half of the \$2.4 billion project was funded by bonds backed by railroad use fees, and the other half came from a combination of grants from the two ports, funds administered by the Los Angeles County Metropolitan Transportation Authority, a loan from the U.S.DOT, and funding from other state and federal sources. Construction of the corridor was completed in 2002 and it is now fully operational.

TABLE 10
FACTORS INFLUENCING SELECTION OF PROJECTS—STATE DEPARTMENTS OF TRANSPORTATION

DOT Responses to Question 5*	No. of States Which Have Approved	No. of States Which Have Implemented	Potential Benefit	Low Cost	Ease of Implementation	Cost-Effectiveness	Public Acceptance	Other
(a) Improved Highway Design								
Improved highway geometrics	3	10	2	0	1	2	3	0
New or upgraded structures	2	9	2	0	0	3	3	0
New or improved pavement	1	13	2	0	0	2	3	0
Modified design standards (geometric/structural/pavement)	0	8	0	0	0	0	0	0
(b) Roadway Facilities								
Dedicated roads for trucks or commercial vehicles	1	0	0	0	0	0	0	0
Special use lanes for trucks or commercial vehicles	3	3	1	0	0	0	0	0
Truck climbing lanes	2	18	5	0	3	5	7	0
Dedicated truck ramps	2	3	0	0	0	0	0	0
(c) Operational Strategies								
Lane restrictions for trucks	1	15	3	4	4	5	6	0
Time-of-day restrictions for trucks	1	3	1	1	1	1	1	0
Restriction of prohibition of trucks on some roads	1	15	2	2	1	1	4	0
Truck parking restrictions/prohibitions	2	13	1	0	0	0	1	0
Improved incident management	4	15	3	4	1	4	6	0
Improved intermodal operations	7	4	2	1	0	0	1	0
(d) Intelligent Transportation Systems								
ITS strategies to facilitate truck flow on roads	4	11	7	0	1	5	3	0
Intelligent warning devices	7	8	3	0	2	4	3	0
Weigh-in-motion	6	18	10	3	4	5	5	1
(e) Signing								
Improved warning signing	3	13	2	3	3	3	3	0
Improved directional or informational signing	3	9	2	2	2	2	3	0
(f) Vehicle Size and Configuration								
Increased size or weight limits	0	7	1	0	0	1	2	0
Reduced size or weight limits	1	4	1	0	0	1	0	0
Allow triple trailers on roadways	2	7	2	1	1	2	1	0
(g) Enforcement/Compliance								
Additional inspection stations	2	7	3	0	1	1	2	0
Additional truck inspections	3	9	4	1	2	2	3	0
Electronic screening	4	15	4	3	3	3	3	1
Enhanced enforcement or remove noncompliant trucks	2	12	4	1	2	2	3	0
Enhanced enforcement of operator hours	2	7	3	0	1	1	2	0
(h) Alternative Infrastructure Investments								
Improvements in port/shipping infrastructure	5	5	2	0	0	1	3	1
Improvements in air freight infrastructure	4	5	2	0	1	0	1	0
Improvements in rail infrastructure	7	5	3	0	1	0	4	0

*Factors driving selection of the project.

Notes: Survey data (28 states responding).

Portway International/Intermodal Corridor (New Jersey)

The Portway Corridor is a series of related roadway improvement projects designed to improve the efficiency of truck movements between New Jersey's Newark–Elizabeth air and seaport complex, intermodal rail facilities, warehouse and truck transfer facilities, and the regional highway system (26). The Portway projects include bridge replacements, street improvements (geometric upgrades), new roadway segments, interchange upgrades, a new interchange (potentially freight only) with the New Jersey

Turnpike, an ITS linked to the port, and a new river crossing. Many of the projects involve the upgrading of old infrastructure to more generous geometrics that help facilitate the flow of trucks.

The program is slated for implementation in three phases—with the expenditures for the elements of Phase I totaling \$780 million—and ground was broken on the first project (the \$31 million Doremus Avenue bridge replacement) in July 2000. Elements of subsequent phases are being delineated in a feasibility assessment, to be completed by 2004.

FAST Corridor (Freight Action Strategy for Seattle–Tacoma–Everett) (Washington)

FAST is a partnership composed of transportation agencies, ports, cities, and economic development organizations, as well as trucking, rail, and business interests (27). Since 1996, the FAST partnership has studied freight movement in the Puget Sound region to identify and develop improvements to move freight more efficiently and improve safety for cars, trucks, and trains.

Phase I includes 15 top priority projects—12 grade separations and 3 truck access projects. By August 2002, two projects were complete and seven more were under construction. Ten additional improvement projects have been identified for Phase II.

EXPECTED BENEFITS AND FACTORS INFLUENCING IMPLEMENTATION

When asked to identify expected benefits of the identified projects, survey respondents typically listed from one to three types of benefits. The survey responses can therefore be interpreted as showing the most important benefits expected from these projects. Table 9 shows that the primary benefits are improved safety and decreased congestion (or improved traffic operations). The benefit cited next most frequently is improved productivity (or more reliable truck flow), and next is improved infrastructure.

The expected benefits are informative when compared with the correlation of improvement strategies with challenges in chapter four, because Table 9 identifies the types of benefits expected from specific projects, whereas Table 7 identifies the challenges that can be addressed by generic types of improvement strategies. The expected benefits of generic and specific strategies revealed these primary differences:

- In the generic correlation, safety was clearly the issue most frequently addressed by the strategies and congestion was decidedly secondary (although still more important than the other challenges). When specific project benefits are identified, congestion is cited almost as often as safety.
- In the generic correlation, infrastructure and transportation system deficiencies were addressed by the most strategies (after safety and congestion). When specific project benefits are identified, improved productivity moves ahead of infrastructure and system benefits.

The primary factors influencing the selection of projects are summarized in Table 10. Overall, the potential benefit and public acceptance are the two most important factors cited, with cost-effectiveness also an important factor in

many of the selections. Ease of implementation and low cost were cited the least often.

STRATEGIES STUDIED BUT ELIMINATED IN SOME STATES

Sometimes evaluation of failures can provide as much useful information as success stories, and a review of potential truck management strategies indicates that not all strategies are appropriate or acceptable in all circumstances. Although the list of rejected strategies is not extensive (11 of the 30 strategies have been studied and eliminated in at least one state), the available experience provides useful insights into which strategies are more controversial and the reasons why certain strategies are difficult to implement. It should be remembered that the benefits and costs of each potential strategy vary by location and are situation specific, so that any one strategy may be implemented in different ways with different types and levels of benefit, depending on the unique characteristics of the local situation. As Table 11 shows, these strategies have been approved or implemented in more states than they have been rejected.

The following discussion identifies the strategies that have been studied but eliminated from consideration, and the primary reason(s) for their elimination, as summarized in Table 11. The strategies are presented generally in order of frequency of rejection.

Allow Triple Trailers on Roadways

This has clearly been the most controversial measure in dealing with the increasing volume of goods movement. Nine responding states (32%) have decided to accommodate triple trailers, with six states (21%) having rejected triple trailers. The overwhelming reason for not accommodating triple trailers is public opinion; other factors cited include insufficient benefits, high cost, and safety.

Changes in Size or Weight Limits

Almost equally controversial has been the debate over increasing the size and/or weight limits on trucks. Limits on increased size or weight have been implemented in seven responding states (25%) and rejected in four states (14%). Meanwhile, size and weight restrictions have been rejected in one responding state (4%) and implemented on a localized basis in five states (18%). The factors influencing decisions to change size and weight limits are not nearly so clear cut. Those most commonly cited are insufficient benefits, difficulty in implementation, and public opinion.

TABLE 11
STRATEGIES REJECTED BY STATE DEPARTMENTS OF TRANSPORTATION

DOT Responses to Question 4*	No. of States in Which Rejected	No. of States Which Have Approved or Implemented	Factors Driving the Decision						
			Insufficient Benefits	High Cost	Difficult to Implement	Not Cost-Effective	Public Opinion	Lack of Information	Other
(b) Roadway Facilities									
Dedicated roads for trucks or commercial vehicles	1	1	0	1	1	0	1	0	1
Special use lanes for trucks or commercial vehicles	3	6	1	1	1	0	2	0	1
(c) Operational Strategies									
Lane restrictions for trucks	2	16	1	0	0	0	0	0	0
Time-of-day restrictions on trucks	2	4	1	0	1	0	0	0	0
(f) Vehicle Size and Configuration									
Increased size or weight limits	4	7	2	1	2	1	2	1	1
Reduced size or weight limits	1	5	1	0	1	1	1	0	0
Allow triple trailers on roadways	6	9	2	1	0	0	5	0	1
(g) Enforcement/Compliance									
Additional inspection stations	2	9	1	1	0	0	0	0	0
Additional truck inspections	2	12	0	0	0	1	1	0	0
Enhanced enforcement of operator hours	1	9	1	0	1	1	1	0	0
(h) Alternative Infrastructure Investments									
Improvements in air freight infrastructure	1	9	0	1	0	0	0	0	0

*Strategies studied but eliminated from further consideration.

Notes: Survey data (28 states responding).

Special Use Lanes or Dedicated Roads

Three responding states have considered but rejected special use lanes, and one of these three also rejected dedicated roads. The factors behind the decisions are varied, but public opinion plays a significant role when special use facilities are considered.

Restrictions on Truck Operations (Lane or Time-of-Day Restrictions)

Lane restrictions have achieved fairly wide popularity among the responding states, whereas time-of-day restrictions have been implemented in only a few locations. For each strategy, two states reported having studied but eliminated the option. Insufficient benefits and difficulty of implementation were cited as the factors for rejecting these strategies.

Enforcement Strategies

Two responding states have decided not to develop additional inspection stations, two states have decided not to

conduct additional truck inspections, and one state decided not to increase enforcement of operator hours. In these states, construction of additional inspection stations was rejected because of the high cost and insufficient benefits. Additional truck inspections were rejected because they were deemed not cost-effective, and the role of public opinion was also a factor. Enhanced enforcement of operator hours was rejected because of insufficient benefits, difficulty of implementation, lack of cost-effectiveness, and public opinion. For the latter two issues, public opinion affected the decision, because of the potential for undesirable effects resulting from additional enforcement (more trucks might be driving through or parking in communities).

Improvements in Air Freight Infrastructure

Improvements to air freight infrastructure were studied in one state (Minnesota), primarily for the purpose of improving access to overseas markets, providing incentives for Minnesota businesses, and addressing cargo security requirements. However, the improvements were rejected, with high cost the primary factor cited; the idea is still being considered and a decision was expected by the end of 2002.

CONCLUSIONS

The key findings of this report can be summarized as follows:

- State departments of transportation (DOTs) and metropolitan planning organizations (MPOs) are facing a broad array of challenges that can be attributed to increasing levels of truck traffic, including traffic congestion, transportation system deficiencies, safety, infrastructure deterioration, intermodal connections, environmental impacts, quality of life, economic development, and losses in productivity.
- The challenges that are most prevalent for state DOTs include congested urban highways, insufficient truck parking, and pavement deterioration. The challenges that are most prevalent for MPOs include congestion, environmental issues (air quality and noise), and economic issues (transport costs and productivity).
- State DOTs and MPOs are currently undertaking a wide range of planning activities for dealing with truck traffic, including large-area freight planning (state, region, or corridor), local-area freight planning (intermodal facilities or truck-related land use), and goods movement forecasting.
- Relatively few of the planning efforts have been completed, however, indicating that planning for goods movement is still in its early stages.
- State DOTs and MPOs have considered a broad range of potential strategies for managing increasing truck traffic, including improved highway design, special roadway facilities for trucks, operational improvements, intelligent transportation systems, improved signing, changes in allowed vehicle size or configuration, enhanced enforcement and compliance, and investments in alternative infrastructure.
- All states and metropolitan areas that participated in this synthesis are studying and implementing some type of management strategies for dealing with truck traffic. The challenges being faced significantly affect the strategies that are considered and implemented.
- The types of projects being implemented most frequently include improved pavement, climbing lanes, lane restrictions, and weigh-in-motion.
- Specific projects being implemented are tailored to the type and scope of the challenge being faced. Expected benefits of these projects primarily include improvements in safety, reductions in congestion, and increases in productivity. The primary factors influencing the selection of these projects usually include the potential benefits and public acceptance.
- Strategies that have been considered but rejected in some states include changing vehicle size or configuration limits, special roadway facilities for trucks, restrictions on lane or time-of-day usage, enhanced enforcement, and improvements in alternative infrastructure. These situations indicate that not all strategies are appropriate in all situations, and consideration must be given to public opinion, project cost, likely benefits, and ease of implementation.

From the review and findings of this report the following can be concluded:

- Challenges associated with increasing truck traffic pose a significant and growing threat to transportation safety and efficiency throughout the United States.
- More and better planning, and more continuous planning, will be needed as these challenges become more frequent and severe.
- A wide range of potential strategies is available for addressing these challenges, but strategies must be selected to specifically address the challenges being faced.
- Potential benefit and cost will be key factors to consider when evaluating alternative strategies, and public opinion must always be considered.
- There is not yet sufficient literature of documented experience on the effectiveness of various strategies in achieving their objectives. Agencies will need to continue testing and evaluating those strategies that best apply to their situation, and document the results so that other agencies may learn from their experience.

For agencies addressing the challenges of increasing truck traffic, the following applications of material in the synthesis are suggested:

- Use the list of challenges in chapter two to identify potential issues that an agency may need to address as truck traffic grows.
- Use the information in chapter three to identify planning activities that are needed to address expected truck challenges.
- Use the list of potential strategies in chapter four to identify improvement or management options that relate to the challenges an agency is facing.
- Use the discussion in chapter five to determine what types of strategies have been applied, which strategies

may be controversial, and the factors that may affect decisions.

- Use the list of source materials in the bibliography to identify documents and studies that may provide useful information for projects an agency is considering.
- Use the material in Appendix C, Summary of Survey Responses, to identify projects of interest and the states in which they have been undertaken.

The most critical need for further research is to help increase the number and scope of the published sources that quantitatively document the effectiveness of the various truck-related roadway improvements or management strategies in improving safety, reducing congestion, and increasing productivity. To conduct an effective evaluation of project costs and benefits the transportation professional needs documented, quantitative evidence of the potential benefits of a strategy. For example, how will traffic operations be affected if trucks are restricted to certain lanes? How will the accident rate change if separate lanes are constructed for trucks? To what extent can wider traffic lanes improve traffic flow? Can light rail be used for freight transportation? What types of strategies have been proven to effectively address the unique needs of border or major gateway areas? Some sources of data are available

for certain strategies (see the bibliography for examples); however, because there has been relatively little experience with truck strategies to date, there is a great need for studies of before-and-after or with-and-without.

Future research should address the following to supply quantitative documentation:

- Evaluate and quantify the benefits—especially safety improvements, congestion reduction, and productivity gains—of strategies implemented to manage increasing truck traffic.
- Identify and quantify if possible the potential undesirable effects of these strategies. Such effects would include diversion of trucks to undesirable routes, pavement deterioration and increased roadway maintenance, and detrimental effects on the economy and the flow of goods.
- Document the capital and operating costs of implementing the strategies.
- Identify the conditions under which other transportation modes (including freight rail, high-speed rail, light rail, air cargo, and waterborne transportation) can be substituted for trucks carrying freight; identify methods for quantifying the impact on truck traffic.

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APPENDIX A

Survey

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

Survey

STRATEGIES FOR MANAGING INCREASING TRUCK TRAFFIC

With changes in the global economy and increases in total population and freight movement, many states are seeing significant increases in the number of trucks on their roadways. Increasing truck traffic poses many challenges for state departments of transportation (DOTs), metropolitan planning organizations (MPOs), and other transportation organizations. This survey is being sponsored by the National Cooperative Highway Research Program and is designed to help identify the strategies being used to address the challenges associated with increasing truck traffic.

The survey should be filled out by those in your agency who are familiar with your agency's activities related to trucking—highway improvements, operational strategies, safety, pavement enhancement, code enforcement, etc. *Your responses are relevant and important, regardless of whether your agency has actively engaged in identifying and mitigating impacts of truck traffic.* Comments and explanations are encouraged, particularly if the multiple-choice responses do not capture your situation. Please attach additional pages if necessary.

Please return the completed survey and any supporting documents by August 15, 2001 to:

James G. Douglas
Parsons Brinckerhoff
505 South Main Street, Suite 900
Orange, CA 92868

If you prefer, you may fax your response to him at (714) 973-4918.

If you have any questions, you may contact him by telephone at (714) 973-4880, or by email at: douglasj@pbworld.com.

BACKGROUND INFORMATION

Agency/Organization Responding: _____

Address: _____

Name of Respondent(s): _____

Title(s)/Department(s): _____ Phone: _____

Date: _____ Email: _____

1. What challenges attributable to increasing truck traffic is your agency facing?

For each challenge, circle the most appropriate response number (one only).

0 = No work undertaken to determine whether it is a challenge.	3 = Serious challenge in localized areas.
1 = Minor challenge, or not an issue.	4 = Moderate challenge through much of our state or urban area.
2 = Moderate challenge in localized areas.	5 = Serious challenge through much of our state or urban area.

a) Congestion						
• Bottlenecks near terminals, ports, border crossings, etc.	0	1	2	3	4	5
• Congested urban streets	0	1	2	3	4	5
• Congested urban highways	0	1	2	3	4	5
• Congested intercity roads	0	1	2	3	4	5
• Other (please specify)	0	1	2	3	4	5
b) Transportation System						
• Substandard geometrics	0	1	2	3	4	5
• Insufficient truck parking	0	1	2	3	4	5
• Poor directional signing	0	1	2	3	4	5
• Other (please specify)	0	1	2	3	4	5
c) Safety						
• Truck crashes (single vehicle)	0	1	2	3	4	5
• Multivehicle crashes (especially auto-truck)	0	1	2	3	4	5
• Other (please specify)	0	1	2	3	4	5
d) Infrastructure						
• Pavement deterioration	0	1	2	3	4	5
• Bridge structure deterioration	0	1	2	3	4	5
• Other (please specify)	0	1	2	3	4	5
e) Environment						
• Air quality (emissions)	0	1	2	3	4	5
• Noise	0	1	2	3	4	5
• Other (please specify)	0	1	2	3	4	5
f) Intermodal Connections						
• Rail/truck connectivity	0	1	2	3	4	5
• Air/truck connectivity	0	1	2	3	4	5
• Truck/truck connectivity	0	1	2	3	4	5
• Water/truck connectivity	0	1	2	3	4	5
• Other (please specify)	0	1	2	3	4	5
g) Quality of Life						
• Trucks driving through residential areas	0	1	2	3	4	5
• Trucks parking in residential areas	0	1	2	3	4	5
• Other (please specify)	0	1	2	3	4	5
h) Economic Development						
• Incompatible land uses	0	1	2	3	4	5
• Truck uses that discourage “desirable” development	0	1	2	3	4	5
• Other (please specify)	0	1	2	3	4	5
i) Losses in Productivity Due to Congestion						
• Increased transport costs	0	1	2	3	4	5
• Worker productivity loss	0	1	2	3	4	5
• Other (please specify)	0	1	2	3	4	5

2. Has your agency undertaken planning activities to address the effects of increasing truck traffic? Please circle the most appropriate response for each type of planning (one only).

1 = No planning of this type.	4 = Under way but not completed.
2 = Discussed but not undertaken.	5 = Completed.
3 = Undertaken in support of another agency.	

a) Freight/goods movement plan (for state or metropolitan area)	1	2	3	4	5
b) System plan for freight/goods movement facilities	1	2	3	4	5
c) Corridor freight/goods movement plan	1	2	3	4	5
d) Freight/goods movement element of multimodal system plan	1	2	3	4	5
e) Freight/goods movement element of multimodal corridor plan	1	2	3	4	5

Project Description	Insufficient Benefit	High Cost	Difficult to Implement	Not Cost-Effective	Public Opinion	Lack of Information	Other (specify)

5. For each strategy with 4 or 5 circled in Question #3, please provide the information requested in the following table. Briefly describe the project, indicate its cost, describe the expected benefits, indicate whether the benefits have been evaluated, and mark (with an X) the factor(s) which drove the selection of that strategy. Attach additional pages if necessary.

Project Description	Cost	Expected Benefits	Were Benefits Evaluated?	Factors Driving Selection					
				Greatest Potential Benefit	Low Cost	Ease of Implementation	Cost-Effectiveness	Public Acceptance	Other (specify)
			Yes No Not Yet						
			Yes No Not Yet						
			Yes No Not Yet						
			Yes No Not Yet						

Note: If benefits were evaluated, please attach information about criteria used for evaluation.

6. If you have relevant plans or studies that you could share, please send a copy when you return the survey. Or attach a separate page with the titles of relevant documents that are available. Please include

- Freight/goods movement plans
- Studies of improvements to accommodate increasing truck traffic
- Other relevant documents.

7. Comments: _____

APPENDIX B

Survey Respondents

STATES

Arkansas	Nevada
California	New Hampshire
Colorado	New Jersey
Connecticut	New York
Delaware	North Dakota
Florida	Ohio
Hawaii	Oregon
Idaho	South Carolina
Kansas	Tennessee
Louisiana	Texas
Maryland	Utah
Minnesota	Washington
Missouri	West Virginia
Nebraska	Wyoming

METROPOLITAN PLANNING ORGANIZATIONS

Baltimore Metro Council
Baton Rouge (Louisiana) MPO
Delaware Valley (Philadelphia)
Denver Regional Council of Governments
Metropolitan Transportation Commission (Oakland/San Francisco)
Metropolitan Washington (D.C.) Council of Governments
Southeast Michigan Council of Governments (Detroit)
Southern California Association of Governments (Los Angeles)

	AR	CA	CO	CT	DE	FL	HI	ID	KS	LA	MD	MI	MO	NE	NV	NH	NJ	NY	ND	OH	OR	SC	TN	TX	UT	WA	WV	WY	TOTAL	
1. What challenges attributable to increasing truck traffic is your agency facing?																														
a. Congestion																														
Bottlenecks near terminals, ports, border crossings, etc.																														
0. Not determined																														
1. Minor																														
2. Moderate localized																														
3. Serious localized																														
4. Moderate widespread																														
5. Serious widespread																														
Congested urban streets																														
0. Not determined																														
1. Minor																														
2. Moderate localized																														
3. Serious localized																														
4. Moderate widespread																														
5. Serious widespread																														
Congested urban highways																														
0. Not determined																														
1. Minor																														
2. Moderate localized																														
3. Serious localized																														
4. Moderate widespread																														
5. Serious widespread																														
Congested intercity roads																														
0. Not determined																														
1. Minor																														
2. Moderate localized																														
3. Serious localized																														
4. Moderate widespread																														
5. Serious widespread																														
b. Transportation System																														
Substandard geometrics																														
0. Not determined																														
1. Minor																														
2. Moderate localized																														
3. Serious localized																														
4. Moderate widespread																														
5. Serious widespread																														
Insufficient truck parking																														
0. Not determined																														
1. Minor																														
2. Moderate localized																														
3. Serious localized																														
4. Moderate widespread																														
5. Serious widespread																														
Poor directional signing																														
0. Not determined																														
1. Minor																														
2. Moderate localized																														
3. Serious localized																														
4. Moderate widespread																														
5. Serious widespread																														

	AR	CA	CO	CT	DE	FL	HI	ID	KS	LA	MD	MN	MO	NE	NV	NH	NJ	NY	ND	OH	OR	SC	TN	TX	UT	WA	WV	WY	TOTAL	
g. Land-use planning for truck-related uses																														
	1. No planning	0	0	0	0	1	1	0			0	1	1	0	1	0	1	0	0	1	0	0	1	0	0	1	0	1	11	
	2. Discussed	0	1	0	0	1	0	0	1		0	0	0	1	0	0	0	1	0	1	0	0	1	1	0	1	0	9		
	3. Support of another agency	0	0	0	0	0	0	0	0		1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
	4. Under way	0	0	1	1	0	0	0	0		0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3		
5. Completed	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1		
h. Freight forecasts																														
	1. No planning	0	0	0	0	0	0	0		0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	3		
	2. Discussed	1	0	0	0	1	0	1		0	1	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	8		
	3. Support of another agency	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
	4. Under way	0	0	1	1	0	1	0	0		1	0	0	0	0	0	0	0	0	1	1	0	1	0	0	1	0	8		
5. Completed	0	1	0	0	0	0	0	0		0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	4		
i. Truck forecasts																														
	1. No planning	0	0	0	0	0	0	0		0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	3		
	2. Discussed	1	0	0	0	1	0	1		1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	5		
	3. Support of another agency	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
	4. Under way	0	0	1	1	0	1	0	0		0	0	0	1	0	0	0	0	0	0	1	1	0	1	0	0	1	9		
5. Completed	0	1	0	0	0	0	0	0		0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	7		
3. Has your agency evaluated or implemented specific strategies to address the effects of increasing truck traffic?																														
a. Improved Highway Design																														
Improved highway geometrics																														
1. Not considered	0	0	0	0	0	1	0	1		0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	4		
2. Identified/not studied	0	1	0	1	1	0	0	0		0	1	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	7		
3. Studied/not recommended	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
4. Studied/recommended	0	0	1	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	3		
5. Implemented	1	0	0	0	0	0	0	1		0	1	0	1	1	0	1	1	1	1	1	1	0	0	0	1	0	0	10		
Challenges being addressed																														
Congestion	0	0	1	1	0		1	0		0	1	0	0	1	0	1	1	1	0	1	1	0	1	1	0	0	1	4		
Transportation System	0	0	0	0	1		0	0		0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	6		
Safety	1	1	1	1	1		1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	21		
Infrastructure	0	0	0	0	1		0	0		0	1	0	0	1	0	1	0	1	0	1	0	0	0	1	0	0	0	7		
Environment	0	0	0	1	0		0	0		0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	4		
Intermodal Connections	0	1	0	0	0		0	0		0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	4		
Quality of Life	0	0	0	0	0		0	0		0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
Economic Development	0	0	0	0	0		0	0		0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1		
Loss in Productivity	0	0	0	0	0		0	0		0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2		
New or upgraded structures																														
1. Not considered	0	0	0	1	0		1	0		0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	5		
2. Identified/not studied	0	1	1	0	1		0	0		1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	5		
3. Studied/not recommended	0	0	0	0	0		0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
4. Studied/recommended	0	0	0	0	0		0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2		
5. Implemented	1	0	0	0	0		0	1		0	0	0	1	0	1	1	1	1	0	1	1	0	1	1	1	1	0	9		
Challenges being addressed																														
Congestion	0	0	1	1	0		0	0		0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	6		
Transportation System	1	0	0	0	1		1	0		0	0	0	0	0	0	1	1	0	1	0	1	1	1	1	1	0	9			
Safety	1	1	1	1	1		1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	17		
Infrastructure	1	1	1	0	1		1	0		1	0	1	0	1	1	1	1	1	1	1	1	1	0	1	1	1	1	15		
Environment	0	0	0	1	0		0	0		0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2		
Intermodal Connections	0	0	0	0	1		0	0		1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	3		
Quality of Life	0	0	0	0	0		0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Economic Development	0	0	0	0	0		0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Loss in Productivity	0	0	0	0	0		0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2		
3. Has your agency evaluated or implemented specific strategies to address the effects of increasing truck traffic?																														
a. Improved Highway Design																														
Improved highway geometrics																														
1. Not considered	0	0	0	0	0	1	0	1		0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	4		
2. Identified/not studied	0	1	0	1	1	0	0	0		0	1	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	7		
3. Studied/not recommended	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
4. Studied/recommended	0	0	1	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	3		
5. Implemented	1	0	0	0	0	0	0	1		0	1	0	1	1	0	1	1	1	1	1	1	0	0	0	1	0	0	10		
Challenges being addressed																														
Congestion	0	0	1	1	0		1	0		0	1	0	0	1	0	1	1	1	0	1	1	0	1	1	0	0	1	4		
Transportation System	0	0	0	0	1		0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	7		
Safety	1	1	1	1	1		1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	21		
Infrastructure	0	0	0	0	1		0	0		0	1	0	0	1	0	1	0	1	0	1	0	0	0	1	0	0	0	7		
Environment	0	0	0	1	0		0	0		0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	4		
Intermodal Connections	0	1	0	0	0		0	0		0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	4		
Quality of Life	0	0	0	0	0		0	0		0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
Economic Development	0	0	0	0	0		0	0		0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1		
Loss in Productivity	0	0	0	0	0		0	0		0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2		
New or upgraded structures																														
1. Not considered	0	0	0	1	0		1	0		0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	5		
2. Identified/not studied	0	1	1	0	1		0	0		1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	5		
3. Studied/not recommended	0	0	0	0	0		0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
4. Studied/recommended	0	0	0	0	0		0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2		
5. Implemented	1	0	0	0	0		0	1		0	0	0	1	0	1	1	1	1	0	1	1	0	1	1	1	1	0	9		
Challenges being addressed																														
Congestion	0	0	1	1	0		0	0		0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	6		
Transportation System	1	0	0	0	1		1	0		0	0	0	0	0	0	1	1	0	1	1	1	0	1	1	1	0	9			
Safety	1	1	1	1	1		1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	17		
Infrastructure	1	1	1	0	1		1	0		1	0	1	0	1	1	1	1	1	1	1	1	1	0	1	1	1	1	15		
Environment	0	0	0	1	0		0	0		0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2		
Intermodal Connections	0	0	0	0	1		0	0		1	0	0	0	0																

	AR	CA	CO	CT	DE	FL	HI	ID	KS	LA	MD	MN	MO	NE	NV	NH	NJ	NY	ND	OH	OR	SC	TN	TX	UT	WA	WV	WY	TOTAL	
New and improved pavement																														
1. Not considered	0	0	0	1	0	0	1	0	1	0	0	0	0		0		0	0	0	0	0	1	0	0	0	0	0	0	4	
2. Identified/not studied	0	0	0	0	1	0	0	0	0	1	0	0	0				0	0	0	0	0	0	0	1	0	0	0	1	1	5
3. Studied/not recommended	0	0	0	0	0	0	0	0	0	0	0	0	0		1		0	0	0	0	0	0	0	0	0	0	0	0	0	1
4. Studied/recommended	0	0	0	0	0	0	0	0	0	0	0	0	0		1		0	0	0	0	0	0	0	0	0	0	0	0	0	1
5. Implemented	1	1	1	0	0	1	0	1	0	0	1	0	1		0		1	1	1	1	1	0	0	1	1	1	0	0	0	13
Challenges being addressed																														
Congestion	0	0	0	1	0	0	0	0	0	0	0	0	0		0		0	1	0	0	0	0	0	0	0	1	0	0	3	
Transportation System	1	0	0	0	1	0	1	0	1	0	1	0	1		0		0	0	1	0	0	0	0	1	1	1	0	0	8	
Safety	1	0	0	1	1	0	1	0	1	0	1	0	1		1		0	1	1	1	1	1	0	0	1	0	1	0	12	
Infrastructure	1	1	1	0	1	1	1	1	1	1	1	0	1		1		1	1	1	1	1	1	0	1	1	1	1	1	18	
Environment	0	0	0	1	0	0	0	0	0	0	0	1	0		1		0	0	0	0	0	0	0	0	0	0	0	0	0	2
Intermodal Connections	0	0	0	0	0	0	0	0	0	1	0	0	0		0		0	0	0	0	1	0	0	0	0	0	0	0	0	2
Quality of Life	0	0	0	0	0	0	0	0	0	0	0	0	0		0		0	0	0	0	0	0	0	0	0	0	0	0	0	1
Economic Development	0	0	0	0	0	0	0	0	0	0	0	0	0		0		0	0	0	0	0	0	0	0	0	1	0	0	0	1
Loss in Productivity	0	1	0	0	0	0	0	0	0	0	0	0	0		0		0	1	0	0	1	0	0	0	0	1	0	0	0	4
Modified design standards (geometric/structural/pavement)																														
1. Not considered	1	1		1				0	0	1	0	0	0				0	0	0	0		1	0	0	0	0	0	1	6	
2. Identified/not studied	0	0		0	1	0	1	1	0	0	1	0	0			1	0	0	0	0		0	1	0	0	0	1	0	7	
3. Studied/not recommended	0	0		0	0	0	0	0	0	0	0	0	0			0	0	0	0	0		0	0	0	0	0	0	0	0	0
4. Studied/recommended	0	0		0	0	0	0	0	0	0	0	0	0			0	0	0	0	0		0	0	0	0	0	0	0	0	0
5. Implemented	0	0		0	0	0	0	0	0	1	0	1	0			0	1	1	1	1		0	0	1	1	1	1	0	0	8
Challenges being addressed																														
Congestion				1	0			0	0	0	0	0	0		0		1	1	1	0			0	0	0	1	0	0	5	
Transportation System				0	1			1	0	0	0	0	0		0		1	0	1	0			0	1	1	1	0	0	7	
Safety				1	1		1	1	1	0	1	1	1		1		1	0	1	0			0	0	1	1	1	0	1	13
Infrastructure				0	1		1	1	1	1	1	0	1		1		1	1	1	1			0	0	1	1	1	0	0	12
Environment				1	0		0	0	0	0	0	0	0		0		0	0	1	0			0	0	0	0	0	0	0	2
Intermodal Connections				0	1		0	0	0	0	0	0	0		0		1	0	1	0			0	0	0	0	0	0	0	3
Quality of Life				0	0		0	0	0	0	0	0	0		0		1	0	1	0			0	0	0	0	0	0	0	2
Economic Development				0	0		0	0	0	0	0	0	0		0		1	0	1	0			0	0	0	0	0	0	0	2
Loss in Productivity				0	0		0	0	0	0	0	0	0		0		0	0	1	0			0	0	0	1	0	0	0	2
b. Roadway Facilities																														
Dedicated road for trucks or commercial vehicles																														
1. Not considered	1	0	0	0	1	1	1	1	1	0	0	0	0				1	0	0	1		1	1	0	1	1	1	1	15	
2. Identified/not studied	0	1	1	1	0	0	0	0	0	1	1	1	1				0	0	1	0		0	0	0	0	0	0	0	8	
3. Studied/not recommended	0	0	0	0	0	0	0	0	0	0	0	0	0				0	1	0	0		0	0	0	0	0	0	0	1	
4. Studied/recommended	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0	0		0	0	0	0	0	0	0	1	
5. Implemented	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0	0		0	0	0	0	0	0	0	0	0
Challenges being addressed																														
Congestion	1	0	1	0						1	1	1	1				1	0											8	
Transportation System	0	0	0	0	0					0	0	1	0				0	0											2	
Safety	0	0	1	0						1	0	1	0				1	1											7	
Infrastructure	0	0	0	0						0	0	1	0				0	1											3	
Environment	0	0	1	0						0	0	0	0				0	0											2	
Intermodal Connections	0	0	0	0						0	0	0	0				1	0											2	
Quality of Life	0	0	0	0						1	0	0	0				0	1											3	
Economic Development	0	0	0	0						0	0	0	0				1	0											4	
Loss in Productivity	0	0	0	0						0	0	0	0				1	0											0	0

	AR	CA	CO	CT	DE	FL	HI	ID	KS	LA	MD	MN	MO	NE	NV	NH	NJ	NY	ND	OH	OR	SC	TN	TX	UT	WA	WV	WY	TOTAL	
Truck parking restrictions/prohibitions																														
1. Not considered	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1		0	1	1		0	0	0	0	6	
2. Identified/not studied	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3	
3. Studied/not recommended	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4. Studied/recommended	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	
5. Implemented	0	1	1	1	0	0	1	1	0	1	1	1	1	1	1	0	1	1	0	1	0	1	0	0	0	1	0	0	13	
Challenges being addressed																														
Congestion	0	0	1	1			1	1		0	1			1	0		0	1		0	0		0	0	0	0	0	0	7	
Transportation System	1	0	0	0	0		0	0	0	0	1			1	0	0	0	1		1	0	0	0	0	0	0	0	0	5	
Safety	1	1	1	1	1		0	1		1	1			1	0	1	1	0	1	0	0	0	0	1	0	1	0	0	1	
Infrastructure	0	0	0	0	0		0	0	0	0	0			1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Environment	0	0	1	0	0		0	0	0	0	0			1	0	0	1	0		0	0	0	0	0	0	0	0	0	3	
Intermodal Connections	0	0	0	1	0		0	0	0	0	1			1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
Quality of Life	0	0	0	0	1		0	0		0	1			1	0	0	1	1		0	0	0	0	0	1	0	0	0	6	
Economic Development	0	0	0	0	0		0	0	0	0	0			1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Loss in Productivity	0	0	0	0	0		0	0	0	0	0			0	0	0	0	1		0	0		0	0	0	0	0	0	1	
Improved incident management																														
1. Not considered	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0		0	0	0	1			0	0	0	0	0	0	5	
2. Identified/not studied	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
3. Studied/not recommended	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4. Studied/recommended	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	4	
5. Implemented	0	1	1	1	0	0	0	1	0	1	1	1	1	1	0	0	1	1	0	1	0	1	0	1	0	1	1	1	15	
Challenges being addressed																														
Congestion	0	1	1	1	0	0		1		1	1			1		0	1	1		1	1		1	0	1	1	1	1	16	
Transportation System	1	0	0	0	0		0	0	0	1	0			1		0	0	0	0	0	0	0	0	0	0	0	0	0	5	
Safety	1	1	1	1			1	1		0	1			1	1	0	1	1	1	0	1	1	1	1	0	1	0	0	17	
Infrastructure	0	0	0	0	0		0	0	0	0	0			1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
Environment	0	0	0	1	0		0	0	0	0	1			1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
Intermodal Connections	0	0	0	0	0		0	0	0	0	1			1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
Quality of Life	0	0	0	0	0		0	0	0	0	1			1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	4	
Economic Development	0	0	0	0	0		0	0	0	0	1			1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
Loss in Productivity	0	0	0	0	0		0	0	0	0	1			1	0	0	0	1	1	0	1		0	1	0	1	1	1	15	
Challenges being addressed																														
Congestion	0	1	1	1	0	0		1		1	1			1		0	1	1		1	1		1	0	1	1	1	1	16	
Transportation System	1	0	0	0	0		0	0	0	1	0			1		0	0	0	0	0	0	0	0	0	0	0	0	0	5	
Safety	1	1	1	1			1	1		0	1			1	1	0	1	1	1	0	1	1	1	1	0	1	0	0	17	
Infrastructure	0	0	0	0	0		0	0	0	0	0			1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
Environment	0	0	0	1	0		0	0	0	0	1			1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
Intermodal Connections	0	0	0	0	0		0	0	0	0	1			1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
Quality of Life	0	0	0	0	0		0	0	0	0	1			1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	4	
Economic Development	0	0	0	0	0		0	0	0	0	1			1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
Loss in Productivity	0	0	0	0	0		0	0	0	0	1			1	0	0	0	1	1	0	1		0	1	0	1	1	1	15	
Challenges being addressed																														
Congestion	0	1	1	1	0	0		1		1	1			1		0	1	1		1	1		1	0	1	1	1	1	16	
Transportation System	1	0	0	0	0		0	0	0	1	0			1		0	0	0	0	0	0	0	0	0	0	0	0	0	5	
Safety	1	1	1	1			1	1		0	1			1	1	0	1	1	1	0	1	1	1	1	0	1	0	0	17	
Infrastructure	0	0	0	0	0		0	0	0	0	0			1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
Environment	0	0	0	1	0		0	0	0	0	1			1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
Intermodal Connections	0	0	0	0	0		0	0	0	0	1			1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
Quality of Life	0	0	0	0	0		0	0	0	0	1			1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	4	
Economic Development	0	0	0	0	0		0	0	0	0	1			1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
Loss in Productivity	0	0	0	0	0		0	0	0	0	1			1	0	0	0	1	1	0	1		0	0	0	1	0	0	5	
Improved intermodal operation																														
1. Not considered	0	0	0	0	0	1	0	0	1		0			0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	4	
2. Identified/not studied	0	0	1	0	1	0	1	0	0		0			1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	
3. Studied/not recommended	0	0	0	0	0	0	0	0	0		0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4. Studied/recommended	1	1	0	0	0	0	0	0	0		1			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5. Implemented	0	0	0	1	0	0	0	1	0		0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
Challenges being addressed																														
Congestion	0	1	1	1	0		0	0	0		0			1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	8	
Transportation System	1	0	0	0	0		0	0	0	0	0			0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	6	
Safety	1	1	1	1	0		0	0	0		0			1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	6	
Infrastructure	0	0	0	0	0		0	0	0		1			1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
Environment	0	0	0	1	0		0	0	0		0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
Intermodal Connections	1	0	0	0	0		1	1		1	1			0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	8	
Quality of Life	0	0	0	0	0		0	0	0		1			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
Economic Development	1	0	0	0	0		0	0	0	1	1			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	
Loss in Productivity	0	0	1	0	0		0	0	1		0			0	0	0	0	1	1	0	1		0	0	0	0	0	0	4	

	AR	CA	CO	CT	DE	FL	HI	ID	KS	LA	MD	MN	MO	NE	NV	NH	NJ	NY	ND	OH	OR	SC	TN	TX	UT	WA	WV	WY	TOTAL	
d. Intelligent Transportation Systems (ITS)																														
ITS strategies to facilitate truck flow on roads																														
1. Not considered	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
2. Identified/not studied	0	0	0	1	1	1	0	0	0	0	0	1	0	0	0	1	1	0	1	0	1	0	0	0	0	0	0	0	1	8
3. Studied/not recommended	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4. Studied/recommended	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	4
5. Implemented	0	1	1	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0	1	0	1	0	0	1	1	1	1	0	11	
Challenges being addressed																														
Congestion	1	0	1	1	1	0	0	1	1	1	0	0	1	1	0	1	1	1	0	1	1	1	1	1	1	1	1	0	14	
Transportation System	1	0	0	0	0	0	0	0	0	1	0	0	1	0	1	1	1	1	1	1	1	1	0	0	0	0	0	1	9	
Safety	1	0	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	17	
Infrastructure	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3	
Environment	0	0	1	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
Intermodal Connections	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
Quality of Life	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Economic Development	1	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	
Loss in Productivity	0	1	0	0	0	0	0	1	1	0	1	0	0	1	1	0	0	0	0	0	1	0	0	0	1	1	0	0	8	
Intelligent warning signing																														
1. Not considered	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	4	
2. Identified/not studied	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	5	
3. Studied/not recommended	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4. Studied/recommended	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	7	
5. Implemented	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	1	0	0	0	1	1	0	0	8	
Challenges being addressed																														
Congestion	0	0	0	1	0	0	0	0	1	1	0	0	0	1	0	0	1	1	0	0	1	0	0	0	0	0	0	0	11	
Transportation System	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1	1	1	1	1	1	1	0	0	0	0	0	0	17	
Safety	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	0	1	0	1	0	0	22	
Infrastructure	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
Environment	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
Intermodal Connections	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Quality of Life	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Economic Development	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Loss in Productivity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Weigh-in-motion																														
1. Not considered	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
2. Identified/not studied	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
3. Studied/not recommended	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4. Studied/recommended	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5. Implemented	1	1	1	1	0	1	0	1	0	1	0	0	0	0	1	0	1	0	1	0	1	1	1	1	1	1	1	0	18	
Challenges being addressed																														
Congestion	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	0	1	0	11		
Transportation System	1	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	11	
Safety	0	1	0	1	1	1	1	0	1	1	1	0	1	1	0	0	0	1	1	1	1	1	1	1	1	0	0	0	16	
Infrastructure	1	0	1	0	1	1	0	0	1	0	0	1	1	0	0	0	1	1	1	1	1	0	1	0	1	0	0	0	13	
Environment	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
Intermodal Connections	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Quality of Life	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Economic Development	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Loss in Productivity	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	

		AR	CA	CO	CT	DE	FL	HI	ID	KS	LA	MD	MN	MO	NE	NV	NH	NJ	NY	ND	OH	OR	SC	TN	TX	UT	WA	WV	WY	TOTAL			
e. Signing																																	
Improved warning signing																																	
1. Not considered		1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2			
2. Identified/not studied		0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	1	7		
3. Studied/not recommended		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
4. Studied/recommended		0	0	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3		
5. Implemented		0	1	0	1	0	1	0	1	0	1	1	0	0	1	0	0	0	1	1	1	1	1	0	0	1	0	1	0	1	13		
Challenges being addressed																																	
Congestion			0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	5		
Transportation System			0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	6		
Safety		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	22		
Infrastructure			0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
Environment			0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2		
Intermodal Connections			0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
Quality of Life			0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
Economic Development			0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
Loss in Productivity			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Improved directional or informational signing																																	
1. Not considered		1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3		
2. Identified/not studied		0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	7	
3. Studied/not recommended		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
4. Studied/recommended		0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
5. Implemented		0	1	0	1	0	0	1	0	1	0	1	0	0	0	0	0	0	1	1	0	1	0	0	0	0	1	0	1	0	9		
Challenges being addressed																																	
Congestion			0	0	1	1	1	1	0	1	1	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	9	
Transportation System			0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	1	7	
Safety		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	0	0	0	16		
Infrastructure			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Environment			0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Intermodal Connections			1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
Quality of Life			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Economic Development			0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
Loss in Productivity			0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	3	
f. Vehicle Size and Configuration																																	
Increased size or weight limits																																	
1. Not considered		0	0	0	0	1	1	0	0	1	0	0	0	1	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	1	9		
2. Identified/not studied		0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	6		
3. Studied/not recommended		1	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4		
4. Studied/recommended		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
5. Implemented		0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	
Challenges being addressed																																	
Congestion			0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
Transportation System			0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	6	
Safety		0	1	1	1	0	1	0	1	0	1	0	0	0	0	0	0	1	1	1	1	0	0	0	1	0	0	0	0	0	0	11	
Infrastructure			0	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	7	
Environment			0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Intermodal Connections			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Quality of Life			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Economic Development			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Loss in Productivity			0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7

	AR	CA	CO	CT	DE	FL	HI	ID	KS	LA	MD	MN	MO	NE	NV	NH	NJ	NY	ND	OH	OR	SC	TN	TX	UT	WA	WV	WY	TOTAL		
Reduced size or weight limits																															
1. Not considered	0	0	1	0	1	1	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	0	1	1	0	1	0	12	
2. Identified/not studied	0	0	0	1	0	0	1	1	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	1	0	0	0	0	0	8	
3. Studied/not recommended	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
4. Studied/recommended	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	
5. Implemented	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1	0	0	4	
Challenges being addressed																															
Congestion	0		1	0			0	0	0	0	0	0	0	0	0	0	0	0	0	1	0		0	0		0	0	0	0	2	
Transportation System	0	1	1	0	0	0	0	0	1	1	0	0	0	0	1	1	1	0	1	1	0	1	1	1	0	0	0	0	0	4	
Safety							1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14	
Infrastructure	1		0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	7	
Environment	0		1	0			0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	
Intermodal Connections	0		0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	
Quality of Life	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	
Economic Development	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2	
Loss in Productivity	0		0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3	
Allow triple trailers on roadways																															
1. Not considered	0	0	0	0	1	1	1	0	0	0	0	0	1	0	0	0	1	1	0	1	0	1	1	0	0	0	0	1	1	11	
2. Identified/not studied	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	3	
3. Studied/not recommended	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	6	
4. Studied/recommended	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
5. Implemented	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0	1	0	0	0	6	
Challenges being addressed																															
Congestion	0		0	1	0			0	0	0	0	0	0	0	0	0	1	0	0	1	0		0	0	0	0	0	0	0	3	
Transportation System	0		0	0			0	0	0	0	0	0	0	1	0	0	1	0	0	1	0		1	1	0	0	0	0	0	6	
Safety	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	13	
Infrastructure	0		1	0			0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	4	
Environment	0		0	1	0		0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
Intermodal Connections	0		0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Quality of Life	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	
Economic Development	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2	
Loss in Productivity	1		0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	5	
g. Enforcement/Compliance																															
Additional inspection stations																															
1. Not considered	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1	1				1	0	0	0	0	0	0	5	
2. Identified/not studied	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0				0	0	1	0	0	1	1	7	
3. Studied/not recommended	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0				0	0	0	0	0	0	0	2	
4. Studied/recommended	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0				0	0	0	0	0	0	0	2	
5. Implemented	1	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0				0	1	0	1	0	0	0	7	
Challenges being addressed																															
Congestion	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0	0	0	0	0	2	
Transportation System	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1				0	0	0	0	0	0	0	0	3	
Safety	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				1	1	1	1	1	1	1	17	
Infrastructure	0	1	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0				0	1	1	1	1	1	0	7	
Environment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0				0	0	0	0	0	0	0	0	1	
Intermodal Connections	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0	0	0	0	0	0	0	
Quality of Life	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0	0	0	0	0	0	0	
Economic Development	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0				0	0	0	0	0	0	0	0	3	
Loss in Productivity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1				0	0	0	0	0	0	0	0	

	AR	CA	CO	CT	DE	FL	HI	ID	KS	LA	MD	MN	MO	NE	NV	NH	NJ	NY	ND	OH	OR	SC	TN	TX	UT	WA	WV	TOTAL
Improvements in rail infrastructure																												
1. Not considered	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	0	0	0	0	0	1	1	0	1	0	0	1
2. Identified/not studied	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	4
3. Studied/not recommended	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4. Studied/recommended	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	7
5. Implemented	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	5
Challenges being addressed																												
Congestion	0	0	0	1	1								1	0	1	0	0	1	1	0	0			1	0	0	1	8
Transportation System	0	0		1	0								1	0	1	1	1	1	1	1	1			1	0	1	1	10
Safety	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2
Infrastructure	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2
Environment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Intermodal Connections	1	1	0	0	1																			0	0	0	1	9
Quality of Life	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Economic Development	0	0	0	0	1								1	1	1	0	0	1	1	1	1	1	0	0	0	1	0	8
Loss in Productivity	0	0	0	0	0							0	0	1	0	0	1	0	0	0	0	1	0	0	0	1	0	4

Notes: AR = Arkansas, CA = California, CO = Colorado, CT = Connecticut, DE = Delaware, FL = Florida, HI = Hawaii, ID = Idaho, KS = Kansas, LA = Louisiana, MD = Maryland, MN = Minnesota, MO = Missouri, NE = Nebraska, NV = Nevada, NH = New Hampshire, NJ = New Jersey, NY = New York, ND = North Dakota, OH = Ohio, OR = Oregon, SC = South Carolina, TN = Tennessee, TX = Texas, UT = Utah, WA = Washington, WV = West Virginia, WY = Wyoming.

	Baltimore Metro Council	Baton Rouge (LA) MPO	Delaware Valley	Denver Regional COG	Metro Trans. Comm.	Metro Wash. COG	SE Michigan COG	SCAG	TOTAL
Multivehicle crashes (especially auto-truck)									
0. Not determined	1	0	0	1	0	0	0	0	2
1. Minor	0	0	0	0	0	0	0	0	0
2. Moderate localized	0	0	0	0	0	0	1	0	1
3. Serious localized	0	1	0	0	0	1	0	0	2
4. Moderate widespread	0	0	1	0	1	0	0	1	3
5. Serious widespread	0	0	0	0	0	0	0	0	0
d. Infrastructure									
Pavement deterioration									
0. Not determined	0	0	0	1	0	0	0	0	1
1. Minor	0	0	0	0	0	1	0	0	1
2. Moderate localized	0	0	0	0	0	0	0	0	0
3. Serious localized	1	0	0	0	0	0	0	0	1
4. Moderate widespread	0	0	1	0	1	0	0	1	3
5. Serious widespread	0	1	0	0	0	0	1	0	2
Bridge structure deterioration									
0. Not determined	0	0	0	1	0	0	0	1	2
1. Minor	0	1	0	0	0	1	0	0	2
2. Moderate localized	0	0	0	0	1	0	0	0	1
3. Serious localized	1	0	0	0	0	0	0	0	1
4. Moderate widespread	0	0	1	0	0	0	0	0	1
5. Serious widespread	0	0	0	0	0	0	1	0	1
e. Environment									
Air quality (emissions)									
0. Not determined	0	0	0	1	0	0	0	0	1
1. Minor	0	0	0	0	0	0	0	0	0
2. Moderate localized	0	0	0	0	0	0	0	0	0
3. Serious localized	0	0	0	0	0	0	0	0	0
4. Moderate widespread	0	0	1	0	1	1	1	1	5
5. Serious widespread	1	1	0	0	0	0	0	0	2
Noise									
0. Not determined	0	0	0	0	0	0	0	0	0
1. Minor	0	0	0	0	0	0	0	0	0
2. Moderate localized	1	0	1	1	0	1	0	0	4
3. Serious localized	0	0	0	0	1	0	0	0	1
4. Moderate widespread	0	0	0	0	0	0	1	1	2
5. Serious widespread	0	1	0	0	0	0	0	0	1
f. Intermodal Connections									
Rail/truck connectivity									
0. Not determined	0	0	0	1	0	0	0	0	1
1. Minor	0	0	0	0	0	1	0	0	1
2. Moderate localized	1	0	1	0	1	0	0	0	3
3. Serious localized	0	0	0	0	0	0	1	0	1
4. Moderate widespread	0	1	0	0	0	0	0	1	2
5. Serious widespread	0	0	0	0	0	0	0	0	0
Air/truck connectivity									
0. Not determined	0	0	0	1	0	0	0	0	1
1. Minor	1	0	0	0	0	0	0	0	1
2. Moderate localized	0	0	1	0	1	1	0	0	3
3. Serious localized	0	0	0	0	0	0	1	0	1
4. Moderate widespread	0	1	0	0	0	0	0	1	2
5. Serious widespread	0	0	0	0	0	0	0	0	0
Truck/truck connectivity									
0. Not determined	1	0	0	1	0	0	0	0	2
1. Minor	0	0	0	0	0	0	0	0	0
2. Moderate localized	0	0	1	0	1	1	0	0	3
3. Serious localized	0	0	0	0	0	0	1	0	1
4. Moderate widespread	0	1	0	0	0	0	0	1	2
5. Serious widespread	0	0	0	0	0	0	0	0	0
Water/truck connectivity									
0. Not determined	0	0	0	1	0	0	0	0	1
1. Minor	0	0	0	0	1	1	0	0	2
2. Moderate localized	1	0	1	0	0	0	0	0	2
3. Serious localized	0	0	0	0	0	0	0	0	0
4. Moderate widespread	0	0	0	0	0	0	1	1	2
5. Serious widespread	0	1	0	0	0	0	0	0	1

	Baltimore Metro Council	Baton Rouge (LA) MPO	Delaware Valley	Denver Regional COG	Metro Trans. Comm.	Metro Wash. COG	SE Michigan COG	SCAG	TOTAL
g. Quality of Life									
Trucks driving through residential areas									
0. Not determined	0	1	0	1	0	0	0	0	2
1. Minor	0	0	0	0	0	0	0	0	0
2. Moderate localized	1	0	0	0	0	1	0	0	2
3. Serious localized	0	0	1	0	1	0	1	1	4
4. Moderate widespread	0	0	0	0	0	0	0	0	0
5. Serious widespread	0	0	0	0	0	0	0	0	0
Trucks parking in residential areas									
0. Not determined	1	1	1	1	0	0	0	0	4
1. Minor	0	0	0	0	0	0	0	0	0
2. Moderate localized	0	0	0	0	0	1	0	0	1
3. Serious localized	0	0	0	0	1	0	1	1	3
4. Moderate widespread	0	0	0	0	0	0	0	0	0
5. Serious widespread	0	0	0	0	0	0	0	0	0
h. Economic Development									
Incompatible land uses									
0. Not determined	0	0	0	1	0	0	0	0	1
1. Minor	0	0	0	0	0	0	0	0	0
2. Moderate localized	1	0	1	0	0	1	0	0	3
3. Serious localized	0	1	0	0	1	0	1	1	4
4. Moderate widespread	0	0	0	0	0	0	0	0	0
5. Serious widespread	0	0	0	0	0	0	0	0	0
Truck uses that discourage "desirable" development									
0. Not determined	1	0	0	1	0	0	0	0	2
1. Minor	0	0	0	0	0	0	0	0	0
2. Moderate localized	0	0	1	0	0	1	0	1	3
3. Serious localized	0	1	0	0	1	0	1	0	3
4. Moderate widespread	0	0	0	0	0	0	0	0	0
5. Serious widespread	0	0	0	0	0	0	0	0	0
i. Losses in Productivity Due to Congestion									
Increased transport costs									
0. Not determined	0	0	0	1	0	0	0	0	1
1. Minor	0	0	0	0	0	0	0	0	0
2. Moderate localized	0	0	0	0	0	0	0	0	0
3. Serious localized	0	0	0	0	0	0	0	0	0
4. Moderate widespread	1	0	1	0	1	1	1	0	5
5. Serious widespread	0	1	0	0	0	0	0	1	2
Worker productivity loss									
0. Not determined	1	0	0	1	0	0	0	0	2
1. Minor	0	0	0	0	0	0	0	0	0
2. Moderate localized	0	0	0	0	0	0	0	0	0
3. Serious localized	0	0	0	0	0	0	0	0	0
4. Moderate widespread	0	0	1	0	1	1	1	1	5
5. Serious widespread	0	1	0	0	0	0	0	0	1
2. Has your agency undertaken planning activities to address the effects of increasing truck traffic?									
a. Freight/goods movement plan (for state or metropolitan area)									
1. No planning	0	0	1	1	1	0	0	0	3
2. Discussed	0	1	0	0	0	1	1	0	3
3. Support of another agency	0	0	0	0	0	0	0	0	0
4. Under way	1	0	0	0	0	0	0	0	1
5. Completed	0	0	0	0	0	0	0	1	1
b. System plan for freight/goods movement facilities									
1. No planning	0	0	0	1	1	0	0	0	2
2. Discussed	1	1	0	0	0	1	1	0	4
3. Support of another agency	0	0	0	0	0	0	0	0	0
4. Under way	0	0	0	0	0	0	0	1	1
5. Completed	0	0	1	0	0	0	0	0	1
c. Corridor freight/goods movement plan									
1. No planning	0	0	1	1	0	0		0	2
2. Discussed	0	0	0	0	0	1		0	1
3. Support of another agency	0	0	0	0	0	0		0	0
4. Under way	1	0	0	0	0	0		1	2
5. Completed	0	1	0	0	1	0		0	2

	Baltimore Metro Council	Baton Rouge (LA) MPO	Delaware Valley	Denver Regional COG	Metro Trans. Comm.	Metro Wash. COG	SE Michigan COG	SCAG	TOTAL
d. Freight/goods movement element of multimodal system plan									
1. No planning	0	0	0	0	1	0	0	0	1
2. Discussed	0	0	0	0	0	1	1	0	2
3. Support of another agency	0	0	0	0	0	0	0	0	0
4. Under way	1	0	0	1	0	0	0	1	3
5. Completed	0	1	1	0	0	0	0	0	2
e. Freight/goods movement element of multimodal corridor plan									
1. No planning	0	0	0	1	1	0	0	0	2
2. Discussed	0	0	0	0	0	1	1	0	2
3. Support of another agency	0	0	0	0	0	0	0	0	0
4. Under way	1	0	0	0	0	0	0	1	2
5. Completed	0	1	1	0	0	0	0	0	2
f. Intermodal facility planning									
1. No planning	0	1	0	0	0	1	0	0	2
2. Discussed	1	0	0	1	0	0	0	0	2
3. Support of another agency	0	0	0	0	1	0	1	0	2
4. Under way	0	0	0	0	0	0	0	1	1
5. Completed	0	0	1	0	0	0	0	0	1
g. Land-use planning for truck-related uses									
1. No planning	0	1	1	1	0	1	0	0	4
2. Discussed	1	0	0	0	0	0	0	1	2
3. Support of another agency	0	0	0	0	1	0	1	0	2
4. Under way	0	0	0	0	0	0	0	0	0
5. Completed	0	0	0	0	0	0	0	0	0
h. Freight forecasts									
1. No planning	0	1	1	1	0	0	0	0	3
2. Discussed	1	0	0	0	0	1	1	0	3
3. Support of another agency	0	0	0	0	0	0	0	0	0
4. Under way	0	0	0	0	0	0	0	1	1
5. Completed	0	0	0	0	1	0	0	0	1
i. Truck forecasts									
1. No planning	0	1	0	1	0	0	0	0	2
2. Discussed	0	0	0	0	0	1	1	0	2
3. Support of another agency	0	0	0	0	0	0	0	0	0
4. Under way	1	0	1	0	0	0	0	1	3
5. Completed	0	0	0	0	1	0	0	0	1
3. Has your agency evaluated or implemented specific strategies to address the effects of increasing truck traffic?									
a. Improved Highway Design									
Improved highway geometrics									
1. Not considered	0	0	0	1	0	1	1	1	4
2. Identified/not studied	0	0	0	0	0	0	0	0	0
3. Studied/not recommended	0	1	0	0	0	0	0	0	1
4. Studied/recommended	1	0	0	0	1	0	0	0	2
5. Implemented	0	0	1	0	0	0	0	0	1
Challenges being addressed									
Congestion		1	1		1				3
Transportation System		0	0		0				0
Safety	1	1	0		1				3
Infrastructure		0	1		0				1
Environment		0	0		0				0
Intermodal Connections	1	0	0		0				1
Quality of Life		0	0		0				0
Economic Development		1	0		1				2
Loss in Productivity		1	0		1				2

	Baltimore Metro Council	Baton Rouge (LA) MPO	Delaware Valley	Denver Regional COG	Metro Trans. Comm.	Metro Wash. COG	SE Michigan COG	SCAG	TOTAL
New or upgraded structures									
1. Not considered	0	0	0	1	1	1	1	0	4
2. Identified/not studied	0	0	0	0	0	0	0	0	0
3. Studied/not recommended	0	1	0	0	0	0	0	0	1
4. Studied/recommended	1	0	0	0	0	0	0	1	2
5. Implemented	0	0	1	0	0	0	0	0	1
<u>Challenges being addressed</u>									
Congestion	0	0	0	0				1	1
Transportation System	0	0	0					1	1
Safety	1	0	0					1	2
Infrastructure	0	0	1					1	2
Environment	0	0	0					0	0
Intermodal Connections	1	0	0					1	2
Quality of Life	0	0	0					0	0
Economic Development	1	1	0					0	2
Loss in Productivity	0	1	0					1	2
New and improved pavement									
1. Not considered	0	0	0	1	1	1	1	1	5
2. Identified/not studied	0	0	0	0	0	0	0	0	0
3. Studied/not recommended	0	1	0	0	0	0	0	0	1
4. Studied/recommended	1	0	0	0	0	0	0	0	1
5. Implemented	0	0	1	0	0	0	0	0	1
<u>Challenges being addressed</u>									
Congestion	0	0	0						0
Transportation System	0	0	0						0
Safety	1	1	0						2
Infrastructure	0	0	1						1
Environment	0	0	0						0
Intermodal Connections	1	0	0						1
Quality of Life	0	0	0						0
Economic Development	0	1	0						1
Loss in Productivity	0	1	0						1
Modified design standards (geometric/structural/pavement)									
1. Not considered	0	0	0	1	1	1	1	1	5
2. Identified/not studied	0	0	0	0	0	0	0	0	0
3. Studied/not recommended	0	1	0	0	0	0	0	0	1
4. Studied/recommended	1	0	0	0	0	0	0	0	1
5. Implemented	0	0	1	0	0	0	0	0	1
<u>Challenges being addressed</u>									
Congestion	0	0	0						0
Transportation System	0	0	0						0
Safety	1	1	0						2
Infrastructure	0	0	0						0
Environment	0	0	0						0
Intermodal Connections	1	0	1						2
Quality of Life	0	0	0						0
Economic Development	0	1	0						1
Loss in Productivity	0	1	0						1
b. Roadway Facilities									
Dedicated road for trucks or commercial vehicles									
1. Not considered	0	1	1	1	1	1	0	1	6
2. Identified/not studied	1	0	0	0	0	0	1	0	2
3. Studied/not recommended	0	0	0	0	0	0	0	0	0
4. Studied/recommended	0	0	0	0	0	0	0	0	0
5. Implemented	0	0	0	0	0	0	0	0	0
<u>Challenges being addressed</u>									
Congestion	1	0			0				1
Transportation System	0	0			0				0
Safety	1	1							2
Infrastructure		0							0
Environment		0							0
Intermodal Connections		0							0
Quality of Life		0							0
Economic Development		0							0
Loss in Productivity		0							0

	Baltimore Metro Council	Baton Rouge (LA) MPO	Delaware Valley	Denver Regional COG	Metro Trans. Comm.	Metro Wash. COG	SE Michigan COG	SCAG	TOTAL
Special use lanes for trucks or commercial vehicles									
1. Not considered	0	0	1	1	0	1	1	0	4
2. Identified/not studied	1	1	0	0	0	0	0	0	2
3. Studied/not recommended	0	0	0	0	1	0	0	0	1
4. Studied/recommended	0	0	0	0	0	0	0	1	1
5. Implemented	0	0	0	0	0	0	0	0	0
<u>Challenges being addressed</u>									
Congestion	1	0			1			1	3
Transportation System	0	0			0			1	1
Safety	1	1			1			1	4
Infrastructure	0	0			0			0	0
Environment	0	0			0			1	1
Intermodal Connections	0	0			0			0	0
Quality of Life	0	0			0			0	0
Economic Development	0	0			1			1	2
Loss in Productivity	0	0			1			1	2
Truck climbing lanes									
1. Not considered	1	1	1	1	0	1	1	0	6
2. Identified/not studied	0	0	0	0	0	0	0	0	0
3. Studied/not recommended	0	0	0	0	0	0	0	0	0
4. Studied/recommended	0	0	0	0	0	0	0	0	0
5. Implemented	0	0	0	0	1	0	0	1	2
<u>Challenges being addressed</u>									
Congestion		0			1			1	2
Transportation System		0			0			1	1
Safety		1			1			1	3
Infrastructure		0			0			0	0
Environment		0			0			0	0
Intermodal Connections		0			0			0	0
Quality of Life		0			0			1	1
Economic Development		0			0			0	0
Loss in Productivity		0			0			0	0
Dedicated truck ramps									
1. Not considered	1	1	1	1	1	1	0	0	6
2. Identified/not studied	0	0	0	0	0	0	1	0	1
3. Studied/not recommended	0	0	0	0	0	0	0	0	0
4. Studied/recommended	0	0	0	0	0	0	0	1	1
5. Implemented	0	0	0	0	0	0	0	0	0
<u>Challenges being addressed</u>									
Congestion		0					0	1	1
Transportation System		0						1	1
Safety		1						1	2
Infrastructure		0						0	0
Environment		0						1	1
Intermodal Connections		0						0	0
Quality of Life		0						0	0
Economic Development		0						1	1
Loss in Productivity		0						1	1
c. Operational Strategies									
Lane restrictions for trucks									
1. Not considered	1	0	1	1	1	0	1	1	6
2. Identified/not studied	0	1	0	0	0	1	0	0	2
3. Studied/not recommended	0	0	0	0	0	0	0	0	0
4. Studied/recommended	0	0	0	0	0	0	0	0	0
5. Implemented	0	0	0	0	0	0	0	0	0
<u>Challenges being addressed</u>									
Congestion		0				0			0
Transportation System						0			0
Safety						1			1
Infrastructure						0			0
Environment						0			0
Intermodal Connections						0			0
Quality of Life						0			0
Economic Development						0			0
Loss in Productivity						0			0

	Baltimore Metro Council	Baton Rouge (LA) MPO	Delaware Valley	Denver Regional COG	Metro Trans. Comm.	Metro Wash. COG	SE Michigan COG	SCAG	TOTAL
Time-of-day restrictions on trucks									
1. Not considered	1	0	1	1	0		1	0	4
2. Identified/not studied	0	1	0	0	1		0	0	2
3. Studied/not recommended	0	0	0	0	0		0	1	1
4. Studied/recommended	0	0	0	0	0		0	0	0
5. Implemented	0	0	0	0	0		0	0	0
<u>Challenges being addressed</u>									
Congestion		0			0			0	0
Transportation System					0			0	0
Safety					0			0	0
Infrastructure					0			0	0
Environment					0			0	0
Intermodal Connections					0			0	0
Quality of Life					0			1	1
Economic Development					0			0	0
Loss in Productivity					1			0	1
Restriction or prohibition of trucks on some roads									
1. Not considered	0	0	1	1	1	0	1	1	5
2. Identified/not studied	0	0	0	0	0	0	0	0	0
3. Studied/not recommended	0	0	0	0	0	0	0	0	0
4. Studied/recommended	0	1	0	0	0	0	0	0	1
5. Implemented	1	0	0	0	0	1	0	0	2
<u>Challenges being addressed</u>									
Congestion	0					0			0
Transportation System	0					0			0
Safety	0					1			1
Infrastructure	0					0			0
Environment	0					0			0
Intermodal Connections	0					0			0
Quality of Life	1					1			2
Economic Development	0					0			0
Loss in Productivity	0					0			0
Truck parking restrictions/prohibitions									
1. Not considered	1	0	1	1	1	0	1	1	6
2. Identified/not studied	0	1	0	0	0	0	0	0	1
3. Studied/not recommended	0	0	0	0	0	0	0	0	0
4. Studied/recommended	0	0	0	0	0	0	0	0	0
5. Implemented	0	0	0	0	0	1	0	0	1
<u>Challenges being addressed</u>									
Congestion	0					0			0
Transportation System						0			0
Safety						0			0
Infrastructure						0			0
Environment						0			0
Intermodal Connections						0			0
Quality of Life						0			0
Economic Development						0			0
Loss in Productivity						0			0
Improved incident management									
1. Not considered	0	0	0		0	0	0	1	1
2. Identified/not studied	0	0	0		0	0	0	0	0
3. Studied/not recommended	0	0	0		0	0	0	0	0
4. Studied/recommended	0	0	0		0	0	1	0	1
5. Implemented	1	1	1		1	1	0	0	5
<u>Challenges being addressed</u>									
Congestion	1		1		1	1	1		5
Transportation System	0		0		0	1	0		1
Safety	1		1		1	1	1		5
Infrastructure	0		0		0	0	0		0
Environment	0		0		0	0	0		0
Intermodal Connections	0		0		0	0	0		0
Quality of Life	0		0		0	0	0		0
Economic Development	0		0		0	0	0		0
Loss in Productivity	0		1		0	0	0		1

	Baltimore Metro Council	Baton Rouge (LA) MPO	Delaware Valley	Denver Regional COG	Metro Trans. Comm.	Metro Wash. COG	SE Michigan COG	SCAG	TOTAL
Improved intermodal operation									
1. Not considered	1	0	0	0	1	0	0		2
2. Identified/not studied	0	1	0	0	0	1	0		2
3. Studied/not recommended	0	0	0	0	0	0	0		0
4. Studied/recommended	0	0	0	1	0	0	1		2
5. Implemented	0	0	1	0	0	0	0		1
<u>Challenges being addressed</u>									
Congestion			0				1	1	2
Transportation System			0				1	1	2
Safety			0				1	0	1
Infrastructure			0				1	1	2
Environment			0				0	0	0
Intermodal Connections			1				1	1	3
Quality of Life			0				0	0	0
Economic Development			0				1	1	2
Loss in Productivity			1				0	1	2
d. Intelligent Transportation Systems (ITS)									
ITS strategies to facilitate truck flow on roads									
1. Not considered	0	0	0	1	0	0			1
2. Identified/not studied	0	0	0	0	1	0			1
3. Studied/not recommended	0	0	0	0	0	0			0
4. Studied/recommended	1	0	0	0	0	0			1
5. Implemented	0	1	1	0	0	1			3
<u>Challenges being addressed</u>									
Congestion	1	0	1		0	1			3
Transportation System	0	1	0		0	0			1
Safety	0	1	0		0	1			2
Infrastructure	0	0	0		0				0
Environment	0	0	0		0				0
Intermodal Connections	0	1	0		1				2
Quality of Life	0	0	0		0				0
Economic Development	1	1	0		1				3
Loss in Productivity	0	1	0		0				1
Intelligent warning signing									
1. Not considered	0	0	0	1	1	0			2
2. Identified/not studied	0	0	0	0	0	0			0
3. Studied/not recommended	0	0	0	0	0	0			0
4. Studied/recommended	0	1	0	0	0	0			1
5. Implemented	1	0	1	0	0	1			3
<u>Challenges being addressed</u>									
Congestion	1	0	1			1			3
Transportation System	0	1	0			0			1
Safety	0	1	0			0			1
Infrastructure	0	0	0			0			0
Environment	0	0	0			0			0
Intermodal Connections	0	1	0			0			1
Quality of Life	0	0	0			0			0
Economic Development	0	1	0			0			1
Loss in Productivity	1	1	0			0			2
Weigh-in-motion									
1. Not considered	0	0	0	1	0	0	1	1	3
2. Identified/not studied	0	0	0	0	0	0	0	0	0
3. Studied/not recommended	0	0	0	0	0	0	0	0	0
4. Studied/recommended	1	0	0	0	0	0	0	0	1
5. Implemented	0	1	1	0	1	1	0	0	4
<u>Challenges being addressed</u>									
Congestion	0	0	0		1	1			2
Transportation System	0	1	0		0	0			1
Safety	0	1	0		1	1			3
Infrastructure	0	0	0		0	0			0
Environment	0	0	0		0	0			0
Intermodal Connections	0	1	0		0	0			1
Quality of Life	0	0	0		0	0			0
Economic Development	0	1	0		1	0			2
Loss in Productivity	0	1	1		0	0			2

	Baltimore Metro Council	Baton Rouge (LA) MPO	Delaware Valley	Denver Regional COG	Metro Trans. Comm.	Metro Wash. COG	SE Michigan COG	SCAG	TOTAL
Allow triple trailers on roadways									
1. Not considered	1	1	1	1	1	1		1	7
2. Identified/not studied	0	0	0	0	0	0		0	0
3. Studied/not recommended	0	0	0	0	0	0		0	0
4. Studied/recommended	0	0	0	0	0	0		0	0
5. Implemented	0	0	0	0	0	0		0	0
Challenges being addressed									
Congestion									0
Transportation System									0
Safety									0
Infrastructure									0
Environment									0
Intermodal Connections									0
Quality of Life									0
Economic Development									0
Loss in Productivity									0
g. Enforcement/Compliance									
Additional inspection stations									
1. Not considered	1	1	1	1	1	1	1	1	8
2. Identified/not studied	0	0	0	0	0	0	0	0	0
3. Studied/not recommended	0	0	0	0	0	0	0	0	0
4. Studied/recommended	0	0	0	0	0	0	0	0	0
5. Implemented	0	0	0	0	0	0	0	0	0
Challenges being addressed									
Congestion		1					0		1
Transportation System		0							0
Safety		1							1
Infrastructure		0							0
Environment		0							0
Intermodal Connections		0							0
Quality of Life		0							0
Economic Development		0							0
Loss in Productivity		0							0
Additional truck inspections									
1. Not considered	1	1	1	1	1	1	1	1	8
2. Identified/not studied	0	0	0	0	0	0	0	0	0
3. Studied/not recommended	0	0	0	0	0	0	0	0	0
4. Studied/recommended	0	0	0	0	0	0	0	0	0
5. Implemented	0	0	0	0	0	0	0	0	0
Challenges being addressed									
Congestion		1							1
Transportation System		0							0
Safety		1							1
Infrastructure		0							0
Environment		0							0
Intermodal Connections		0							0
Quality of Life		0							0
Economic Development		0							0
Loss in Productivity		0							0
Electronic screening									
1. Not considered	0	0	0	1	1	1	1	1	5
2. Identified/not studied	0	0	0	0	0	0	0	0	0
3. Studied/not recommended	0	0	0	0	0	0	0	0	0
4. Studied/recommended	1	1	0	0	0	0	0	0	2
5. Implemented	0	0	1	0	0	0	0	0	1
Challenges being addressed									
Congestion		1	0						1
Transportation System		0	0						0
Safety		1	0						1
Infrastructure		0	0						0
Environment		0	0						0
Intermodal Connections		0	0						0
Quality of Life		0	0						0
Economic Development		0	0						0
Loss in Productivity		0	1						1

	Baltimore Metro Council	Baton Rouge (LA) MPO	Delaware Valley	Denver Regional COG	Metro Trans. Comm.	Metro Wash. COG	SE Michigan COG	SCAG	TOTAL
Enhanced enforcement to remove noncompliant trucks									
1. Not considered	0	0	1	1	1	1	1	1	6
2. Identified/not studied	0	0	0	0	0	0	0	0	0
3. Studied/not recommended	0	0	0	0	0	0	0	0	0
4. Studied/recommended	0	1	0	0	0	0	0	0	1
5. Implemented	1	0	0	0	0	0	0	0	1
<u>Challenges being addressed</u>									
Congestion	0	1							1
Transportation System		0							0
Safety		1							1
Infrastructure		0							0
Environment		0							0
Intermodal Connections		0							0
Quality of Life		0							0
Economic Development		0							0
Loss in Productivity		0							0
Enhanced enforcement of operator hours									
1. Not considered	1	1	1	1	1	1	1	1	8
2. Identified/not studied	0	0	0	0	0	0	0	0	0
3. Studied/not recommended	0	0	0	0	0	0	0	0	0
4. Studied/recommended	0	0	0	0	0	0	0	0	0
5. Implemented	0	0	0	0	0	0	0	0	0
<u>Challenges being addressed</u>									
Congestion		1							1
Transportation System		0							0
Safety		1							1
Infrastructure		0							0
Environment		0							0
Intermodal Connections		0							0
Quality of Life		0							0
Economic Development		0							0
Loss in Productivity		0							0
h. Alternative Infrastructure Investments									
Improvements in port/shipping infrastructure									
1. Not considered	0	0	0	1	1	1	1	0	4
2. Identified/not studied	0	0	0	0	0	0	0	0	0
3. Studied/not recommended	0	0	0	0	0	0	0	0	0
4. Studied/recommended	1	1	0	0	0	0	0	1	3
5. Implemented	0	0	1	0	0	0	0	0	1
<u>Challenges being addressed</u>									
Congestion		0	0					1	1
Transportation System		0	0					1	1
Safety		0	0					0	0
Infrastructure		0	0					1	1
Environment		0	0					0	0
Intermodal Connections		0	0					1	1
Quality of Life		0	0					0	0
Economic Development		1	1					1	3
Loss in Productivity		1	0					1	2
Improvements in air freight infrastructure									
1. Not considered	0	0	0	0	1	1	1	0	3
2. Identified/not studied	0	0	0	0	0	0	0	0	0
3. Studied/not recommended	0	0	0	0	0	0	0	0	0
4. Studied/recommended	0	1	0	1	0	0	0	1	3
5. Implemented	1	0	1	0	0	0	0	0	2
<u>Challenges being addressed</u>									
Congestion		0	0	0				1	1
Transportation System			0	0				1	1
Safety		0	0	0				0	0
Infrastructure		0	0	0				1	1
Environment		0	0	0				0	0
Intermodal Connections		0	0	1				1	2
Quality of Life		0	0	0				0	0
Economic Development		1	1	0				1	3
Loss in Productivity		1	0	1				1	3

[illegible]

"Other" Responses from State DOTs and MPOs		
Question 1		
AR	1	d. (Infrastructure). Construction lane
MD	1	g. (Quality of Life). Truck parking on shoulders of interstate highways
	2	h. (Economic Development). Public resistance to increased development of land for truck uses (i.e., weigh stations)
NY	1	c. (safety). Theft
SCAG	1	b. (Transportation System). Pier truck dock loading areas
Question 2j		
AR	1	Interstate highway reconstruction
MD	1	Truck safety---weight enforcement
NJ	1	Truck parking studies
UT	1	Sizes, weight, and combinations
Question 3		
AR	1	g. (Enforcement/Compliance). Out of service and inoperable brakes
CT	1	b. (Roadway Facilities). Truck route system
	2	d. (Intelligent Transportation System). On-line registration
OR	1	b. (Roadway Facilities). Truck escape ramps
	2	c. (Operational Strategies). Weight restriction on bridges and restriction of operations during peak travel time for loads requiring permits
SC	1	b. (Roadway Facilities). Designated parking or rest areas
UT	1	a. (Improved Highway Design). Structure heights
	2	d. (Intelligent Transportation Systems). Automatic vehicle identification
Notes: AR = Arkansas; MD = Maryland; NY = New York; SCAG = Southern California Association of Governments; NJ = New Jersey; UT = Utah; CT = Connecticut; OR = Oregon; SC = South Carolina.		

Question 4											
For each strategy studied, but eliminated from further consideration, provide information		Project Description	Insufficient benefits	High cost	Difficult to implement	Not cost-effective	Public opinion	Lack of information	Other	Other explanation	
AR	1	Increased size or weight limits	1	1	0	1	0	0			
	2	Reduced size or weight limits	1	0	1	1	1	0			
	3	Allow triple trailers on roadway	1	1	0	1	0	0			
CA	1	Urban Freeway Gridlock Study	1	1	0	0	1	0			
	2	Triple trailers federal freeze on LCV since 1991	0	0	0	0	1	0	1		
CO											
CT	1	Federal proposal to change operator hours	1	0	1	1	1	0	0		
DE	1	Additional permanent inspection scales/sites	1	1	0	0	0	0	0		
ID		Designated several routes as a pilot project for studying the effect of increased weight limits (129,000 lb) on bridges, pavements, safety, and operations. Too few trucking companies registered for this weight, so we got little data on effects. Weight increase denied									
	1		1	0	1	0	1	1	0		
KS	1	Triple bottoms not allowed by policy--no formal study	1	0	0	0	1	0			
MD	1	57 ft trailer study (examined the effects of allowing 57 ft trailers on MD highways)	0	0	0	0	0	0	1	Safety	
MN		Over height study (currently underway, will examine if over height vehicles are a national problem)									
	2		0	0	0	0	0	0	1	Safety	
	1	Lane restrictions may be reconsidered in the future	1	0	0	0	0	0	0		
	2	Have restrictions for trucks	0	0	1	0	0	0	0		
	3	Allow triples on roadways	0	0	0	0	1	0	0		
		In the 80s "time of day" and "lane restrictions" were both examined									
	4		1	0	1	0	0	0	0		
	5	Heavier (NAFTA) trucks were examined a few years ago to reduce traffic & pavement wear	0	0	1	0	1	0	0		
	6	Improvements in air freight infrastructure	0	1	0	0	0	0	0		
NE	1	Triple trailers only allowed under very specific circumstances for safety	1						1	Safety	
NJ		Road network too dense (urbanized) and too much regular traffic								Network use to heavy	
	1		0	1	1	0	1	0	1	heavy	
	2	State jurisdiction roadways need all lanes for high-volume traffic	0	1	1	0	1	0	1	Network use to heavy	
ND	1	Increased size or weight limits	1	0	0	0	0	0	0		
OH	1	First phase of freight study in progress in conjunction with update of long-range plan									
WA	b.2---	Shared lanes studied and continue as option in the future.	1	0	0	0	1	0	0		
	f.3---	Washington public opposes triples. On-going discussion because Oregon and Idaho allow triples									
	2		0	0	0	0	1	0	0		
WV	1	Review of truck inspections	0	0	0	1	1	0	0		
Baltimore MC	1	Increased truck size	0	0	0	0	1	0	0		
MTC	1	I-880 small truck use of HOV lanes	0	0	1	0	1	0	0		
Notes: MC = Metro Council; MTC = Metropolitan Transportation Commission (Oakland/San Francisco);											
HOV = high-occupancy vehicle; NAFTA = North American Free Trade Agreement; LCV = longer combination vehicles.											

Question 5	For each strategy recommended or implemented, provide information	Project Description	Cost	Expected Benefits	Evaluated?	Factors Driving Selection						Explanation of Other
						Greatest Potential Benefit	Low Cost	Ease of Implementation	Cost-Effectiveness	Public Acceptance	Other	
DOTs	AR	1 Port and other intermodal facilities	Varies	Not quantified	NY						1	Funding
	CA	1 SR-60 dedicated truck lanes	\$4-6B	Safety, reduced congestion, reliable delivery	Y	1	0	0	0	0		
		2 Alameda Corridor	\$2B	Safety, community livability, reliable delivery	Y	1	0	0	0	1		
		3 Alameda Corridor East	\$1B	Safety, community livability, reliable delivery	Y	1	0	0	0	1		
		4 Airport ground access study by Division of Aeronautics	?	Congestion relief, just-in-time delivery	Y	1	0	1	0	0		
		5 Port of Oakland freight shuttle trains	?	Highway congestion relief	Y	1	0	0	1	1		
		6 Truck climbing lanes, lane restrictions, road restrictions, parking restrictions		Decreased congestion, improved safety, increased sight distance	N	0	0	0	0	0	1	Safety dividend
		7 ITS strategies (WIM, improved information signing)		Save time and money, collect data, increased safety	N	1	0	0	0	0		
		8 Additional inspection stations, additional truck inspections, increased enforcement to remove, increased enforcement operation hours		Increased safety	N	1	0	0	0	0		
CT	1	Lane restriction		Safety	NY	0	1	1	0	1	0	
	2	Truck prohibition on some roads		Safety	NY	0	1	1	0	1	0	
	3	Improved incident management		Safety	NY	0	1	1	1	1	0	
	4	Improved intermodal global positioning systems or GPS		Improve port area activities	NY	1	1	0	0	1	0	
	5	WIM		Improved data	Y	1	0	0	0	1	0	
	6	Improved signing		Safety	Y	1	1	1	1	1	0	
	7	Additional truck inspections		Safety	Y	1	1	1	1	1	0	
	8	Enhanced enforcement		Safety	Y	1	1	1	1	1	0	

Question 5	For each strategy recommended or implemented, provide information	Project Description	Cost	Expected Benefits	Evaluated?	Factors Driving Selection						Explanation of Other
						Greatest Potential Benefit	Low Cost	Ease of Implementation	Cost-Effectiveness	Public Acceptance	Other	
	9	Improvements in ports		Transportation system operations	Y	1	0	0	0	1	0	
	10	Improvements in rail		Transportation system operations	Y	1	0	0	0	1	0	
	11	Improvements in air freight		Transportation system operations	Y	1	0	0	0	1	0	
DE	1	Electronic screening		Decreased congestion, improved safety enforcement	NY	1	1	0	1	0	0	
	2	Rail infrastructure improvements			NY	1	0	1	0	1	0	
HI	1	Kalaheo Blvd. WIM (project planned)	\$150K	Regulate overweight trucks from harbor and monitor ESAL data vs. design life	N	1	0	0	1	0		
	2	Automatic vehicle identification system; Honolulu Int'l Airport	\$1.435M	Revenue increase and improve traffic flow	Y	1	0	0	1	0		
	3	Airport road signage	\$617,163	Reduce traffic congestion	Y	0	0	0	1	1	0	
	4	Signage and graphics; Honolulu Int'l Airport	\$1,839,155	Reduce traffic congestion	Y	1	0	0	1	0		
ID	1	a. Realigning highways, rehabilitating pavements and bridges b. Truck climbing lanes are constructed at locations meeting regulations. Of grade, average daily truck traffic (%) c. Truck use left lane restrictions---size and weight restriction, restored ramp paving	High	Improves highway operations, safety, and service to public	Y	1	0	0	1	1		
	2		Low	Congestion reduced, safety improve	Y	0	0	0	1	1		
	3		Low	Safety, infrastructure preserved, incidents cleared sooner	Y	1	0	0	0	1	0	
	4	d. ITS including WIM	Moderate	Trucks assisted with information and speedier weigh-in	Y	0	0	0	0	1	0	
	5	e. General signing improvements	Low	Safety	Y	0	0	0	1	0		

Question 5						Factors Driving Selection						
For each strategy recommended or implemented, provide information		Project Description	Cost	Expected Benefits	Evaluated?	Greatest Potential Benefit	Low Cost	Ease of Implementation	Cost-Effectiveness	Public Acceptance	Other	Explanation of Other
	6	f. Restrictions on state routes' spring thaw that allow triples on Interstate	Low	Preserve infrastructure, better truck productivity	Y	1	0	0	1	0		
	7	g. Better quantity and quality of Dept. of Energy enforcement	Moderate	Safety---Better hazardous material control	Y	0	0	0	0	1		
KS	1	Plan to use a variable message sign approximately 1 mile in advance of the weigh station to inform truck drivers of the open or closed status. Presently, have skid marks at the exit gore indicating indecision	60k	Smoother traffic flow in advance of the exit ramp for the weigh station; should eliminate the skid marks at the gore	N	1	1	1	1	1		
	2	Under the CVISN program, Kansas plans to meet Level One deployment by Sept. 2003	N/A		N	1	0	0	1	0		
	3	Kansas has authorized PrePass to install electronic clearance at the six weigh stations on Interstate highways. One of the six sites will have mainline WIM for weight clearance		Allow the compliant carriers to bypass the weigh station, which allows enforcement personnel to concentrate on noncompliant carriers	N	1	1	0	1	0		
	4	US-50 Emporia to Newton passing lanes	N/A	Passing lanes (equivalent to climbing lanes) allow vehicles to pass slower vehicles at several locations along high truck count two-lane route (see report)	Y	0	0	1	1	1		
MD	1	Climbing lanes and lane restrictions	N/A	Highway safety, reduce congestion	N	0	0	1	1	1	0	
	2	Commercial Vehicle Safety Plan	N/A	Better enforcement, coordination of efforts, reduction in accidents	Y	1	0	1	1	0	0	

Question 5	For each strategy recommended or implemented, provide information	Project Description	Cost	Expected Benefits	Evaluated?	Factors Driving Selection						Explanation of Other
						Greatest Potential Benefit	Low Cost	Ease of Implementation	Cost-Effectiveness	Public Acceptance	Other	
	3	Early Warning Ramp Hazard Devices	N/A	Safety, reduction in roll-over accidents	Y	1	0	1	1	1	0	
	4	Commercial Vehicle Information Systems and Networks	N/A	Increased through-put & reduction in congestion at weigh stations, effective use of enforcement	NY	1	0	0	0	0	0	
	5	Incident management	N/A	Reduction in congestion, timely driver information on road closures, effective use of resources, effective traffic management, coordination of efforts	Y	1	0	0	0	1	0	
MN	1	All new or rebuilt ramps and intersections use 70--75 (?) ft design vehicle (too many to list built-into design standards)	?	Turning radii improved to accommodate trucks	Y	0	0	1	0	0	0	
	2	Truck climbing lanes	?	Safer movements	Y	0	0	0	1	1	0	
	3	Truck restrictions on I-35 E St. Paul	?	decrease noise, and community impacts	Y	0	0	0	0	1	0	
	4	Improve incident management in the Minn./St. Paul metro area (e.g., highway helper)	?	Reduced congestion, delay, and improved reliability/travel times	Y	1	0	0	1	1	0	
	5	Intelligent warning devices	?		Y	0	0	0	1	0	0	
	6	WIM	4M	Better understand truck travel patterns and truck weight patterns. Improved pavement design	Y	1	0	0	0	0	0	
	7	Improved directional signing	?	Safety and improved driver awareness	Y	0	1	1	0	1	0	
	8	Warning signs (e.g., advanced signal warning flashers)	?	Improved safety	Y	0	1	1	0	1	0	
MO	1	Joplin Prototype Project (electronic screening in progress)		Interoperability with existing regional toll systems and national electronic screening programs	NY							

Question 5		Project Description	Cost	Expected Benefits	Evaluated?	Factors Driving Selection						Explanation of Other
For each strategy recommended or implemented, provide information						Greatest Potential Benefit	Low Cost	Ease of Implementation	Cost-Effectiveness	Public Acceptance	Other	
MT	2	North American International Trade Corridor ITS/CVO (in progress) planning study		Enhance safety, reduce transaction costs, economic growth	NY							
	1	Allowed additional group axle weights for overweight vehicles	0	Benefits to public, not to state	N				1			
NE	2	Installed "prepay" at entry scales to state on I-80 in conjunction with WIM at those locations.	Minor	Safety and more time for officers to inspect other trucks.	Y	0	1	1	0	1	1	Safety
	1	Lane restrictions	0	Distributed ESALs to "inside" lane; increase life of pavement in "outside lane"	N	0	1	1	1	0	0	
NV	2	Truck climbing lanes	?	Reduce congestion and improve safety	N	1	0	1	0	1	0	
	3	Lane restrictions (I-395 in Carson)	0	Increase pavement	N					1	0	
	4	Time-of-day restrictions on Hoover Dam	0	Reduce congestion during visitor hours and improve pedestrian safety		1	1	1	1	1	0	
	5	Truck parking by explosive-laden vehicles on US-95 in selected towns	0	Reduce probability of explosions in towns	N					1		
	6	WIM	?	Reduced delays to commercial trucking	N	1	1	1	1	0	0	
	7	Triples	?	Improved efficiency for truckers. Decreased pavement loadings and vehicle emissions	N	1	1	1	1	0	0	
	8	Electronic screening	?	Reduced delays to commercial vehicles	N	1	1	1	1	0	0	

Question 5		Project Description	Cost	Expected Benefits	Evaluated?	Factors Driving Selection						Explanation of Other
For each strategy recommended or implemented, provide information						Greatest Potential Benefit	Low Cost	Ease of Implementation	Cost-Effectiveness	Public Acceptance	Other	
NJ	1	Overall comment: Road network in NJ is just too heavily used by both in-state and through-state truck movements. Public opinion: there are just too many trucks/vehicles										
NY	1	Red Hook Container Barge: More efficient permanent barge system to move marine containers between Red Hook and Port Newark, thus alleviating truck trips through the boroughs of New York, especially Brooklyn	\$5.75M	Reduction of truck trips in New York					1			
	2	Arthur Sheridan Expressway resurfacing and safety improvement	\$18M	Rehabilitation of highway helps smooth and faster truck movements and delivery schedule					1			
	3	Construct Edgewater Road (NYC) dedicated truck route	\$11.2M	Will facilitate movement of freight separated from other forms of traffic					1			
	4	New England Thruway (CT): Noise barrier	\$2.73M	Environmental improvement, noise mitigation					1			
	5	New York State Thruway: Bridge rehabilitation between interchange 8 to Tappan Zee Bridge	\$20M	Bridge improvement will reduce congestion and help smooth truck movement across the Hudson River					1			
	6	Freight tunnel between Brooklyn and Staten Island or NJ	\$20M for EIS \$2B for construction	Tunnel will help freight movement into and out of NY; will reduce number of trucks on the congested roads					1			

Question 5		Project Description	Cost	Expected Benefits	Evaluated?	Factors Driving Selection						Explanation of Other
For each strategy recommended or implemented, provide information						Greatest Potential Benefit	Low Cost	Ease of Implementation	Cost-Effectiveness	Public Acceptance	Other	
	7	Operational, geometric, and safety improvements on Bruckner and Sheridan Expressways	\$10.2M	Improved geometry helps smooth truck movements						1		
	8	Gowanus Expressway--Reconstruction and EIS	\$13.7M &	Will improve highway for heavily used truck route and improve access to freight facilities along the way						1		
ND	1	Newer upgraded structures		Increased vertical clearance	Y	0	0	0	1	0	0	
	2	Truck climbing lanes		Traffic flow	Y	1	0	0	0	0	0	
	3	Restriction of trucks on some roads		Increased pavement life	Y	0	0	0	1	0	0	
OH	1	Downtown Dayton (I-75)		Geometric improvements (in study)								
	2	70/71 split downtown Columbus		Study to begin								
OR	1	(Region 1) Replace the MLK (SPRR overcrossing) Blvd. Bridge on OR-99E	\$28M	Did not state								
	2	(Region 1) Construct split diamond interchange including new structure over I-205 at Sunnybrook I/C (phase 1)	\$26M	Did not state								
	3	(Region 1) Implement Phase 3 of Camelot I/C---Sylvan I/C project on US-26. Reconstruct Sunset Highway mainline, replace Canyon Road crossing, add third lanes.	\$24.3M	Did not state								
	4	(Region 2) Provide thick overlay/reconstruction on I-5 (SB) Phase 1 from Jefferson I/C to N. Albany I/C	\$19.4M	Did not state								

Question 5	For each strategy recommended or implemented, provide information	Project Description	Cost	Expected Benefits	Evaluated?	Factors Driving Selection						Explanation of Other
						Greatest Potential Benefit	Low Cost	Ease of Implementation	Cost-Effectiveness	Public Acceptance	Other	
	5	(Region 2) Improve alignment, widen shoulders, and build channelization at appropriate locations on US-20 from Pioneer Mountain to Eddyville, Phase 1	\$10.9M	Did not state								
	6	(Region 2) Provide a thick overlay on OR-126 from the Willamette River to I-5	\$10.7M	Did not state								
	7	(Region 3) Grind and inlay/overlay pavement on I-5 from Canyonville to Azalea	\$12.7M	Did not state								
	8	(Region 3) Preserve pavement on I-5 from S. Ashland to N Ashland I/C. Includes deck overlay and rail work on two overcrossings (Crowson Rd. and Eagle Mill Road)	\$11.3M	Did not state								
	9	(Region 3) Grind and inlay/overlay pavement on I-5 in the Roseburg area from Garden Valley Blvd. to Roverts Creek	\$11.3M	Did not state								
	10	(Region 4) Address alignment issues, guardrail upgrades and rock fall on US 97 from Modoc Point to Algoma (north of Klamath Falls)	\$10.0M	Did not state								
	11	(Region 4) Preserve pavement on US-20 in Deschutes County from Horse Ridge to Fredrick Butte Road	\$5.8M	Did not state								

Question 5		Project Description	Cost	Expected Benefits	Evaluated?	Factors Driving Selection						Explanation of Other
						Greatest Potential Benefit	Low Cost	Ease of Implementation	Cost-Effectiveness	Public Acceptance	Other	
SC	For each strategy recommended or implemented, provide information											
	12	(Region 4) Preserve pavement on US-97 between Crescent and Chemult in Klamath County	\$4.7M	Did not state								
	13	(Region 5) Inlay/overlay pavement on I-84 in Malheur County from Farewell Bend to N. Jacobsen Gulch	\$18.6M	Did not state								
	14	(Region 5) Inlay/overlay pavement and undertake bridge rail work on I-84 between Hilgard and La Grande	\$8.8M	Did not state								
	15	(Region 5) Construct new arterial, including culvert and signal work on Highway 201 in Ontario between SW 4th Ave. and North Oregon Street	\$8.2M	Did not state								
TN	1	Truck climbing lanes	?	Move slow moving trucks from main line on Interstate	N	1	0	0	0	0	0	
	2	Designated truck parking areas at statewide rest areas and welcome centers	?	Increase safety at facilities by reducing truck and car/pedestrian conflicts	NY	1	0	0	0	1	0	
	3	Lane restrictions for trucks	\$100K for signs	Provide at least one lane for faster moving vehicles	NY	0	1	0	1	1	0	
	4	Restrictions on trucks on some roads	Minimum	Protect pavement. Reduce concerns of area residents	N	0	1	0	0	1	0	
	5	Improved incident management	?	Reduce exposure of rescue workers; open roads faster	NY	1	1	0	1	1		
	6	ITS strategies	?	Improved freeway operations	NY	1	0	0	1	1		
	7	Weigh-in-Motion	?	Improved freeway operations	NY	1	0	0	0	0		
	8	Improved warning signing	?	Reduce truck overturning accidents	NY	0	0	0	0	0		
TN	1	Climbing lanes		Traffic flow, less congestion	NY	1	0	0	0	1	0	
	2	Memphis Super Terminal		Productivity, less congestion	Y	1	0	0	0	0	0	

Question 5		Project Description	Cost	Expected Benefits	Evaluated?	Factors Driving Selection						Explanation of Other
						Greatest Potential Benefit	Low Cost	Ease of Implementation	Cost-Effectiveness	Public Acceptance	Other	
For each strategy recommended or implemented, provide information	3	I-65 pilot ITS project		Less congestion	NY	1	0	0	0	0	0	
	4	WIM at truck weigh stations		Less congestion, safety	N	1	0	1	0	0	0	
		See Texas Survey Report										
	1	I-15 reconstruction project	\$3B	Improved traffic flow---extended pavement life	NY	1	0	0	1	1	0	
TX	2	Ongoing regulation	0	Smoother traffic flow---reduced truck/car accidents	Y	0	0	0	0	1	1	safety
	3	Ongoing regulation	0	Smoother traffic flow---reduced truck/car accidents	Y	1	0	0	0	0	1	safety
	4	Improvement at ports of entry, ITS; signing, size, and weight	?	Smoother traffic flow, concentrate on bad not good---convenience for Industry	Y	1	0	0	1	1	1	safety, convenience
	1	Lane restrictions	0	Less blockage of high-speed lanes	Y	1	1	1	1	1	0	
WV	2	Improved incident management	?	Less congestion, lower loss of life	Y	0	1	0	1	1	0	
	3	ITS WIM	50k/lane	Reduced congestion due to weaving, improved productivity	Y	1	0	1	1	1	0	
	4	Intelligent signs	?	Less congestion, improved safety	Y	1	0	1	1	1	0	
	1	Truck climbing lanes and lane restrictions	N/A	Reduced congestion and improved LOS on I-80	NY	0	0	0	1	1	0	
WY	2	Improved incident management; during road closures with ITS warning devices	N/A	Reduce impacts to communities near closure	NY	0	1	0	0	1	0	
MPOs	1	Improved highway design	?	Safety	Y	1	1	0	0	0	0	
	2	Incident management		Congestion								
	3	Signing		Safety	Y	1	0	0	0	0	0	
	4	Improved highway geometrics		Safety	Y	1	1					
	5	New or upgraded structures		Safety								
	6	New or improved pavement		Safety								
	7	Modified design standard		Safety								
	8	Restriction or prohibition of trucks on some roads		Improve quality of life				1	0	1		

Question 5	Project Description	Cost	Expected Benefits	Evaluated?	Factors Driving Selection						Explanation of
For each strategy recommended or implemented, provide information					Greatest Potential Benefit	Low Cost	Ease of Implementation	Cost-Effectiveness	Public Acceptance	Other	Other
	9 Improved incident management		Congestion/safety		1			1	1		
	10 ITS strategies to facilitate truck flow on roads		Congestion								
	11 Intelligent warning devices		Safety								
	12 WIM		Economic development/congestion								
	13 Improved warning signing		Safety	Y	1	0	0	0	0	0	
	14 Electronic screening		Economic development/congestion								
	15 Enhanced enforcement to remove noncompliance trucks		Safety								
	16 Improvements in port/shipping infrastructure		Efficiency								
	17 Improvements in air freight infrastructure		Efficiency								
Delaware Valley RPC	1 a. Improved (existing) highway design		Infrastructure better suited to commercial vehicle operations	N	0	0	1	0	0		
	2 c. Improved incident management and intermodal operations		Appropriate emphasis on incident management and intermodal facilities	N	1	0	0	0	0		
	3 d. ITS		Utilization of new technologies well suited to tracking activity	N	0	1	0	0	0		
	4 h. Alternative infrastructure investments		Full and coordinated utilization of all modes	N	1	0	0	0	0		
Denver Reg. COG	1 Regional ITS plan	\$300K	Motorist information traffic management	Y	1	0	0	0	0		
	2 Air cargo study	\$100K	Airport improvements, roadway geometric improvements	N	1	0	0	0	0		
MTC	1 I-880 truck corridor study	N/A	Improve truck flow on corridor arterials	N	1	0	0	0	0	0	
	2 I-205/I-580 truck lanes	\$60M	Improve traffic flows, including safety	Y	1	0	1	1	1	0	
	3 I-80 Quick Response Program	N/A	Improve flow	Y	1	1	1	1	1	0	
	4 WIM study	Varies	Improve truck flow, including safety (eliminate truck merges)	Y	1	1	1	1	1		

Question 7---Comments	
DOTs	Comments
AR	In response to Question 5---The Department, through the normal course of design activities, is exploring strategies related to heavy truck traffic and improved highway design, roadway facilities, and lane restrictions. This is an ongoing process and no specific projects have been identified for these types of improvements. Therefore, specific costs, expected benefits, and factors driving selection have not been determined.
CA	"California Global Gateways Development Plan" goods movement study. Available around Oct. 1, 2001.
HI	Honolulu International Airport Master Plan will include study on traffic flow to include trucks.
KS	Response to Question 2c---Kansas is participating with several states on a corridor plan titled "North American International Trade Corridor Comprehensive and Coordinated ITS/CVO Plan." The three areas that are being addressed are (1) ITS Services Planning, (2) Federal/State Systems Interoperability, and (3) CVO Traveler Information Services. The two outputs of the study will be a Comprehensive ITS/CVO Project Plan and a Corridor ITS/CVO Services Business Model.
MN	The Minnesota Freight Flow Study and other planning information is available at www.dot.state.mn.us/ofrw/freight.html .
NV	Improved pavement design was addressed under SHRP and LTPP. However, at this time, Nevada's own mix design has proved superior to SuperPave. ITS/CVO improvements and attendant costs are addressed in Nevada's ITS/CVO Business Plan.
NJ	Under Large Truck (102"/53' & twin-T) Regulations: Implement regulations that force a better distribution of large truck trips---In-state movement use access network and through truck trips--no stops in state use national large truck network.
NY	Currently, NYMTC is working on the Regional Freight Plan project, which includes recommendation for major capital investments, policies to improve the flow of goods, and operating and financial programs to make the changes work. The plan of action and scope of work is the product of NYMTC's Freight Transportation Working Group, which consists of a wide range of businesses and organizations involved in the freight issues in the New York metro area. The project built on the results of the recent major freight studies can be found on the NYMTC website at: http://www.nymtc.org/downloadablepgs/freight .
ND	Several studies should be completed soon, such as a biennial freight study, several corridor studies, intermodal facilities, etc.
SC	1a. Interstate congestion on I-85 and I-526. 1b. Insufficient truck parking at older rest areas. 3a. Although South Carolina DOT has no active programs in this area, we follow AASHTO guidelines for design and modify pavements as necessary. 3c. Have implemented truck lane restrictions on a trial basis. 3g. Enforcement is not a South Carolina DOT function. 3h. Not a South Carolina DOT function.
WY	Wyoming DOT conducted a truck parking study.
MPOs	
Denver Reg. COG	Outside of traffic congestion on most major freeways, the motor carriers have not voiced any other concerns to us.
Metro Wash COG	Both Maryland and Virginia are active in truck planning and there is great interest in ITS.
Notes: ITS = intelligent transportation system; CVO = commercial vehicle operations; SHRP = Strategic Highway Research Program; LTPP = long-term pavement performance; NYMTC = New York Metropolitan Transportation Council; COG = Council of Governments.	

Abbreviations used without definition in TRB Publications:

AASHO	American Association of State Highway Officials
AASHTO	American Association of State Highway and Transportation Officials
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
IEE	Institute of Electrical and Electronics Engineers
ITE	Institute of Transportation Engineers
NCHRP	National Cooperative Highway Research Program
NCTRP	National Cooperative Transit Research and Development Program
NHTSA	National Highway Traffic Safety Administration
SAE	Society of Automotive Engineers
TCRP	Transit Cooperative Research Program
TRB	Transportation Research Board
U.S.DOT	United States Department of Transportation