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The Honorable James L. Oberstar
Chairman
Committee on Transportation and Infrastructure
House of Representatives

The Honorable Peter A. DeFazio
Chairman
Subcommittee on Highways and Transit
Committee on Transportation and Infrastructure
House of Representatives

Subject: *Approaches to Mitigate Freight Congestion*

Strong productivity gains in the U.S. economy hinge, in part, on transportation networks working efficiently. Continued development and efficient management of the nation's freight transportation system—especially highways and rail lines that connect international gateways and intermodal facilities to retailers, producers, and consumers—are important to sustaining the nation's competitive position in the global economy. However, the increasing congestion on the transportation system poses a threat to the efficient flow of the nation's goods and has strained the system in some locations. Moreover, recent growth in international trade has placed even greater pressures on ports, border crossings, and distribution hubs. Congestion delays that significantly constrain freight mobility in these areas could result in increased economic costs for the nation. The Federal Highway Administration has calculated that delays caused by highway bottlenecks cost the trucking industry alone more than $8 billion a year.[1]

We reported earlier this year on ways in which freight transportation stakeholders have been addressing those factors, and the many challenges public planners face in advancing freight projects.[2] In that report, we showed how stakeholders have advanced projects and proposals to enhance freight mobility by increasing system efficiency and building new infrastructure. The challenges we identified included competition from nonfreight projects for public funds and community support in the planning process, lack of coordination among various government entities and

[1]U.S. Chamber of Commerce, *The Transportation Challenge: Moving the U.S. Economy* (Washington, D.C., 2008).

[2]GAO, *Freight Transportation: National Policy and Strategies Can Help Improve Freight Mobility*, GAO-08-287 (Washington D.C.: Jan. 7, 2008).

private sector stakeholders, and limited or restricted availability of public funds for projects related to freight transportation. Compounding these challenges facing state and local transportation planners is the fact that the federal government is not well positioned to enhance freight mobility due to the absence of a clear federal strategy and role for freight transportation, an outmoded federal approach to transportation planning and funding, and the unsustainability of planned federal transportation funding. We recommended that DOT work with Congress and freight stakeholders to develop a national strategy to transform the federal government's involvement in freight transportation projects.

Recognizing that freight congestion has been well-defined and studied, you asked us to research technologies and projects currently in place or in development that could improve freight mobility, including low-cost approaches. In doing our work, we learned that the National Cooperative Freight Research Program (NCFRP) is currently conducting a comprehensive research project to identify low-cost and quickly implementable approaches to address freight mobility constraints.[3] To not duplicate NCFRP's efforts by conducting a similar review, we limited the scope of our work. Therefore, as agreed with your staff, this report provides high-level information on (1) the ongoing research project being conducted by NCFRP, and (2) examples of implemented or planned technologies and projects to improve freight mobility that fall under the two broad approaches we identified in our earlier report—efforts to increase the efficient use of existing infrastructure and to add new capacity to the transportation network. To obtain information on these issues, we spoke with the lead researcher working on the NCFRP research project to learn about its objectives, scope, and methodology. We also reviewed existing literature on technologies and approaches being implemented to mitigate congestion, and prior GAO reports on freight and surface transportation. We interviewed officials with the Department of Transportation (DOT), as well as industry stakeholders representing ports and railroads to provide a snapshot of current approaches that could be used to address freight mobility constraints. Because defining "low-cost approaches" would have required work outside the scope of this engagement, we include examples of approaches and projects to improve freight mobility that may incur substantial investments. We performed our review from May 2008 to November 2008.

Results in Brief

The NCFRP study is focused on identifying low-cost and quickly implementable approaches to address freight mobility constraints. The research group conducting the study intends to capture information on low-cost improvements that have been or are in the process of being implemented, the costs that were associated with and the impact of the improvements, and any lessons learned. The information collected will be used to develop a searchable database that will allow users to find low-cost and quickly implementable solutions to their particular freight mobility issue, based on

[3]NCFRP was initiated under The Safe, Accountable, Flexible, Efficient Transportation Equity Act—A Legacy for Users. DOT was directed to have NCFRP managed by the National Academy of Sciences (NAS). NAS, operating through the Transportation Research Board (TRB), is now managing this program. TRB is one of six major divisions of the National Research Council, a private nonprofit institution that is the principal operating agency of NAS in providing services to the government, the public, and the scientific and engineering communities. The research project is being carried out by Battelle Memorial Institute under the guidance of a NCFRP project panel.

defined criteria. The research group issued its first interim report in May 2008, which outlined the study's scope and methodology, and plans to complete its next interim report by January 2009.

As explained above, we have previously reported on two broad approaches for improving freight mobility and examples of technologies and projects being implemented or studied that fall under those two approaches.[4] During this engagement, we identified other technologies and projects that could help to mitigate congestion, but we did not attempt to determine if these technologies and projects would be considered low-cost. The first broad approach is to increase the efficient use of existing infrastructure. For example, some ports use radio frequency identification technology to electronically identify and track container contents. With such tags, cranes equipped with readers that remove cargo from ships can read the container's allowing the terminal operator to better stage containers. The second broad approach is to add new capacity to the transportation network, such as building new facilities, roads, and bridges. For example, DOT is looking at the possibility of improving freight movement through developing truck-only lanes, which are lanes dedicated for trucks that are physically separated from passenger vehicles.

We provided DOT with a draft of this report for its review and comment. In response, DOT suggested technical corrections, which we incorporated into the report, as appropriate. Further, DOT noted that while the draft report addresses several practical approaches for mitigating freight congestion, it does not discuss expanding the use of waterborne transportation, or "America's Marine Highway" which some DOT officials believe has the potential to mitigate surface freight transportation congestion.

Background

Freight movement is vital to the functioning of the national economy. DOT statistics show that the volume of freight moved on the U.S. transportation system has grown dramatically over the past few decades and is projected to increase by nearly 70 percent by 2020. According to DOT, improvements in the efficiency and reliability of freight transportation have been an engine of prosperity and competitive advantage; but, the U.S. transportation system now faces challenges that, unless addressed, may jeopardize its reliability. According to information from the Transportation Research Board (TRB), the substantial growth in trade volumes, increased congestion, and scarce and expensive real estate for freight have radically altered transport and logistics over the last 5 years. According to DOT, congestion is a serious problem by contributing to longer and more unpredictable transit times and results in the increased cost of transporting freight.[5] Additionally, DOT states that the transportation network's efficiency has not kept pace at a rate commensurate with growth in travel and commerce; and solutions to congestion will likely involve a mix

[4]GAO-08-287.

[5]U.S. Department of Transportation, *The Freight Story: A National Perspective on Enhancing Freight Transportation* (Washington, D.C., November 2002).

of investments to add new capacity, preserve existing infrastructure, and improve operational efficiency.

Current NCFRP Research Project Focuses on Low-cost, Quickly Implementable Approaches to Freight Mobility Constraints

NCFRP has initiated a research project focused on identifying low-cost and quickly implementable approaches to address freight mobility constraints. The objectives of the research are to (1) develop a standardized description of the dimensions of the nation's freight system; (2) analyze business practices and institutional factors that influence freight system decision makers and stakeholders; (3) develop a methodology for identifying, categorizing, and evaluating quickly implementable, low-cost capital, operational, and public policy actions to enhance freight mobility; and (4) apply this methodology in a generic way to create a catalog of improvement actions.

According to the lead researcher of the project, the research group is working to define the terms "low-cost" and "quickly implementable" as they relate to specific modes of transportation. The research group has preliminarily defined a "low-cost" and "quickly implementable" improvement as an action that modifies existing geometry and operational features of the freight transportation infrastructure system to address freight mobility constraints that can be implemented within a short period without extended disruption of traffic flow. The research group has defined the scope of its work and the entities to be interviewed, developed an interview list and guide, defined research parameters by mode (e.g., rail or ports), and determined freight mobility constraints for each mode. The research group intends to interview representatives from trucking, class I and short line railroads, deepwater and river ports, logistics industry associations, freight forwarder and package express shippers, federal and state transportation agencies, metropolitan planning organizations, and labor unions. To supplement information gathered through the interviews, the research group plans to conduct a comprehensive review of project reports and published technical literature to derive information on implemented, low-cost improvement actions directed at addressing freight mobility constraints. Through the interviews and literature searches, the research group expects to capture information on low-cost improvement actions that have been implemented or are currently being implemented, what costs were associated with and the impact of the improvement action, and any lessons learned. All the information collected will be used to develop a searchable database that will allow users to find low-cost and quickly implementable solutions to their particular freight mobility issue based on defined criteria. The goal is to document each type of improvement action by mode, size, and applicability of the improvement action. The research group issued its first interim report in May 2008, which outlines the study's scope and methodology, and plans to complete its next interim report by January 2009.

Increasing the Efficiency of Existing Infrastructure and Adding New Capacity to the Transportation Network Could Improve Freight Mobility

As we have previously reported, one approach that freight stakeholders use to improve freight mobility involves advancing projects and proposals designed to increase the efficient use of existing infrastructure. Among other things, these

activities include restructuring operations at ports, changing hours of operation, deploying technology, and introducing congestion pricing strategies. The following are examples of activities designed to increase efficiency of existing infrastructure that we identified during this engagement or on which we have previously reported.

Chassis pools: According to an official representing port authorities, typically port terminal operators or ocean carriers own their own truck container chassis[6] and when loading freight, would use their own chassis in the loading process. Chassis pools, on the other hand, provide chassis that any company can use, which saves time by eliminating the process of locating and using specific chassis. An example of a chassis pool in operation is at the Port of Virginia.[7] According to information from the Environmental Protection Agency's Office of Transportation and Air Quality, the Port of Virginia established a chassis pool in 2004 requiring all shipping lines to provide chassis that any company can use in loading its freight. As a result, the number of chassis stored at the port has been reduced by 5,000 to 6,000 and has opened up 40 to 60 acres of land recaptured for other uses at the port. Further, local trucking companies have reported that the number of moves their drivers complete in a day has risen dramatically. For example, drivers who would previously only be able to move two to three containers per day can now move up to 10 containers daily.

Radio Frequency Identification (RFID): RFID is an automated data-capture technology that can be used to electronically identify, track, and store information contained on a tag. A radio frequency reader scans the tag and sends the information to a database. For freight purposes, an official representing port authorities stated that containers can be coded with RFID tags, and the cranes removing cargo from ships can be equipped with RFID readers. The RFID reader scans the coded RFID tag for information on the container. With information on the contents of the container, the terminal operator can better position the container for when it is actually moved to a staging area. This approach helps to reduce paperwork and saves time and resources. According to the industry association official, RFID technology on cranes is currently being used at the Port of Long Beach. The port authority official also stated that this process is also being used for trucks entering an intermodal terminal or transfer station. Containers on trucks can be read prior to getting to the transfer station. The information can be relayed to the station, allowing them to prepare for arrival and processing, which results in faster movement of freight.

Virtual container yard: A virtual container yard is a Web-based information exchange platform that allows users to match empty equipment needs so they can interchange, or "street turn," empty containers without first returning them to a terminal, rail ramp, or container yard. In many cases, after a

[6]Truck container chassis are the flat trailer beds that cargo containers are loaded onto when being transported by truck.

[7]The Virginia Port Authority owns Norfolk International Terminals, Newport News Marine Terminal, Portsmouth Marine Terminal and the Virginia Inland Port, in Front Royal; combined, these four facilities make up the Port of Virginia.

container is unloaded by an importer, it is removed from the port to an off-site depot for storage until an exporter calls for a container. In 2006, the ports of Los Angeles and Long Beach and the Alameda Corridor Transportation Authority in southern California implemented a virtual container yard in an attempt to increase the number of containers taken directly to exporters by five-fold.[8]

Extending business hours: Some businesses in New York City have opted to extend hours of operation for receiving shipments to reduce peak daytime traffic congestion. As a result, these businesses receive special incentives from the City to receive deliveries late in the day. For instance, some retail stores have arranged to have employees receive deliveries after 9:00 p.m. The City, in turn, has provided special approval of curbside parking to these businesses and has agreed not to ticket delivery vehicles during off-peak hours. This approach has the potential to reduce peak hour congestion by giving drivers a wider delivery window and avoiding traffic delays.[9]

Congestion Pricing: Congestion pricing involves charging users a toll, fee, or surcharge for using transportation infrastructure during certain peak periods of travel. One congestion pricing approach is the Off-Peak program created by PierPASS. PierPASS is a not-for-profit company created by marine terminal operators at the Los Angeles and Long Beach ports to address multi-terminal issues such as congestion, security and air quality. In 2005, PierPASS launched the Off-Peak program in an effort to encourage cargo owners to arrange transport during nights and weekends. The program imposes a $50 per 20-foot equivalent unit "Traffic Mitigation Fee" on loaded containers that are moved during peak hours. According to a PierPass official, the program has resulted in approximately 36 percent of traffic moving at night, taking thousands of truck trips out of daytime freeway traffic patterns, thus alleviating daytime congestion. These concepts are also useful for passenger traffic.[10]

A second approach that freight stakeholders are using to improve freight mobility involves projects and proposals to create or add new capacity to existing infrastructure. This includes building or adding to facilities, such as establishing inland ports, freight rail improvements, bridge replacement/improvements, on-dock rail access, and establishing additional truck and rail corridors. The following are examples of various approaches for creating or adding to capacity to improve freight mobility. We have previously reported on some of these examples and others were identified during the timeframe of this engagement.

Establishing inland ports: An inland port is a site located away from traditional land, air, and coastal borders with the vision to facilitate and process international trade through strategic investment in multi-modal transportation assets, and by promoting value-added services as goods move

[8]Previously reported in GAO-08-287.

[9]Previously reported in GAO-08-287.

[10]Previously reported in GAO-08-287.

through the supply chain. One such example is the Virginia Inland Port, located in Front Royal, Virginia, started operations in 1989. According to the Virginia Port Authority, the Virginia Inland Port provides a link between truck and rail for the transport of ocean-going containers. Containers are transported by truck from seaports located in Virginia to the Inland Port for immediate loading upon a rail car or for short-term storage prior to loading. According to a report by the Appalachian Regional Commission, prior to the operation of the inland port, companies in this region were using trucks and railroads to move products to ports in Baltimore and Philadelphia. They did so because distance made the Port of Virginia not cost competitive.[11] The report states that shippers in the northern Appalachian region now have the option of moving freight directly to the Port of Virginia through the inland port, rather than the longer highway routes to Baltimore and Philadelphia. The report states that the project has resulted in time savings.

Freight rail improvements: Railroad improvements include building new intermodal facilities and adding tracks to the rail network to relieve capacity constraints and enhance freight mobility. For example, the railroads serving southern California have added or are beginning to build new double track lines into and out of Los Angeles to accommodate the growing freight traffic. According to information reported by one railroad, double tracking will enable the railroad to nearly double train capacity that connects the Los Angeles area with all southern U.S. markets and the major eastern rail gateways. Additionally, transportation planners in Houston, Texas, have proposed several projects to relieve congestion along busy freight rail corridors, including construction of a new mainline track and a new bridge to relieve congestion in bottlenecked sections, construction of grade separations to allow for trains to stop without causing delays or safety hazards to the public, and construction of new rail corridors that bypass populated areas.[12]

Bridge improvement/replacement: Improving or replacing bridges in certain locations can allow for increased volume of traffic carrying freight. For example, a project to rebuild a bridge at the Port of Long Beach will accommodate growing highway traffic and will allow larger ships to pass underneath. The project is scheduled to begin in 2010 and cost an estimated $851 million. Also, a project at the Port of Los Angeles will replace a bridge which is too small to accommodate high truck volumes. The highway project is expected to cost $686 million. Both projects will be funded by federal, state, local, port funds, and through fees charged on import/export cargo. The highway project and bridge replacement will allow trucks to more quickly haul their loads from the ports of Los Angeles and Long Beach to the Intermodal Container Transfer Facility located 3 miles away.

[11]Appalachian Regional Commission, *Meeting the Transportation Challenges of the 21st Century: Intermodal Opportunities in the Appalachian Region* (2004).

[12]Previously reported in GAO-08-287.

On-dock rail access: According to a port industry official, at traditional ports, ships at the receiving port off-load freight to trucks, which transport the freight to a rail station, where it is then transferred to a train for transport to its destination city. On-dock rail places rail facilities at the port terminal—eliminating the need for transport by truck and resulting in a reduction of pollution and traffic on roads. For example, the industry official stated that the Port of Tacoma, Washington, has four dockside rail yards that move cargo quickly and efficiently from container terminals. The first of these four dockside rail yards opened in 1981. The port industry official also stated that the on-dock rail yards have reduced the number of trucks on city streets and highways and that each full train that leaves the port represents 250 to 300 trucks not on the roads, reducing highway congestion and diesel emissions.

Truck-only lanes: Truck-only lanes are highways in which lanes dedicated for trucks are physically separated from passenger vehicles. As part of its Corridors of the Future Program, DOT is looking at the possibility of improving freight movement through developing truck-only lanes. An example of this is a project to study dedicated and segregated truck lanes for the Interstate 70 corridor running from Kansas City to the Ohio/West Virginia border. The concept proposes adding four dedicated truck lanes to the existing infrastructure, two in each direction, with at least one interchange per county providing access to the truck lanes and includes, conceptually, truck staging areas. These lanes present the opportunity to pilot size and weight increases on a facility dedicated to trucks. The dedicated truck lanes are seen as a way to reduce congestion, improve safety, and offset the maintenance costs of general purpose lanes.

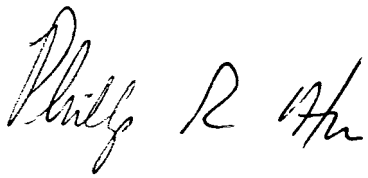
Agency Comments

We provided DOT with a draft of this report for its review and comment. In response, DOT suggested technical corrections, which we incorporated into the report as appropriate. Further, DOT noted that while the draft report addresses several practical approaches to mitigating freight congestion, it does not discuss expanding the use of waterborne transportation, or "America's Marine Highway." DOT said this program is being studied by TRB[13] and some DOT officials believe it has the potential to mitigate surface freight transportation congestion to an equal or greater degree than the other examples in the report. We did not intend for the examples in the report to be exhaustive and determining the extent to which the examples would mitigate congestion was not in the scope of our work. DOT's comments said expanded use of waterborne transportation could be an effective way to help relieve significant shore-side congestion because waterborne transportation is generally underutilized and has substantial capacity. DOT said tapping into America's Marine Highways, consisting of more than 25,000 miles of inland, intracoastal, and coastal waterways, could be cost effective, requires very little new infrastructure, and could represent significant fuel savings and air emissions reductions.

[13]More information on this study can be found at: http://www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=2410.

We are sending copies of this report to interested congressional committees and the Secretary of Transportation. This report will be available at no cost on the GAO Web site at http://www.gao.gov.

Should you or your staff have any questions about this report, please contact me at (202) 512-2834 or herrp@gao.gov. Contact points for our Office of Congressional Relations and Public Affairs may be found on the last page of this report. Key contributors to this report were Andy Clinton, Steven Ervin, Sally Moino, and Courtney Williams.



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Related GAO Products

Surface Transportation: Restructured Federal Approach Needed for More Focused, Performance-Based, and Sustainable Programs. GAO-08-400. Washington, D.C.: March 6, 2008.

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