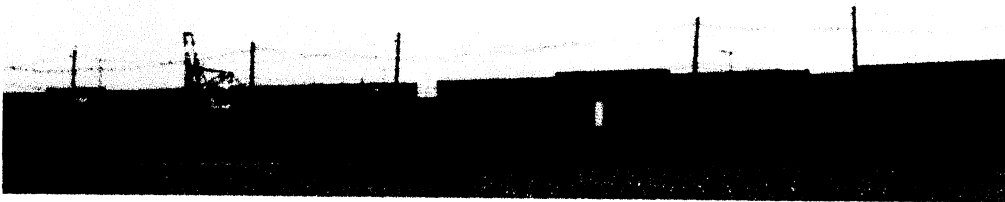
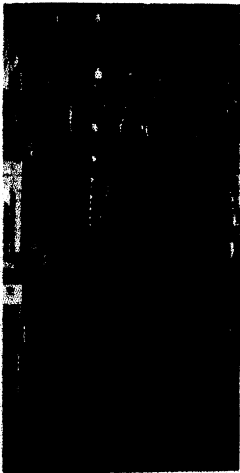




U.S. Department
of Transportation
MARITIME
ADMINISTRATION

Intermodal Access to US Ports Report on Survey Findings



August 2002

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Intermodal Access to US Ports Report on Survey Findings

Prepared for

**U.S. Department of Transportation
U.S. Maritime Administration
Office of Intermodal Development**

Prepared by

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analyses for informed decision-making

August 2002

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Executive Summary

The US Marine Transportation System relies on the effective integration of freight modes – water, truck and rail -- for the smooth transit of cargo and passengers from vessels through terminals and to and from inland destinations. Without efficient land and waterside access, port and terminal investments cannot be fully realized or used.

In recognition of the growing importance of intermodal access, the US Maritime Administration undertook a comprehensive survey of access conditions at US ports. The 2001 Intermodal Access Survey gauged the state of roadway, rail and waterside access conditions at US ports and pinpointed potential actions for the future.

Among the significant findings:

- ***Port access conditions are generally acceptable today but may not sustain continued cargo growth and international trade:*** The current state of the intermodal access system for US ports is generally acceptable for handling the existing volumes of cargo flows. However, “acceptable” is a different condition than “optimal.” Acceptable means that ports, freight transportation providers and shippers can work around problems and can tolerate a certain amount of delay and costs. Acceptable conditions can quickly become unacceptable as cargo volumes increase in the future or if a segment of the system becomes unusable.

The survey also revealed an early indication of this trend: Unacceptable conditions were more often found at the ports handling containerized cargo, particularly those situated in urban areas. The ports located in key population centers in the US face more congestion on landside transportation systems but serve a critical need by directly supplying these areas. Many of these ports anticipate even greater cargo flows in the future. Containerized cargo tends to be higher value and more time sensitive. Accordingly, the container ports and ports located in urbanized areas are most likely to be the first to exhibit stresses in the intermodal access system.

- ***The condition of key elements of the intermodal access system remains unacceptable:*** A significant number of US ports reported unacceptable conditions, including:
 - Local roads to access the ports. Many ports reported unacceptable conditions on local roads in terms of turning lanes, at-grade crossings, turning radii and the availability of truck-only routes.
 - At-grade rail crossings. Unacceptable conditions at at-grade rail crossings were reported on port, local, state and interstate roads.
 - Rail access issues. Ports reported unacceptable rail access conditions in terms of shared use of rights-of-way with rail passenger service and drayage time and costs.

- Channel depth for container ports. Although the survey showed the improvement generated through the major investments made by the public and private sectors to deepen channels, additional work is needed. Nearly 30 percent of the container ports reported unacceptable channel depths.
- The availability of truck-only routes. Truck-only routes are of increasing interest as cargo volumes grow and areas seek to separate freight and passenger traffic. The majority of the ports responding to the survey indicated unacceptable conditions in terms of the availability of truck-only routes within ports, on local roads and on state/interstate roads.
- The growing importance of traffic information. Radio transmission and web-based information on traffic conditions is of increasing importance to ports and transportation providers as they manage the inland movement of maritime cargo. The increased need is reflected in the large number of ports reporting unacceptable conditions for these emerging elements of the intermodal access system.
- ***The survey also revealed the positive results of intermodal access investments:*** More than 90 percent of the ports reported acceptable or higher conditions in terms of the availability of on-dock rail facilities and aids to navigation on the waterways.

I. Introduction

The September 1999 Report to Congress, *An Assessment of the US Marine Transportation System*, noted:

“As the world’s leading maritime and trading nation, the United States relies on an efficient and effective marine transportation system (MTS) to maintain its role as a global power. The MTS provides American businesses with competitive access to suppliers and markets in an increasing global economy. With its vast resources and access, the MTS is an essential element in maintaining economic competitiveness and national security.”

The MTS includes the waterways, ports and their intermodal connections, vessels, vehicles and system users. As such, intermodal access to US ports is a critical component. The MTS relies on the effective integration of modes – water, truck, and rail – and the smooth transit of cargo and passengers from vessels through terminals and to and from inland locations. Without efficient land and waterside access, port and terminal investments cannot be fully realized or used. The US Maritime Administration (MARAD) and the US Coast Guard are the agencies responsible for the MTS.

A. Purpose of this Report

This report summarizes the results of a comprehensive survey of intermodal access conditions at US ports. The survey, which was distributed to deepwater ports throughout the US with the approval of the Office of Management and Budget (OMB) in 2001, was designed to gauge the state of roadway, rail and waterside access at ports.

The report contains three chapters:

- Survey findings;
- Comparison of the Survey findings with other relevant studies; and
- Conclusions

The report also contains five appendices. The first appendix provides background on the survey design, approach, dissemination and analysis and contains a copy of the survey instrument. The second appendix contains a list of the ports that completed the survey. The last three appendices contain the results of the surveys for:

- All the ports that responded to the survey;
- By container and non-container ports; and
- For the top 15 US deepwater container Ports based on the American Association of Port Authorities (AAPA) rankings.

B. Use of this Report

The results of the survey paint a picture of the current state of intermodal access at US ports. The results summarize the overall situation and pinpoint key areas where conditions warrant additional attention. As such, the survey findings provide:

- An understanding of baseline conditions; and
- A roadmap of potential action areas to improve the overall efficiency of cargo flows through US ports and terminals.

Use of the survey instrument in subsequent years can monitor the effectiveness of investments in terms of changes in intermodal access conditions.

II. Survey Findings

This chapter summarizes the results of the survey. The results are organized into four sections:

- Findings from the overall sample;
- Findings for the Top 15 deepwater container ports; and
- Findings for container ports;
- Findings for non-container ports.

The analysis focused on the percentage of ports responding that conditions regarding key attributes of the intermodal access system were currently below acceptable levels. Efficient and effective cargo movement cannot occur under those circumstances, nor can additional cargo flows be easily handled. This approach helps identify those elements of the intermodal access system that are currently working, as well as those system elements where additional emphasis and potential investment are warranted.

Each of the analyses summarizes the overall condition of cargo flows and those system attributes where the greatest number of ports identified unacceptable conditions. The survey included key existing and emerging attributes of the intermodal access system. Existing attributes include turning radii, turning lanes, and drayage costs, which have been key considerations in the intermodal access system for some time.

Emerging attributes focus primarily on electronic and service elements that are growing in importance. These include web-based information, radio transmission of local traffic conditions, "paperless" gates, the availability of "truck-only" roadways and gate hours. In two cases -- electronic toll collection/vehicle identification and web-based traffic information -- an insufficient number of responses were received. Accordingly, these attributes were not assessed.

A. Findings from the Overall Port Agency Sample

The 59 ports responding to the 2001 survey represented small, medium and large deepwater maritime operations throughout the US with various levels and types of cargo flows. Many indicated that intermodal access conditions were at or above acceptable levels to handle current cargo

Figure II-1: Percentage of Ports Indicating Below Acceptable Flow Conditions on Key System Elements

Roadways within the Port	7%
Local Roads	25%
State/Interstate Roads	20%
Rail Line-Haul Moves	20%
Rail Moves on Rights-of-Way Shared with Passenger Operations	23%
Sufficient depth in federal channels	26%
Sufficient depth in private channels and at berths	22%

flows, reflecting the significant investments that have been made in the last several years by federal, state and local governments in the marine transportation system.

However, a large portion of the ports still indicated that flow conditions remain unacceptable and, therefore, require additional attention. As shown in Figure II-1, local roads and the depth of federal channels are the two key flow condition areas with the highest number of ports reporting unacceptable conditions – 25 percent of the ports indicated that the local roads used to access their facilities had unacceptable flow conditions. More than one-quarter of the ports indicated that channel depths were still unacceptable in federal waterway channels.

Figure II-2: Existing Key System Elements with the Greatest Number of Ports Reporting Unacceptable Conditions

Number of turning lanes on local roads	25%
Location of turning lanes on local roads	26%
Traffic flows at at-grade rail crossing within the port	28%
Traffic flows at at-grade rail crossing on local roads	37%
Turning radii on local roads	28%
Availability of near-dock rail terminals	22%
Cost and travel time associated with draying cargo between the port and rail heads	27%

Twenty percent of the ports indicated that flow conditions remain unacceptable on state/interstate roads and on the rail freight long distance routes for their ports. Flow conditions were reported as most acceptable within the port properties.

The worst conditions were reported on the local roads used to access ports. As shown in Figure II-2, local road conditions were unacceptable in terms of turning lanes and at-grade cross-

ings.

Conditions within the port at at-grade crossings were also reported by 28 percent of the ports as unacceptable. Drayage costs and travel times between port facilities and railheads were considered unacceptable by over a quarter of the ports.

The best system elements – reported by ports as at or above acceptable conditions – were height and weight limitations within ports and on state/interstate roads, availability of on-dock rail yards, condition of rail tracks and rights-of-way on main lines, grades on rail rights-of-way, aids to navigation and maintenance dredging. Less than 10 percent of the ports reported unacceptable conditions for these key system elements (See Appendix C).

Emerging key intermodal access system elements showed the highest numbers of unacceptable conditions. The high numbers reflect the increasing need for these types of services and facilities. As shown in Figure II-3, high percentages of ports found unacceptable conditions in terms of “truck-only” routes within their ports, on local roads and on state/interstate roads. Nearly 75 percent of ports

Figure II-3: Emerging Key System Elements with the Greatest Number of Ports Reporting Unacceptable Conditions

Availability of truck-only routes within ports	36%
Availability of truck-only routes on local roads	72%
Availability of truck-only routes on state and interstate roadways	52%
Radio transmission of conditions on roadways within the port	35%
Radio transmission of conditions on local roadways	34%
Availability of “paperless” gates	48%

reported a lack of available truck-only routes on local roads used to access their ports. Over a third of ports reported unacceptable conditions in terms of radio transmission of road conditions within the port and on local roads. Nearly half of the ports reported unacceptable conditions in terms of “paperless” gates. Additional findings from the overall response pool of ports are provided in Appendix C.

B. Findings for the Top 15 US Deepwater Container Ports

Containerized cargo tends to be higher value and more time sensitive than other types of maritime cargo. Consequently, there is generally a greater need to move this cargo quickly and efficiently through the intermodal access system. This requirement is reflected in the responses received from the container ports. This section summarizes the findings from the Top 15 deepwater container ports in the US. The findings for all of the US containerized ports that responded to the survey are discussed in the next section.

The top 15 deepwater container ports, as ranked by AAPA, are shown in Figure II-4. These ports move 90 percent of the maritime containerized traffic through US ports. Many have experienced substantial growth in the past four years and are anticipating experiencing similar cargo growth in the future, meaning that their intermodal access needs will also intensify.

In addition, nearly all of the top 15 ports are located in the largest population centers in the US. Being at the center of population concentrations does increase the attractiveness of a port – cargo wants to move as close as possible to large markets. However, their location within dense urban areas can also mean a greater likelihood of more intense congestion and less acceptable conditions

Figure II-4: Top 15 US Deepwater Container Ports

Port	State	AAPA Ranking	Cargo Growth (1996-2000)	Population Ranking
Long Beach	CA	1	172%	2
Los Angeles	CA	2	136%	2
New York and New Jersey	NY, NJ	3	143%	1
San Juan	PR	4	98%	20
Oakland	CA	5	123%	5
Seattle	WA	6	102%	13
Charleston (SCSPA)	SC	7	156%	77
Virginia Port Authority (VPA)	VA	8	125%	31
Tacoma	WA	9	128%	13
Houston	TX	10	136%	10
Georgia Ports Authority	GA	11	158%	11
Miami-Dade Seaport	FL	12	135%	12
Jacksonville (FL) Port Authority	FL	13	60%	46
Everglades	FL	14	104%	12
Baltimore	MD	15	100%	4

Cargo Growth is based on PIERS data.

Population ranking is based on Census 2000 Ranking Tables for Metropolitan Areas

VPA Cargo Growth shown is for Norfolk.

Georgia Ports Authority Growth is for Savannah

on the landside intermodal access system. The survey findings for the top 15 deepwater container ports confirm this situation.

The findings from the response pool of the Top 15 ports are summarized in this section and detailed in Appendix D.

As shown in Figure II-5, 20-to-25 percent of the Top 15 deepwater container ports reported unacceptable flow conditions on the landside elements of the intermodal access system, a greater percentage of ports than the overall sample. More of the Top 15 ports indicated unacceptable flow conditions on their internal port roads

Figure II-5: Percentage of the Top 15 Ports Indicating Below Acceptable Flow Conditions on Key System Elements

Roadways within the Port	20%
Local Roads	20%
State/Interstate Roads	27%
Rail Line-Haul Moves	21%
Rail Moves on Rights-of-Way Shared with Passenger Operations	36%
Sufficient depth in federal channels	14%
Sufficient depth in private channels and at berths	15%

and on state/interstate roads, reflecting the more intensive movement of cargo.

Over 35 percent of the Top 15 ports reported unacceptable flow conditions on rail rights-of-way shared with passenger operations. This rating reflects the greater use of rail to move cargo inland at these ports, as well as the greater use of rail passenger systems in urbanized areas. The number of ports reporting unacceptable conditions is of particular concern because the demand for and desirability of rail passenger service is increasing at the same time that more maritime cargo needs to move by rail. Conflicting priorities and capacity needs are anticipated to grow, making this intermodal system element a key issue area.

The impact of the substantial federal, state and local investment in channel deepening projects is also reflected in the conditions reported by the Top 15 reports. The vast majority of the Top 15 ports indicated acceptable or above acceptable conditions in terms of sufficient channel depth at their facilities, more than the overall pool of respondent ports. The Top 15 ports generally reported acceptable or above acceptable conditions on all elements of the waterside access system.

Figure II-6: Existing Key System Elements with the Greatest Number of Top 15 Deepwater Container Ports Reporting Unacceptable Conditions

Number of turning lanes on local roads	20%
Location of turning lanes on local roads	20%
Number of turning lanes on state/interstate roads	21%
Location of turning lanes on state/interstate roads	21%
Traffic flows at at-grade rail crossing within the port	45%
Traffic flows at at-grade rail crossing on local roads	31%
Turning radii on local roads	36%
Height/width restrictions for rail tunnels	25%
Cost and travel time associated with draying cargo between the port and rail heads	21%
Number of spurs/tracks within the terminals and on port property	21%

The Top 15 ports reported a higher number of existing key intermodal access system elements than the overall sample. More than 20 percent of the Top 15 ports indicated unacceptable ratings, reflecting the greater amount of cargo moving through these gateways.

A greater percentage of local roadways serving the Top 15 ports had unacceptable conditions in terms of the number and location of turning lanes on local, state and interstate roadways than the overall sample. Over 35 percent of the Top 15 ports reported that turning radii on local

roads were unacceptable.

A much higher level of unacceptable conditions than the overall sample were reported regarding at-grade crossings, reflecting the greater use of rail to move cargo inland at the Top 15 ports. More rail cargo translates into a greater number of trains moving daily, meaning that there are potentially more disruptions to roadway traffic at at-grade rail crossings. Conditions at at-grade crossings within the ports were particularly severe, with 45 percent of the Top 15 ports reporting unacceptable conditions. Over 30 percent reported similar problems at at-grade crossings on local roads used to access the port.

A greater number of unacceptable conditions than the overall sample were also found on the rail freight infrastructure serving the Top 15 ports. A quarter of the Top 15 ports reported unacceptable height and weight clearances on rail tunnels. Over 20 percent reported an unacceptable number of rail spurs on port property.

A lower percentage of the Top 15 ports indicated unacceptable conditions regarding the availability of near-dock rail facilities than the overall sample – only 15 percent of the Top 15 ports indicated unacceptable availability of these facilities. The lower percentage likely reflects the major recent investments in on-dock rail facilities by these ports.

With their greater levels of existing cargo flows and anticipated cargo growth, the Top 15 ports demonstrated a greater need for some of the emerging desirable elements of the intermodal access system. The majority of the Top 15 ports reported unacceptable conditions regarding the availability of truck-only routes on all aspects of the roadway network – within their ports, on local roads and on state/interstate roadways (Figure II-7), a greater percentage than the overall pool of respondent ports.

Figure II-7: Emerging Key System Elements with the Greatest Number of Top 15 Deepwater Container Ports Reporting Unacceptable Conditions

Availability of truck-only routes within ports	71%
Availability of truck-only routes on local roads	86%
Availability of truck-only routes on state and interstate roadways	75%
Radio transmission of conditions on roadways within the port	50%
Radio transmission of conditions on local roadways	40%
Availability of "paperless" gates	50%
Length of gate hours	38%

Half of the Top 15 ports reported unacceptable availability of radio transmission of conditions of roadways within the port. Forty percent reported unacceptable availability of radio transmission of conditions of roadways on local roads. Of the Top 15 ports reporting conditions regarding the availability of web-based traffic information, half of the ports indicated unacceptable conditions.

The increased emphasis on the need to move more cargo faster through terminal gates was also reflected in the responses of the Top 15 ports. Nearly 40 percent of the Top 15 ports reported that the length of gate hours was unacceptable. Half of the Top 15 ports reported that the availability of paperless gates was unacceptable.

C. Findings from the Responses of all the Container Ports

Twenty-nine of the 59 ports responding to the 2001 survey were characterized as container ports. This section summarizes the findings from the responses received from these ports. The findings from the response pool of the container ports are provided in Appendix E.

The container ports reported a higher percentage of unacceptable flow conditions on all aspects of the intermodal access system – roadways, rail and waterside – than the overall response pool of ports (Figure II-8). The greater draft requirements of the new generation of container vessels were also clearly reflected in the responses – nearly 30 percent of the container ports reported insufficient channel depths.

Figure II-8: Percentage of Container Ports Indicating Below Acceptable Flow Conditions on Key System Elements

Roadways within the Port	10%
Local Roads	25%
State/Interstate Roads	30%
Rail Line-Haul Moves	22%
Rail Moves on Rights-of-Way Shared with Passenger Operations	37%
Sufficient depth in federal channels	29%
Sufficient depth in private channels and at berths	28%

All of the container ports reported a greater percentage of unacceptable conditions regarding existing key elements of the intermodal access system (Figure II-9). Unacceptable conditions were reported on roads in terms of turning lanes, turning radii, at-grade crossings and weight restrictions on state/interstate road bridges. Concerns about weight restrictions may reflect the increasing number of overweight containers that would like to move on the domestic roadway system.

The cost and travel time associated with draying or moving cargo between port terminals and railheads is of particular concern to the container ports. Nearly one-third of the container ports reported unacceptable conditions for this intermodal system element. More than 20 percent of the container ports reported unacceptable height and weight limitations, as well as unacceptable rail bed and signal conditions at at-grade crossings.

Figure II-9: Existing Key System Elements with the Greatest Number of the Container Ports Reporting Un-acceptable Conditions

Number of turning lanes on local roads	25%
Location of turning lanes on local roads	22%
Number of turning lanes on state/interstate roads	25%
Location of turning lanes on state/interstate roads	20%
Traffic flows at at-grade rail crossing within the port	43%
Traffic flows at at-grade rail crossing on local roads	52%
Traffic flows at at-grade rail crossing on state/interstate roads	24%
Turning radii on local roads	36%
Weight limitations on state/interstate roadway bridges	20%
Height/width restrictions for rail tunnels	23%
Cost and travel time associated with draying cargo between the port and rail heads	32%
Availability of near-dock rail terminals	21%
Condition of rail at-grade crossings (e.g., signals and roadbed)	23%

The responses of the container ports also reflect the greater need for speed and information to move containerized cargo (Figure II-10). Three-quarters of the container ports reported unacceptable conditions in terms of the availability of truck-only routes on local, state and interstate roads. Over 40 percent of the container ports reported unacceptable conditions regarding radio transmission of conditions on the roadways system.

Half of the container ports reported unacceptable conditions in terms of the availability of "paperless" gates. However, reflecting the recent initiatives to extend gate hours at container facilities, only 20 percent of the container ports indicated unacceptable conditions in terms of length of gate hours.

Figure II-10: Emerging Key System Elements with the Greatest Number of the Container Ports Reporting Unacceptable Conditions

Availability of truck-only routes within ports	38%
Availability of truck-only routes on local roads	77%
Availability of truck-only routes on state and interstate roadways	75%
Radio transmission of conditions on local roadways	45%
Radio transmission of conditions on state/interstate roadways	41%
Availability of "paperless" gates	50%
Length of gate hours	20%

D. Findings from the Non-Containerized Ports

Thirty of the ports responding to the survey were classified as non-container ports, meaning that the majority of the cargo flowing through the port was handled as bulk or breakbulk movements. These commodities can be less time sensitive and potentially more forgiving of conditions on the intermodal access system. Accordingly, the non-container ports reported more acceptable conditions than the over-

Figure II-11: Percentage of Non-Container Ports Indicating Below Acceptable Flow Conditions on Key System Elements

Roadways within the Port	3%
Local Roads	24%
State/Interstate Roads	10%
Rail Line-Haul Moves	18%
Rail Moves on Rights-of-Way Shared with Passenger Operations	10%
Sufficient depth in federal channels	24%
Sufficient depth in private channels and at berths	14%

all sample in a number of flow condition areas (Figure II-11). However, flow conditions on local roads and sufficient depth in federal channels remained at unacceptable levels for nearly 25 percent of the non-container ports. The findings from the response pool of the non-container ports are provided in Appendix E.

Figure II-12: Existing Key System Elements with the Greatest Number of Non-Container Ports Reporting Unacceptable Conditions

Number of turning lanes within the port	21%
Number of turning lanes on local roads	26%
Location of turning lanes on local roads	31%
Traffic flows at at-grade rail crossing on local roads	23%
Turning radii on local roads	28%
Weight limitations on local road bridges	22%
Weight, height or other restrictions on local roads	20%
Availability of near-dock rail terminals	22%
Cost and travel time associated with draying cargo between the port and rail heads	20%
Environmental issues in federal channels	21%

The non-container ports reported more elements with unacceptable conditions than the overall sample regarding existing key system elements. Non-container ports reported unacceptable conditions particularly on local roadways. Unacceptable conditions on local roadways were reported by more than 20 percent of the non-container ports in terms of number and location of turning lanes, at-grade rail crossings, turning radii, weight limitations on bridges and other weight, height and length restrictions. (Figure II-12).

In terms of rail access, 20 percent of the non-container ports re-

ported unacceptable conditions with regard to drayage time and cost, along with the availability of near-dock rail terminals. The non-container ports also reported more unacceptable environmental conditions regarding federal channels than the overall response pool of ports.

The non-container terminals also showed a concentration of unacceptable conditions in the emerging key elements of the intermodal access system (Figure II-13). Two-thirds of the non-container ports reported unacceptable conditions in terms of the availability of truck-only routes on local roads. One-third of the non-container ports indicated unacceptable conditions in terms of the availability of truck-only routes on port roads, while nearly 30 percent of the non-container ports reported unacceptable conditions in terms of truck-only routes on state and interstate roads.

Port-related communication and signage on local roads were also a concern for the non-container ports. Nearly 30 percent of the non-container ports reported unacceptable conditions in terms of radio transmission and port-specific signage on local roads.

Figure II-13: Emerging Key System Elements with the Greatest Number of the Non-Container Ports Reporting Unacceptable Conditions

Availability of truck-only routes within ports	33%
Availability of truck-only routes on local roads	67%
Availability of truck-only routes on state and interstate roadways	27%
Radio transmission of conditions on local roadways	27%
Port-specific signage on local roads	29%

III. Comparison of the Survey Findings with Other Relevant Reports

This chapter reviews the findings from the 2001 Intermodal Access Conditions Survey to other relevant recent studies and reports. As part of the analysis, the findings were compared and reviewed in terms of three studies:

- The 1997 Port Intermodal Impediments Survey;
- The 2000 NHS Intermodal Freight Connectors Report to Congress; and
- The forthcoming *Improving and Financing Access to US Cargo Hubs* study from the National Cooperative Highway Research Program.

The review found that the survey findings were consistent with these reports and studies.

A. 1997 Port Intermodal Impediments Survey

In 1997, AAPA, working closely with MARAD, surveyed ports regarding the status of landside access. The objective of the 1997 effort was to determine the status of the physical infrastructure impediments at US ports and maritime terminals. Fifty-eight ports responded to the 1997 survey, including 31 container ports.

The findings from the 1997 survey included:

- Over half of the ports responding to the survey reported traffic impediments on local truck routes.
- Half of the respondents experienced limited availability and location of turning radii;
- Half of the container ports reported unacceptable conditions in terms of the availability of near-dock rail facilities; and
- Half of the container ports and one-third of all the ports reported bridge impediments pertaining to highway access and load bearing capacity.

Some of the key findings of the 1997 and 2001 surveys can be compared, although an understanding of the differences between the two surveys is required. For example, the survey distribution and questions were different. In particular, the 1997 survey focused on impediments, while the 2001 survey focused on the overall conditions without using the term "impediment." The focus on impediments in 1997 could have generated a potential negative bias in the responses.

In addition, the 1997 survey was distributed by AAPA while the 2001 survey was distributed as a federal agency survey. The distribution approach may have resulted in more cautious appraisals of conditions even though confidentiality was assured to the respondent pool. The on-going use of the 2001 survey instrument should eliminate these differences in the future.

With this understanding, a comparison of the results from the two surveys indicates that conditions have improved, particularly with regard to the availability of

on- and near-dock rail yards. The improvements shown between 1997 and 2001 reflect the results of the significant investments made by the ports, federal, state and local agencies to improve and expand rail capacity.

Significant improvement is also potentially indicated regarding local road access between 1997 and 2001. However, the 1997 and 2001 surveys assessed local road conditions differently. The 2001 survey considered a variety of attributes for local roads and produced a range of responses in terms of conditions (ranging from less than 16 percent reporting unacceptable conditions in terms of height, weight and width restrictions to 72 percent of ports reporting unacceptable conditions in terms of the availability of truck-only routes on local roads). In contrast, the 1997 survey had a single indicator of local road access. It is, therefore, possible that the 59 percent unacceptable rating shown for local roads in 1997 is a composite of the individual conditions tracked in the 2001 survey. Further, while the degree of improvement on local road access could be argued, local roads remain one of the key areas where improvements are needed in the intermodal access system.

B. 2000 NHS Intermodal Freight Connectors Report to Congress

The Transportation Equity Act for the 21st Century Act (TEA-21) mandated that FHWA review the National Highway System (NHS) freight connectors that serve seaports, airports and major intermodal terminals and report the findings to Congress. The connectors link the NHS to these key freight operations. According to the Report to Congress, "despite the fact that connectors are less than one percent of total NHS mileage, they are the 'front door' to the freight community for a broad array of intermodal transport services and options."

FHWA noted that the NHS connectors are primarily local, county or city streets and have a lower design standard than mainline NHS routes (which are primarily state and interstate roads). The intermodal connectors described in the resultant Report to Congress are essentially equivalent to the local road category in the 2001 MARAD Intermodal Access Conditions Survey.

The MARAD Intermodal Access Conditions Survey found that the majority of the roadway access issues were on the local roads. These included turning lanes, turning radii and conditions at at-grade rail crossings. The findings are consistent with the FHWA analysis.

The 2000 NHS Intermodal Freight Connectors Report to Congress voiced concern regarding the condition of the connectors. The report noted, "NHS connectors are 'orphans' in the traditional State and MPO planning processes." The high percentage of unacceptable conditions on local roads, particularly for container traffic, underscores the criticality of the intermodal connector issue.

C. NCHRP Improving and Financing Access to US Cargo Hubs

This study, undertaken by the National Cooperative Highway Research Program (NCHRP), is currently being completed and the findings should be available in the near future. The objective of the NCHRP research initiative is to identify and recommend effective strategies for improving land access to U.S. cargo hubs through existing and emerging funding strategies and by developing partnerships and commitment within the local community.

The NCHRP study defined cargo hubs as all forms of major intermodal transfer points, including the following: airport, seaport, and domestic water terminal transfers to and from rail and truck; truck/rail transfers; and high-volume, truck-to-truck transfer hubs (e.g., package sort centers, break-bulk facilities, and re-load centers).

As part of the project, the consultant team developed an inventory of cargo hub access improvement projects in the US. The inventory, developed in 2001, contains over 40 port-related access improvement projects. Many of these projects begin to address issues and unacceptable conditions identified in the Intermodal Access Conditions Survey. For example, several of the projects address issues at at-grade rail crossings at several ports, including:

- The FAST Corridor Program in Washington State (which was counted as a single project in the inventory) contains 13 projects in the Phase I effort currently underway. The majority of these Phase I projects involve replacing at-grade rail crossings with grade separated crossings, eliminating the type of unacceptable condition reported by many of the ports.
- The Manassas Railroad Alignment Improvement Study. This Virginia project involved relocated rail to improve track alignment and safety, along with eliminating delays at at-grade crossings. The project facilitates doublestack train movement through Virginia and to the Inland Port Terminal at Front Royal.
- Brownsville/Matamoros Railroad Relocation Demonstration Project. This Texas project consisted of several elements that eliminated highway/rail crossings and improved rail access to the Port of Brownsville.
- Port Elizabeth Rail Flyover. This project in New Jersey eliminates the at-grade crossing from the on-dock rail yard at Port Newark/Elizabeth on the major road within the port.

Several of the other projects look to improve or eliminate drayage travel time and cost, including:

- The Alameda Corridor. The new rail lines developed under this public-private initiative in California will eliminate drayage moves and improve rail service to the Ports of Los Angeles and Long Beach.
- The Columbia Slough Intermodal Expansion Bridge. This Oregon project connects the Port of Portland to inland rail yards and eliminates the need for truck drayage.

Additional projects focus on improving local road access to ports, including:

- The Tchoupitoulas Corridor. This Louisiana project provides a new 4-lane truck-only boulevard and rebuilt city streets to improve access to the Port of New Orleans, while removing heavy-vehicle traffic from existing city streets. More than 1,500 trucks travel on this corridor daily to reach the port's intermodal facilities.
- The Port of Palm Beach Skypass and State Route 710 Relocation. This Florida project was designed to grade separate US 1, connect the port physically and operationally, and enhance access, cargo movement and storage in the port.

Other projects in the inventory focus on improving rail capacity and access, as well as creating truck-only routes and new traffic information services.

The inventory confirms that unacceptable conditions, such as those reported in the Survey regarding local roads and at at-grade crossings, are of increasing concern and investment by US ports.

IV. Conclusions

The 2001 Intermodal Access Conditions Survey identified several significant findings, including:

- The current state of the intermodal access system for US ports is generally acceptable to handle the existing volumes of cargo flows. However, “acceptable” is a different condition than “optimal.” Acceptable means that ports, freight transportation providers and shippers can work around problems and can tolerate a certain amount of delay and costs. Acceptable conditions can become unacceptable as cargo volumes increase in the future or if a segment of the system becomes unusable. The fact that the Top 15 deepwater container ports reported less acceptable conditions than the overall response pool is an indicator of the need to address access issues.
- Even with an overall acceptable condition, a significant number of ports reported unacceptable conditions on key aspects of the intermodal access system. The elements with the highest percentage of ports reporting unacceptable conditions include:
 - Local roads to access the ports. Unacceptable conditions were noted in terms of turning lanes, at-grade crossings, turning radii and the availability of truck-only routes.
 - At-grade crossings. Unacceptable conditions were reported regarding at-grade crossings on port, local, state and interstate roads.
 - Rail access issues. Unacceptable conditions were reported in terms of shared use of rights-of-way with rail passenger service, height and width restrictions in rail tunnels and drayage time and costs. Container ports also noted unacceptable conditions in terms of the number of spurs and tracks within terminals and on port property.
 - The availability of truck-only routes. The majority of the ports responding to the survey indicated unacceptable conditions in terms of the availability of truck-only routes within ports, on local roads and on state/interstate roads.
 - Channel depth for container ports. Although the survey showed the improvement generated through the major investments made by the public and private sectors to deepen channels, additional work is still required. Nearly 30 percent of the container ports reported unacceptable channel depths.
 - The growing importance of traffic information. Radio transmission and web-based information on traffic conditions is of increasing importance to ports and transportation providers as they manage the inland movement of maritime cargo. The increased need is re-

flected in the large number of ports reporting unacceptable conditions in these emerging elements of the intermodal access system.

- Unacceptable conditions were more often found at the container ports, and ports situated in urban areas. The ports located in key population centers in the US face more congestion on landside transportation systems but serve a critical need by directly supplying these areas. Many of these ports anticipate even greater cargo flows in the future. Containerized cargo tends to be higher value and more time sensitive. In addition, the new generation of container vessels requires more efficiency on the surface transportation system, as well as deeper channels. Accordingly, the container ports and ports located in urbanized areas are most likely to be the first to exhibit stresses in the intermodal access system.

The 2001 Intermodal Access Survey was designed to gauge the state of roadway, rail and waterside access conditions at US ports. The survey painted a picture of an overall acceptable condition, while pinpointing system elements where greater emphasis is required. The survey also showed the progress made in waterside access and on- and near-dock rail facilities as a result of the investments made to date.

As such, the survey findings provide a roadmap for potential actions and investment priorities. The survey instrument can also be used in the future to gauge the effectiveness of new intermodal access investments and programs.

Appendix A: Survey Approach, Dissemination and Analysis

This chapter summarizes the development of the survey, its dissemination to US ports and terminals, the response to the survey, and how the survey responses were analyzed.

A. Survey Design

MARAD has been tasked with identifying, gathering and assessing information on intermodal access conditions annually. Such information is essential for tracking and resolving maritime-related mobility issues. The Intermodal Access Conditions Survey was designed to be distributed to ports and terminal operators to gather this information.

The Intermodal Access Conditions Survey was developed based on several objectives and parameters:

- The survey would cover the broad categories of access – roadway, rail and waterside.
- Within each of the broad categories, the survey would pinpoint the condition of key attributes of the access system (such as conditions regarding turning radii, at-grade crossings, and flow conditions).
- The survey would identify the geography of the intermodal access conditions – for example, the conditions within the port, on local roads leading to/from the port, and on state and interstate roads.
- The survey needed to be sensitive to the confidentiality needs of ports and terminals, as well as obtain objective information on intermodal access conditions. The survey approach and instrument recognize that port agencies and operators need to walk a fine line between identifying their intermodal access deficiencies in a public forum and maintaining an image that allows them to effectively and competitively market their maritime facilities.
- The survey instrument needed to conform to guidelines with mandate that the staff time required of port agencies to complete the survey instrument would be minimized. These requirements affected the design, format and length of the survey instrument.

The resultant survey instrument is shown at the end of this Appendix.

The Intermodal Access Conditions Survey instrument contains three sections on freight access, one each devoted to road access, rail access and waterside access. The geographical specificity of conditions for road access is considered through separate columns for the roadway system within the port, on the local roads and on state and interstate roadways. Rail freight considers conditions on-port and on line haul rights-of-way, as well as considering drayage lengths and costs. Waterside access covers, primarily, federal channels, private channels and berths.

Within each of the three sections, the survey probes for the condition of specific attributes of the intermodal access system. These attributes were identified and selected based on the 1997 survey, discussions and findings from the Federal Highway Administration (FHWA) Intermodal Connectors survey, and discussions with industry associations. The industry associations, particularly the AAPA and National Association of Waterfront Employers (NAWE), worked closely with MARAD to review the survey and facilitated its distribution.

Survey respondents were asked to rate the condition of each of the attributes based on a scale of 1 through 5, with 1 being excellent, 3 being acceptable and 5 being very poor. A comment box was provided at the end of the two-page survey to allow ports and terminals to comment further. Based on a field test of the survey instrument, it was estimated that the survey would take no more than 20-to-30 minutes to complete.

B. Distribution of the Survey

MARAD distributed the survey in July of 2001 to US deepwater ports and terminal operators. The survey was faxed, mailed and e-mailed to these organizations. The survey could be returned in a similar manner.

Prior to the dissemination, MARAD worked with the industry associations to build awareness regarding the survey instrument and to encourage responses. MARAD staff made follow-up calls to ports that did not respond by the due date. These calls resulted in additional responses to the survey.

C. Survey Responses

Of the 84 US deepwater ports sent the survey, 59 ports responded. This represented a response rate of 70 percent. The resultant response pool was very representative of US deepwater ports:

- Twenty-nine of the 59 ports were classified as container ports, while 30 ports were classified as non-container ports (meaning that the majority of the tonnage moving through those ports was handled as bulk and/or breakbulk movements).
- The response pool was geographically diverse. Twenty-one ports responded from the Gulf region. Six ports responded from the Great Lakes area. Seven ports responded from the North Pacific region. Ten ports responded from the North Atlantic region. Six ports responded from the South Atlantic region. Nine ports responded from the South Pacific region.
- The response pool contained a mix of small, medium and large ports. The entire AAPA list of top 15 ports in the US responded.

Unfortunately, the response for surveys sent directly to terminal operators was not as successful. Of the survey forms distributed to terminal operators, only 15 responses were received.

D. Analysis of the Survey Responses

MARAD staff entered the survey responses into a Microsoft Access database upon receipt. Separate databases were established for the port and terminal operator versions of the survey instrument.

Based on the responses received, MARAD decided to conduct the subsequent analysis based only on the responses received from the port agencies. The response level from the terminal operators was insufficient while the port agency response was robust and representative of the universe of all US ports. As the terminal operator survey was designed to provide additional detail and verification within ports, it was determined that the exclusion of the terminal operator survey responses would not affect the overall analysis or the findings from the survey effort.

MARAD staff and their consultant, A. Strauss-Wieder, Inc., carefully reviewed the port agency responses. Non-responses to individual questions were eliminated, as were "don't know" and N/A responses. When a response indicated a range of ratings (i.e., 3-4), the response was entered into the database as 3.5. Where necessary, MARAD staff confidentially contacted ports to clarify responses.

Once the response pool had been reviewed, the analysis was conducted using Microsoft Excel. Port information was classified by container/non-container port description, geographical location by MARAD region and by whether the port was in the Top 15 AAPA deepwater container port roster.

Excel was used to obtain frequency of responses to the condition scale. The approach screened out non-responses, "don't know" responses and N/A responses. The percentage distribution for each of the ratings in the condition scale was then calculated.

Intermodal Access to U.S. Ports Survey

Name of Port: Name: Fax:	State: Title: E-mail:	Telephone: Date:
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Please complete the attached survey for your port. The survey will provide MARAD with information needed to assess the condition of intermodal access and elevate critical issues within the Department of Transportation for action as we enter the reauthorization cycle for the Transportation Equity Act for the 21st Century (TEA-21). Specific port information will remain confidential.

Please return this survey by [2 WEEKS] by fax to 202.366.6988 or e-mail to Portsurvey@marad.dot.gov.
 Please contact the Office of Intermodal Development at 202.366.8888 if you want an electronic version of the survey, have any questions or would like additional information.

Condition Scale						
1= Excellent	2 = Good	3 = Acceptable	4 = Poor	5 = Very Poor	6 = Don't Know	7=N/A

I. **Road Access:** Using the Condition Scale given above, please rate the conditions that trucks serving your port currently encounter at the following locations.

		Within the Port/Terminal	On Local Access Roads	On State or Interstate Roads
A	Traffic flow conditions			
B	Number of turning lanes			
C	Location of turning lanes			
D	Availability of truck-only roadways			
E	Turning radii			
F	Traffic flow conditions at at-grade railroad crossings			
G	Electronic toll collection or vehicle identification			
H	Radio transmission of local traffic conditions			
I	Web based traffic information			
J	Port-specific signage			
K	Availability of "Paperless" gates		N/A	N/A
L	Length of gate hours		N/A	N/A
M	Height or width clearance limitations for tunnels			
N	Weight limitations for bridges			
O	Weight, height or width restrictions on roadways			
P	Other. Please specify:			

II. **Rail Access:** Using the Condition Scale given above, please rate the following conditions railroads serving your port currently encounter:

A	Availability of near-dock rail terminals (within 5 miles of the port terminals)	
B	Availability of on-dock rail terminals (within the terminals or port property)	

Continued on reverse side

C	Flow conditions on line-haul movements	
D	Flow conditions on rights-of-way shared with passenger traffic	
E	Condition of at-grade crossings (e.g., signals and roadbed)	
F	Condition of rail tracks and rights-of-way on the main line(s)	
G	Condition of rail tracks and rights-of-way within the terminals and port property	
H	Height or width clearance limitations for tunnels	
I	Weight restrictions on bridges	
J	Number of spurs or tracks serving the port terminals from the main line(s)	
K	Number of spurs or tracks within the terminals and on port property	
L	Grading (inclines and declines) for trains on the rights-of-way	
M	Cost and travel time associated with draying cargo between the port terminals and rail heads	
N	Other. Please specify:	

III. **Waterside Access:** Using the Condition Scale given above, please rate the services provided to or conditions that vessels serving your port currently encounter at the following locations:

		Federal Channels	Private Channels & Berths
A	Aids to navigation		
B	Sufficient depths for vessel		
C	Maintenance dredging		
D	Capital improvements to berths and terminals		
E	Environmental issues (Circle: endangered species, ballast water, vessel emissions, other)		
F	Other. Please specify:		

Please provide us with any additional comments, examples of solutions to intermodal access in your geographical area and pressing access issues that should be addressed:

This collection of information is voluntary and will be used to identify and assess the physical intermodal access infrastructure to the Nation's major ports and marine terminals. The reporting burden is estimated to average 30 minutes per response. Send comments regarding this burden estimate or any other aspect of this survey to the Maritime Administration, Office of Management and Information Services, Room 7301, 400 Seventh Street, S.W., Washington, DC 20590. Note that an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number.

Appendix B: List of Ports Participating in the Survey

<i>Port Name</i>	<i>State</i>
Alabama State Docks	AL
Albany	NY
Anchorage	AK
Baltimore	MD
Beaumont	TX
Brownsville	TX
Canaveral	FL
Charleston (SCSPA)	SC
Chicago (ILL International District)	IL
Clark Maritime Centre	IN
Cleveland-Cuyahoga County Port Authority	OH
Corpus Christi	TX
Duluth Seaway Port Authority	MN
Everett	WA
Everglades	FL
Fourchon	LA
Galveston	TX
Georgia Ports Authority	GA
Grays Harbor	WA
Greater Baton Rouge	LA
Guam	GU
Honolulu Harbor	HI
Houston	TX
Indiana's Int'l Port	IN
Jacksonville Port Authority	FL
Lake Charles, Louisiana	LA
Long Beach	CA
Los Angeles	CA
Manatee	FL
Miami-Dade Seaport	FL
Mississippi State Port Authority	MS

<i>Port Name</i>	<i>State</i>
New Orleans	LA
Port of New York and New Jersey	NY, NJ
North Carolina State Ports Authority -Port of Wilmington	NC
Oakland	CA
Olympia	WA
Orange County Navigation & Port District	TX
Panama City	FL
Pascagoula	MS
Philadelphia & Camden	PA
Port Lavaca/Point Comfort	TX
Port of Saipan	MP
Portland	OR
POSL	LA
Quonset Davisville Port & Commerce Park	RI
Richmond	VA
Sacramento	CA
San Diego Unified Port District	CA
San Juan	PR
Seattle	WA
Shreveport - Bossier	LA
South Jersey Port Corporation	NJ
St. Bernard Port, Harbor, & Terminal District	LA
Stockton	CA
Tacoma	WA
Tampa	FL
Toledo-Lucas County Port Authority	OH
Virginia Port Authority	VA
Wilmington	DE

Appendix C: Overall Survey Findings

Percentage of Responses Noting that Conditions Were Below Acceptable			
	w/i port	local roads	state/interstate
Traffic flow conditions	7%	25%	20%
Number of turning lanes	15%	25%	14%
Location of turning lanes	15%	26%	16%
Availability of truck-only roadways	36%	72%	52%
Turning radii	11%	28%	8%
Traffic flow conditions at at-grade railroad crossings	28%	37%	12%
Electronic toll collection or vehicle identification			
Radio transmission of local traffic conditions	35%	34%	14%
Web based traffic information			
Port-specific signage	11%	18%	13%
Availability of "Paperless" gates	48%		
Length of gate hours	11%		
Height or width clearance limitations for tunnels	8%	16%	0%
Weight limitations for bridges	10%	17%	14%
Weight, height or width restrictions on roadways	9%	16%	6%
Other. Please specify:			

Rail

Availability of near-dock rail terminals (within 5 miles of the port terminals)	22%
Availability of on-dock rail terminals (within the terminals or port property)	8%
Flow conditions on line-haul movements	20%
Flow conditions on rights-of-way shared with passenger traffic	23%
Condition of at-grade crossings (e.g., signals and roadbed)	14%
Condition of rail tracks and rights-of-way on the main line(s)	8%
Condition of rail tracks and rights-of-way within the terminals and port property	9%
Height or width clearance limitations for tunnels	18%
Weight restrictions on bridges	11%

Number of spurs or tracks serving the port terminals from the main line(s)	18%
Number of spurs or tracks within the terminals and on port property	10%
Grading (inclines and declines) for trains on the rights-of-way	2%
Cost and travel time associated with draying cargo between the port terminals and rail heads	27%
Other. Please specify:	

	Fed. C	Private/B
Aids to navigation	3%	5%
Sufficient depths for vessel	26%	22%
Maintenance dredging	9%	2%
Capital improvements to berths and terminals	11%	10%
Environmental issues (Circle: endangered species, ballast water, vessel emissions, other)	16%	10%
Other. Please specify:		

Appendix D: Responses of Container and Non-Container Ports

Percentage of Container Port Responses Noting that Conditions Were Below Acceptable

	w/i port	local roads	state/interstate
Traffic flow conditions	10%	25%	30%
Number of turning lanes	9%	25%	25%
Location of turning lanes	17%	22%	20%
Availability of truck-only roadways	38%	77%	75%
Turning radii	8%	36%	13%
Traffic flow conditions at at-grade railroad crossings	43%	52%	24%
Electronic toll collection or vehicle identification			
Radio transmission of local traffic conditions	8%	45%	41%
Web based traffic information			
Port-specific signage	7%	7%	7%
Availability of "Paperless" gates	50%		
Length of gate hours	20%		
Height or width clearance limitations for tunnels	0%	9%	0%
Weight limitations for bridges	8%	12%	20%
Weight, height or width restrictions on roadways	8%	12%	4%
Other. Please specify:			

Rail

Availability of near-dock rail terminals (within 5 miles of the port terminals)	21%
Availability of on-dock rail terminals (within the terminals or port property)	14%
Flow conditions on line-haul movements	22%
Flow conditions on rights-of-way shared with passenger traffic	37%
Condition of at-grade crossings (e.g., signals and roadbed)	23%
Condition of rail tracks and rights-of-way on the main line(s)	13%
Condition of rail tracks and rights-of-way within the terminals and port property	12%
Height or width clearance limitations for tunnels	23%
Weight restrictions on bridges	10%

Number of spurs or tracks serving the port terminals from the main line(s)	16%
Number of spurs or tracks within the terminals and on port property	8%
Grading (inclines and declines) for trains on the rights-of-way	4%
Cost and travel time associated with draying cargo between the port terminals and rail heads	32%
Other. Please specify:	

	Fed. C	Private/B
Aids to navigation	0%	5%
Sufficient depths for vessel	29%	28%
Maintenance dredging	7%	4%
Capital improvements to berths and terminals	19%	16%
Environmental issues (Circle: endangered species, ballast water, vessel emissions, other)	11%	12%
Other. Please specify:		

Percentage of Non-Container Port Responses Noting that Conditions Were Below Acceptable

	w/i port	local roads	state/interstate
Traffic flow conditions	3%	24%	10%
Number of turning lanes	21%	26%	8%
Location of turning lanes	13%	31%	12%
Availability of truck-only roadways	33%	67%	27%
Turning radii	14%	21%	4%
Traffic flow conditions at at-grade rail-road crossings	15%	23%	0%
Electronic toll collection or vehicle identification			
Radio transmission of local traffic conditions		27%	6%
Web based traffic information			
Port-specific signage	15%	29%	19%
Availability of "Paperless" gates			
Length of gate hours	0%		
Height or width clearance limitations for tunnels			
Weight limitations for bridges	13%	22%	8%
Weight, height or width restrictions on roadways	11%	20%	8%
Other. Please specify:			

Rail

Availability of near-dock rail terminals (within 5 miles of the port terminals)	22%
Availability of on-dock rail terminals (within the terminals or port property)	4%
Flow conditions on line-haul movements	18%
Flow conditions on rights-of-way shared with passenger traffic	10%
Condition of at-grade crossings (e.g., signals and roadbed)	7%
Condition of rail tracks and rights-of-way on the main line(s)	4%
Condition of rail tracks and rights-of-way within the terminals and port property	7%
Height or width clearance limitations for tunnels	11%
Weight restrictions on bridges	13%
Number of spurs or tracks serving the port terminals from the main line(s)	19%
Number of spurs or tracks within the terminals and on port property	12%
Grading (inclines and declines) for trains on the rights-of-way	0%

Cost and travel time associated with draying cargo between the port terminals and rail heads 20%

Other. Please specify:

	Fed. C	Private/B
Aids to navigation	7%	6%
Sufficient depths for vessel	24%	14%
Maintenance dredging	10%	0%
Capital improvements to berths and terminals	4%	0%
Environmental issues (Circle: endangered species, ballast water, vessel emissions, other)	21%	8%
Other. Please specify:		

Appendix E: AAPA Top 15 Deepwater Container Port Responses

AAPA Top 15 Ports Reporting Conditions Below Acceptable

	w/i port	local roads	state/interstate
Traffic flow conditions	20%	20%	27%
Number of turning lanes	8%	20%	21%
Location of turning lanes	15%	20%	21%
Availability of truck-only roadways	71%	86%	75%
Turning radii	17%	36%	17%
Traffic flow conditions at at-grade railroad crossings	45%	31%	18%
Electronic toll collection or vehicle identification			
Radio transmission of local traffic conditions	50%	40%	18%
Web based traffic information	50%	33%	0%
Port-specific signage	13%	7%	7%
Availability of "Paperless" gates	50%		
Length of gate hours	38%		
Height or width clearance limitations for tunnels	0%	0%	0%
Weight limitations for bridges	9%	7%	14%
Weight, height or width restrictions on roadways	7%	0%	7%
Other. Please specify:			

Rail	% Below Acceptable
Availability of near-dock rail terminals (within 5 miles of the port terminals)	14.0
Availability of on-dock rail terminals (within the terminals or port property)	15.0
Flow conditions on line-haul movements	21.0
Flow conditions on rights-of-way shared with passenger traffic	36.0
Condition of at-grade crossings (e.g., signals and roadbed)	8.0
Condition of rail tracks and rights-of-way on the main line(s)	7.0
Condition of rail tracks and rights-of-way within the terminals and port property	7.0

Height or width clearance limitations for tunnels	25.0
Weight restrictions on bridges	0.0
Number of spurs or tracks serving the port terminals from the main line(s)	21.0
Number of spurs or tracks within the terminals and on port property	14.0
Grading (inclines and declines) for trains on the rights-of-way	8.0
Cost and travel time associated with draying cargo between the port terminals and rail heads	21.0
Other. Please specify:	

Waterside	% Below Acceptable	
	Fed. C	Private/B
Aids to navigation	0.0	7.0
Sufficient depths for vessel	14.0	15.0
Maintenance dredging	7.0	8.0
Capital improvements to berths and terminals	7.0	0.0
Environmental issues (Circle: endangered species, ballast water, vessel emissions, other)	10.0	11.0
Other. Please specify:		