NCHRP
REPORT 497

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

Financing and Improving Land Access to U.S. Intermodal Cargo Hubs

TRANSPORTATION RESEARCH BOARD
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Financing and Improving Land Access to U.S. Intermodal Cargo Hubs

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in Cooperation with the Federal Highway Administration

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NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

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FOREWORD

By Christopher J. Hedges
Staff Officer
Transportation Research Board

This report presents guidance on the most effective strategies for financing improvements to cargo hub and intermodal freight facilities. These strategies focus on existing and emerging funding sources and on developing partnerships between government agencies, cargo hub operators and users, and local communities. After preparing an inventory of cargo hub improvements projects across the United States, the research team selected 12 projects as case studies for in-depth analysis.

Appendixes to the report include detailed information on each case study, the full inventory of major cargo hub access improvement projects, and a listing of relevant federal and selected state funding sources and mechanisms. The report should be particularly valuable to planners and senior decision-makers in government and the private sector who are faced with a growing challenge to maintain or improve access to cargo hub facilities that are growing rapidly in size, quantity and importance.

Cargo hubs are a relatively new concept in transportation system development, as carriers develop networks that concentrate use of larger ships, higher capacity double-stack trains, dedicated jumbo cargo airplanes, and longer trucks or combination vehicles on certain high-volume routes. Increased use of higher capacity equipment allows carriers to streamline their service routes around a limited number of hubs (international gateways, ports of entry, and inland intermodal transfer facilities) to reduce costs, improve service, and increase the efficiency and reliability of their operations. As a result, serious land-side congestion problems are occurring at U.S. cargo transfer hubs, primarily seaports and rail terminals.

Furthermore, the operating environment for freight transportation is becoming increasingly competitive. This competitiveness is a function of supply chain logistics, shipping costs, and industry-driven strategies to structure and package services in a cost-competitive and time-sensitive manner. Increased land-side congestion at cargo hubs threatens to impede continued competitiveness and raise the transportation costs of goods moving through them.

Recent studies have highlighted the importance of developing stronger local community partnerships to implement statewide strategies for regional and international trade. It is increasingly important to educate communities about the economic significance and land-use issues surrounding cargo hub access.

Despite the existence of various national, state, and local government funding programs, there was a need for research on how best to understand and use these sources, as well as to investigate alternative methods to finance and execute infrastructure and operational improvements at cargo hubs.

Under NCHRP Project 08-39, a research team led by the Louis Berger Group was asked to identify and recommend effective strategies for financing improvements to U.S. cargo hubs. The report begins with a general discussion of cargo hubs and their

growing importance to the shipping community and identifies the key factors driving the need for cargo hub improvements. The report then uses a case study approach to identify best practices for planning and financing cargo hub access improvements. The report concludes with a number of recommendations for further work.

A PowerPoint presentation that summarizes the background, objectives, case studies, and main conclusions of the study is available on the NCHRP website.

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The research team wished to express its deep appreciation to NCHRP Staff Officer Chris Hedges and to the members of the NCHRP panel who provided invaluable comments and support throughout the study. The research team acknowledges the thorough comments from the panel members, which included most helpful guidance, significant editorial comments, and many suggestions, additions, and clarifications that helped improve the content of the report.

The following individuals and organizations contributed information and comments on the various case studies:

- Alameda Corridor: Art Goodwin, Director of Engineering and Construction of ACTA; Gill V. Hicks, former General Manager of the Authority from 1990 until 2001; James P. Preusch, former Treasurer of ACTA from 1989 until 1999; and Bernie Evans, Public Affairs Manager of ACTA.
- San Juan Airport: William Febles, Acting Airport Manager, Luis Muñoz Marin International Airport; Carlos Maeda, P.E., PBS&J (Cargo Access Road Project Manager); Derrick Larson, P.E., PBS&J; Fernando L. Rodriguez, Fernando L. Rodriguez & Associates; Ibsen Santiago, Chief of Billing Section, and Illia Quionnes, Programs Manager Federal Aviation Administration; John Colon, EIT, Airport Planner; José Hernández, Design Director Puerto Rico Highway and Transportation Authority; Luis Garcia, environmental Specialist; Victor Dominguez, P.E., PBS&J.
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- Cooper River Bridge: Richard L. Stewart, SCDOT; Robert J. Probst, Deputy Director of Strategic Planning, SCDOT; and Susan C. Johnson, SCDOT.
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- Joe Fulton Trade Corridor: Frank C. Brogan, Director of Engineering Services, Port of Corpus Christi.
- Lombard Road Overcrossing: Craig Levie, Manager, Rail Development, Port of Portland.
- Kedzie Avenue: Gerald Rawling, Chicago Area Transportation Study; and Jack Javadi, Project Manager, Department of Transportation, City of Chicago.
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The authors acknowledge the valuable cooperation of all those listed and many others in providing data and available reports, a list too long to fully incorporate. Although every effort has been made to correctly relate the history and financing of the case study projects and to present the perspectives of various groups, the authors recognize that not necessarily all views are reflected in the case study narratives and that, in order to summarize the case studies, information that some consider key to understanding the project has been left out. The authors that all those who collaborated and provided their views, which were essential to understand the issues that surfaced in each case study selected for analysis. The authors accept their sole responsibility for any omissions or errors in interpretation of the information provided to the research team, even though every effort has been make to fully and correctly summarize the case study projects.

FINANCING AND IMPROVING LAND ACCESS TO U.S. INTERMODAL CARGO HUBS

SUMMARY

The efficiency of the U.S. freight transportation system is increasingly influenced by congestion along access routes to ports, airports, and other freight hubs. Such congestion increases the cost, reliability, and efficiency of the movement of goods throughout the transportation system, revealing a need for flexible strategies and policy initiatives to address cargo access problems and requirements.

Cargo hubs, a relatively new concept in transportation system development, are becoming more prevalent as carriers develop networks that concentrate the use of larger ships, higher capacity double-stack trains, dedicated jumbo cargo airplanes, and longer trucks or combination vehicles than previously used on certain high-volume routes. Increased use of higher capacity equipment allows carriers to streamline their service routes by focusing on a few hubs (e.g., international gateways, ports of entry, and inland intermodal transfer facilities) to reduce costs, improve service, and increase the efficiency of their operations.

Although private-sector carriers are increasing their emphasis on cargo hub development (e.g., FedEx in Memphis, UPS in Chicago, and Maersk/SeaLand in New York), institutional and funding obstacles make it increasingly difficult to improve and finance the required access to these cargo hubs. Typically, improved access to cargo hubs requires highway and/or rail improvements in developed urban areas where local priorities generally emphasize solving commuter bottlenecks, not improving cargo transfer facilities. In many cases, major investments are required, but principal beneficiaries are dispersed over a broad geographic area, not necessarily along municipal, metropolitan area, or state boundaries, nor concentrated around the project limits. If a major cargo hub depends on only one primary carrier, issues often are raised as to whether or not that private company should be fully responsible, given that the improvements may have many other secondary beneficiaries. Conversely, if many users are involved, it is often difficult to reach a consensus on solutions and their financing.

STUDY OBJECTIVES

The purpose of NCHRP Project 8-39, *Financing and Improving Land Access to U.S. Intermodal Cargo Hubs*, was to examine effective strategies for improving land access to cargo hub and intermodal facilities by making use of existing and emerging funding

sources and by developing partnerships among government agencies, cargo hub operators and users, and local communities. Recommendations are based on case studies and other relevant experience as derived from the literature review.

STUDY APPROACH

This study reviewed selected case studies and other relevant materials as derived from the literature review to develop effective strategies for financing cargo hub access improvements throughout the nation. Guidance material is provided for planners, officials, and private companies based on the project experience gathered from the case studies. Twelve case studies were selected as follows:

1. The Alameda Corridor, Ports of Los Angeles and Long Beach, CA
2. Luis Muñoz Marin International Airport Cargo Access Road, San Juan, PR
3. Red Hook Container Terminal/Port Inland Distribution Network (PIDN), Port of New York and New Jersey
4. Skypass Bridge, Port of Palm Beach, FL
5. Chicago Area Consolidation Hub (CACH), Chicago, IL
6. Port of of Tacoma Overpass, Freight Action Strategy for the Seattle-Tacoma Corridor (FAST Corridor), Port of Tacoma, WA
7. Cooper River Bridge, Port of Charleston, SC
8. Tchoupitoulas Corridor, Port of New Orleans, LA
9. Joe Fulton International Trade Corridor, Port of Corpus Christi, TX
10. Lombard Railroad Overcrossing Project and Columbia Slough Intermodal Expansion Bridge, Port of Portland, OR
11. Kedzie Avenue Access Road, Chicago, IL
12. Portway, Port of New York and New Jersey

FINDINGS

Cargo hubs are increasing in importance as carriers and public authorities enlarge intermodal terminals and multi-modal complexes intended to (1) handle growing shares of the total cargo controlled by private networks and the nation's transportation system and (2) increase the efficiency of cargo movements. The nation's transportation system faces a significant challenge in providing and/or maintaining adequate access facilities as new cargo hubs are developed and existing hubs expand. Arterial highways, local streets, and access facilities that connect these cargo hubs to Interstate and other major highway facilities—often in developed parts of metropolitan areas—require significant investments to replace obsolete infrastructure, separate truck from rail or automobile traffic, provide adequate capacity, or improve safety. In some cases, the most practical solutions involve non-highway investments (e.g., new rail connections, added rail capacity, new intermodal rail yards, and barge services).

Special policy attention is needed to address this cargo hub access challenge. This need for policy attention is heightened by several major trends that drive the need for improvements and highlight the importance of further development, growth, and increased efficiency of cargo hubs.

Currently, cargo hub access projects are being implemented primarily by making use of available highway user tax funding sources and/or by obtaining private, port, airport, or economic development program contributions. This is an appropriate approach; however, based on the analysis of the case studies, several major issues relating to how access improvements are being financed require attention. These issues are as follows:

- Lack of dedicated funds and competition with commuter needs for limited highway funds,
- Limited applicability and suitability of user funds and project finance approaches,
- Obstacles to obtaining public funding for railroad access to private facilities, and
- Inability of public-sector agencies to respond promptly to expanding volumes and to the needs of private agencies, ports, or airports.

The research team found numerous cargo hub access projects being implemented across the nation, often requiring creation of ad hoc task forces, as well as innovative and creative use of available funding sources. Therefore, the research team recommends that national and regional initiatives to address cargo hub access should be considered to

- Formally recognize and measure progress to address this cargo hub access problem;
- Establish guidelines that ensure consideration of cargo hub access needs in the statewide and metropolitan transportation planning process;
- Encourage collaboration among multi-jurisdiction and private–public entities in evaluating solutions and the implementation of projects to address cargo hub access problems and needs;
- Encourage states and metropolitan planning organizations (MPOs) to address cargo hub access needs to consider port, airport, rail, and major private terminal operator and carrier expansion plans, as well as changing shipper logistics, in developing their long-range plans and transportation improvement programs;
- Establish a training or professional development program to encourage agencies and private companies to develop professionals on their staffs who are qualified to address cargo hub access improvement planning and financing issues; and
- Provide appropriate financing support, incentives, or other mechanisms to facilitate the structuring of practical funding programs for projects aimed at addressing cargo hub access problems and needs.

The research team further concludes that there is a need to consider the development of additional funding sources and/or financing mechanisms to facilitate implementation of cargo hub access improvements, such as (1) dedicated funds for cargo hub access projects; (2) a discretionary program that can make funds available to the most important national projects; (3) legal authorization for additional optional sources that states, regions, or local areas may use where needs are great; and/or (4) flexibility to make all types of cargo hub access projects specifically eligible for priority use of available funds, particularly all the major funding categories of highway-user-financed federal and state aid.

The proposed approach would emphasize practical solutions that help address needs promptly and provide the flexibility to facilitate the use of existing funding sources while encouraging local areas, private operators, port and airport authorities, and railroads to help frame innovative funding approaches tailored to their specific needs.

The research team recommends that the following specific mechanisms and/or initiatives be considered to address cargo hub access needs:

1. A cargo hub access program could be encouraged or required to be developed by all states and metropolitan areas with cargo hubs of national and/or regional significance;
2. An optional cargo hub access fee could be authorized nationally and collected regionally directly from users;

3. Laws and regulations could be clarified so that all types of cargo hub access projects are specifically defined to be eligible for tax exempt-financing; and
4. Private contributions by carriers, terminal operators, and others could be made eligible for investment tax credits when such contributions are part of cargo hub access programs approved by governmental bodies.

OVERVIEW

Cargo Hub Definition

For this research, a *cargo hub* is defined as any facility that provides cargo handling/transfer facilities and services, and, in most cases, involving intermodal transfers. Depending on volume level and markets served, cargo hubs can be categorized on the basis of their global, national, state, or regional significance.

A major cargo hub of national significance is defined as a cargo complex or area that handles a significant volume or dollar value as a percentage of total national cargo volume or dollar value. For example, Memphis International Airport, the largest air cargo hub in the nation and the world, handles about 7.7% of total U.S. air cargo volume. Within a private carrier network, a major hub is defined as a major transfer point or a consolidation point where the cargo handled represents a significant percentage of the carrier's total volume. For example, approximately 10% of daily domestic package volume for UPS is handled through the Chicago Area Consolidation Hub (CACH), the largest package sort facility in the world.

Major cargo hubs of state or regional significance are defined on the basis of the total volume handled by the area terminal(s). FHWA has established criteria to designate intermodal connectors to the National Highway System (NHS). These criteria are based primarily on traffic or cargo hub volume [e.g., 100 trucks daily in each direction on the principal route connecting to an intermodal terminal; principal roads connecting to maritime terminals or rail yards handling 500,000 annual twenty-foot equivalent units (TEUs) or 500,000 tons per year; and air cargo terminals handling 100,000 tons annually]. FHWA also established secondary criteria, such as (1) access roads to those terminals handling 20% or more of the total freight volume by mode in a state and (2) roads that connect to an intermodal terminal that is being expanded significantly.[1]

Cargo hubs can be categorized on the basis of the available facilities, markets served, and the services provided, as follows:

- Available modal connections and facilities,
- Geographic scope of markets served,
- Ownership/operation and control of the facility(ies),
- Extent of participation of connecting carriers (single or multiple users), and
- Scale and range of services provided.

Table S-1 shows examples of the various cargo hub types and the cargo handling services typically provided at these facilities, categorized according to geographic scope (i.e., domestic or primarily foreign cargo) and major markets served at each type of hub.

[1] FHWA, Federal-Aid Policy Guide, December 19, 1997, Transmittal 20, Subchapter E, Planning, Part 470, Highway Systems, Subpart A, Federal Aid Highway Systems, Appendix D—Guidance Criteria for Evaluating Requests for Modifications to the National Highway System.

TABLE S-1 Types of cargo hubs

Geographic Scope	Market Served	Examples	Cargo Hub Services	Carrier/ Terminal Control/Users
Domestic	Regional	• Regional hubs operated by FedEx that connect to its national hub at Memphis. • Intermodal rail yards, such as CSX yard in Philadelphia or NS yard in Atlanta	• Truck service connections to regional and national air cargo services • Truck and rail interface for regional rail services	• Single carrier (FedEx) • Single carrier (CSX and Norfolk Southern (NS))
	National	• UPS hub in Chicago • Rail hubs in Chicago and Kansas City • FedEx air cargo hub in Memphis and UPS air cargo hub in Louisville	• Truck and rail package consolidation hub • Truck and rail transfers to destinations nationally • Air package and cargo transfers to destinations	• UPS with BNSF rail • Individual rail carriers • Single carriers (FedEx and UPS)
International	Rail/Truck border crossings	• Border crossing rail yard and truck terminals at Laredo, Tx	• Border services to/from the US and Canada or Mexico	• Multiple or single carriers
	Air Cargo Gateway	• JFK, MIA, LAX cargo centers	• Domestic truck connections and air cargo connections between domestic and foreign markets	• Multiple carriers and connecting services
	Carrier Maritime Load Center	• Maersk/Sea Land Terminal in New Jersey	• Intermodal connections between domestic inland truck/rail services and international ocean vessels as well as transshipment to feeder vessels connecting to other regional ports	• Private single carrier (Maersk/Sea Land)
	New York/ New Jersey Maritime Terminals	• Multiple Terminal Complex	• Intermodal connections between domestic inland truck/rail services and international ocean vessels as well as transshipment to feeder vessels connecting to other regional ports	• Public and private terminals with multiple carriers and connecting services
	LA/LB Port Hub	• Multiple Terminal Complex	• Intermodal connections between domestic inland truck/rail services and international ocean vessels as well as transshipment to feeder vessels connecting to other regional ports	• Public and private terminals with multiple carriers and connecting services

THE NEED FOR SPECIAL ATTENTION TO CARGO HUB ACCESS

Special policy attention is needed to address the cargo hub access challenge, in light of the following major trends and other factors that drive the need for improvements and that highlight the importance of further development, growth, and improvement in the efficiency of cargo hub operations as follows:

- Globalization trends and growth in international trade are major drivers for economic development. The United States historically has had an advantage in intermodal transportation efficiency and reliability in the global economy, and cargo hub access is an opportunity to maintain and improve the U.S. competitive advantage.
- Industry practice and emphasis is to establish more and larger hubs, relying on spoke and feeder networks that can take advantage of larger ships, vehicles, planes, and trains, so as to increase efficiencies, lower costs, and increase reliability, and thereby concentrate heavy truck traffic in the roads immediately next to the intermodal terminals or cargo hubs.
- State/local governments and port/airport authorities are usually interested in attracting major hub operations to their areas, because such complexes generate significant employment and attract additional nearby development.
- Most existing cargo hubs are in and around metropolitan areas, near established areas of the city and near passenger airport terminals, where there is often heavy

automobile traffic and congestion, or near at-grade rail crossings, which generate unreasonable delays and difficult-to-resolve safety and security concerns for nearby residents and businesses, particularly as cargo hub traffic increases.
- Intermodal connections at major hubs are a major source of delays but may well be where enhancements may be possible to improve transit times and reliability (compared with the smaller opportunities that may be possible in the long-haul segments of the cargo movements).
- A quick response is needed to address changing and fast-growing market demands and multi-jurisdictional coordination involving public/private sectors, particularly when private carriers and shippers decide to build a new facility or significantly expand an existing facility.

In addition to the economic and industry emphasis on cargo hubs and the importance of access to these facilities, cargo hub access needs special attention because many different factors drive the need for the improvement at each cargo hub. The wide-ranging factors that drive cargo hub access needs illustrate the complexity and challenges associated with identifying and financing practical solutions to address the various cargo hub access problems. Often the greatest hurdles lie in

- Coordination among several jurisdictions or public-sector agencies and private companies so as to reach a consensus on practical solutions;
- Lack of concentration of many project beneficiaries in or near where the project is located;
- Lack of support by local communities, which often do not understand that, even though heavy truck traffic may have some negative impacts, such traffic also has positive economic benefits, and access improvements actually can reduce some of the negative impacts;
- The difficulties in obtaining financing, including
  - The need for flexibility, innovation, and creativity, to use available financing sources and mechanisms, particularly for large cargo hub access projects involving various modes, many jurisdictions, and private companies;
  - Legal constraints and delays associated with use of federal funds;
  - The fact that many cargo hub access improvements involve rail grade separations requiring private–public financing partnerships and approvals;
  - The lack of dedicated funding sources for cargo hub access projects and difficulties in meeting eligibility requirements for available public funding sources that were established with different primary objectives; and
  - The limited applicability of a project-specific user financing approach for most cargo hub access needs.

CASE STUDIES—PROJECT TYPES, NEEDS, AND OBJECTIVES

The case study projects were used as a tool to understand the variety of cargo hub access improvement project types and their funding programs or financing approaches. The case studies were selected to include various project types and were intended to cover different situations for different types of cargo hubs. Some projects involved a series of improvements serving a specific facility in a cargo hub (e.g., the projects built to serve the new UPS CACH or the Kedzie Avenue improvements to the Burlington Northern Santa Fe (BNSF) Corwith rail yard located within the Chicago intermodal hub). Other projects were intended to serve all terminals in a cargo hub complex, such as the Alameda Corridor serving the port terminals in Los Angeles/Long Beach (LA/LB); the FAST program improvements aimed at improving freight access along

the Seattle-Tacoma Corridor; or the Portway improvements connecting the major port terminals and rail yards in northern New Jersey.

The case studies covered a full range of projects that represented various sizes, scopes, types, locations and modes involved. The project also represented a variety of

- Financing methods (e.g., only public sources, mainly private sources, public and private sources, with and without user fees);
- Approaches to implementation (e.g., one agency with full responsibility from initial stage to implementation versus shared responsibility, and immediate full implementation versus phased implementation); and
- Cargo hub access issues (e.g., at-grade crossings, congestion, capacity, separation of truck and auto traffic, obsolete facilities, and provision of adequate access to new terminals or cargo hubs).

Although all case study projects shared an objective—to improve cargo hub access—no one model emerges for successfully implementing these cargo access improvement projects, and no ideal number of partners or funding mechanisms exist. Financing approaches in the large case studies considered who benefits most from the project, but generally emphasized current opportunities to attract existing funding sources or to help frame new funding approaches.

The access improvement projects addressed in the case studies had the following objectives:

1. Improve rail and highway connections between ports and intermodal rail yards by reducing drayage distances, eliminating drayage, or improving highway and rail facilities to reduce time and cost for these connections (mainly requiring rail line improvements, new intermodal rail yards on or near dock, grade crossings, and various highway improvements such as widenings, intersection improvements, and traffic lights. Three of the 12 case studies involved connections between rail yards and ports);
2. Improve rail access to port terminals and railyards so as to improve safety and reduce delays (particularly the elimination of at-grade crossings—six of the 12 case studies involved grade separations);
3. Develop alternative mode facilities and services to reduce congestion in the vicinity of cargo hubs (Red Hook Container Barge/PIDN)
4. Improve road access to cargo handling terminals [i.e., ports, railyards, truck terminals, and airports to reduce delays, add capacity, modernize infrastructure (e.g., interchanges, street lights, widenings, drainage improvements, pavement rehabilitation, and new connections)], which were involved in 9 of the 12 case studies;
5. Replace deficient or obsolete facilities to improve the condition of access infrastructure (three of the case studies involved bridge replacements); and
6. Provide new cargo handling terminals for new hubs (e.g., UPS).

All of the above projects generally are aimed at reducing congestion, eliminating delays, increasing capacity, improving safety, and/or modernizing/rehabilitating existing facilities. Most of the case studies share a main common objective: reduce traffic congestion and delays. Indeed, this is the leading reason for improving cargo access to U.S. hubs. Whether traffic is being generated solely or mostly by the cargo hub traffic (e.g., Luis Muñoz Marin International Airport) or by a combination of the cargo traffic and regular public traffic using the same roads (e.g., Alameda Corridor and Kedzie Avenue), the issues of congestion and delays eventually arise. The solution typically requires some type of improvement of the road and highway system near the cargo hub terminal facilities.

In addition to eliminating delays and congestion, other typical project objectives were as follows:

- Promote economic development—open land for development, create new areas for port expansion, and/or provide access to new facilities.
- Increase system reliability—not only every day congestion but also nonrecurring congestion.
- Meet carrier and terminal operator needs—this includes expansion needs to maintain and improve facility market share.
- Improve national and international competitiveness—as well as cargo hub competitiveness, particularly for large projects in major hubs.
- Reduce consumer costs—via lower transportation costs, reduced delays, reduced inventory costs, and increased reliability for businesses.
- Improve overall system efficiency locally and regionally—particularly addressing the "last mile" segment of long hauls for cargo moving nationally or internationally.
- Improve air quality and reduce congestion—by developing alternatives that shift truck traffic to other modes, thereby reducing truck traffic on highways.
- Improve intermodal connections and links—especially between cargo terminals and warehouses or industrial areas.
- Improve or replace obsolete facilities—such as bridges, roads, and rail facilities.
- Improve safety and reduce rail-truck/auto or auto-truck conflict points—primarily by building dedicated truck lanes and overpasses, eliminating at-grade crossings, and improving traffic signals.

PRIMARY PROJECT BENEFICIARIES

Several major groups benefit directly from cargo hub access improvements; others benefit indirectly. The direct beneficiaries can be summarized as follows:

- Owners, operators, and users of the cargo hubs (e.g., ports, airports, intermodal rail yards, terminal operators, and carriers) benefited in all case studies.
- Communities and local areas near the terminal facilities, experiencing reduced levels of truck traffic or delays at grade crossings, benefited in at least three of the case studies.
- Other highway users (particularly commuters and safety/emergency road vehicles) on the less congested highways that provide access to the terminals benefited to some degree in all case studies.
- Rail carriers that increased their business and the efficiency of their operations through the access improvements (in some cases also benefiting passenger rail carriers) benefitted in nine of the case studies.
- Shippers who obtained more reliable service were able to reduce inventory levels and their logistics costs as a result of the more efficient cargo hub access. This was the case for the larger cargo hub access projects, such as the Alameda Corridor.

The primary beneficiaries in all cases are the cargo hub operation and the highway users in the adjacent road system and, depending on the specific situation, railroads and nearby communities also can be important beneficiaries. The many indirect beneficiaries include

- Shippers, businesses, and consumers (nationally and even internationally—for foreign cargo hubs) who benefit from the reduced costs and improved business efficiencies,

- The state and regions that attract jobs as a result of cargo hub growth, and
- The local residents who are exposed to lower emissions as a result of reduced truck traffic after a project is completed.

FUNDING SOURCES

The case studies demonstrate the various financing sources that can be used. Some case study projects include simple financing approaches involving only one or two sources [e.g., the Luis Muñoz Marin International Airport Cargo Access Road in San Juan, Puerto Rico, which was financed by the FAA and Passenger Facility Charges (PFCs) and the Kedzie Avenue project, financed by the Federal Congestion Mitigation and Air Quality (CMAQ) Program and Chicago DOT funds]. At the other extreme is the Alameda Corridor, clearly the most complex project, which involved federal, state, and local funding, in addition to port funding, a major bond issue, and user fees.

Federal funding was used in 11 of the case studies. Funding sources used include FAA grant funds, various FHWA and Surface Transportation Program (STP) programs, including congestion relief, CMAQ, High-Priority, Section 1118, and NHS funds, as well as the Transportation Infrastructure Finance and Innovation Act (TIFIA) loan program. The only project that involved no specific federal funding was the UPS CACH. In general, agencies consider obtaining federal aid, which is the major source of highway funds nationally for large projects.

Ten of the case studies used some type of state financial assistance—in most cases as a match for federal funds. Every state has different laws and funding programs that are designed to finance highway projects, and nearly all cargo hub access projects are eligible projects. Many states also have state infrastructure banks (SIBs) and/or economic development programs that are specifically available for transportation projects (e.g., Florida, Texas, and Louisiana). Depending on the type of project, some of the state's programs can offer a quicker funding option and/or a less restrictive approach than federal funding.

Nine of the case studies were partially financed by the port or airport authority or a similar agency. Most ports and airports were key players in obtaining the political support to implement the case studies and, in several cases, were the key lead agency, involving substantial financial support. Most ports and airports usually have their own dedicated funding sources and the ability to issue their own bonds or to use their operating revenues to finance access improvements.

Five of the case studies included some funding from private terminal operators or railroads. In three of the case studies, private-sector funding ultimately is providing far more than one-half of the project cost. These three projects involve investments that are mainly or solely cargo hub oriented, so the overall percentage of private funding exceeds the public percentage. However, most projects are entirely publicly funded, because many involve typical highway and road projects on routes where cargo hub traffic is only one of many reasons for the needed improvement. Furthermore, more than one-half of the case studies include port or airport authority funding, which involves user revenues, taxes, fees, and other charges that are collected for promoting and/or developing and operating those facilities.

Only two projects incorporated project-specific user fees: the Alameda Corridor and the Columbia Slough Railroad Bridge. In both cases, user fee financing was complemented with federal aid and other sources. However, almost all the projects included a multi-funding source package, including user-related contributions (e.g., federal and state highway user taxes and port/airport and private-sector contributions).

GUIDANCE FOR PLANNERS, OFFICIALS, AND THE PRIVATE SECTOR

Usually institutional obstacles require multi-jurisdictional and/or public–private coordination to reach a consensus on cargo hub access projects to be implemented. In addition, as is the case with any transportation improvement, a financing package should be structured considering the beneficiaries, and most importantly, the readily available sources of funding and practical approaches to obtain additional required financing. A successful approach should typically include the following:

- A lead sponsor to ensure that the project is implemented, which can be a private company, a state or local transportation agency, a port or airport authority, or a new special purpose agency (for larger or more complex projects);
- Strong coalitions of organizations to champion and support the access improvement;
- Flexibility in defining the access improvements and structuring the financing to accommodate all stakeholders, government jurisdictions, affected communities, carriers, and so forth; and
- Creativity and innovation to justify use of program funds and/or help articulate need for a new funding program or changed eligibility requirements.

Table S-2 describes recommended best practices for planning and financing cargo hub access projects. These best practices are divided into three categories: planning and institutional coordination, financing, and community involvement and environmental process. This table presents guidelines on how to identify needs, define and plan projects, and structure practical financing packages for improving cargo hub access.

INCORPORATING BEST PRACTICES INTO THE TRANSPORTATION DEVELOPMENT PROCESS

Cargo hub and freight transportation requirements vary significantly by metropolitan area and state. However, nearly every metropolitan area and state has some cargo hub facility or intermodal terminal that periodically may require access improvements. Transportation planners should consider these cargo hub access requirements formally within the framework of their overall planning process and address needs by taking into consideration the perspective of the major carriers and facilities that operate in an area.

Two primary factors can help to integrate cargo hub access needs into the overall transportation planning process as follows:

- Educating planners so they gain experience with freight issues and cargo hub access needs; and
- Establishing stronger coordination and communications between the public and private sectors, particularly the carriers and shippers operating at the cargo terminals.

A proposed approach to consider cargo hub access needs formally in the transportation planning and projects selection process as typically carried out in any MPO or statewide planning process is presented in the report. It should be recognized that stakeholder involvement—not just data gathering, analysis, and forecasting—is important to achieve the planning objectives.

PROJECT BENEFITS, PRIMARY BENEFICIARIES, AND FUNDING

The benefits generated from improved cargo hub access will accrue not only to the direct users, but also to the users of the larger regional transportation network (by alleviating congestion and diversifying modal options) and to the national, regional, and state

TABLE S-2 Best practices–cargo hub access planning, financing, and community/environmental processes

Planning and Institutional Coordination	Financing	Community Involvement and Environmental Process
• Planning process led by agency or private company responsible for cargo hub, and/or involved in transportation infrastructure, i.e. State DOT, or other appropriate local/State agencies. • MPO Freight Task Force or Statewide Freight Coordination group established. • Long term freight corridor/access improvement needs identified with participation of key private sector users and freight stakeholders. • When cargo hub access issues involve multistate regional issues, ad-hoc or special, multi-state or regional, organizations or task forces may need to be established. • For typical, routine smaller improvements, MPO and Statewide Planning process and/or public agencies with responsibility for access roads can quickly respond. • For major projects and access programs to major cargo hub complex, key to successful development is coordination between various public agencies/private companies to achieve the project's goal. • The existence of public/private task force or coordinating group can lead to quick identification of access issues and solutions. • For larger, complex projects, once project need is defined and consensus reached on solution, a State or local organization should be responsible for implementation, or an ad hoc specific purpose organization may need to be formally established. • Flexibility in incorporating recommendations and suggestions of various groups, including private companies, public sector organizations and affected communities is key in reaching consensus on a practical and implementable solution. • For major hub complexes, it may be appropriate to consider various modal alternatives to reduce congestion by shifting freight traffic from trucks, if such options are feasible under a commercially viable price-service combination. • Priority investments should be evaluated within framework of area's long term Master Plan after evaluation of multimodal corridor and intermodal connection improvement opportunities, particularly for rail and highways. • Planning process needs to react rapidly to incorporate responses/solutions to near term private sector/terminal operational access needs that require shift of priorities and quick response by public sector highway and transportation agencies as a result of private facility/hub expansion. • For major hub complexes, multi-project cargo hub access programs should be explicitly identified as part of the planning process, identifying a mix of large and smaller projects that create long-term plan wider in scope than any one project can incorporate. • Private companies that have need for access improvements adjacent/connecting to their terminals need to articulate those needs and be willing to contribute to financing solutions. • When planning cargo hub access improvements, planners should consider how alternative solutions can contribute to other objectives, including community/environmental goals (reducing traffic congestion or expanding transit services), as well as cargo hub operational efficiency. • The planning process and alternative solutions studied should explicitly consider the important role of cargo hubs in State and regional economic development programs, recognizing that main objective of cargo hub access projects is to expedite movement of goods and provide reliable travel times at competitive costs.	• In structuring financing package, available funds from Federal, State, and other public transportation sources along with private participation when appropriate, should be considered, taking into account project objectives and beneficiaries. • Most cargo hub access projects can be financed through regularly available highway programs. Often programs do not have required amounts of funding, and special cooperation is essential to obtain the needed priority or to structure a package under more than one program. • For major cargo hub access programs and large projects, financing usually requires public/private partnerships, so investment and operating costs are shared fairly among public/private organizations, including risks, such as overruns, revenue shortfalls and contingencies. • The financing approach may need to be adjusted as project goes through planning and design steps, to be able to respond to scope changes that might be necessary to obtain community support, local agency approvals, and/or environmental permits. • For larger projects in major hubs where users are identifiable, loans or bond proceeds should be considered to structure the financing package, with repayment through user fees or through contributions from future tax revenue sources. • When considering user fees, the competitive situation of the hub should be examined • In certain cases, economic development, infrastructure banks and other general governmental programs can support access improvements, when those projects create or preserve jobs and where they meet established program guidelines. • Although it is best to tie project funding sources as directly as possible to beneficiaries, creative approaches can tap available funding sources, even when those sources might not previously have been used to finance cargo access projects. • An appropriate participation by private companies and port/airport authorities benefiting from projects should be established (particularly when the projects are a direct result of their expansion or operational needs). • In obtaining financing for cargo hub access projects, planners, policy makers, and private companies will often have to work with their elected officials to change laws and/or regulations that may be obstacles to project implementation.	• Planners and policy makers need to explicitly consider local area needs/priorities as well as environmental process/mitigation requirements when planning and implementing cargo hub access projects • As is the case with any transportation development project, there is a need to be flexible and adjust projects to respond to local community and environmental concerns. • Planners, private companies and others involved in defining and implementing projects need to work with community leaders to define projects that help development locally. • Planners and implementing agencies should establish mechanisms to obtain local community and environmental group views as early as possible and maintain communication with all groups throughout the planning and implementation process • In all cases, close interagency, public/private and community coordination (preferably through formal mechanisms) are key to resolving issues as they emerge. • When private companies or port/airport authorities are the major beneficiaries of a project, there is a need for their representatives to formally be involved with the community to develop support and explain the project need and benefits, as well as to obtain input. • Environmental concerns (e.g., air quality, vibrations, noise pollution and natural resource impacts) always need to be considered early when developing an access improvement project. • Any capital improvement project can impact the existing environmental situation, resulting in some environmental impacts during construction or operations of the new or expanded facility. It is crucial to develop a strong relationship/partnership with environmental organizations, in addition to the local governments, focusing on each group's needs and objectives, in order to successfully implement a project.

economies (through increased productivity and the competitiveness of regional businesses dependent on freight movements). This wide distribution of project benefits has implications for project funding. An equitable assessment of benefits/beneficiaries is appropriate to provide a basis for a fair allocation of costs among project beneficiaries. The beneficiaries range from shippers (who will receive more efficient cost-effective service) to taxpayers (who may enjoy savings from infrastructure conservation and other sources of tax revenues from increased jobs and additional business). Benefits generally relate to transportation, the environment, infrastructure, quality of life, and commerce.

Understanding the range of private and public benefits of projects provides the foundation and justification for the range of financing mechanisms that are employed for hub access improvements. Given that the benefits of cargo hub access projects accrue typically to public, as well as private beneficiaries, the issue that planners, policy makers, and interested private carriers or operators generally face in reaching a consensus for financing projects is how to structure public–private partnerships that reflect benefits and beneficiaries in a reasonable and equitable manner for each project. There are no simple methodologies to fully quantify all of the benefits from cargo hub access projects. However, approaches are available to estimate delay reductions and their impact on business costs, the number of jobs created, increased tax revenues to state and local jurisdictions, and similar measures.

Ultimately, a specific cost allocation agreement is achieved through negotiation among the parties involved, but the degree to which the project benefits (or is perceived to benefit) the different parties is essential in the negotiation and determination of funding. In addition, some funding sources have legal limitations, while other have more flexibility, and these practical considerations will determine the extent of the eventual relationship between benefits/beneficiaries and financial contributions.

In addition, to considering private versus public benefits and how the two sectors should participate in funding a project, there is the question of which public agencies or categorical programs should contribute and what are the appropriate contributions for each. In addition to federal, state, and local agencies, port and airport authorities are major beneficiaries of cargo hub access improvement projects to their facilities. Most airports and ports are owned and operated by public-sector independent authorities or agencies of state or local governments that may receive state and/or local funding.

A theoretical mix of public and private benefits may be estimated by performing a simple analysis that identifies the major beneficiaries of a project and specific objectives of a project (basically a listing of project objectives and major beneficiaries). From such a list, private-sector versus public-sector benefits can be segregated. Such a list can provide a basis for discussions among agencies and interested private companies. Similarly, the public-sector benefits can then be listed to consider the type of public benefits and whether they are of

- National significance and determining what categorical programs would logically be potential sources of funding considering the level of benefits that accrue to the national economy as compared with state or local benefits;
- State significance and any potential state economic development or special programs that relate to these benefits (e.g., ports, airports, economic development, infrastructure, or other transportation programs); or
- Local significance (including local traffic, community quality of life aspects, or environmental benefits) and any programs or funding sources that relate to these benefits similar to those examples supplied for states.

In any of the above cases, negotiations among the parties to consider practical solutions will ultimately provide the mix of funding that will make it possible to implement

a project. It should be understood that the funding mix actually achieved is the "most appropriate" or the "most practical" mix of public and private funds relative to benefits achieved and cannot necessarily be based on a quantifiable analysis of benefits versus costs. However, the final outcome will represent the political expression of benefit through the negotiations and tradeoffs of grant availability; ability to pay; bond limits; federal, state, local, and private-sector priorities; and commitment to the project. The political process of negotiation, however imperfect, results in assigning costs to private and public participants who benefit from the desired projects.

FINANCING TOOLS MATRIX

To evaluate the best options for developing a funding package for an access project or program, the improvement need or problem to be solved should be articulated, including

- The specific cargo hub (i.e., air cargo, maritime, rail, trucking and/or multimodal complex);
- The freight transportation modes used to access the cargo hub;
- The type of improvement;
- The location of the improvement;
- The level of funding required to undertake the project;
- The urgency of the improvement project; and
- The primary beneficiaries of the project.

These project characteristics frame the discussion for structuring a financing package. The size, location, urgency, and beneficiaries dictate the type of options that may be available. If improvements are small or located on property controlled by a single organization, then the discussion and ultimate financing decisions may be internal to that organization. The report includes a financing tools matrix as a means to offer guidance to public- and private-sector organizations seeking to fund the development of cargo hub access projects. One other key aspect in selecting a financing approach is the main type of project involved (i.e., whether it primarily involves access improvements to an airport, port, or a rail, private, or multimodal complex).

APPLICABILITY OF USER FEES AND USER CONTRIBUTIONS

User fees provide a mechanism for supporting the ongoing operation and maintenance of transportation infrastructure. In addition, user fees can create an identifiable revenue stream to obtain loans and/or support the issuance of bonds for capital investments and construction costs. User fees often are mentioned as a source for financing cargo hub access projects, particularly when large, complex projects or access to private facilities is involved. However, project-specific, dedicated user fees to implement a cargo hub access improvement are not easily applicable and are not suitable to most cargo hub access projects because of the following:

- Cargo hub access improvements typically are not aimed solely at cargo hub users and generate benefits that cannot be separated from those accruing to other facility users and the connecting transport infrastructure.
- User fees cannot be practically applied, given the nature of the project, the users and the location.
- Other more practical approaches to obtain user contributions toward financing cargo hub access projects are available.

In general, three types of user-related contributions (i.e., taxes, fees, or charges) traditionally have been used to finance transportation projects and can be used to finance cargo hub access projects, as follows:

- Highway user taxes, air transport, and other transport-related taxes and fees, such as gasoline taxes and truck registration fees;
- Facilities revenues and charges, collected at cargo terminals; and
- Project-specific user fees, collected from users of a facility and dedicated to repay its capital, operating, and maintenance costs (e.g., tolls, rail wheelage fees, carload, or per container fees).

In its most basic form, a project finance approach is one in which a substantial portion of the funding (up to 70% or 80%) to build a project is obtained through a debt issue, which is then repaid fully over time by the dedicated revenues from the operation and facility users. User contributions can then be separated into those from general user taxes and related fees, the contributions of private companies, ports and airports from their general corporate or facility revenues, and specific user fees dedicated to financing a particular project. As noted previously, specific, dedicated user fees or revenues collected from a particular facility are commonly used in project finance (i.e., obtaining required financing to implement a project through the capital markets). However, in terms of considering contributions of various user groups to a particular cargo hub access project, it is appropriate to also consider the other two options—(1) general transportation user taxes/fees and (2) contributions from private companies or from cargo hub facility revenues.

Even if project-specific user fees can be applied and benefits accrue to specific identifiable cargo hub users, the business and political context may make such specific project user financing inappropriate. The main factors generally considered regarding suitability of user fees are as follows:

- Competition—User fees can shift traffic to other hubs or other facilities and can change the market share of the cargo hub. If it is decided to apply such a fee, it is important to consider an appropriate level to generate needed revenues without substantially decreasing demand and taking into consideration fees and costs at competing terminals.
- Impact on general public or non-cargo hub users—Even when appropriate, if the facility being built or expanded cannot be dedicated exclusively to cargo hub traffic, other traffic may be affected, and the effect on such traffic must be carefully assessed.

Both applicability and suitability ultimately affect whether user fees can practically be used as a funding mechanism for cargo hub access projects. The case studies illustrate the few situations where specific project user fees are practical—most cargo hub access projects are improvements to existing facilities or short additional connections where it simply is not practical to consider user fees tied specifically to only that project. In limited cases, project-specific user fees are the most logical and practical approach to project financing.

SUGGESTIONS FOR ADDITIONAL RESEARCH

Based on the case studies reviewed, suggestions for additional research are as follows:

1. Technical criteria and nationally consistent information should be developed and updated regularly to define cargo hubs of national and regional significance. Cargo

hub definition should reflect the volume of cargo handled, the size of facilities, and the services provided. This study found that such data are readily available for ports and airports, but not for rail yards, intermodal terminals, privately operated terminals, and other multimodal hub complexes.

2. The results and benefits of selected cargo hub access projects should be evaluated so as to provide guidance to planners on the advantages and disadvantages of different approaches and solutions to cargo hub access problems.
3. Analysis tools should be developed to more accurately estimate relative benefits and objectives of cargo hub access projects to project financing, to provide guidance or illustrative cases that planners and officials can use, and to determine appropriate levels of funding by various beneficiaries and user groups.
4. The case study analysis should be expanded and updated regularly to maintain a national inventory of cargo hub access projects. This inventory will assist planners and officials in their planning activities and help identify relevant examples that can be useful in defining solutions and identifying financing strategies for cargo hub access projects.

CHAPTER **1**

INTRODUCTION

1.1 BACKGROUND

Increasingly, the efficiency of the U.S. freight transportation system is influenced by the adequacy of land access at cargo hubs. Congestion along access routes to ports, airports, and other freight hubs increases the cost and affects the reliable and efficient movement of goods throughout the transportation system. Land access, a critical component of goods movement, is as important as adequate channel depths, efficient use of air space, sufficient line haul rail track capacity, and efficient terminals.

Cargo hubs (defined in this study as any transfer or transshipment point, in most cases involving intermodal transfers, that provides cargo handling/transfer facilities and services) are a relatively new concept in transportation system development. As carriers use larger ships, higher capacity double-stack trains, dedicated jumbo cargo airplanes, and longer trucks or combination vehicles than previously used, cargo hubs are becoming an increasingly important element of the nation's transportation system. Increased use of higher capacity equipment allows carriers to streamline their service routes and used a limited number of international gateways, ports of entry, and inland intermodal transfer facilities to reduce costs, improve service, and increase the efficiency of their operations.

Although private-sector carriers are giving increased emphasis to cargo hub development (e.g., FedEx in Memphis, UPS in Chicago, Maersk/SeaLand in New York), institutional and funding obstacles make it increasingly difficult to improve and finance the land access to these cargo hubs. Land access to cargo hubs typically requires highway and/or rail improvements in developed urban areas where local priorities generally emphasize solving commuter bottlenecks over improving access to airports, seaports, rail yards, and other cargo transfer facilities. In many cases, major investments are required, but principal beneficiaries are dispersed over a broad geographic area, not necessarily along municipal, metropolitan area, or state boundaries nor concentrated around the project limits. If a major cargo hub depends on only one primary carrier, issues often arise as to whether or not that private company should be fully responsible, when the improvements may have many other secondary beneficiaries. Conversely, if numerous users are involved, it is often difficult to reach a consensus on solutions and their financing.

Inefficient or inadequate land access to cargo hubs results in increased transport costs, reduced safety, environmental issues, and negative impacts on local residents and their quality of life. Improving land access to major cargo hubs is a complex process. In addition to jurisdictional and institutional obstacles, there are often land use and environmental issues. In addition, the financial condition of many freight providers and their competitive situation in a deregulated industry when combined with the usual limited availability of public and private funding sources requires a thorough understanding of potential financing tools, practical strategies for using available funds, and innovative ways to allocate the costs equitably among the project's beneficiaries.

1.2 STUDY OBJECTIVES AND CASE STUDIES CONSIDERED

NCHRP Project 8-39, *Financing and Improving Land Access to U.S. Cargo Hubs,* was conducted to consider and recommend effective strategies for improving land access to intermodal facilities by taking advantage of existing and emerging funding sources and developing partnerships within the local community. Recommendations are based on case studies and other relevant information.

The study is based on an analysis of 12 case studies selected after preparing an inventory of cargo hub access projects around the United States. Based on this inventory, six case studies covering various project locations, types, sizes, and modes were selected for in-depth analysis and the remaining six projects were selected for a brief review of their objectives and financing. All 12 case studies are described below.

1.2.1 The Alameda Corridor, Ports of Los Angeles and Long Beach, California

The Alameda Corridor project is a $2.4 billion, 20-mile–long, multiple-track rail corridor connecting the Ports of Los Angeles and Long Beach facilities to downtown Los Angeles and to the intercontinental rail network (see Figure 1). The project consolidates 90 mi of rail tracks with 200 roadway crossings into a single, 20-mi–long, high-capacity rail line, which was mostly in trench and grade separated. It is one of the most complex and largest infrastructure development

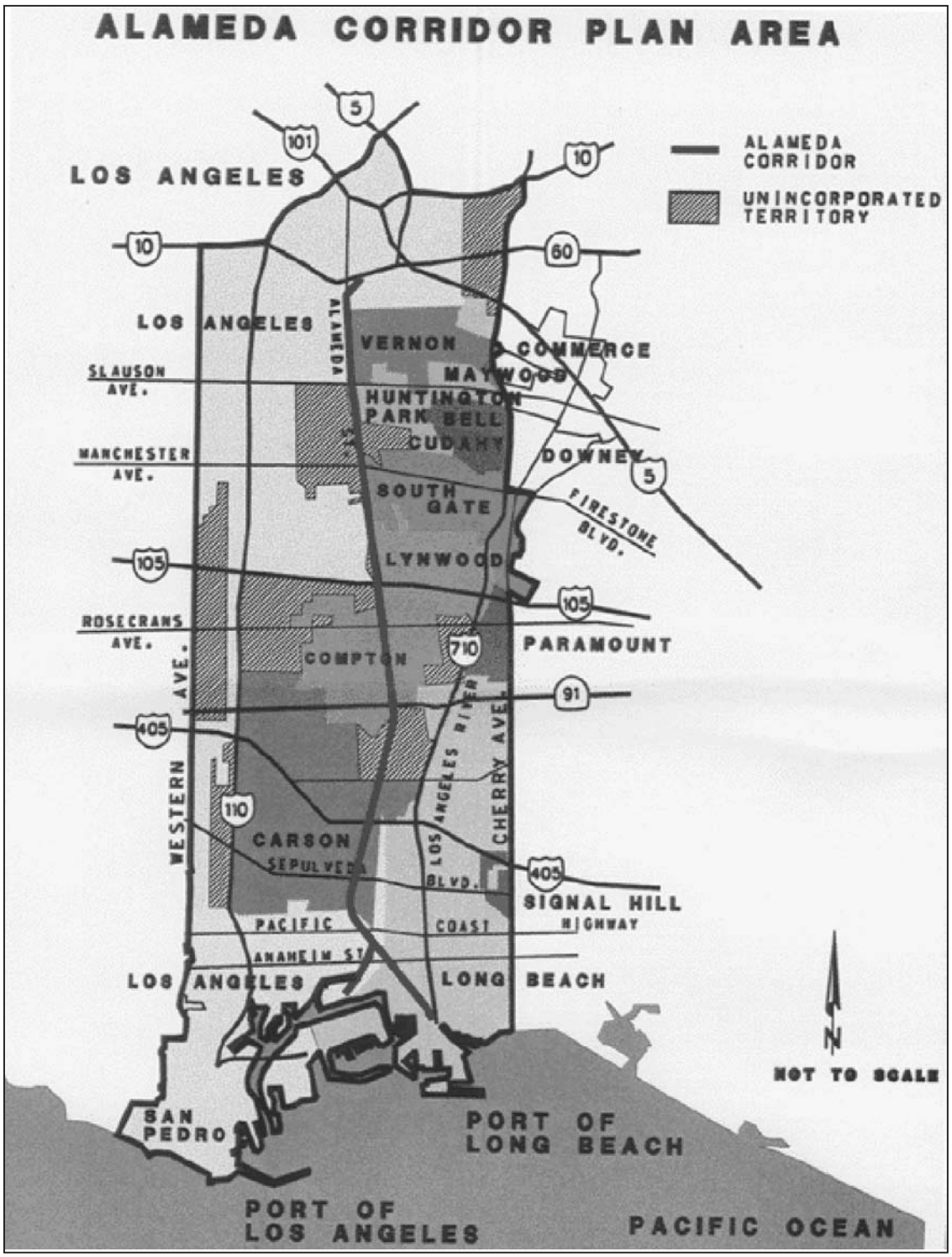

Figure 1. The Alameda Corridor, Ports of Los Angeles and Long Beach, California.

projects in the United States. The corridor was opened to service in early 2002.

1.2.2 Luis Muñoz Marin International Airport Cargo Access Road, San Juan, Puerto Rico

This $5.2 million project consists of widening an existing access road to four lanes to improve access to the primary cargo area of Luis Muñoz Marin International Airport in San Juan, Puerto Rico, the largest air cargo hub in the Caribbean area (see Figure 2). The existing cargo access road is a single, two-lane, two-way corridor. The project also includes the improvement of the current traffic light system with PR-26. Project completion is scheduled for December 2004.

1.2.3 Red Hook Barge/Port Inland Distribution Network, Port of New York/New Jersey

The Red Hook Barge and the Port Inland Distribution Network (PIDN) are examples of non-capital intensive access improvement projects designed to provide an alternative mode and route for the movement of cargo by truck through a congested area. The barge service is designed to provide an alternative to the trucking of containers to and from the congested Brooklyn waterfront, between the Red Hook Marine Terminal in Brooklyn, New York, and Port Newark, New Jersey (see Figure 3). The barge service has been operating since October 1991. PIDN, which will enable the shifting of containers directly from marine vessels to trains at the terminal for movement to inland terminals, is also conceived as a means of reducing direct truck trips between Port of New York/New Jersey maritime terminals. PIDN is under study.

Figure 2. Luis Muñoz Marin International Airport Cargo Access Road, San Juan, Puerto Rico.

1.2.4 Skypass Bridge, Port of Palm Beach, Florida

The Skypass Bridge Project is a $31.6 million, 13-span structure with a length of 1,900 ft and a height of 60 ft over the existing US–1 roadway and the Port of Palm Beach (see Figure 4). The purpose of the project was to elevate US–1 and connect the east and west portions of the port property under the elevated road to increase the cargo handling capacity and the efficiency of freight movement internally at the port. The project also decreased traffic congestion on US–1 by eliminating cross-port traffic. The project was inaugurated in December 1999.

1.2.5 Chicago Area Consolidation Hub, Chicago, Illinois

The Chicago Area Consolidation Hub (CACH) is a new, centralized, national package sorting facility that was privately sponsored and built by UPS. This project required several different types of access improvements (see Figure 5), at a cost that totaled over $25 million. Three major roadside access projects were implemented: (1) a $15 million interchange providing direct access to the hub from I-294 developed by the Illinois State Toll Highway Authority; (2) a $10 million road overpass (grade separation) to eliminate the highway-rail conflicts associated with increased hub traffic; and (3) local street access improvements to accommodate employee access and increases in truck traffic. Also implemented was a $75 million intermodal facility developed and operated by the Santa Fe Railway Company [now Burlington Northern Santa Fe (BNSF)] to provide direct connections from the hub to the rail system. The hub consolidates wholesale distribution of UPS package shipments from throughout the country. The CACH opened in 1995.

1.2.6 Port of Tacoma Road Overpass, FAST, Port of Tacoma, Washington

The Port of Tacoma Road Overpass is a $33 million project, developed as part of the Freight Action Strategy for the Seattle-Tacoma (FAST) Corridor program, cooperatively managed by several area organizations. The project eliminated at-grade railroad crossings and traffic lights, improved access from I-5 to Port of Tacoma marine terminals, and increased rail capacity (see Figure 6). The project was completed in 2001.

1.2.7 Cooper River Bridge, Port of Charleston, South Carolina

The new $636 million Cooper River Bridge over the Federal shipping channel in Charleston Harbor carries the principal route that connects the major container facility in the Port of Charleston to the Interstate highway system in the City of Charleston (see Figure 7). The bridge will feature

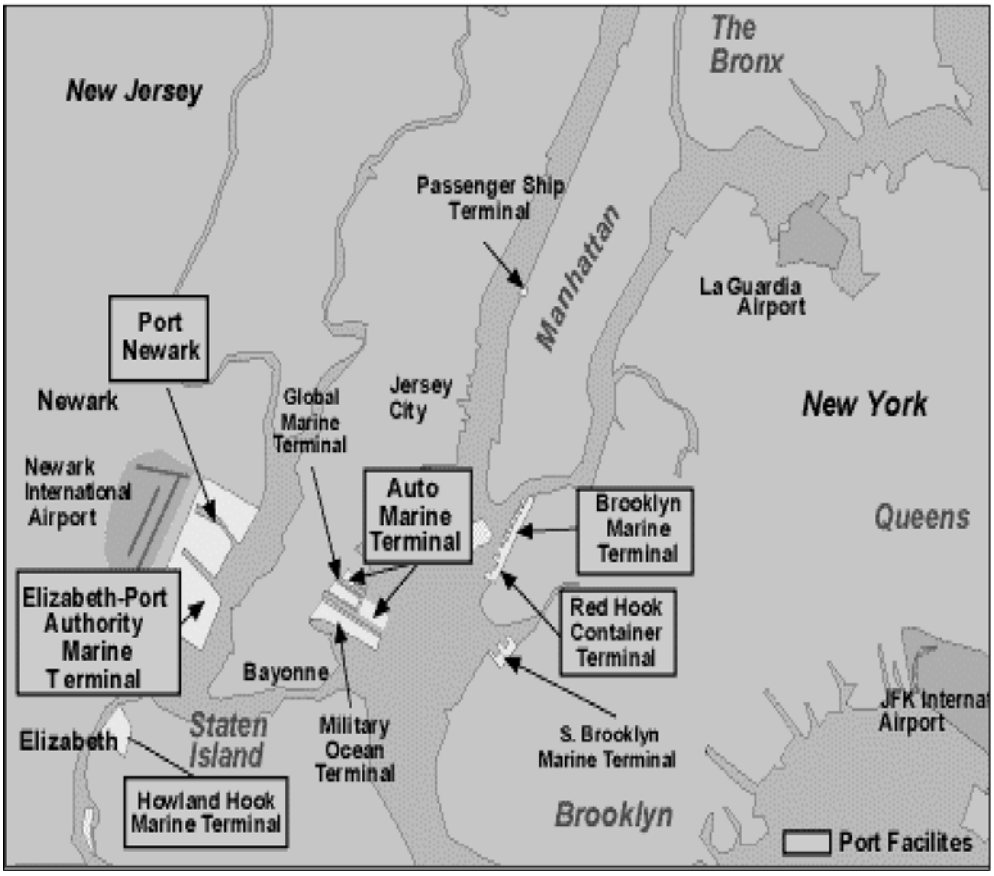

Figure 3. Red Hook Container Barge/Port Inland Distribution Network, Port of New York/New Jersey.

Figure 4. Skypass Bridge Project, Port of Palm Beach, Florida.

Figure 5. CACH, Chicago, Illinois.

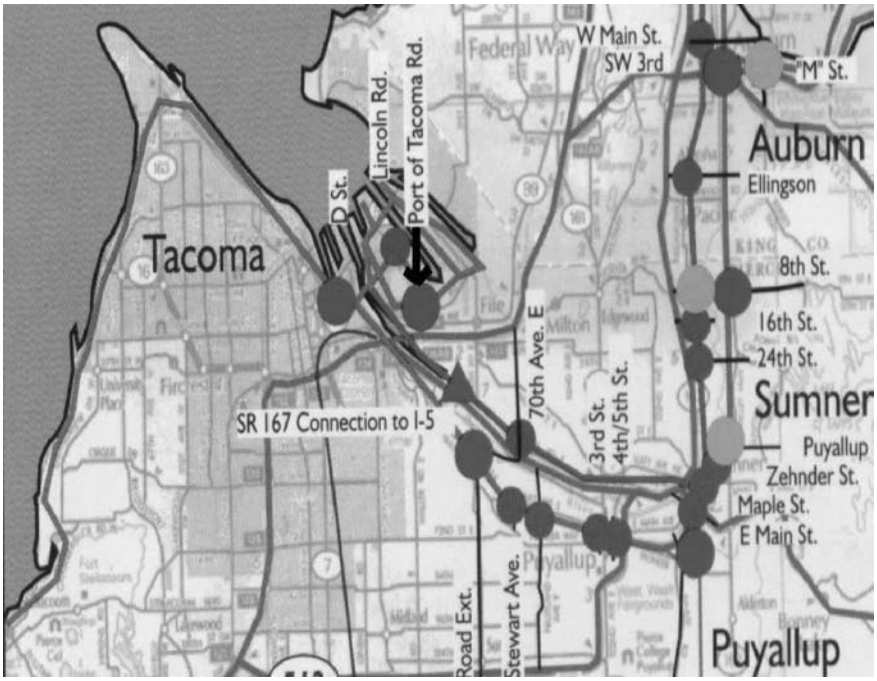

Figure 6. Port of Tacoma Overpass Project, FAST, Port of Tacoma, Washington.

eight traffic lanes; a 1,546-ft center span; and a 186-ft vertical clearance. Construction started in 2001, and the project is scheduled to be completed in 2006.

1.2.8 Tchoupitoulas Corridor, Port of New Orleans, Louisiana

The Tchoupitoulas Corridor project consists of a rebuilt and improved city street, a new dedicated port access roadway (see Figure 8), the repair and/or replacement of existing sewer and drainage systems, modifications to existing flood walls, and the relocation and consolidation of railroad tracks. The purpose of this project is to provide a dedicated truckway to access the port while removing heavy-vehicle traffic from existing city streets, as well as to reconstruct existing Tchoupitoulas Street. Tchoupitoulas Corridor is being implemented in phases and, currently, the total cost for the project is estimated at $70 to $75 million. The truckway is open to traffic, several other sections are also completed, and the final section is expected to be complete in mid 2003.

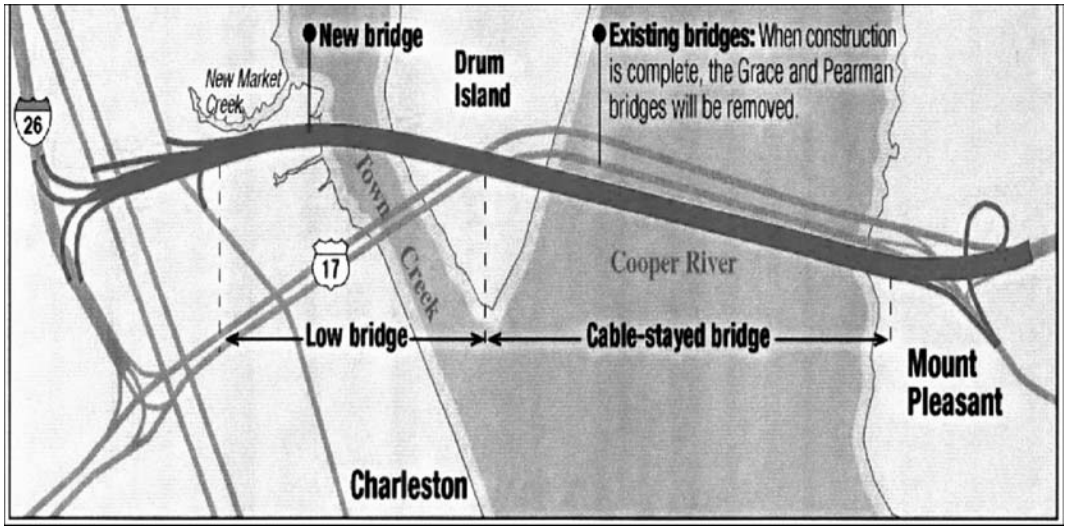

Figure 7. Cooper River Bridge, Port of Charleston, South Carolina.

Figure 8. Tchoupitoulas Corridor, Port of New Orleans, Louisiana.

1.2.9 Joe Fulton International Trade Corridor, Port of Corpus Christi, Texas

The Port of Corpus Christi's Joe Fulton International Trade Corridor is a $49.7 million, 11.8-mi road and 7-mi rail corridor, designed to (1) improve access to land and sea intermodal facilities and (2) provide an alternative connection between major components of the regional highway system (see Figure 9). This project is in the design phase. Construction is anticipated to start in 2003 with completion by 2006.

1.2.10 Lombard Railroad Overpass and Columbia Slough Bridge, Port of Portland, Oregon

These two projects are aimed at improving truck and rail access to Port of Portland marine terminals and the industrial park, Rivergate (see Figure 10). The $25.9 million Lombard Railroad Overpass is being planned by the Port and the City of Portland to improve the link between the marine terminals and I-5 by carrying traffic on a grade-separated structure over a rail line). The Lombard Railroad Overpass is scheduled to begin construction in 2003 or 2004. The Port and the City are the joint leads for this project. The second project is the Columbia Slough Bridge. This $6.1 million bridge (not including a $7 million Wye connection funded by the railroads) was built over the Columbia Slough in 1997, connecting the two halves of Rivergate, to improve rail service to, from, and between marine terminals.

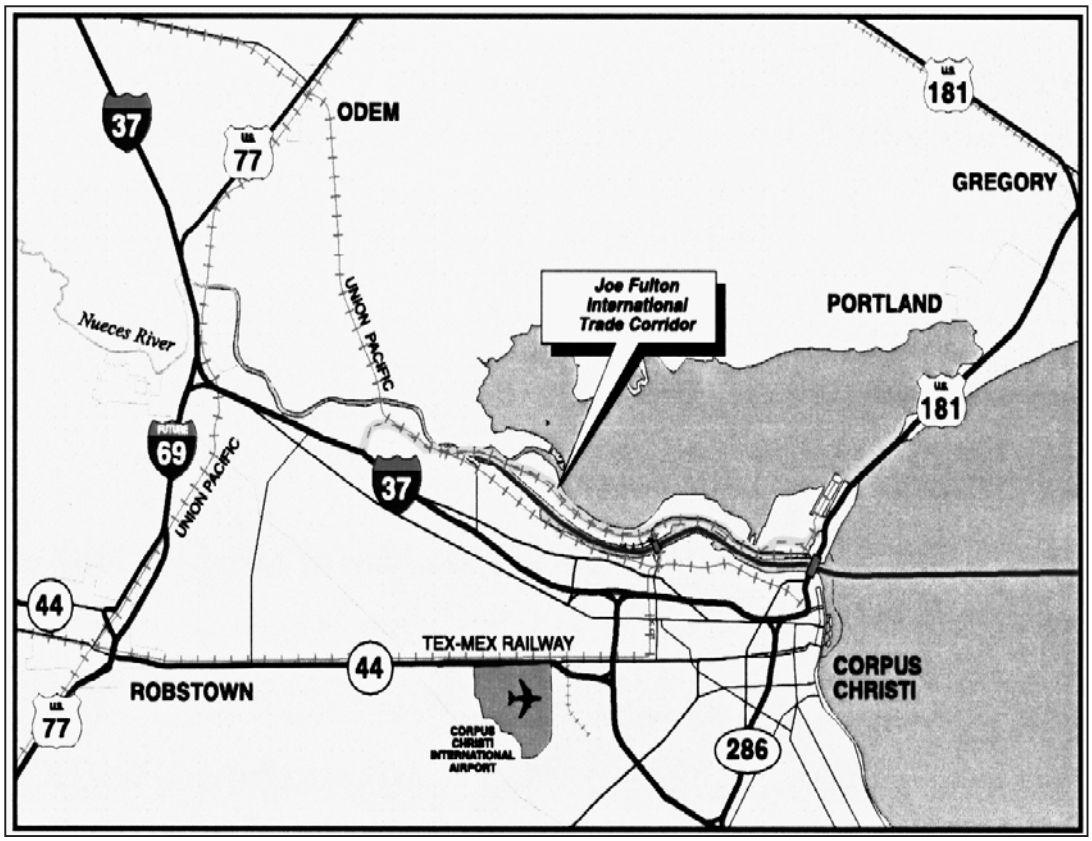

Figure 9. Joe Fulton International Trade Corridor, Port of Corpus Christi, Texas.

Figure 10. Map of Rivergate Industrial Park–Portland, Oregon.

1.2.11 Kedzie Avenue Access Road, Chicago, Illinois

This $4.7 million project was designed to improve highway access from I-55 to the BNSF Corwith Yard Piggyback Railroad Terminal. Kedzie Avenue was reconstructed, and traffic signals were modernized between I-55 and 47th Street, a distance of approximately 1½ mi (see Figure 11). The project synchronized signals along Kedzie Avenue; improved the substandard pavement, lighting, and drainage; and widened the road. The project was completed in 1997.

1.2.12 Portway, Port of New York/New Jersey

Portway is a series of freight improvement projects designed to strengthen the access to and connections among key maritime, air cargo, railroad, regional surface transportation system, and warehouse/distribution center concentrations in Northern and Central New Jersey (see Figure 12). Phase 1, currently underway, extends from the Port Newark/Elizabeth complex to the Croxton Rail Yard and consists of 13 projects with an anticipated cost of more than $800 million. Construction on three projects in the Phase 1 component is under way with three more projects scheduled in the next 5 years. One Phase 1 project under construction by the Port Authority is a $35 million rail flyover that replaces an at-grade rail crossing at the port. The New Jersey Department of Transportation (NJDOT) is undertaking 11 of these projects, with the Port Authority of New York/New Jersey undertaking two projects. Collectively, these projects will create an 8-mi roadway from the port facilities to the Croxton Rail Yard, as well as improve road and rail freight access within the Port Newark/Elizabeth marine complex.

1.3 ORGANIZATION OF THE REPORT

The remainder of this report is organized into chapters that present the results of the study, discuss the cargo hub

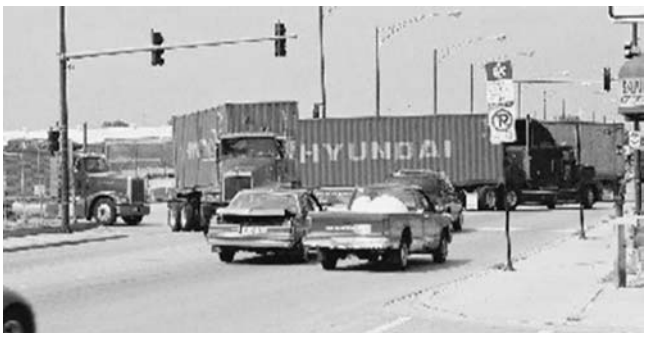

Figure 11. Kedzie Avenue Access Road, Chicago, Illinois.

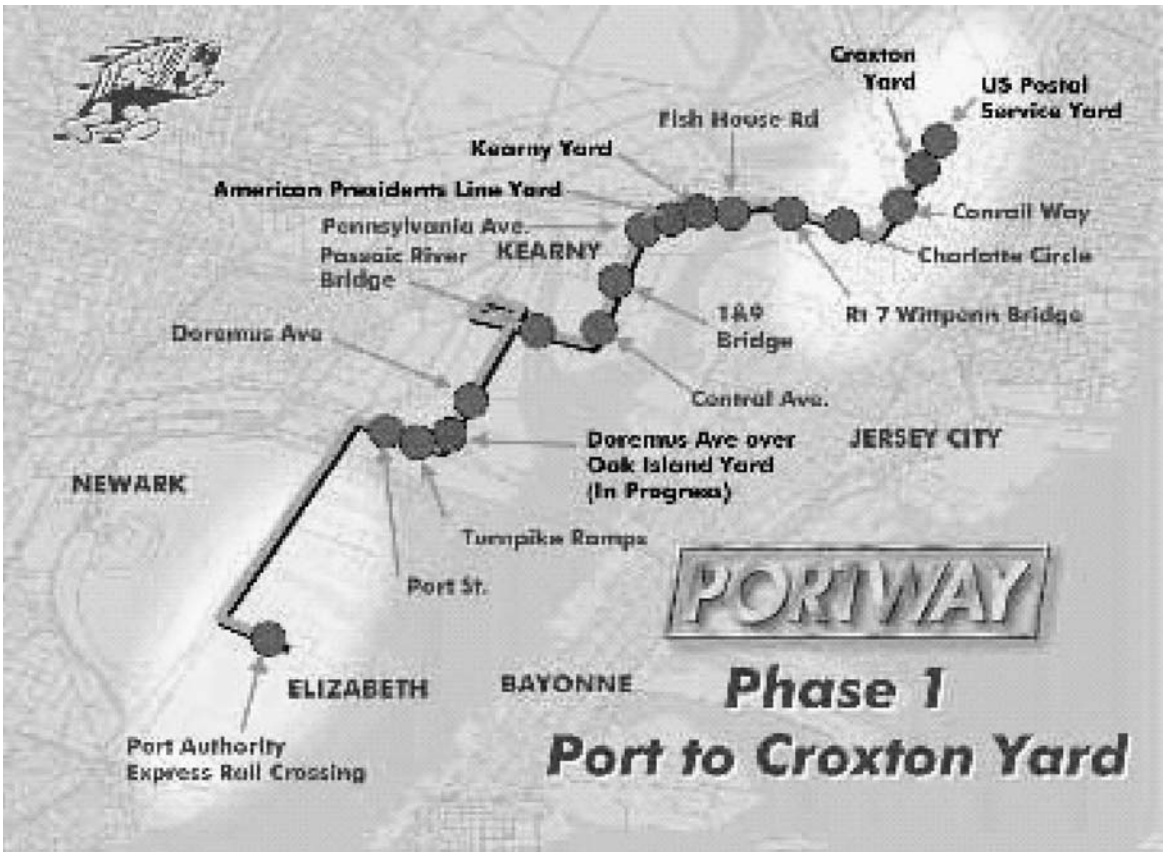

Figure 12. Portway, Port of New York/New Jersey.

access problem, and delineate approaches to implementing and financing improvements as follows:

- Chapter 2 defines cargo hubs, types of cargo hubs, their sizes and rankings, and their importance in moving freight efficiently in a global economy.
- Chapter 3 describes the cargo hub access challenge and key factors that drive the need for improved hub access; summarizes why there is a need for special attention to cargo hub access problems; presents the various needs and types of projects required, involving all modes; and details the major trends in shipping that increase the importance of attracting hub operations.
- Chapter 4 delineates cargo hub access project experience, based on the 12 case studies considered in this study and highlights the main lessons learned regarding planning, institutional issues, financing, community coordination, and environmental issues.
- Chapter 5 provides guidance for planners and officials, including a summary of best practice recommendations and a list of major beneficiaries of cargo hub access improvement projects. The chapter also includes a financing tools matrix that describes the advantages and disadvantages associated with each type of financing mechanism and presents an approach to considering the applicability of dedicated user fees under different circumstances.
- Chapter 6 recommends possible strategies and initiatives at the national and regional levels to address the planning and financing issues associated with the cargo hub access challenge.

Also provided are appendixes that readers should find useful. Note: where websites are listed as sources, these sites were current and available as of February 2003.

CHAPTER 2

CARGO HUBS

2.1 CARGO HUB DEFINITION

The modern cargo hub typically involves a major airport, seaport, or other type of intermodal facility. Cargo hubs develop to exchange freight between different vessels, airplanes, trains, or trucks, or between different modes of transport, efficiently.

In the transportation industry, the concept of a cargo hub involves a cargo handling terminal complex that meets the broad logistical needs of shippers and carriers and provides integrated facilities and services (which may include package sorting, consolidation, warehousing, distribution, trade services, communications systems, and other related services) in addition to cargo handling and transfers. This concept implies not simply one intermodal terminal, but a complex or center of cargo activity that provides various services for one or more cargo transfer terminals.

However, for the purposes of this research, a *cargo hub* is defined as any transfer or transshipment point, in most cases involving intermodal transfers, that provides cargo handling/transfer facilities and services. Under this definition, any intermodal terminal can be viewed as a cargo hub. Not all intermodal terminals or cargo hubs, however, handle significant volumes of freight. Therefore, depending on the volume level and markets served, cargo hubs can be categorized according to their global, national, state, or regional significance. The case studies selected for this research range from international hubs (e.g., the Ports of Los Angeles and Long Beach and the Port Authority of New York and New Jersey terminal complex) to nationally significant hubs (e.g., the UPS CACH) to state and regionally significant hubs (e.g., the Port of Palm Beach and Luis Muñoz Marin International Airport).

This research defines a major cargo hub of national significance as a cargo complex or area that handles a significant volume or dollar value as a percentage of total national cargo volume or dollar value. For example, Memphis International Airport, the largest air cargo hub in the nation and in the world, handles about 7.7% of the total national air cargo volume. Within a carrier network or system, a major hub can also be defined as a major transfer point between vehicles and modes, or a cargo consolidation point for the cargo handled by the carrier, typically involving a significant volume as a percentage of the carrier's total volume. As an example, approximately 10% of UPS daily domestic package volume is handled through CACH, the largest package sort facility in the world. This research selected major multiterminal hubs of national significance, as well as one hub in a private carrier network (UPS facility), as case studies.

Major cargo hubs of state or regional significance can also be defined on the basis of total volume handled by the area terminal(s). FHWA has established criteria to designate intermodal connectors to the National Highway System (NHS). These criteria are based on traffic- or cargo hub volume-related criteria that define connecting roads between the NHS and major intermodal terminals as follows:

- 100 trucks daily in each direction on the principal route connecting to an intermodal terminal, or
- Principal roads connecting to maritime terminals or rail yards handling 500,000 annual 20-ft equivalent units (TEUs), or
- 500,000 tons per year and air cargo terminals handling 100,000 tons annually.

FHWA also established secondary criteria, such as access roads to those terminals handling 20% or more of the total freight volume by mode in a state, or roads that connect to an intermodal terminal that is being expanded significantly.[1] Most of the case studies selected for this research meet FHWA criteria.

2.2 TYPES OF CARGO HUBS

The simplest way to describe cargo hubs is by the modes served and the intermodal cargo transfers involved. Examples are as follows:

- Ports,
- Airports,
- Rail yards,
- Truck terminals,
- Multimodal terminals (more than two modes), and

[1] FHWA, Federal-Aid Policy Guide, December 19, 1997, Transmittal 20, Subchapter E, Planning, Part 470, Highway Systems, Subpart A, Federal Aid Highway Systems, Appendix D—Guidance Criteria for Evaluating Requests for Modifications to the National Highway System

- Cargo complex (single or multimodal) with additional warehousing/distribution/consolidation facilities and services.

Cargo hubs also can be categorized according to the following services:

- The market served,
- The services provided,
- Geographic scope of markets served,
- Extent of participation of connecting carriers (single or multiple users),
- Ownership/operation and control of the facility, and
- Scale and range of services provided.

Table 1 shows examples of the various cargo hub types and the cargo handling services typically provided at these facilities, categorized according to the geographic scope and major markets served at each type of hub. Another major defining characteristic of cargo hubs is whether the facility serves domestic or foreign cargo. Domestic and international cargo hubs can be further divided by mode, services provided, and ownership/operating control of the facility. Ownership/operating control also generally affects the extent of connecting services (whether single or multiple users).

Domestic hubs include truck terminals; intermodal rail yards or truck/rail terminals; high-volume truck-to-truck transfer terminals (e.g., package sort centers, break-bulk facilities, and re-load centers); airports; and domestic ports or waterway transfer terminals to and from rail and truck. A complex of rail yards or truck terminals in one area can become a major hub of national significance.

International hubs include rail and truck border crossing transfer and consolidation terminals, air cargo terminals, and maritime port terminals at points of entry into the United States. A complex of terminals at an international airport or at a port can become a major hub, handling a significant volume or dollar value (as a percentage of total foreign cargo volume or dollar value).

An individual terminal operated by or for a single carrier can also be a major cargo hub within the carrier system that establishes the "hub" terminal, such as the UPS' CACH, FedEx's national hub in Memphis, or Maersk/Sea Land's hub in Newark, New Jersey.

TABLE 1 Types of cargo hubs

Geographic Scope	Market Served	Examples	Cargo Hub Services	Carrier/ Terminal Control/Users
Domestic	Regional	• Regional hubs operated by FedEx that connect to its national hub at Memphis. • Intermodal rail yards, such as CSX yard in Philadelphia or NS yard in Atlanta	• Truck service connections to regional and national air cargo services • Truck and rail interface for regional rail services	• Single carrier (FedEx) • Single carrier (CSX and NS)
	National	• UPS hub in Chicago • Rail hubs in Chicago and Kansas City • FedEx air cargo hub in Memphis and UPS air cargo hub in Louisville	• Truck and rail package consolidation hub • Truck and rail transfers to destinations nationally • Air package and cargo transfers to destinations	• UPS with BNSF rail • Individual rail carriers • Single carriers (FedEx and UPS)
International	Rail/Truck Border crossings	• Border crossing rail yard and truck terminals at Laredo, TX	• Border services to/from the US and Canada or Mexico	• Multiple or single carriers
	Air Cargo Gateway	• JFK, MIA, LAX cargo centers	• Domestic truck connections and air cargo connections between domestic and foreign markets	• Multiple carriers and connecting services
	Carrier Maritime Load Center	• Maersk/Sea Land Terminal in New Jersey	• Intermodal connections between domestic inland truck/rail services and international ocean vessels as well as transshipment to feeder vessels connecting to other regional ports	• Private single carrier (Maersk/Sea Land)
	New York/ New Jersey Maritime Terminals	• Multiple Terminal Complex	• Intermodal connections between domestic inland truck/rail services and international ocean vessels as well as transshipment to feeder vessels connecting to other regional ports	• Public and private terminals with multiple carriers and connecting services
	LA/LB Port Hub	• Multiple Terminal Complex	• Intermodal connections between domestic inland truck/rail services and international ocean vessels as well as transshipment to feeder vessels connecting to other regional ports	• Public and private terminals with multiple carriers and connecting services

2.2.1 Geographic Scope and Markets Served

The origin and destination markets served by cargo hubs vary in size and scale. Cargo hubs typically serve local, regional, national, and/or international markets. Although the criteria for distinguishing regional and local markets may not be consistently defined, regional markets are usually characterized by rail service and intercity trucking. Local markets normally employ short-haul trucking to and from the terminal that is typically less than a round-trip truck-day (a maximum daily driving and on-duty time of 10 consecutive hours for single drivers under current federal hours-of-service regulations). Local cargo hub markets will be more dependent on access during routine business hours.

Regional cargo hubs usually provide services to a sizable geographic area, with direct services concentrated in one portion of the nation (e.g., the regional hubs operated by FedEx that connect to its national hub at Memphis or the intermodal rail yards on the Norfolk Southern system that connect to its major hubs in Chicago or Norfolk). National cargo hubs serve destinations throughout the nation, such as the rail hubs in Chicago and Kansas City, or the air cargo hubs in Memphis and Louisville. International gateway terminals or international cargo hubs normally provide direct services to or from foreign markets without intermediate access through other hubs.

International terminals and hubs provide unique services with respect to import and export cargo requirements (e.g., documentation, customs, inspection, and bonding). The availability of customs clearances often define international cargo hubs unless there is prior clearance at applicable border crossings (as in the case of international rail freight to or from the United States and Canada or Mexico). Regional, national, and international cargo hub markets typically require access at all hours, not just during routine business hours.

Some regional, national, or international cargo hubs provide transshipment services wherein cargo that does not originate or terminate locally or regionally is handled through the terminal. Transshipment cargo normally would not be directly affected by land access to the cargo hub unless the cargo had to be removed from the terminal under unusual circumstances. When categorizing cargo hubs by volume, allowances should be made for the degree to which transshipment cargoes are included or excluded with cargoes that rely on rail and road access.

2.2.2 Single or Multiple Users

Cargo hubs composed of single or multiple terminals also vary in the extent to which the facilities are used or shared by different entities. Cargo hubs that are exclusive with respect to use by a particular marine vessel operator, railway, or air cargo aircraft operator are commonly denoted as private single-user facilities. Conversely, cargo hubs that are available to serve all carriers that might provide marine vessel, rail, or aircraft services are customarily denoted as public facilities. The use of the terms *private* and *public* refers to the extent to which the cargo hub is available on an exclusive or non-exclusive basis, respectively. Generally, public cargo hubs have more fluctuation of users (tenants) and less stable volume patterns of use of their access facilities over time compared with private cargo hubs.

2.2.3 Cargo Hub Terminal Ownership/Operation

Cargo hubs will exhibit different patterns of ownership and operation generally as an extension of the historical development and organization of the major modal service providers.

For example, private-sector railways in North America usually own and assume responsibility for operation of intermodal terminals as an extension of their particular franchise (exclusive rail rights-of-way). However, several recent examples of major intermodal rail yards have been developed and are owned by public agencies (particularly as part of major marine terminal development projects). The Intermodal Container Transfer Facility (ICTF) near the Ports of Los Angeles and Long Beach is an example of such an intermodal terminal development by public agencies, at a site that offers near, but not immediate, port terminal access.

In contrast to the general pattern of private rail intermodal terminals in North America, the maritime and air sectors often use terminals that they do not own. These terminals may be privately owned by commercial enterprises or provided as public-sector infrastructure by local communities, states, port authorities, or other public entities. There are many examples of major air cargo and marine terminal facilities that have been developed and are owned privately at publicly owned airports and ports.

In summary, there are many variations with respect to the role of the private and public sectors in the development and operation of cargo hubs. A landlord owner non-operator will normally have little control over the use of access by tenants unless this is specified as part of the facility lease. Conversely, a private owner–operator may exhibit substantial control over the scheduling of facility operations as well as the related timing of use of road and rail access.

2.2.4 Scale and Range of Services Provided

Cargo hubs also can be distinguished by the scale and range of services provided. The smallest scale would encompass facilities and services for the physical transfer of cargo between connecting modes. Other cargo-related services provided could be storage; minor processing, packaging, or labeling; repair; and inspection not related to customs. Cargo hubs also may be distinguished by the array of services provided for connecting transportation modes (e.g., fuel, main-

tenance, and equipment storage). The array of cargo hub services will influence the timing and degree to which access is used for activities other than cargo transfer. For example, cargo hubs that are major service providers for non-cargo transfer activities may have large employment traffic flows as well as receipts of supplies that constitute an important element of access that is not reflected in cargo statistics.

2.3 SIZE AND RANKING OF DIFFERENT CARGO HUB TYPES

The two key aspects that are most useful in determining the importance of a cargo hub in the global, national, state, or regional economy are the volume and value of the cargo handled. Another measure that can be useful in categorizing the economic importance of a hub to the regional or local economy is its total employment. In determining the importance of an intermodal terminal or cargo hub complex within its jurisdiction, one can look at these three measures—volume, value, and employment—to rank the various cargo hubs. Generally, data on cargo volume or terminal traffic are readily available from terminal operators and/or can be obtained through port authorities, airport authorities, railroads, or trucking firms. Dollar value of cargo is not as readily available, except for international cargo (e.g., for cargo arriving in the United States that must clear customs). Generally, employment data at cargo hubs are readily available from employers, although at some terminals, it may not be easy to determine locally or regionally based employment at the cargo hub, because transportation carriers may use employees based in other locations for some functions in a terminal operation.

As previously defined, a major cargo hub of international, national, state, or regional significance is one that handles a significant volume or dollar value of the total goods handled in that jurisdiction (as a percentage of total international, national, state, or regional cargo volume or dollar value). As examples of how this definition can be applied for two modes (air and maritime), Tables 2, 3, 4, and 5 present the rankings for the top air and seaport cargo hubs for both national and worldwide movement of goods.

In the United States, the largest air cargo hub by volume is Memphis International Airport, followed by Los Angeles International Airport and John F. Kennedy International Airport (see Table 2). Memphis International Airport handled more than 2.4 million tons of cargo in 2000 and consistently has been ranked Number 1 in the United States since 1993. FedEx, the world's largest express transportation company, is headquartered in Memphis and operates its primary overnight package sorting facility at this airport. FedEx transported approximately 95% of all cargo handled at the airport last year.[2]

Memphis International Airport is also ranked Number 1 in the world for air cargo volume, followed by Hong Kong International Airport, and Los Angeles International Airport (see Table 3). In 2000, U.S. airports held 7 of the top 15 rankings for total air cargo handled.

In the port sector, the largest maritime container cargo hubs in TEUs in the United States are the San Pedro Bay ports of Los Angeles and Long Beach. Combined, these facilities handled a commanding 31.1% of the national volume, or 9,479,000 TEUs, followed by New York/New Jersey with 9.9% and Seattle/Tacoma in Washington State with 9.4% (see Table 4).

Internationally, the San Pedro Bay ports of Los Angeles and Long Beach ranked seventh and eighth respectively,

TABLE 2 U.S. air cargo hub rankings

Rank* (2000)	Airport	% of National Air Cargo
1	MEM (Memphis)	7.7
2	LAX (Los Angeles)	6.3
3	JFK (New York)	5.6
4	ANC (Anchorage)	5.6
5	MIA (Miami)	5.1
6	SDF (Louisville)	4.7
7	ORD (Chicago)	4.5
8	IND (Indianapolis)	3.6
9	EWR (Newark)	3.3
10	DFW (Dallas–Fort Worth)	2.8
11	ATL (Atlanta)	2.7
12	SFO (San Francisco)	2.7
13	DAY (Dayton)	2.6
14	OAK (Oakland)	2.1
15	PHL (Philadelphia)	1.7

*www.aci-na.org

TABLE 3 World airport rankings by total cargo

Rank* (2000)	Airport	Total Cargo (metric tons)
1	Memphis (MEM)	2,489,078
2	Hong Kong (HKG)	2,267,609
3	Los Angeles (LAX)	2,038,784
4	Tokyo (NRT)	1,932,694
5	Seoul (SEL)	1,874,232
6	New York (JFK)	1,817,727
7	Anchorage (ANC)	1,804,221
8	Frankfurt/Main (FRA)	1,709,410
9	Singapore (SIN)	1,705,410
10	Miami (MIA)	1,642,744
11	Paris (CDG)	1,610,484
12	Louisville (SDF)	1,519,528
13	Chicago (ORD)	1,468,553
14	London (LHR)	1,402,089
15	Amsterdam (AMS)	1,267,385

SOURCE: Airports Council International

[2] www.mscaa.com

TABLE 4 Top 15 U.S. maritime container cargo hubs in TEUs

Rank* (2000)	Port	Share %
1	Los Angeles/Long Beach, CA	31.1
2	New York/New Jersey, NY/NJ	9.9
3	Seattle/Tacoma, WA	9.4
4	San Juan, PR	7.6
5	Oakland, CA	5.8
6	Charleston, SC	5.3
7	Hampton Roads, VA	4.4
8	Houston, TX	3.5
9	Savannah, GA	3.1
10	Miami, FL	2.8
11	Jacksonville, FL	2.3
12	Port Everglades, FL	2.2
13	Baltimore, MD	1.6
14	Honolulu, HI	1.5
15	Anchorage, AK	1.4

*www.aapa.com

and New York/New Jersey ranked fourteenth (see Table 5). Currently, Asia and the Pacific region are home to the top four ports in the world in TEUs handled and hold 8 of the top 15 rankings for total TEUs in 2000. The Port of Hong Kong handled 18,098,000 TEUs in 2000 and ranked first, followed by Singapore and Busan in South Korea.

The 12 cargo hub case studies selected for analysis in this research project include major cargo hubs of national significance that are among the busiest in the world and the United States (e.g., the Alameda Corridor in the San Pedro Bay Ports of Los Angeles and Long Beach, the UPS CACH, and the Port of New York and New Jersey port terminals), but also include smaller cargo hubs (e.g., the Luis Muñoz Marin International Airport cargo facilities, and the US–1 Skypass project in the Port of Palm Beach, Florida). These smaller hubs may not rank high as nationally significant, but they are important hubs within their states or regions. Luis Muñoz Marin International Airport, for example, is the largest air cargo hub in Puerto Rico, as well as within the entire Caribbean area. The rankings of these 12 cargo hubs are shown in Table 6. These rankings are based on cargo hub volume compared with the national cargo volume for the respective facility type.

TABLE 5 Worldwide container port rankings in TEUs

Rank* (2000)	Port	Total TEUs
1	Hong Kong (China)	18,098,000
2	Singapore (Singapore)	17,090,000
3	Busan (South Korea)	7,540,387
4	Kaohsiung (Taiwan)	7,425,832
5	Rotterdam (Netherlands)	6,274,000
6	Shanghai (China)	5,613,000
7	Los Angeles (USA)	4,879,429
8	Long Beach (USA)	4,600,787
9	Hamburg (Germany)	4,248,247
10	Antwerp (Belgium)	4,082,334
11	Tanjung Priok (Indonesia)	3,368,629
12	Port Kelang (Malaysia)	3,206,753
13	Dubai (UAE)	3,058,866
14	New York/New Jersey (USA)	3,050,036
15	Tokyo (Japan)	2,898,724

*www.aapa-ports.org

2.4 IMPORTANCE TO THE TRANSPORTATION INDUSTRY AND LOCAL ECONOMIES

Cass Information Systems estimated that, in 2001, total logistic costs in the United States were $970 billion, equivalent to 9.5% of the U.S. nominal GDP, a record low. Transportation costs declined as a percentage of GDP after deregulation and have remained at historically low levels.[3] Increasing or decreasing transportation costs, associated with deteriorating or improved access to cargo hubs, have a direct relationship to economic productivity and the costs of goods to the ultimate consumer. Further, when export costs rise or fall, U.S. products can become less or more competitive abroad, which affects the competitiveness of American businesses and U.S. economic growth.

Cargo hubs are then increasingly critical to the global transportation industry, especially given that the concentration of movement through major hubs provides significant economies of scale in handling costs, investments in new technology, and improved efficiency of trunk routes. Cargo hubs also are of increasing importance to private businesses, carriers, and communities that compete in the global economy.

As noted, major cargo hubs are not only key points in the local and regional domestic distribution of freight, but also provide international access, through the North American highway, rail intermodal, and international air and ocean service networks. International access is increasingly important to U.S. businesses that rely on foreign products for manufacturing and sell their products in foreign markets. These networks provide efficient long-haul transportation of both consumer goods and industrial raw materials. Several major auto assembly plants have nearby intermodal hubs, some of which were developed with public assistance specifically to give these auto production facilities low-cost access to the world's most efficient sources of auto parts and subassemblies.

From the perspective of private industry, hubs that improve land access to manufacturing plants mean increased market range for exports and greater choice of supply sources. For private carriers, efficient land access to terminals means fewer challenges to address, making it

[3]Cass Information Systems, Inc. and Prologis, 13th Annual 2002 State of Logistics Report, June 10, 2002.

TABLE 6 Ranking of cargo hubs—case studies

Hub	Cargo Hub Volume	National Cargo Volume	% of National Cargo Volume	Specific Facility	% of Cargo Hub	Mode	Ranking in Ton Volume
San Pedro Bay Ports (Ports of Long Beach and Los Angeles)	118.3 Million Short Tons (2000)**	2.4 Billion Short Tons (2000)**	4.9%	All LA and LB Terminals	100%	Ports	Port of Long Beach No. 8(*) Port of Los Angeles No. 16
	Container TEUs: 9.4 Million (2000)**	Container TEUs: 30.3 Million (2000)**	31%				
Luís Muñoz Marín International Airport	265,000 Tons (2000)	31.9 Million Tons (2000)	0.8%	Cargo Area of Airport	100%	Airport	No. 35***
Port of New York & New Jersey Complex	138.6 Million Short Tons (2000)**	2.4 Billion Short Tons (2000)**	5.7%	Red Hook Marine Terminal Handled 630,000 Short Tons (2000)	0.45%	Port	No. 3(*)
	Container TEUs: 3 Million (2000)**	Container TEUs: 30.3 Million (2000)**	9.9%	Container TEUs 60,000 (2000)	9%		
Port of Palm Beach	1.2 Million Tons (2000)**	2.4 Billion Short Tons (2000)**	0.05%	Entire Port	100%	Port	No. 81(*)
	Container TEUs: 214,890 (2000)**	Container TEUs: 30.3 Million (2000)**	0.7%				
Chicago Hub	111 Million Tons Handled Overall in Chicago Region 11 Million TEUs Handled Overall in Chicago Region	183.3 Million Tons Container TEUs: 30.3 Million (2000)	60% 36%	UPS Processing Facility: 1.3 Million Packages are Processed Daily in this Facility out of 14 Million Packages Processed by UPS Daily in U.S.	9.3% of National UPS Volume	Intermodal and Packages	No. 1
Port of Tacoma	22.2 Million Short Tons (2000)**	2.4 Billion Short Tons (2000)**	0.9%	Entire Port	100%	Port	No. 32(*)
	Container TEUs: 1.3 Million (2000)**	Container TEUs: 30.3 Million (2000)**	4.5%				
Port of Charleston	21 Million Short Tons (2000)**	2.4 Billion Short Tons (2000)**	0.8%	Not Available	Not available	Port	No. 34(*)
	Container TEUs: 1.6 Million (2000)**	Container TEUs: 30.3 Million (2000)**	5.2%	Wando Terminal handled 982,000 TEUs (2000)	61%		
Port of New Orleans	90.7 Million Short Tons (2000)**	2.4 Billion Short Tons (2000)**	3.7%	Various Terminals along Tchoupitoulas Corridor Handled 4.4 Million Short Tons (2000)	4.8%	Port	No. 4(*)
	Container TEUs: 278,932 (2000)**	Container TEUs: 30.3 Million (2000)**	0.9%	Container TEUs: 62,000 (2000)	22%		
Port of Corpus Christi	83.1 Million Short Tons (2000)**	2.4 Billion Short Tons (2000)**	3.4%	Entire Port	100%	Port	No. 5(*)
	Container TEUs: Not Available	Container TEUs: 30.3 Million (2000)**	N/A				
Port of Portland	34.3 Million Short Tons (2000)**	2.4 Billion Short Tons (2000)**	1.4%	Terminals 5 and 6 Handled 4.8 Million Short Tons (2000)	14%	Port	No. 22(*)
	Container TEUs: 290,943 (2000)**	Container TEUs: 30.3 Million (2000)**	0.9%	Container TEUs: for Terminal 6 only* 290,000 (2000)	99%		
Chicago Hub (Kedzie Avenue)	111 Million Tons Handled overall in Chicago Region	183.3 Million Tons	60%	Corwith Rail Yard Handled Approx. 1.2 Million TEUs (1998)	9.1%	Intermodal	No. 1
	11 Million TEUs Handled Overall in Chicago Region	Container TEUs: 30.3 Million (2000)	36%				
Port of New York & New Jersey Complex	138.6 Million Short Tons (2000)**	2.4 Billion Short Tons (2000)**	5.7%	Elizabeth Marine Terminal	Not Available	Port	No. 3(*)
	Container TEUs: 3 million (2000)**	Container TEUs: 30.3 Million (2000)**	9.9%				

(terminal 5 does not handle containers) **www.aapa.com ***www.faa.gov (*)www.wrsc.usace.army.mil/ndc/wcporton00.htm

possible to offer customers reduced transportation prices, increasingly reliable travel times, and efficient use of equipment.

Access issues affect all types of freight movement, from bulk to container to air cargo. For example, project cargo (also referred to as over-dimensional or overweight loads) needs to move efficiently between ports and inland locations. Breakbulk hubs, transfer, or distribution centers for commodities such as steel, lumber, paper, and cocoa beans, rely on efficient land access to distribute these products. Liquid and dry bulk cargo flows (e.g., corn syrup, grains, and coal) also require efficient transload operations. For general merchandise that moves mostly as containerized cargo, reliable transshipment and tracking, along with the ability to break shipments down as necessary for efficient distribution, is absolutely essential as shippers increasingly expect "just-in-time delivery" and smaller, more frequent shipments than previously common. Air cargo particularly relies on efficient inland access—shippers pay a premium to expedite their shipments by air; they do not want those loads to be delayed on the roadways to and from airports.

Local communities recognize that cargo hubs attract employment and overall economic development, but also often express concerns about impact. These communities want to see tangible benefits from hosting the cargo hub operations in their areas and from the access infrastructure that supports those cargo hub operations. Economic benefits tend to be measured in terms of jobs and tax revenues generated, along with the new economic and redevelopment activities accruing to the community as a result of the cargo hub and access infrastructure. Many initiatives to enhance the potential to achieve such economic impacts are being pursued, including "brownfield" (brownfields include former industrial property requiring environmental remediation) redevelopment and other increased-value activities in mature urban areas that generate a high volume of truck traffic and require improved access infrastructure to handle the increased volumes that these activities may generate.

CHAPTER 3

FACTORS THAT DRIVE THE NEED FOR IMPROVEMENTS—THE CARGO HUB ACCESS CHALLENGE

3.1 INTRODUCTION

Cargo hubs play a key role in the flow and trade of goods and merchandise in the economy, not only within the United States, but internationally as well. Smooth access to and from cargo hubs helps facilitate trade, increases the competitiveness of U.S. businesses, and can spur economic development. Because of the importance of cargo hubs in supporting economic activity and trade, there is a strong need for the federal and state governments to pay special attention to improving cargo hub access. Access improvements are often stymied, however, when the significant investments, resources, and priority attention required in order to resolve cargo hub access problems fall to local jurisdictions to justify. With the scope of such improvements frequently beyond the means of local jurisdictions, it becomes necessary for other governmental and/or private operators to become involved in financing the improvements required to reap the broad benefits that are obvious from a national, state, and regional perspective.

Special attention also is appropriate to address cargo hub access challenges in light of the following major trends and factors:

- Growth in international trade as a key driver for economic development;
- Changing business practices, establishment of efficient hubs, and improvements in logistics to achieve greater efficiencies and economies of scale;
- Public and private sector in attracting hubs as job creators and economic development catalysts;
- Location of cargo hubs in congested metropolitan areas; and
- Opportunities for significant improvements.

The remainder of this chapter discusses the key factors that drive the need for improving access to U.S. cargo hubs; discusses the difficult challenges in financing and implementing practical solutions; and illustrates why policy attention to cargo hub access is an important issue at the federal, state, and metropolitan levels.

3.2 TRENDS AND FACTORS

3.2.1 Growth in International Trade as a Key Driver for Economic Development

In recent years, the rapid growth of international trade has become a major driver for economic development. Multinational sourcing, manufacturing, and distribution have extended the freight transportation requirements of U.S. businesses around the world. The share of trade (imports and exports) as a percentage of the U.S. gross national product (GNP) has risen from 12.4% in 1970 to about 25% from the 1990s to 2002 (in constant 1987 dollars).

World trade trends also have set the stage for further integration of economies and transportation systems. In 1992, the United States, Canada, and Mexico signed the North American Free Trade Agreement (NAFTA). In 1993, European countries established a single economic market known as the European Union. In 1994 in the Far East, the Asia-Pacific Economic Cooperation (APEC) countries adopted the Bangor Declaration aimed at achieving free and open trade and investments by 2020.

The importance of trade to the U.S. economy generates additional demands and requirements for U.S. cargo hub access as follows:

- Increased demand for international shipments and handling at hubs connecting the U.S. transportation system and the global freight system, which in turn increases demand at access routes to these hubs; and
- Customs and border considerations, including the demand on routes connecting to customs stations (ports of entry) and border crossings.

The continued growth in global trade substantially increases the amount of freight moving through U.S. cargo hubs that serve as international gateways. The U.S. transportation system infrastructure, particularly the Interstate highway system and extensive air system, has given American businesses a competitive advantage by enabling unparalleled reliability and speed. As global networks develop and the transport infrastructure improves in other regions, the United States has an opportunity to lead in further increasing efficiency and

capacity to support economic growth. U.S. ports are already planning and investing in facility expansions. The Alameda Corridor (serving the San Pedro Bay ports of Long Beach and Los Angeles) presents a perfect example of the need to improve cargo hub access in response to increasing global trade and the need for improved logistics and distribution. Shippers also have come to expect the same levels of freight service and systems integration at the global level that they previously demanded at the national level. This places increased pressure on cargo hubs to process freight and on access infrastructure to ensure efficient cargo movement to and from the hubs.

3.2.2 Changing Business Practices, Establishment of Efficient Hubs, and Improvements in Logistics to Achieve Greater Efficiencies and Economies of Scale

Cargo hubs are increasingly critical to the transportation industry, especially as the concentration of movement through major hubs provides significant economies of scale in handling costs, investments in new technology, and improved efficiency of trunk routes. From the perspective of private industry, inefficient land access means more obstacles to overcome, including potentially increased transportation costs, unreliable travel times, and less efficient use of equipment.

Recent industry practice has focused on the establishment of cargo hubs and logistics improvements to achieve greater efficiencies, economies of scale, and increased reliability. Of greatest significance, shippers require faster delivery and place increasing emphasis on reliability. The key factors affecting cargo hub demand and the need for logistics improvements are summarized in the following subsections.

Changing Business Practices

The U.S. economy has recently undergone dramatic changes. These changes include a restructuring of traditional manufacturing, changes in production cycles and planning, the emergence of high technology and knowledge-based industries, the emergence of demanufacturing (i.e., breaking down equipment into metallic and non-metallic parts that can be recycled or into components and subassemblies that are marketable) and remanufacturing (i.e., disassembly of products during which time parts are cleaned, repaired, or replaced then reassembled in sound working condition), and outsourcing of the logistics function.

Restructuring of Traditional Manufacturing

Restructuring grew out of the need for U.S. companies to regain their competitiveness, particularly in the emerging global marketplace. Restructuring efforts included modernization of manufacturing and distribution systems and approaches, as well as downsizing and business restructuring. Manufacturing industries increasingly rely on multinational production and sourcing, combined with undertaking final assembly and customization separately but closer to the actual markets. This approach enables production runs to occur in the most cost-effective locations and maximizes responsiveness to particular markets.

This new manufacturing philosophy also places increased demands on logistics and freight transportation—American manufacturers must be able to move raw materials, partially assembled products, and finished goods efficiently throughout the world. More freight is now moving longer distances. Further, final assembly and customization now takes place as part of the value-added services performed at warehouses and distribution centers, making these facilities as critical as other elements of the freight transportation system. As carriers and freight service providers adjust their operations to meet the requirements of manufacturers, they have established cargo hubs that allow them to serve more destinations efficiently through a limited number of cargo hubs.

Changes in Production Cycles and Planning

Previously, cost considerations drove the need for large production runs of the same product. If demand levels shifted, then inventory levels could become greater or lower than the levels needed to satisfy demand. By changing to a system that sets production runs based on actual real-time demand, manufacturers can better manage production planning and operations. The optimization of production runs involves intensive use of information and telecommunication systems, along with carefully managing and timing the delivery of goods needed for the production runs. In addition, the need to be responsive to real-time demand translates into the need for more reliable and flexible freight delivery to end users. The resultant freight transportation requirements include the following:

- Shifting to smaller, more frequent deliveries and shipments;
- Maintaining an “information backbone” that permits real-time tracking of shipments, along with the flexibility to change transportation destinations and times while goods are en route; and
- Demanding extreme precision in shipment deliveries, with on-time performance and accuracy approaching 100%.

Carriers have established major cargo hubs that allow them additional flexibility to respond to these requirements.

Emergence of High-Technology and Knowledge-Based Industries

In addition to the traditional manufacturing industries, the U.S. manufacturing sector now includes businesses that can

best be characterized by the technological or knowledge intensity of their products. The physical inputs and outputs of these industries are particularly small, light, and highly valuable. Examples include computer software, pharmaceuticals, and computer components. Typically, these newer manufacturing industries comprise many smaller firms that rely on other firms for supplies and basic services. Their production runs, while smaller, are highly valuable and can often be essential components to other companies' production processes. Product cycles are short, which produces an even greater requirement for reliable freight transportation service.

Cargo hubs established and/or operated by the major carriers provide added capabilities to respond to these needs, particularly air cargo hubs that allow daily overnight service to nearly every destination in the United States.

Emergence of Demanufacturing and Remanufacturing

Both demanufacturing and remanufacturing focus on the post-consumer disposition of products and are quite recent processes. Demanufacturing refers to the recycling of products after they have been used—products are returned to one or more sites, where they are disassembled into component materials (e.g., plastics and metals) for recycling. Remanufacturing refers to the return of products to one or more sites where they can be reconditioned or reused. Examples of remanufactured products include printer and copier toner cartridges, which are reconditioned and refilled, and the flash units of disposable cameras.

The freight transportation associated with demanufacturing and remanufacturing is referred to as *reverse logistics*. Reverse logistics involves the collection of the used or discarded products, delivery to one or more processing centers, and then shipment of either the reusable or recyclable materials to the appropriate locations. It is the opposite process to the supply chains used to deliver products. Although less time-sensitive, the freight movements associated with reverse logistics introduce new traffic flows to and from cargo hubs.

Outsourcing of the Logistics Function

One of the ways that companies have pursued competitiveness is to outsource certain functions so they can focus on their core competencies. For example, instead of maintaining their own traffic department, companies may enter into a strategic alliance with a third-party logistics provider (3PL) to handle their freight transportation arrangements. Having emerged to fulfill a wide range of distribution functions, 3PLs often include the arrangement of freight services and warehousing. As such, 3PLs now have a strong influence on determining the routes and modes used to move goods. These logistics providers also rely on cargo hubs, often establishing alliances or long-term associations with carriers, and sometimes also establishing warehouses or distribution centers at or near cargo hubs.

Changing Consumer Practices

Retail companies now use three sales channels to market products to consumers:

- "Brick and mortar" stores,
- Mail-order catalogs, and
- E-commerce websites.

The most successful retail companies have learned to use all three channels and maximize the benefits of each. The newest sales channel to emerge is e-commerce, which has grown in popularity. Although e-commerce can reduce the number of deliveries going to stores, it increases the number of shipments that need to flow directly to residences. Consumers also expect to receive their purchases with the same speed and efficiency that they experience when ordering via the Internet. A December 1999 DHL survey found that 54% of e-commerce customers indicated that they expected to receive delivery of their order in less than 3 days. The freight transportation requirement is timely and accurate delivery of small shipments to multiple, dispersed destinations.

The newest trend in e-commerce is worldwide delivery. Crossing borders requires additional logistics capabilities. These requirements probably contributed to UPS's recent purchase of freight forwarder/customshouse broker Fritz, and FedEx's purchase of McGraw Hill's freight forwarder/customshouse division (Tower). All of the integrated carriers (e.g., FedEx and UPS) rely on hub-and-spoke systems and a series of cargo hubs for expediting shipments to their customers throughout the United States and abroad. UPS has the largest package sort hub in the world located in Chicago, with direct access to a BNSF rail intermodal yard and the Interstate highway system, and FedEx has the largest air cargo hub in the world at the Memphis airport.

Integration of Goods Movement Across Modes

Shippers developed a fundamentally different view of how to handle shipment requirements in the 1990s. Instead of focusing on routes and modes, the focus is now on the characteristics of the freight service across modes. It is a systems approach that views freight transportation in terms of meeting business requirements, regardless of the physical moves involved. Firms seek several performance characteristics in freight transportation, including reliability, transit time, efficiency, cost, low damage rate, and safety.

Freight transportation providers meet these goals by using the best combination of modes. Increasingly, the services

provided by transportation companies are mode neutral—a combination of multimodal or intermodal movements that achieve desired transportation services at the lowest possible cost. Examples include FedEx and UPS, which use combinations of aircraft, trucks, and rail service to move packages. Carriers, such as J.B. Hunt Transport Services, Inc., have developed domestic containers that can move on double-stack trains and have the same carrying capacity as over-the-road trailers. At either end of the rail trip, the container is placed on a chassis.

The increased emphases on overall system efficiency and use of multiple modes increase (1) the importance of cargo hubs for intermodal connections and (2) the efficiency of access to and from these hubs.

Consolidation of Freight Transportation Service Providers

The demand for higher levels of service at lower costs has resulted in a wave of consolidations and strategic alliances within and across freight modes. Recent examples include the railroad mergers, the American Airlines–TWA merger, the arrangement between FedEx and the U.S. Postal Service, and the numerous vessel-sharing agreements and alliances that have evolved between steamship lines and airlines.

These mergers and strategic alliances have allowed freight transportation companies to provide shippers with a broader array of service options, including enhanced door-to-door services; broader geographical coverage, in many cases now stretching across the globe; and an increased frequency of service. Vessel-sharing arrangements and alliances enable more efficient use of equipment and promote economies of scale. However, these economies of scale may also result in greater use of larger vessels, aircraft, and vehicles, generating increased and/or more peaked volumes at U.S. cargo hubs and increasing demand for access routes to these hubs.

3.2.3 Public and Private Sector in Attracting Hubs as Job Creators and Economic Development Catalysts

Just as logistics and distribution have become competitive factors for the private sector, the placement of a cargo hub is a competitive factor among regions in the quest to attract development. Cargo hubs can become a focal point for development and their importance is recognized increasingly by economic development agencies.

Today, regions, cities, ports, and airports are seeking to become hubs for cargo activities. The economic benefits from this strategy include easier access to global markets, reduced transportation costs, and the ancillary development of value-added activities (e.g., warehousing, wholesaling, and final assembly and preparation). Hosting a cargo hub also reinforces an area's world-class status.

An example of economic benefits stemming from cargo hubs is the UPS CACH. The project helped create many construction-related and permanent jobs. UPS, among other initiatives, worked to hire welfare recipients. In addition, the improvement of the overall transportation system facilitates access to other nearby sites in the industrial area of Chicago and maintains the Chicago area's role as the largest intermodal center in the world.

The economic impact of this project extends well beyond the direct employment generated by UPS and the railroad companies in Chicago. A UPS-sponsored study estimated employment effects of more than 1,300 pre-operations jobs and more than 2,700 jobs after inception. Income was estimated at over $58 million annually prior to operations, increasing to more than $70 million after operations began.

As regions position themselves to attract cargo hubs and gateways, increasing attention is being focused on ensuring access to freight facilities. Efficient highway access is a crucial element in hub planning and operation—it has become as important as planning and investing in facility operations and other forms of access (e.g., waterside, airside, and rail line capacity).

3.2.4 Location of Cargo Hubs in Congested Metropolitan Areas

Most major hubs are located in or near large metropolitan areas (e.g., the ports of Los Angeles and Long Beach, the Port Authority of New York and New Jersey facilities, and the UPS CACH). These hubs rely on spoke-and-feeder networks that can use the advantages of large ships, vehicles, planes, or trains. Yet, many of the port and intermodal rail terminals are in older sections of metropolitan areas accessed by city streets that have not been well maintained and do not always meet modern standards for handling heavy truck traffic. These areas often also are congested and not well served by new highways. Similarly, airports usually are located near congested freeways, with heavy traffic related to passenger travel. Thus, a recurring major problem in almost every cargo hub studied is the need for improved infrastructure as a result of the hub location in areas where the condition of access highways and/or congestion of access routes limits efficiencies, creates delays, and constrains the hub's ability to grow.

Cargo hub access improvements generally require addressing the following types of problems and concerns:

- Capacity limitations and congestion at peak hours,
- At-grade crossings,
- Infrastructure conditions, and
- Conflicts between automobiles and freight traffic.

Capacity Limitations and Congestion

A cargo hub is a significant traffic generator. The location of a cargo hub in a metropolitan area, near other sources of traffic, is another factor contributing to congestion on the major access routes. No data on the location and duration of congestion around cargo hubs now exists. To some degree, recurring congestion can be planned for within scheduling of commercial operations. Given that non-recurring delay cannot be planned for, such delay is particularly disruptive to cargo hub operations, service levels, and reliability.

The increased use of transfers at cargo hubs is intensifying the volumes of cargo moving through a single location. The more cargo moving through the hub and involving a truck intermodal move, the more traffic is generated on access infrastructure. In addition to an overall increase in traffic volume, freight service providers must consider potential traffic surges—periods of intense freight activity associated with loading and discharging new, large-sized cargo vessels and aircraft, and double-stack trains.

Congestion results when traffic volumes approach or exceed the capacity of the access infrastructure, gates at the cargo hubs back up, and/or traffic incidents occur. Congestion decreases travel time predictability and reduces the number of cargo runs that a single truck can handle in a day. Congestion therefore, also, decreases the profitability of motor carriers, increases driver tension, and adversely affects the environment.

Some new information and traffic management technologies are specifically designed to address these concerns. However, traffic volumes, delays, and congestion remain the leading factors driving the need for access improvements.

Several of the case study projects (e.g., the Red Hook Barge) are aimed at reducing congestion by shifting traffic from congested highways to alternative modes. Similarly, the Alameda Corridor project, FAST Corridor in Washington, Portway in New Jersey, and the Kedzie Avenue project in Chicago are examples of major efforts to streamline traffic to and from ports and intermodal rail yards. Increases in highway congestion probably will become an even more important reason for cargo hub access improvements in the future.

At-Grade Rail Crossings

The increasing number of trains moving to and from on-dock rail yards and other rail intermodal terminals may increase the amount of truck and other vehicle waiting time at at-grade crossings on access infrastructure. Grade separations may be required to alleviate the situation. Many of the most expensive projects among the 12 case studies analyzed in this research effort involve grade separations, including the Alameda Corridor, FAST, the US–1 Skypass project in the Port of Palm Beach, the UPS CACH, Portway, and the Lombard rail overpass in the Port of Portland.

Infrastructure Condition

Infrastructure condition, particularly in areas served by relatively older transportation infrastructure, is an important problem that must be addressed. This older infrastructure may no longer meet the needs of today's vehicles and equipment, nor be sufficient for the transportation requirements associated with certain cargo movements. Three major concerns are as follows:

- **Height, Weight and Width Restrictions.** Over-dimensional cargo can require substantially greater height and width clearances than may be provided at bridges, overpasses, and other structures. In addition, pavements may not be designed for the required weight nor have the required lane widths. Examples of over-dimensional cargo include aircraft fuselages, utility plants, transmission towers, and modular houses. Meeting clearance and design criteria for newly enlarged and overweight vehicles is a factor driving the need for improved access facilities to cargo hubs.
- **Road Geometries.** Large vehicles (e.g., rail cars and double-deckers) and equipment, along with over-dimensional cargo movements, require wider turning lanes and accommodation of the required radii on access infrastructure.
- **Pavement Conditions.** Poor pavement conditions, which may be exacerbated by the use of such pavements by heavy trucks, can increase the wear and tear on transportation equipment, can damage the cargo being moved, and is often another major factor driving the need for cargo hub access improvements.

Conflicts Between Automobiles and Freight Traffic

Cargo hub access improvements are often needed because of the growth in both heavy truck traffic related to the cargo hub and similar automobile traffic growth resulting from nearby urban land development. As the existing infrastructure approaches its capacity, potential conflicts between passenger and freight movements grow. Efficient passenger and freight movements are of equal importance; both must have adequate capacity. Adequate access to cargo hubs then requires compatible solutions and defining improvements that address both cargo and passenger vehicle requirements.

3.2.5 Opportunities for Significant Improvements

Intermodal connections at major hubs are a major source of delays and a significant portion of transportation costs for carriers operating into and out of those facilities as well as for personal travel in those areas. The greatest improvements may well be made at the congested and delay-prone intermodal

connections at major hubs, in comparison with the long-haul intercity segments, which by comparison, are not a major source of delays and congestion.

Cargo hub access is then an important element in addressing obstacles to efficient and reliable movement of cargo domestically and internationally. Access is an important link in the intermodal transport supply chain. As terminals grow, it is becoming clear that cargo hub access infrastructure is a constraint to efficient intermodal cargo flows. Furthermore, cargo hub access is affected by nearby congestion while cargo movements are constrained by terminal operations restrictions and/or regulatory and environmental constraints. There may be diminished efficiency returns to larger terminals and improved access in some locations unless dedicated corridors and/or new distribution patterns to cargo hubs are implemented. Moreover, in some cases, more terminal and access capacity cannot be provided because of landlocked sites and resistance to highway capacity increases and to growth in truck traffic. In these instances, terminal expansion at a new location involving significant and costly access improvements may be required.

One relatively new area of research to be explored is how to develop a systems perspective on the interrelationships between terminal operations and highway access requirements. Changes in the hours of terminal operation and related highway access use, as well as other institutional changes (e.g., limited permitting of overweight containers) could augment the capacity of existing cargo hubs and provide another option to improving highway access. These operational and institutional/regulatory options are similar to flex hours for reducing commuting traffic during peak hours and can result in improved cargo hub access.

3.3 NEEDS AND OBSTACLES

Cargo hub access needs are not all the same. The wide-ranging factors that drive cargo hub access needs illustrate the complexity and challenges associated with identifying and financing practical solutions to address the various cargo hub access problems. Often the greatest hurdles lie in the following:

- Coordinating among several jurisdictions or public-sector agencies and private companies to reach a consensus on practical solutions;
- Convincing many project beneficiaries who often are not concentrated in or near the project location;
- Making local communities understand that, even though heavy truck traffic may have some negative impacts, such traffic also has positive economic benefits, and access improvements actually can reduce some negative impacts; and
- Formulating the means of financing for implementation.

The rest of this chapter will describe some of these obstacles and challenges faced by planners and public/private-sector decision makers in successfully and quickly responding to identified cargo hub access needs.

The major challenges facing U.S. cargo hubs to improve and finance access improvements include

- The variety of needs, involving multiple modes and types of hubs, that creates many case-specific types of access improvement projects for which no "cookie cutter" approach is appropriate and for which simply repeating what worked in another hub is not appropriate;
- The need for a quick response to changing and fast-growing market demands and multi-jurisdictional coordination involving public/private sectors, particularly when private carriers and shippers decide to build a new facility or significantly expand an existing facility;
- The fact that local jurisdictions and communities next to cargo hub access projects often do not place a high priority on these improvements, are concerned that hub expansion generates additional traffic and related negative impacts, and are not fully aware of how such improvements can benefit them and reduce negative impacts; and
- Many financing challenges, including (1) the need for flexibility, innovation, and creativity to use available financing sources and mechanisms to structure an overall financing package, particularly for large cargo hub access projects involving various modes, many jurisdictions, and private companies; (2) legal constraints and delays associated with the use of federal funds; (3) the special challenges presented by structuring private/public financing partnerships and obtaining required approvals for cargo hub access improvements involving rail grade separations; (4) lack of dedicated funding sources for cargo hub access projects and difficulties in meeting eligibility requirements for available public funding sources that were established with different primary objectives; and (5) limited applicability of a project-specific user financing approach for most cargo hub access needs.

The following sections will analyze some of these challenges commonly found in planning and financing cargo hub improvements and, where appropriate, will refer to the case studies as examples.

3.4 TYPES OF NEEDS, SOLUTIONS, AND ISSUES

3.4.1 Various Needs and Approaches/ Solutions Involving All Modes

The 12 case studies were used to explore cargo hub access needs, solutions to meeting these needs, and the funding programs used or financing approaches used. The 12 case stud-

ies were selected to include various project types and to illustrate different needs as well as unique and innovative solutions adopted for different types of cargo hubs. The case studies can be categorized into the following four groups:

1. Various areawide or corridor projects or programs to improve access to all terminals in a corridor or cargo hub complex,
2. Various access improvements to one facility,
3. Specific highway improvement to one facility (e.g., the US–1 overpass at the Port of Palm Beach)
4. Non-highway improvements to substitute other modes for heavy truck traffic (e.g., the Red Hook Barge and PIDN).

The first two of these four categories generally involve many project types, rather than one specific improvement type. The first category involves various project types combined into a large project or program aimed at serving many or all terminals in a corridor serving a cargo hub complex. For example

- Alameda Corridor serving the port terminals in Los Angeles/Long Beach: new consolidated rail line, new highway-railroad grade-separated crossings, highway improvements along Alameda Street, and so forth;
- FAST Corridor aimed at improving freight access along the Seattle-Tacoma Corridor: grade separations, rail curve improvements, and rail capacity improvements; and
- Portway improvements to connections between the major port terminals and rail yards in northern New Jersey: highway extensions, new bridges, bridge replacements, highway improvements, new interchanges, and so forth.

The second category includes a series of improvements that usually involve many project types serving a specific facility in a cargo hub and meeting various needs. For example

- UPS CACH projects providing an Interstate interchange, rail grade separation, intermodal rail yard, and local access improvements; and
- Kedzie Avenue improvements to the BNSF Corwith intermodal rail yard within the Chicago intermodal hub and including road reconstruction, new signals, synchronized signals, and intersection improvements.

The case studies, therefore, demonstrate a wide variety of needs involving all modes and creative approaches unique to each situation for addressing those needs. Clearly, the cargo hub access needs or solutions do not always fit neatly into existing highway funding programs or into other federal and state transportation planning or grant programs, even though they involve the same types of investments. Because of the wide variety of needs, cargo hub access projects are often more challenging to implement than other types of transportation projects.

3.4.2 Variety of Project Types

Access improvement project types included in the case studies covered a wide range as detailed below:

- Cargo hub facility types included ports (i.e., container and bulk), airport and air cargo facilities, intermodal rail yards, package consolidation centers, and warehouse/distribution centers.
- Cargo hub size, when measured by volume handled annually, ranged from 265 tons (Luis Muñoz Marin International Airport Air Cargo) to 100 million tons (Los Angeles/Long Beach ports).
- Access improvements included rail improvements (e.g., right-of-way consolidation and relocation or rail bridges); highway and road improvements (e.g., overpasses; interchanges; widening; bridges; highway-rail grade crossings; traffic signals; intersection improvements; street rehabilitation; drainage improvements and repaving; new street, road, and highway connections; and/or combinations of these elements); and improvements that reduce congestion by shifting truck traffic to other modes (e.g., intermodal rail yards and barge service).
- Project scale/complexity ranged from non-capital-intensive projects to relatively simple (1- to 2-year implementation period and under one or two contracts) to multiyear, multicontract, multimodal complex combinations of projects.
- Project cost ranged from $4.3 million to $2.4 billion.
- Financing sources included federal, state, and local funds as detailed in Table 7. User fees and investment earnings are often cited as financing sources, because they can be used to recover the cost of a project. In most cases, these revenues cannot be used for paying for initial project costs, but can be used in developing a financial plan to obtain loans or bond issue approval, with user fees and interest earnings being used to repay the loan once the project is built.

The case studies demonstrate that nearly all projects involve some type of highway investment and almost every type of highway project may be part of the best solution to improve cargo hub access. In some cases, though, rail and barge improvements also can be important alternative solutions, so part of the cargo hub access challenge is flexibility in finding the best solution, regardless of mode, project type, or funding criteria constraints.

The case studies also demonstrate that solutions can range from relatively small projects costing as little as a few million dollars to projects costing several billion dollars. Again,

TABLE 7 Typical examples of financing sources*

Federal	State	Other
FHWA Surface Transportation Program	DOT Grants	Ports
Congestion Mitigation Air Quality Program, Borders and Corridors Program, Other Grants	Economic Development Agencies	Airports
Loan Programs—Transportation Infrastructure Finance and Innovation Act, Other Programs	State Infrastructure Bank Loans	Railroads, Other Carriers, Other Private Sources
Earmarks Such as the High Priority Projects Program	Special Port Financing Programs	Bond Proceeds

*Appendixes D, E, and F provide detailed information on available funding sources for the projects inventoried.

cargo hub access solutions cannot be neatly categorized into other planning and financing programs.

3.4.3 Quick Response from Multijurisdictional, Public/Private Sectors

Cargo hubs may be owned and operated by private-sector, public-sector, or public/private joint venture entities. However, the access infrastructure for these hubs is generally owned and operated by separate, and sometimes multiple, public agencies or authorities. For example, a port may be owned and operated by a port authority, but the roadways connecting to the facility typically are owned and operated by municipal, county, and state agencies.

Each of these agencies may have different priorities, funding mechanisms, regulations, and planning processes. Accordingly, although access is critical to the success of cargo hubs, planning and investment in access infrastructure may be outside the jurisdiction of the cargo hub operator. This factor alone has sometimes delayed important access improvements to cargo hubs, because no one entity with authority to act recognizes the significance of the need for the cargo hub. The need for multijurisdictional planning, coupled with the private involvement often required for successful implementation, is another factor that makes addressing cargo hub access requirements challenging.

When major projects are proposed by private companies responding to changing market demands, carrier operational efficiency needs, and shipper requirements, they often have tight timeframes for implementation. Public-sector agencies often are not equipped to respond in a timely manner, because the typical planning process and the requirements to obtain available federal, state, or other funding take too long to comply with the project's schedule. The UPS CACH access projects are an excellent example of this situation. This UPS hub handles about 10% of UPS' national domestic package volume and UPS estimates that volume represents 0.6% of the U.S. GNP. Yet, when UPS needed access improvements in order to open the largest package sort facility in the world, the schedule would not allow going through the required metropolitan area planning process or using federal or state financing for any of the projects. Commitments were made for a special funding package, put together with approval from the governor, local jurisdictions, UPS, and BNSF in a relatively short timeframe to allow the required access projects to proceed.

3.4.4 Low Priority on the Part of Local Jurisdictions and Communities; Community Concerns about Impacts from Hub Traffic

One of the major problems faced by cargo hubs with emerging needs for improvements is the lack of support from local jurisdictions and the communities surrounding the cargo hub. The communities tend not to recognize the benefits of improving cargo hub access, particularly when improvement projects compete for the same funds as other community or commuter transportation projects. At the same time, because the benefits from cargo hub access investments to the users are apparent, there is often little involvement and support from the community which often expects cargo hub users to fund these needs. Such financing often is not easy to achieve, given that many truck or cargo hub users are from outside the local area and, in many cases, it is difficult to set up a private-funding mechanism, identify solutions, and publicly finance needed improvements without local support.

In addition to competition with other locally important projects for funds, in most areas, cargo hubs and access infrastructure are surrounded and hosted by communities that are affected by truck traffic and hub operations. The effects, some of which may be positive and some of which may be negative, include the following:

- Environmental impacts,
- Economic development and benefits, and
- Safety considerations.

As traffic grows and more cargo moves through hubs, these factors become increasingly important and often generate opposition from adjacent communities opposed to cargo activity near their homes. Although often not understood by the adjacent communities, access improvements can affect economic development and traffic positively. When the com-

munities are aware of these positive effects, such communities can become a driving force for access improvements; however, achieving such understanding can be challenging.

An example of how community opposition can evolve to become support and understanding for the project benefits is the Alameda Corridor. At first, the Alameda Corridor project was opposed by many of the adjacent communities. This opposition including filing of lawsuits. However, the Alameda Corridor Transportation Authority (ACTA) worked closely with the local communities to craft a series of initiatives (including local hiring and job training and school building improvements), which provided measurable benefits. As these initiatives progressed, opposition to the project decreased.

Growing levels of cargo movement and traffic activity have raised concerns regarding air quality, vibrations, and noise impacts on surrounding communities, resulting in calls for improvements aimed at ameliorating these conditions. Some access initiatives and concepts have been funded through programs aimed at reducing environmental impacts. For example, the Red Hook Barge was designed to reduce congestion on roads to and from a marine terminal in Brooklyn and received funds from the FHWA's CMAQ Program.

The communities next to access infrastructure and cargo hubs want to see tangible benefits from hosting these freight operations. Economic benefits tend to be measured in terms of jobs and tax revenues generated, along with the new economic and redevelopment activities in the community resulting from the cargo hub and access infrastructure. Several initiatives to enhance the potential to achieve such economic impacts are already being pursued, including brownfield redevelopment for value-added activities.

Additionally, communities are concerned about safety issues related to the movement of freight in or next to their areas. These concerns include the movement of hazardous materials (along with preparedness for potential hazardous materials accidents), increased truck traffic in residential communities and on local roads, increased rail traffic over at-grade crossings, and other safety considerations associated with increased volumes of traffic. Access to local police, fire, and emergency vehicles are additional considerations that sometimes affect cargo hub access improvement projects (notably where at-grade crossings can delay such vehicles in emergency situations).

Communities may not be as supportive as they could be about investments in cargo hub access, because the benefits may appear to be going to what are often perceived as non-local shippers and carriers. In reality, even though additional heavy truck traffic does have some negative impacts, many cargo hub access projects benefit the local area positively (e.g., where the increased truck traffic is given a direct connection to an Interstate highway, thereby avoiding residential areas, as in the case of the new interchange connecting to the UPS CACH).

3.4.5 Financing

Cargo hub access projects involve many types of situations and potential solutions as previously described; likewise developing financing sources requires many different approaches that create challenges that can go beyond those associated with funding a typical project.

Need for Flexibility, Creativity, and Innovation

The case studies demonstrate the challenges faced in finding funding sources for cargo hub access projects and the importance of flexibility, creativity, and innovation in structuring the financing package. Examples include the following:

- Port of Palm Beach Skypass, which took advantage of a readily available financing source (Florida Seaport Transportation and Economic Development Council—the FSTED Program) and changed from their previous approach of seeking federal funding. As a result, the project did not have to go through the lengthy federal approval process and was completed on an expedited schedule.
- Alameda Corridor, in which the Long Beach and Los Angeles Ports and ACTA revised their project scope to accommodate community concerns, thereby increasing the cost of the project. When it became clear that sufficient federal grant funds would be difficult to obtain, ACTA changed its approach to obtain approval of a federal loan (see TIFIA, below).
- Port of Tacoma Road Overpass, which involved the FAST Program's anticipation of $12 million in funding from the Washington State DOT. When passage of Initiative 695 rescinded some funding sources for the DOT, FAST quickly was able to obtain Puget Sound Regional Council (PSRC) support to use other available funding sources to keep the road overpass project on schedule.

Similarly, the case studies also demonstrate innovation and creativity used to set up new funding sources for cargo access projects or to make these types of projects eligible for existing programs that were not intended to be used for this purpose. Examples include the following:

- Transportation Infrastructure Finance and Innovation Act (TIFIA) Program—When the Alameda Corridor sponsors were unable to convince federal officials to provide sufficient grant funds to make the project viable, the Alameda Corridor sponsors helped develop the approach for what eventually became the TIFIA loan program.
- Borders and Corridors Program—The FAST Program helped frame the Borders and Corridors Program of the

TEA-21 legislation, so that projects like the Tacoma Port Road overpass could be eligible for this funding source.
- CMAQ Program—The Red Hook Barge was the first freight project approved for CMAQ funds, a program not originally envisioned nor intended for freight access improvements. Since then, CMAQ funds have been approved and used successfully by many freight access projects, including the Columbia Slough Rail Bridge in Portland and the Kedzie Avenue project in Chicago.

At one extreme, the case studies demonstrated the variety of financing sources that can be used. Small, simple, routine projects may be financed from typically available federal, state, and local highway financing sources. Some of the case study projects such as the Luis Muñoz Marin International Airport Access Road (financed by the FAA and PFCs) and the Kedzie Avenue project (financed partly by CMAQ funds) also included simple, but innovative uses of financing approaches involving only one or two sources.

At the other extreme is the Alameda Corridor, the most complex and expensive project, which involved federal, state, and local grant and loan funding, in addition to port funding, a major bond issue, and user fees.

Legal Constraints for Federal Funding of Facilities on Private Property and Delays Associated With Use of Federal Funds

Federal funding was used in 11 of the 12 case studies. Funding sources used included FAA grants; various FHWA and STP programs, including congestion relief, CMAQ, the Borders and Corridors Program, and NHS funds; as well as earmarks and the TIFIA loan program.

In general, agencies consider getting federal aid. The major apparent challenges are as follows:

- Projects that involve construction on privately owned facilities (mainly rail projects) or that are sponsored primarily by private companies often cannot obtain the needed support for federal funding. For example, the access projects to the new UPS facility in Chicago were carried out without federal funding. Even where it is legally possible to obtain approval, there are delays and difficulties in obtaining such approvals. The Alameda Corridor is another example of a project where, considering its national significance, a larger share of federal funding was anticipated than actually received. Federal rules did not even allow full tax exemption of some of the bonds that were issued for this project because the IRS ruled that the project was not fully a public purpose project.
- Projects that have a tight schedule and are tied to private carrier or shipper requirements often do not have sufficient time in the required schedule for completion to meet all the federal procedures and requirements. The UPS Chicago hub is an example of a project needed to satisfy the carrier's requirements on a tight schedule, and, therefore, no federal funding was used, even for those highway access projects that otherwise would have been eligible. The Skypass bridge project in the Port of Palm Beach, Florida, is another example. This project was initially intended to be built with federal aid as it is a bridge on US–1, a major East Coast highway. In order to save time and meet the expansion needs of major port customers, the Port of Palm Beach decided to concentrate its efforts on obtaining state funds. Indeed, one of the requirements for federal funding is the National Environmental Policy Act (NEPA) process, which can take longer than state procedures. State funding usually makes faster and more flexible resolution of environmental requirements possible. In the Skypass Project, the lengthy federal environmental process requirements associated with federal aid were avoided, even though some federal funds were used for a relatively small part of the project.

Rail Grade Separations Require Private/ Public Financing and/or Approvals

Although there is a federal funding program for rail grade separations that is used for many cargo hub access projects, frequently the larger projects are difficult to fund through this source because of funding limitations. In addition, rail/highway grade separations often require funding participation from the railroad, which in some cases is unwilling to contribute, given that such improvements may not fit with the railroad's overall priority for system improvements. Generally, the railroad's approval is required for rail grade crossings, given that its right of way and operations are involved, but in many cases, the railroad does not act quickly on such approvals, because railroads enjoy priority over highway traffic at the grade crossings. These railroad funding and approval requirements frequently delay needed cargo hub access projects and, in some cases, result in continuing congestion, delays, accidents, and effects on emergency vehicle movements at grade crossings.

The rail grade crossing cargo hub access needs can be particularly challenging. An excellent example of such a challenge is the Alameda Corridor, which started as a project to eliminate some railroad grade crossings. Because of the many difficulties involved, the project culminated with the building of a separate, consolidated rail line as a substitute for four separate rail lines. This solution used no direct financing from the railroads.

Lack of Dedicated Source Funding

The lack of a specific freight-oriented program sometimes makes it difficult to justify a cargo hub access project for var-

ious federal aid programs. The U.S. DOT has used all the available flexibility in the existing legislation to make freight projects eligible under various programs (e.g., the Red Hook Barge, the Columbia Slough railroad bridge, and the Tacoma Road Overpass have qualified for CMAQ and Section 1118/9 TEA-21 funds). Some agencies however, may chose not to pursue federal aid because of the lengthy requirements (which may be of limited relevance) for their cargo hub access projects.

That there are no specific funding sources dedicated to cargo hub access improvements makes it difficult to plan and implement projects as rapidly as demand grows. This problem may increase with the further development of intermodal terminals and creation of hub complexes by private carriers responding to the globalization of production and the emphasis on international trade. Some arguments can be made that there should be no dedicated funding source for cargo hub access, given that many sources of funds can be used for such improvements. Some even argue that there should be no dedicated funding for any purposes. However, it is clear that the lack of such a funding mechanism has made it more challenging to plan and finance cargo hub access improvements.

Limited Applicability of Project-Specific User Financing Approach

Another challenge to implementing and financing cargo hub access projects is the lack of applicability of a project-specific user financing approach. The argument is often made that if a project is intended to benefit primarily shippers and cargo carriers, these entities should pay for the project costs. The case studies—covering various project types, regions of the country, and public/private partnerships—indicate that user fees are not being imposed extensively and have only been imposed in unique cases involving dedicated single-carrier cargo hub access facilities and in very large projects involving special circumstances.

Most cargo hub access improvement needs are multipurpose public use highways, roads, and streets shared with automobile traffic. In those cases, most projects are being implemented by using available user tax and fee funding sources or by obtaining private, port, airport, or economic development program contributions. There have been some legal hurdles to using these available funding sources for non-roadway access improvements (particularly privately owned rail projects), although the last two surface transportation program reauthorizations have added significant flexibility (e.g., through TIFIA and CMAQ). These relatively new programs have been instrumental in broadening available funding sources for all types of cargo hub access projects. In some cases, access improvements also have been funded from the revenues of adjacent cargo hub facilities.

In the case studies considered in this research, the Alameda Corridor and the Columbia Slough railroad bridge are the only projects that were financed significantly through dedicated and project-specific user fees for a specific period. In other cases, some user taxes, other fee sources, or user revenues were used, but using non-specific user fees or user fees collected at an adjacent cargo hub facility is no different than considering all possible funding sources in structuring a financing approach to any project.

Project finance approaches through project-specific user fees have limited applicability to large unique access projects and are not generally applicable for cargo hub projects because most cargo hub access projects are relatively small (e.g., traffic lights, road rehabilitation, and grade separations) and existing funding sources may be adequate to meet the requirements In some cases, user fees simply are not appropriate for the proposed project. For example, added rail capacity on an existing line more appropriately may be provided and maintained directly by the railroad or agency that operates that service, and costs can be recovered through the rate structure rather than through user fees on the project segment. Similarly, an existing road operated by state DOTs or other local public agencies is more appropriately financed or improved through their capital and maintenance programs. So, even though some see user fees as the obvious mechanism for cargo projects, with a few limited exceptions, user fees typically are not an appropriate funding mechanism.

There are other reasons why user fees, user revenues, or similar sources are not easily available for cargo access projects. Ports and hubs typically are self-supporting public agencies or part of a profitable private enterprise that supports both operations and capital. As such, ports and hubs are reluctant to finance access improvements generally viewed as a public-sector responsibility and not to be paid for from cargo hub revenues. At the same time, there is generally a public-sector reluctance to fund a project primarily benefiting a private enterprise or a public authority with its own revenue stream. This situation highlights the need for public-private coordination and partnership, from the early planning phases through financing and implementation. The result is the lack of an obvious argument for funding most cargo hub access projects through any means other than highway and other public-sector tax-supported transportation programs.

The Red Hook Barge provides a case in point. In this instance, the improvement sought was an alternative means of preserving existing service, rather than markedly increasing capacity and/or efficiency. Because it was offered at no charge (in order to maintain customers and competitiveness), it had no potential for creating or sustaining a revenue stream that could back bond financing. This heightened the need for identifying and using unique government funding mechanisms (e.g., the CMAQ Program).

3.5 IMPLICATIONS OF IMPROVEMENTS

The implications of these factors and the challenges faced in improving access to U.S. cargo hubs are wide-ranging and urgent. Improved access to U.S. cargo hubs is an increasingly crucial element for ensuring an efficient and competitive freight transportation system nationally and internationally. More specifically, these factors show that access to U.S. cargo hubs will need to

- Handle greater volumes of traffic (both throughout the day and during peak periods), which will be generated by the increasing domestic and international freight being moved; the use of larger vessels, aircraft, and vehicles; and the new types of freight traffic being generated by emerging businesses (e.g., technology- and knowledge-based industries, demanufacturing, and remanufacturing).
- Provide predictable travel times in order to ensure efficient, on-time, reliable service.
- Handle a broader range of vehicles, including overweight, over-dimensional vehicles, along with 53- and 57-ft trailers, twin trailers, and smaller trucks and delivery vans. The range of vehicle types will depend on the type of cargo hub being served.
- Handle these vehicles in facilities equipped to transfer cargo between modes efficiently and with fast turnaround, with similar efficient multimodal access, including the greater use of grade-separated crossings to move rail traffic across vehicular access infrastructure.
- Process international shipments expeditiously to maintain efficient cargo and traffic flows. (This may require improvements at and near international gateways, border cargo hubs, and ports of entry).
- Be sensitive and responsive to the need for compatible and efficient movement of both passenger and freight traffic where shared high-volume use of the infrastructure requires improvements to the shared infrastructure.
- Consider improvements that use new traffic management technologies to optimize flow conditions, as well as operational and regulatory/institutional changes that help reduce congestion and improve traffic flows.
- Include improvements to mitigate adverse environmental impacts associated with increased traffic volumes and cargo flows.
- Target improvements that provide tangible economic benefits to surrounding communities.
- Define improvements that take into account adjacent land uses (e.g., commercial, office, residential, and recreational activities) and consider the transportation needs associated with these activities if they share the same infrastructure for access.
- Consider improvements to address safety issues and the potential costs to communities associated with providing police, fire, and emergency management teams in response to incidents on the access infrastructure in their area.

CHAPTER **4**

DESCRIPTION OF CASE STUDIES AND LESSONS LEARNED

4.1 INTRODUCTION

This chapter describes the similarities and differences among the case studies, as well as the lessons learned. The chapter also integrates the results of the case study analysis and provides the basis for the best practices discussed in Chapter 5, which covers various aspects of project planning, financing, and development. Both Chapters 4 and 5 give special emphasis to project financing issues, including the funding sources, obstacles overcome, innovative mechanisms used, and organizations involved.

4.2 OVERVIEW OF CASE STUDIES

The case studies represent a cross section of projects. Projects vary in terms of the type of access improvement, the types of cargo hub and modes involved, the magnitude of cargo volumes and project scale, the geographic location, and the mix of domestic and international freight handled. The case studies addressed a wide range of different problems and issues with very distinct characteristics but one common objective—improving access to a cargo hub.

In addition to the variation in project size and complexity, the case study projects differ in the planning or implementation approach used by the lead organization or authority and the methods of financing. Some projects, such as the Alameda Corridor, were massive in size and required complicated coordination and financing, including the creation of a special-purpose agency. Other projects, like the Luis Muñoz Marin International Airport cargo access road or the Kedzie Avenue improvements in Chicago were relatively small, but still required significant interagency or private–public coordination to define solutions and reach agreement on financing approaches.

Although all case studies shared the objective of improving cargo hub access, no one model and no ideal number of partners or funding mechanisms emerged for successfully implementing these cargo hub access improvement projects. Every cargo hub access problem or issue requires consideration of different types of alternatives, growth scenarios, immediate and long-term needs, possible solutions, and financing approaches. Financing approaches in the larger case studies considered the major beneficiaries of the project but, in many cases, emphasized the opportunities to attract existing funding sources or to help frame new funding approaches.

Table 8 summarizes the major drivers, strategies, and lead sponsoring organizations of the 12 case study projects. Table 9 summarizes the project objectives compared with the primary beneficiaries of each of the case study projects. Table 10 summarizes the funding sources for the projects. All of these aspects are described in the following sections.

4.2.1 Major Drivers and Strategies

The major needs and issues for the access improvement projects addressed in the case studies can be summarized as follows:

1. Improve rail and highway connections between ports and intermodal rail yards by reducing drayage distances, eliminating drayage, or improving highway and rail facilities so as to reduce time and cost for these connections (mainly requiring rail line improvements, new intermodal rail yards on or near dock, grade-separated crossings, and various road improvements such as widenings, intersection improvements, and traffic lights). Three of the twelve case studies involved connections between rail yards and ports.
2. Improve rail access to port terminals and rail yards so as to improve safety and reduce delays (particularly through the elimination of at-grade crossings). Six of the twelve case studies involved grade separations.
3. Develop alternative-mode facilities and services to reduce congestion in the vicinity of cargo hubs. Two case studies concentrated on the development of alternative facilities or services.
4. Improve road access to cargo handling terminals (i.e., ports, rail yards, truck terminals, and airports) to reduce delays, add capacity, and modernize infrastructure (e.g., interchanges, street lights, widenings, drainage improvements, pavement rehabilitation, and new connections). These types of improvements were involved in nine of the twelve case studies.
5. Replace deficient or obsolete facilities to improve the condition of access infrastructure. Three of the twelve case studies involved bridge replacements.
6. Provide access improvements to new cargo handling terminals or new hubs. One case study (i.e., the UPS CACH) focused on the creation of new terminal facilities.

TABLE 8 Major drivers, strategies, and sponsoring organizations[1]

Case Study	Major Drivers	Major Actions/Strategies	Lead/Sponsoring Organizations[2]
1. The Alameda Corridor, Ports of Los Angeles and Long Beach, CA	Improve long-term rail access and capacity from Ports of Los Angeles and Long Beach to downtown Los Angeles rail yards and reduce delays and congestion at grade crossings in the corridor	Grade-separated consolidated rail corridor with overpasses and improved highway along the corridor	SCAG, then ports, then ACTA, a special-purpose agency, was created
2. Luís Muñoz Marín International Airport Cargo Area Access Road, San Juan, Puerto Rico	Add road capacity and alleviate ground access congestion to air cargo facility at major airport hub	Road widening from 2 to 4 lanes, and improvements to traffic signal system at connection to major interchange	Puerto Rico Ports Authority (operator of Luís Muñoz Marín International Airport)
3. Red Hook Container Barge/Port Inland Distribution Network (PIDN), Port of New York and New Jersey	Maintain viability of Red Hook Terminal, only operating terminal in Brooklyn, and provide emergency competitive inland access as major highway was congested and scheduled for a long reconstruction period	Free barge service connecting Red Hook Terminal in Brooklyn to New Jersey facility with guaranteed next-day delivery based on vessel call schedule	Concept developed by Red Hook Promotion Committee, implemented by Port Authority of New York and New Jersey and the private terminal operator, American Stevedore, Inc.
4. Skypass Bridge Project, Port of Palm Beach, FL	Directly connect the two sides of the port and increase space for cargo handling capacity, while eliminating at-grade highway and rail crossings and reducing congestion on US–1	New highway overpass on US–1 and elimination of at-grade highway and rail crossings	Port of Palm Beach
5. CACH, Chicago, IL	Improve rail and highway access to site of the proposed new private UPS hub facility	New interchange providing direct Interstate highway access to new hub facility, new adjacent intermodal rail facility, rail overpass, local road improvements	UPS with implementation by Illinois State Toll Highway Authority (ISTHA), BNSF Railroad, and Illinois DOT
6. Port of Tacoma Overpass Project, FAST, Port of Tacoma, WA	Improve rail and highway access to the port, increase rail capacity, eliminate at-grade rail crossings and traffic lights	Grade separation project including highway overpass above new and existing rail	Port of Tacoma, under FAST Program
7. Cooper River Bridge, Port of Charleston, SC	Replace existing, narrow, deficient bridges with limited capacity and increase vertical clearances for large vessels	New multilane bridge with higher clearances to serve local traffic needs and access to a major port terminal	South Carolina DOT
8. Tchoupitoulas Corridor, Port of New Orleans, LA	Separate automobile traffic and truck port traffic to recently completed port terminals, thereby improving highway access to the port and reducing truck traffic on local roads	New port access road exclusively for port truck traffic, and rebuilt city street	Port of New Orleans with local street rehabilitation by New Orleans Department of Public Works
9. Joe Fulton International Trade Corridor, Port of Corpus Christi, TX	Improve highway and rail access to the port and to new land under development	New (and upgrades to existing) highways and railways creating a through corridor	Port of Corpus Christi
10. Lombard Road Overpass and Columbia Slough Railroad Bridge, Port of Portland, OR	Improve rail and highway access to the port and to its main industrial park	Highway overpass bridge above rail lines; new rail bridge	Port of Portland and City of Portland
11. Kedzie Avenue Access Road, Chicago, IL	Improve highway access to BNSF Corwith Rail Yard	Rehabilitation and widening of road, improved traffic signals	Chicago DOT
12. Portway, Port of New York/ New Jersey	Improve access to and connections between key freight facilities and distribution centers in northern and central NJ	Phase 1 has 13 projects including highway bridge; rail flyover replacing at-grade rail crossing; roadways, traffic circles, interchanges, bridge construction and replacement, etc.	New Jersey DOT, with implementation of some projects by the Port Authority of New York and New Jersey

[1] See Appendix A for acronyms.
[2] Lead or sponsoring organization is defined as the agency responsible for planning, concept development, project construction, or implementation

TABLE 9 Project objectives and primary beneficiaries[1]

Project	Project Objectives	Primary beneficiaries and resulting benefits			
		Community and Consumers	Port/Airport/Truck Terminal	Highway Users	Railroad Users
1. The Alameda Corridor, Ports of Los Angeles and Long Beach, CA	• Reduce highway traffic delays by 90% and improve safety by eliminating 200 at-grade crossings • Improve ports' competitiveness and rail access capacity to hub ports • Improve rail operations • Promote economic development	• Less congestion • Pollution and noise reduction • Improved local economy (new jobs, enhanced development opportunities) • Lower consumer prices as a result of faster deliveries and increased reliability	• Better service, reduction of logistics costs • Increased competitiveness • Increased volume and market potential	• Less congestion (as more cargo will be moved by rail) • Reduced accidents and increased safety • Decreased maintenance and investments	• Increased level of service through higher speed, capacity, and reliability • Reduced operational costs (despite pass-through user fees) • Increased volume • Obtained cash payments from ROW • Improved facilities
2. Luís Muñoz Marín International Airport Cargo Area Access Road, San Juan, Puerto Rico	• Alleviate traffic delays and congestion on cargo area access road • Meet cargo carriers' needs • Improve competitiveness of airport	• Impact on local community is minimal • Passenger charge established	• Meets cargo carriers' demand • Improved airport competitiveness	• Improved intersections and access for air cargo movements	• Not applicable
3. Red Hook Container Barge/Port Inland Distribution Network (PIDN), Port of New York and New Jersey	• Preserve terminal market share and viability during anticipated highway construction • Reduce truck traffic and congestion • Improve air quality • Improve efficiency	• Reduced traffic congestion • Improved air quality	• Barge reduced truck trips between maritime terminals • Maintained port competitiveness • PIDN will shift containers directly to trains and barges	• Barge and PIDN created an alternative to truck movements, reducing truck traffic on roads	• PIDN increases rail market share of port volume, thereby increasing rail business
4. Skypass Bridge Project, Port of Palm Beach, FL	• Increase port space for cargo handling capacity • Improve connection between two parts of the port • Reduce traffic congestion on US-1 • Eliminate at-grade crossing and improve safety	• Community benefited from grade separation • Minimized impact during construction by keeping 4 lanes of US-1 open • Reduced congestion after opening	• Cut times to connect two sides of port • Allowed expansion of major tenant • Improved cargo handling capacity	• Eliminated traffic interruptions from intra-port traffic crossing US-1 and from rail crossings	• Eliminated rail traffic crossings • Facilitated rail switching that formerly crossed US-1 • Provided improved access to Florida East Coast rail yard
5. CACH, Chicago, IL	• Provide required access to new UPS facility • Create jobs and help the local economy • Improve efficiency and increase volume of Chicago hub	• Minimized local traffic impact by providing direct access to Interstate highway and rail • Helped local economy through "ripple" effect and job creation	• Facilitated access to new UPS hub • Improved hub operations (intermodal facility)	• Minimized potential traffic from new hub on local roads	• Provided easy access to hub from rail (nationally) • Allowed major share of UPS hub cargo to be moved by rail • Increased business opportunity for BNSF

[1]See Appendix A for acronyms

(*continued on next page*)

TABLE 9 Project objectives and primary beneficiaries[1] (Continued)

Project	Project Objectives	Primary beneficiaries and resulting benefits			
		Community and Consumers	Port/Airport/Truck Terminal	Highway Users	Railroad Users
6. Port of Tacoma Overpass Project, FAST, Port of Tacoma, WA	• Increase speed and efficiency of truck and rail movements • Improve commuting time and motorist safety	• Reduced delays and congestion for general public • Allowed extensive public involvement; 11 communities in FAST CAST helped set priorities • Provided residents with project purpose and detour information	• Improved flow of cargo to and from the port • Grade separations reduced crossing delays for both trucks and trains	• Reduced crossing delays • Improved safety by decreasing locations of rail/highway at-grade hazards • Improved emergency access	• Added rail capacity • Increased speed of rail freight movements
7. Cooper River Bridge, Charleston, SC	• Replace obsolete bridges • Satisfy South Carolina's increased transportation needs	• Improved aesthetics • Lessened congestion • Improved local economy (new jobs during construction)	• Maintained service • Increased clearances for commercial vessels • Increased competitiveness	• Lessened congestion and added improved, new facility	• Not applicable
8. Tchoupitoulas Corridor, New Orleans, LA	• Improve access to the port through dedicated truck-only highway • Remove heavy truck traffic from city streets	• Eliminated port-bound truck traffic from local streets • Reduced congestion	• Improved the port's competitiveness • Provided better access to port facilities	• Separated the 1,500 trucks per day that use the Corridor from local traffic through the construction of port–traffic-only roadway	• Faster intermodal movements and increased quality of service
9. Joe Fulton International Trade Corridor, Port of Corpus Christi, TX	• Create opportunities and provide improved access to over 1,000 acres of land for new development • Improve intermodal links and facilitate trade • Improve competitiveness of port	• Considered environmental and safety concerns • Will provide economic development opportunities	• Made available 1,000 acres of land for maritime-related and industrial development • Provided access to available land for future port expansion	• Improved highway connections and facilitated cargo movements	• Provided rail connections to new land thereby increasing future rail business • Increased safety and addressed age of Tule Lake's lift bridge
10. Lombard Road Overpass and Columbia Slough Railroad Bridge, Port of Portland, OR	• Improve rail and highway access to the port and an industrial park • Reduce congestion and eliminate at-grade crossings • Improve air quality	• Eliminated grade crossing, reduced traffic congestion, and improved traffic flow • Improved air quality	• Cut rail traffic switching in area • Improved connection time between port's terminals	• Reduced highway traffic through improved rail service • Improved safety and reduced congestion by at-grade crossing elimination	• Improved rail service between port's terminals • Reduced rail switching
11. Kedzie Avenue Access Road, Chicago, IL	• Improve design of roads not originally intended to handle large truck volumes • Reduce traffic congestion • Improve air quality • Increase rail terminal access capacity	• Reduced bottleneck for residential as well as truck traffic	• Provided improved access to rail yard being expanded by railroad	• Eliminated lengthy lines of trucks in and out of the terminal and improved traffic signals	• Supported increased trailer-on-flat-car lift capacity of BNSF rail yard
12. Portway, Port of New York/ New Jersey	• Improve access between port terminals in NJ and rail transportation facilities • Reduce traffic congestion of intermodal freight corridor • Increase safety	• Promoted economic development and environmental improvements along the corridor	• Reduced congestion along the intermodal freight corridor • Met growing demand at port facilities through improved intermodal service connections	• Strengthened access to warehouse/distribution centers for trucks traveling to and from the Port of NY and NJ through a series of highway access improvements	• Reduced congestion for intermodal rail movements through a rail flyover at Port Elizabeth • Strengthened connection between Port Elizabeth's terminals and rail yards

[1]See Appendix A for acronyms

TABLE 10 Funding sources[1]

Project	Project Cost	Funding Sources						
		Federal	State and Local	Port Airport/ Truck Terminal	Bonds	Private	Other	User Fees
1. The Alameda Corridor, Ports of Los Angeles and Long Beach, CA	$2.4 billion	$400 million federal loan (repaid through user fees) $80 million federal funds (including state and/or local match) and other pass-through funds part of total MTA grant for $347.3 million (see State and Local)	$347.3 million in MTA grants (76% state and federal pass-through grants and 24% from MTA Proposition C sales tax revenues) including $40 million in state grant and $80 million in federal funds with match (see Federal) $18 million state grant	$394 million from ports (up to $132 million to be repaid through user fees) Ports also advanced $107 million, which was reimbursed from bond proceeds	$1.167 billion bond issue (repaid through user fees)	$17.5 million reimbursement by railroads to ACTA	$89 million investment earnings on funds held by ACTA	$15 per waterborne container (loaded TEU) $4 per waterborne container (empty TEU) $4 per non-waterborne container (empty or loaded TEU) $8 per railcar—(auto and misc.) $8 per railcar—(coal, white bulk, iron, steel and liquid bulk)
2. Luís Muñoz Marín International Airport Cargo Area Access Road, San Juan, Puerto Rico	$5.2 million	$3.9 million from AIP (construction and design)		$1.3 million in passenger facility charges ($4.50 per passenger)				None (PFCs are user charges paid by air passengers so the users of the cargo access facility are not paying any user charges)
3. Red Hook Container Barge/Port Inland Distribution Network (PIDN), Port of New York and New Jersey	$58.8 million (includes operating and investment costs but excludes private contribution)	$7.7 million from CMAQ (operational and equipment) $1.6 million in STP funds $3 million from TEA-21 Section 1104 congestion relief	$1.7 million from NJDOT $1.8 million from New York State DOT $2 million from CMAQ (local match) $0.4 million from STP (local match) $0.8 million from TEA-21 (local match)	$39.8 million from the Port Authority of New York and New Jersey		Several million contributed by American Stevedore (terminal operator)		None

[1]See Appendix A for acronyms

(*continued on next page*)

TABLE 10 Funding sources[1] (Continued)

Project	Project Cost	Funding Sources						
		Federal	State and Local	Port Airport/ Truck Terminal	Bonds	Private	Other	User Fees
4. Skypass Bridge Project, Port of Palm Beach, FL	$29.7 million (Skypass)		$2 million from Office of Trade, Tourism & Economic Development grant $0.9 million from FDOT (ROW)	$0.1 million in port cash	$16.7 million from FSTED Program via 2 bond issues—(FSTED Program allocates state and bond funds for seaport projects) $10 million in port 1996 non-AMT bonds issued by the port			Port bonds to be repaid partly through user fees from port operations, although these fees are not directly tied to improvements
5. CACH, Chicago, IL	$1.8 million (access road projects)	$0.6 million in ISTEA funds	$1.2 million from FDOT					None
	$0.6 million					$0.45 million paid by UPS and $0.15 million paid by BNSF as annexation fees and special use permit fees applicable to CACH as well as access projects (paid to Village of Willow Springs)		
	$15.6 million (interchange)		$0.6 million from Village of Hodgkins $2.5 million from IDOT $7 million from ISTHA $2.5 million from State DCCA			$3 million UPS contribution to purchase land for interchange ROW		Tolls paid by trucks are user fees (but not applied specifically to UPS cargo hub users)
	$70 million (intermodal facility)					$70 million from BNSF		Use charges and fees at railyard are user fees that allow BNSF to recover its infrastructure costs
	$10 million (rail grade separation)		$5 million from IDOT			$5 million from BNSF		
	$1.3 million (local roads improvement)					$1.3 million from UPS		

6. Port of Tacoma Overpass Project, FAST, Port of Tacoma, WA	$31.1 million* *not including cost overruns	$4.5 million from TEA-21 high priority funds $3.3 million from TEA-21 Section 1118 $3.2 million from STP regional funds $0.2 million from STP direct allocation $12 million from STP 6/00 Action	$1.8 million from WSDOT	$5 million from Port of Tacoma; in addition, port is responsible for cost overruns, which may add up to $1.6–1.8 million when project is complete		$1.1 million from BNSF		None tied directly to these improvements (although port and railroad funds can be expected to be repaid at least partly through user fees from port and railroad operations)
7. Cooper River Bridge, Charleston, SC	$636.6 million (not including $25 million to tear down existing bridges)	$215 million TIFIA loan[2] $96.6 million from TEA-21 funds including SCDOT matching funds	$325 million State Infrastructure Bank grant					Tolls and local tax considered but not approved
8. Tchoupitoulas Corridor, New Orleans, LA	$70 to 75 million	$13.7 million from STP	$35 million from TIMED Program (state transportation program promoting economic development) $8 million from City of New Orleans bond proceeds $12 million from City of New Orleans Regional Planning Commission (LDOT contributed to over-budget cost increases)	Up to $12 million from Port of New Orleans, including contribution to over-budget costs				None
9. Joe Fulton International Trade Corridor, Port of Corpus Christi, TX	$49.7 million	$10.3 million from STP Port to apply for additional $10 to 15 million	$11 million from TxDOT $3 million from MPO Regional Highway Improvement Plan $16.3 million in State Infrastructure Bank loan to port	$1.75 million from Port of Corpus Christi				None but port is responsible to repay State Infrastructure Bank loan, possibly using revenues from port operations

[1] See Appendix A for acronyms
[2] Loan to be repaid from SCDOT funds, ($8 million annually), Charleston County ($3 million annually), SCSPA (about $3 million annually), and the remaining $1 million from State Infrastructure Bank (gasoline tax, truck registration, etc.)

(*continued on next page*)

TABLE 10 Funding sources[1] (Continued)

Project	Project Cost	Funding Sources						
		Port Airport/ Federal	State and Local	Truck Terminal	Bonds	Private	Other	User Fees
10. Port of Portland, OR								
Lombard Overpass (project funding not totally in place)	$25.9 million lombard	Commitment of $16.8 million in STP funds, including $13 million TEA-21 high priority	$3 million	$1.75 million		$1 million		
Columbia Slough Railroad Bridge	$6 million (not including Wye connection funded by Railroad)	$2.1 million in ISTEA Demonstration Funds $0.9 million from CMAQ		$3 million from the Port of Portland				Port of Portland collects wheelage fee for each rail car that uses the trackage for 15 years (it will take $53 per railcar with a minimum of 10,000 railcars per year to recoup port's investment)
11. Kedzie Avenue Access Road, Chicago, IL	$4.7 million	$0.7 million from CMAQ	$4 million from Chicago DOT (including matching CMAQ funds)					None
12. Portway, Port of New York/ New Jersey								
Phase I: Doremus Ave. Bridge (financing under discussion)	$36.5 million		$16 million from NJ bridge bond $20.5 NJ Transportation Trust Fund (Doremus Ave.)					None
Phase I: Rail Flyover for Express Railyard in Port Elizabeth (financing under discussion)	$35 million			$35 million from PANYNJ				None; PANYNJ may recover through user charges at Express-Rail yard
Phase I: Route 1 and 9 C. and T. Circle (financing under discussion)	$12.2 million	$11.2 million from NHS	$1 million—NJ Trans Transportation Trust Fund (Route 1 and 9 C. and T. Circle)					None

[1]See Appendix A for acronyms

All of the above problems and issues generally involve projects aimed at reducing congestion, eliminating delays, increasing capacity, improving safety, and/or modernizing/rehabilitating existing facilities.

4.2.2 Lead Project Sponsors

Lead or sponsoring organization is defined as the agency responsible for planning, concept development, and project construction or implementation, and is not necessarily the organization that provides most of the financing. Nine of the twelve case studies involve primarily port or airport access improvements. In most of these case studies (i.e., San Juan Airport, Port of Palm Beach, Port of New Orleans, Port of Corpus Christi, and Port of Portland), the initial lead organization has been a port or airport. Even in the remaining four port case studies where other organizations took the initial lead, the port was in the lead for part of the time, for some of the improvements, or significantly involved (i.e., Alameda Corridor, Red Hook Container Barge, Portway, Port of Tacoma Overpass). In these nine case studies, other organizations that were heavily involved, at least taking the lead for part of the time, were the MPOs or Councils of Governments (COGs). The Southern California Association of Governments (SCAG) actually was the organization that started the studies that led to the Alameda Corridor project and Puget Sound Regional Council (PSRC) was instrumental in establishing the FAST program. In all nine case studies, state DOTs and local public works agencies have been involved in some of the implementation or financing. Note that the lead agency for early planning is not always the same as the main agency or organization responsible for implementing the project.

Two of the three case studies not directly involving a port or airport involved access improvements to major rail yards or package sorting facilities in the Chicago area. In these two cases, the lead organization was the private company that needed the improvements in order to develop its cargo handling or terminal facility (UPS) or the local public works agency or DOT (Chicago DOT). In the Cooper River Bridge project, the lead organization was the State DOT. Although this project replaces a key crossing for access to the Port of Charleston, it is a key part of the regional highway network serving commuters and other businesses in the area.

4.2.3 Project Objectives

Typically, the cargo hub terminals and facilities in all of the case studies reviewed generate substantial truck traffic. As a result, most of the case studies share a main objective to reduce traffic congestion and delays. Indeed, based on this research, it can be concluded that congestion and delays are the leading reasons for improving cargo access to U.S. hubs. Regardless of whether traffic is being generated solely or mostly by the cargo hub (Luís Muñoz Marín International Airport) or by a combination of the cargo traffic and public traffic using the same roads (e.g., Alameda Corridor, Kedzie Avenue), the issues of congestion and delays eventually arise. The solution typically requires some type of improvement of the road and highway system near the cargo hub facilities.

In addition to eliminating delays and congestion, other typical project objectives are as follows:

- Promote economic development (e.g., open land for development, create new areas for port expansion, and/or provide access to new facilities);
- Meet carrier and terminal operator needs;
- Maintain and improve facility market share;
- Improve national and international competitiveness, as well as cargo hub competitiveness, particularly for large projects in major hubs;
- Reduce consumer costs as a result of lower transportation costs, reduced delays, reduced inventory costs, and increased reliability for businesses;
- Improve overall system efficiency locally and regionally while particularly addressing the “last mile” segment of what are long hauls for cargo moving internationally or across the nation;
- Reduce truck traffic on highways by shifting to alternative modes, and thereby improve air quality and reduce congestion;
- Improve intermodal connections and links between cargo terminals and warehouses or industrial areas;
- Improve or replace obsolete bridges, roads, and rail facilities; and
- Improve safety and reduce rail/truck or auto/truck conflict points, primarily by building overpasses, eliminating at-grade crossings, and improving traffic signals.

4.2.4 Primary Project Beneficiaries

In all of the case studies, several major groups benefit directly from cargo hub access improvements. The direct beneficiaries are as follows:

- The cargo hubs themselves (e.g., ports, airports, intermodal rail yards, terminal operators, and carriers) benefited in all case studies.
- The communities and local areas near the terminal facilities, which were experiencing increased levels of truck traffic or delays at grade crossings, benefited in at least three of the case studies.
- Other highway users (particularly commuters and safety/emergency workers) on the congested roads that provide access to the terminals benefited to some degree in all case studies.
- Rail carriers may increase business or efficiency of operations through the access improvements (in some

cases also benefiting passenger rail carriers), as was the case in nine of the case studies.
- Shippers who obtained increasingly reliable service were able to reduce inventory levels and their logistics costs as a result of the more efficient cargo hub access, as was the case for the larger cargo hub access projects, such as the Alameda Corridor.

The major beneficiaries in all cases are the cargo hub operation and the highway users in the adjacent road system. Depending on the specific situation, railroads and nearby communities also can be important beneficiaries. The many indirect beneficiaries include the following:

- Businesses and consumers (nationally and even internationally for foreign cargo hubs) who benefit from reduced costs and improved business efficiencies,
- The state and regions that attract jobs as a result of cargo hub growth, and
- The nearby local residents who are exposed to lower emissions from reduced truck traffic after project completion.

[Chapter 5 presents further discussion regarding project benefits and the beneficiaries of cargo hub access projects.]

4.2.5 Funding Sources

As previously described, cargo hub access projects are, by definition, different because they involve many types of situations and solutions and require a wide range of flexible financing sources and approaches. The case studies demonstrate some of the various financing sources that can be used. Some case study projects include simple financing approaches involving only one or two sources (e.g., the Luís Muñoz Marín International Airport Access Road was financed by FAA's Airport Improvement Program and PFCs and Kedzie Avenue was financed by federal CMAQ and Chicago DOT funds). At the other extreme is the Alameda Corridor, the most complex project of the 12 case studies, which involved federal, state, and local funding, in addition to port funding, a major bond issue, and user fees.

A review of the project costs and the major funding sources for the 12 case studies by funding source appears in the following sections.

Federal

Federal funding was used in 11 of the case studies. Funding sources included FAA grant funds; various FHWA and STP programs, including congestion relief, CMAQ, high priority, Section 1118, and NHS funds; and the TIFIA loan program. The only project that involved no specific federal funding was the UPS CACH.

In general, agencies consider obtaining federal aid, because this is the major source of highway funds available nationally for large projects. The major apparent disadvantages are as follows:

- Projects that involve construction on privately owned facilities (mainly rail projects) may not be eligible for federal aid,
- Projects that have tight timeframes and are tied to private carrier or shipper requirements often do not have sufficient time to meet all of the needed federal requirements and follow procedures, and
- The lack of a specific freight-oriented program sometimes makes it difficult to justify a cargo hub access project under various federal aid program eligibility or other requirements.

Even where projects may not be able to obtain federal money under one of the available programs, the TIFIA loan program provides a mechanism for obtaining a federal loan for very large projects. TIFIA loans can be repaid through user fees (as in the Alameda Corridor), tax revenues from the state DOT (Cooper River Bridge), or other sources.

State

Ten of the 12 case studies used some type of state financial assistance, in most cases as a match for federal funds. Every state has different laws and funding programs designed to finance highway projects, and nearly all cargo hub access projects are eligible projects. Many states also have State Infrastructure Banks and/or economic development programs that are specifically available for transportation projects (e.g., Florida, Texas, and Louisiana). Depending on the type of project, some of the state programs can offer a faster funding option and/or a less restrictive approach than federal funding.

The Skypass Bridge project in the Port of Palm Beach, Florida, was financed almost entirely by a state funding program (FSTED). Although the hub had initiated a request for federal funding, it eventually switched to the state program. The program allowed the quick release of funds and avoided a lengthy environmental impact analysis and documentation process required for federal funds. The UPS CACH had important financial support from the state, including the Illinois State Toll Highway Authority, Illinois DOT, and the Department of Commerce and Community Affairs. The Tchoupitoulas Corridor in New Orleans used funds from Transportation Infrastructure Model for Economic Development (TIMED—a state transportation program specifically geared to promote economic development). Joe Fulton International Trade Corridor at the Port of Corpus Christi, and the Cooper River Bridge in Charleston are being financed partly through State Infrastructure Banks. In Corpus Christi, the loans are to be repaid through port revenues, and in South

Carolina, they are to be repaid through highway-user future tax revenues.

Ports and Airports

Nine of the 12 case studies were partially financed by the port or airport authority or a similar agency. Most ports and airports were key players in obtaining the political support to implement the case studies and, in several cases, were the key lead agency, involving substantial financial support (including the Alameda Corridor, Skypass in Palm Beach, the Luis Muñoz Marin International Airport Cargo Access Road in San Juan, and the express rail flyover as part of the Portway program).

Most ports and airports have their own dedicated funding sources and the ability to issue their own bonds or to use their operating revenues to finance access improvements. The large hubs are able to finance many types of improvements, sometimes large projects (e.g., PANYNJ is financing the $35 million express rail flyover as part of the Portway program). Small hubs are also able to improve cargo access roads—mostly with their own funding sources (e.g., Luis Muñoz Marin International Airport Cargo Access Road). Small ports and airports rarely are able to finance most road improvements beyond the immediate terminal boundary, because they must use their dedicated funds and revenues for competitive terminal development and channel access improvements. In general, it is not appropriate to finance major highway access projects (e.g., interchange improvements and capacity additions) primarily through port revenue sources. (For further discussion, see Benefits and Beneficiaries of Cargo Hub Access Improvements in Chapter 5).

Private Terminals

Five of the case studies included funding from private terminal operators or railroads. The largest private funding support was for the UPS CACH by both UPS and BNSF. Three other case studies with private financing were the Alameda Corridor (which in addition to some relatively small railroad funding also involved a user fee that will recover a major portion of the total project costs), the Red Hook Container Barge, and the Port of Tacoma Overpass, which had a relatively small contribution from BNSF. The Columbia Slough Railroad Bridge also involved a user fee to be paid by the railroad to recover the port contribution.

Table 11 shows the breakdown of funding sources by the private sector, port/airport authorities, and other public sources. Table 11 demonstrates that there is no set formula to distribute costs between the private and public sectors. In three of the twelve cases, private-sector funding ultimately is providing far more than one-half of the project cost. These three projects involve investments that are mainly or solely cargo-hub-oriented, so the overall percentage of private funding exceeds the public percentage.

However, most projects are entirely funded by the public sector, because many involve typical highway and road projects on routes where cargo hub traffic is only one of many reasons for the needed improvement. Furthermore, more than one-half of the case studies include port or airport authority funding that involves user revenues, taxes, fees, and other charges collected for promoting and/or developing and operating those facilities. Port and airport organizations are public-sector organizations with their own ability to raise revenues, either through charges and fees or through the bond markets. When a cargo hub access project increases the operational efficiency of their facilities, adds to their competitiveness, and helps them expand or attract new business, port and airport organizations should be considered as potential funding contributors.

A review of the funding sources provides a fairly clear indication of relative interests and importance, and by implication, relative benefits. Reviewing the logic behind a few of the cases illustrates this point.

The contrast in funding sources between the two most costly projects—the Alameda Corridor and the Cooper River Bridge—demonstrates the principle of relative benefit. The Alameda Corridor was of great importance to the Ports of Los Angeles and Long Beach to preserve competitiveness, plan for growth, and increase market share compared with other ports. Although Los Angeles and Long Beach would undoubtedly have welcomed more grants, the project was important enough to them to seek federal loans and bonds guaranteed from user fees and project revenues to generate most of the funding. It also should be noted that the port does not ultimately pay the fees; rather the railroads pay the fees and generally pass the charges on to their customers. The public received benefits from congestion relief and reduced air pollution, as well as economic growth, but participated rather modestly by proportion in outright funding (although the actual dollar values were very significant). The public sector clearly helped the port obtain the necessary loans and bonds, but did not assume outright responsibility for repayment.

The Cooper River Bridge, by contrast, was of great importance to the state for safety and transportation reasons, and of moderate importance to the port. Initially, the port authority was unwilling to contribute to the project. The port ultimately agreed to participate in the financing with about a 20% share of the repayment of the federal TIFIA loan (the TIFIA loan was guaranteed by the State Infrastructure Bank), with certain commitments from other agencies (i.e., the state DOT, Charleston County, and the SCSPA).

The two Chicago cases, the UPS CACH and Kedzie Avenue, provide another small-scale example of relative contributions. The UPS hub access road projects (excluding the BNSF intermodal facility) presented a near-exclusive access benefit to UPS. However, the road access improvements minimized the adverse impact of the new hub on local residents, who would otherwise see increased truck traffic on their local

TABLE 11 Summary of distribution of private ports airports, public-sector funding

Project Name	Project Cost (Millions)	Private Sector Percent	Port/Airport Authority Percent	Public Sector Percent
1. The Alameda Corridor, Ports of Los Angeles and Long Beach, CA[1]	$2,432.8	65%	20%	15%
2. Luís Muñoz Marín International Airport Cargo Area Access Road, San Juan, Puerto Rico	$5.2	0%	25%[2]	75%
3. Red Hook Container Barge/Port Inland Distribution Network (PIDN), Port of New York and New Jersey[9]	$51.1	N/A[3]	78%	22%
4. Skypass Bridge Project, Port of Palm Beach, FL	$31.5	0%	32%	68%
5a. Chicago Area Consolidation Hub (CACH) with Intermodal Facility, Chicago, IL	$97.5	82%	0%	18%
5b. Chicago Area Consolidation Hub (CACH) without Intermodal Facility, Chicago, IL	$27.5	36%	0%	64%
6. Port of Tacoma Overpass Project, FAST, Port of Tacoma, WA	$31.1	4%	16%	80%
7. Cooper River Bridge, Charleston, SC	$636.6	0%	7%	93%
8. Tchoupitoulas Corridor, New Orleans, LA[4]	$70.0	0%	4%	96%
9. Joe Fulton International Trade Corridor, Port of Corpus Christi, TX	$49.7	0%	36%	64%
10a. Lombard Overpass, Port of Portland, OR[5]	$25.9	4%	7%	76%
10b. Columbia Slough Railroad Bridge, Port of Portland, OR[6]	$13.0	77%	0%	23%
11. Kedzie Avenue Access Road, Chicago, IL	$4.7	0%	0%	100%
12a. Portway, Port of New York/New Jersey, Doremus Avenue Bridge, Phase 1	$36.5	0%	0%	100%
12b. Portway, Port of New York/New Jersey Rt. 1 and 9 Charlotte and Tonnele Circle Improvements, Phase 1	$12.2	0%	0%	100%
Total/Weighted Average All Cases with Chicago intermodal Facility[7]	$3,497.8	48%	17%	35%
Total/Weighted Average All Cases without Chicago intermodal Facility[8]	$3,427.8	47%	18%	35%
Range		0–82%	0–78%	15–100%

[1] Includes investment earnings in private sector column.
[2] Passenger facility charge (PFC), used as match to FAA funds, included as airport authority funds.
[3] American Stevedore, terminal operator, contributed several millions, but amount not known.
[4] Contribution to $12 million cost overrun was shared by local and state governments and port–amounts not available–equal shares assumed.
[5] $3.3 million (12%) was unfunded.
[6] Includes $7 million Wye connection funded totally by railroad.
[7] The Chicago intermodal facility may be included as an access project because it directly links rail and road and removes trucks from highways.
[8] Some suggest the Chicago intermodal facility should be excluded from the analysis because the other projects evaluated examined access projects, not handling, shipping, or processing facilities.
[9] Includes only investment costs, not operating or private costs.

roads, and also promised significant numbers of new jobs in an area where a GM plant had closed. UPS' contribution to the roads was substantial, but the public contribution was larger. It should be noted that UPS also invested in a major facility at the site, while BNSF built the intermodal facility; access roads were a relatively small portion of total project investment, which was initiated by the private sector and mainly financed by the private sector.

Kedzie Avenue, by contrast, was more like Cooper River Bridge. While the Corwith Yard Piggyback Terminal operators received some benefit from the improvements, this was not at all an exclusive private use, and the terminal did not participate in the funding. The significant public benefits of reduced congestion on a public road and the relatively small size of the project resulted in the 100% public investment.

Reviewing the stories behind the funding—how the project originated, who championed the project, and the primary beneficiaries—provides clear lessons for other public–private partnerships. In cases where a port, airport, or private firm has a great stake in the success of the project, private-sector or port/airport participation can be expected. In cases like Portway NY–NJ, where the port is an independent governmental agency and public benefits related to economic growth are paramount, public-sector funds may be the most logical choice, although bonds backed by user revenues might also be a possibility (if fees were not assumed to stifle growth or affect competitiveness). In cases where the perceived public interest and benefit is greater than the private benefit, as in the Kedzie Avenue and Cooper River Bridge cases, a totally, or nearly exclusive, public funding role is the typical experience.

User Fees and Contributions

The twelve case study projects employed a wide range of financing mechanisms, although only two projects incorporated project-specific user fees. The two projects involving project-specific user fees were the Alameda Corridor and the Columbia Slough Railroad Bridge and, in both cases, user fee financing was complemented with federal aid and other sources. Almost all of the projects included a multi-funding source package, involving several funding sources from various programs, including user-related contributions (e.g., federal and state highway user taxes, port/airport contributions, and private-sector contributions). The consideration and adoption of project-specific user fees in these projects is summarized in Table 12.

4.3 LESSONS LEARNED

Table 13 describes some of the lessons learned as extracted from the case studies analyzed by the research team. The major conclusions regarding best practices are presented in Chapter 5. The lessons learned from the case studies are summarized below and are divided into three categories:

- Planning and institutional coordination,
- Financing, and
- Community involvement and environmental process.

4.3.1 Planning and Institutional Coordination

The planning process for a cargo hub access project is usually initiated through the MPO process (Alameda Corridor), a port or airport agency (San Juan's Airport Cargo Area Access Road), a coordinated cargo hub program (FAST or Portway) or the private sector (UPS CACH). Any group identifying a problem usually brings forth the issue for analysis or solution through the area's planning process or appropriate coordination groups. In most cases, the MPO (e.g., Alameda Corridor) or the FAA master planning process (e.g., San Juan Airport Master Plan) or similar multi-agency processes were involved as a coordination forum for initial discussion of need and possible solutions. The long-term freight corridor and access improvement projects in the case studies were identified as part of the state and metropolitan area transportation planning processes with participation of key private-sector users and freight stakeholders (e.g., carriers, ports, airports, terminal operators, and major shippers) in several, but not all, cases. Projects identified in the MPO Long-Range Plan eventually were included in the Transportation Improvement Program so that they would be eligible for federal funding.

The key to successful development of several of the large cargo hub access case studies was the coordination between various public agencies and private companies to achieve the project's goal (e.g., the Alameda Corridor, the Red Hook Container Barge, the FAST Corridor, and the UPS CACH). In these cases, the existence of a public/private task force or coordinating group led to the identification of access issues and solutions, or—as in the case of the UPS CACH—the private company established communication links to resolve project issues.

In almost all case studies, once the project officially has begun, the detailed planning and implementation process has usually been led by the agency or private company responsible for the cargo hub and/or the involved transportation infrastructure (e.g., the state DOT) or other appropriate local/state agencies. In the case of the Alameda Corridor, because of the

TABLE 12 Consideration and adoption of project-specific user fees

Case Study Projects	User Fee for Capital/Construction	User Fee for On-Going Operation and Maintenance
Alameda Corridor	●	●
Luís Muñoz Marín International Airport Access Road	⊙	⊙
Red Hook Container Barge	⊙	○, ✶
Palm Beach Skypass	⊙	⊙
CACH	✶	⊙
Port of Tacoma Overpass/FAST	✶	⊙
Cooper River Bridge	○	○
Tchoupitoulas Corridor	⊙	⊙
Joe Fulton International Trade Corridor (To Date)	⊙	⊙
Columbia Slough Railroad Bridge/Lombard Overpass	●	●
Kedzie Avenue	⊙	⊙
Portway (To Date)	⊙	⊙

○—Project-specific user fee considered and rejected.
●—Project-specific user fee applied.
⊙—Project-specific user fee not considered.
✶—Partially funded by private sector.

TABLE 13 Lessons learned

Project	Planning and Institutional Coordination	Financing	Community Involvement and Environmental Process
1. The Alameda Corridor, Ports of Los Angeles and Long Beach, CA	• Flexibility to adjust project scope is required to respond to community and stakeholder comments • Planning studies to identify needs and possible solutions must involve key parties • MOUs and formal agreements enable organizations to reach consensus • Forming a single agency (ACTA, in this case) was better to coordinate the project, than appointing one existing organization to lead project • Revisions to federal laws and state/local policies may be required to make the project possible	• Beneficial to consider project costs and financing early in the process but also to stay flexible on the project scope • A combination of grants, a bond issue, and loan with user fees to repay the bonds and loan may be necessary for large projects such as this one • Instituting user fees is controversial—concerns remain here as to how the extra charge that the railroads are passing on to the steamship lines will influence the competitiveness of the ports • Creativity and innovation to define new loan programs (TIFIA) may be needed for large and complex projects • It is difficult to obtain a significant financing contribution from the railroads even when they are major beneficiaries; in this case the railroads made no significant contribution and also got significant payments for ROW	• Program can be established with no use of federal funds to encourage contractors to use local workers and work awarded to disadvantaged business enterprises (22% in this case) to gain community support • Reindustrialization of the area can help obtain community support (here, established Alameda Corridor Industrial Reclamation Act and provided funds for reindustrialization) • Keeping community informed by sending regular newsletters to all local residents and businesses is helpful • Being responsive to community concerns and (in this case) lawsuits may require negotiating community agreements and modifying project scope at significant extra cost (e.g., trench)
2. Luís Muñoz Marín International Airport Cargo Area Access Road, San Juan, Puerto Rico	• Improvements can be defined through an evaluation and prioritization of access improvement projects in the master plan • Carrying out a broad evaluation that goes beyond the immediate project (e.g., to identify relationship to roads "outside" the airport property) is worthwhile • The master plan process can be used to establish eligibility for (federal) AIP funding only if planned improvement is part of the airport layout plan (ALP) • Interagency coordination was critical to prioritize this project against other projects	• Creativity and innovation may be needed to use an existing funding source (FAA, in this case) and make this cargo hub access project eligible for such funding programs • Federal funding programs that provide flexibility let local jurisdictions and hub operators best decide how to use available funds for most needed projects; in this case, part of funds came from passenger facility charges, even though passengers will gain no direct benefit from the improvements	• No major public participation or community involvement is necessary when only a small number of cargo users is impacted and coordination can be achieved via annual airport joint planning sessions
3. Red Hook Container Barge/Port Inland Distribution Network (PIDN), Port of New York and New Jersey	• Ideas that surface through user committees and endorse long-term planning process can respond to an immediate customer need • It is possible to shift freight traffic from trucks to another mode using the right price-service combination, even if an operating subsidy is required	• Creative thinking led to federal funding (e.g., CMAQ, although not originally designed for freight projects was used here) • CMAQ program objectives are a good match for barge project goals (provide alternative non-congested option for access to port terminal) • It is possible to meet requirements to obtain CMAQ funds for freight projects • No user fees—funding must be sought continually to support operations • It is imperative to find ways to distribute the operating cost among various public/private organizations	• Projects can emanate from groups composed of labor representatives and local elected officials like the Red Hook Promotion Committee, which first proposed this project • No lengthy environmental or community process is needed where there are few issues regarding negative environmental impacts or local community concerns and there is overall support for continuation of terminal operation

4. Skypass Bridge Project, Port of Palm Beach, FL	• Projects that are relatively simple (e.g., involving a typical overpass to reduce congestion and eliminate at-grade crossing) revolve around finding funding • Need for operational efficiencies plus additional land for expansion (key motivations for port to obtain support for improved highway) can be an improvement catalyst • Single implementation agency (Port of Palm Beach) supported by other public agencies was effective in initiating and managing project	• Seaport bond program sponsored by State of Florida financed majority of the project	• Limited number of issues requiring resolution (limited here to City of Riviera Beach and agreements on street closures and utility relocation permits) helps expedite approvals • Department of Environmental Resources Management's streamlined environmental process was faster than the federal NEPA process and was worthwhile although it required working mainly without federal funding
5. CACH, Chicago, IL	• Private hub operators and terminal operating companies (like UPS and Santa Fe) can initiate and fund initial studies, including project benefit assessments, and manage the process to obtain approvals • Private companies (like UPS and BNSF) must recognize local jurisdictions' requirements and objectives (e.g., response to unexpected annexation lawsuit) • Governor's commitment may be needed to help achieve objectives of operational efficiency in highway and rail network connections to hub • Flexibility is necessary to address local needs, such as welfare worker access to new hub site • Coordinated relationship essential for success between public sector transportation agencies and private companies • Projects can be quickly planned and implemented when interests coincide: for UPS, faster, direct movement to limited access highways increased efficiency, while DOT and local governments limited congestion on local roads	• Access improvements for private hubs are difficult to accomplish without private funding; UPS and Santa Fe were willing to participate in the funding of the access improvement projects • Largest investment (intermodal facility) financed 100% by Santa Fe • Although no information is available, it is assumed that UPS cargo business potential and expected fees to Santa Fe justified Santa Fe's investment in the intermodal facility • State can provide funding, mobilize its resources, and respond to private carrier needs in a timely manner when significant jobs and economic development potential are at stake • If a private company's required timeframe is very short, it may make using federal funds impossible	• Private sector needs to develop and maintain strong community support (a UPS representative attended community meetings to modify lighting plans, etc.) • Expect to compromise—UPS developed compromise for annexation as a result of lawsuit and one town initially "left out" • When economic development of the local area is the key motivator to accomplish the projects, environmental processes can be streamlined, if no federal funds are involved
6. Port of Tacoma Overpass Project, FAST, Port of Tacoma, WA	• Through a coordinated long-term planning process, and ability to apply funding provided by the ports, railroads, and Sec. 1118 program, a comprehensive approach to cargo hub access can be developed for the entire corridor • Individual projects benefit from being part of an overall program, involving more than one mode; and resulting in increased operational efficiency for rail and truck movements • A comprehensive corridor can also benefit transit and commuter movements (less congestion) • When the problems addressed are too large for a single agency, early in the project the need for partnerships should be addressed, as was the case here • Prioritizing is essential—the road overpass was a high priority in the FAST project selection criteria and this was key to its successful implementation	• A corridor program can allow a port to join with other agencies for diversified funding • Successful coordination of extremely different funding sources can be key to funding strategy • Important to innovate and consider how to obtain access to new funding sources (e.g., FAST CAST helped frame Section 1118-9 Program as an important factor in TEA-21 legislation) • Important to approve changes in funding quickly in response to unavailability of initially intended funds and to have a contingency in case anticipated DOT funds are unavailable • Port willingness to cover cost overruns in order to expedite the project's completion is extremely helpful • Best to set up funding mechanisms, where possible, for the overall program and not individual projects (e.g., funds provided through Section 1118 were designed for the overall FAST program)	• Extensive community involvement, from setting project priorities through informing community of project purpose, detours, etc., can help assure support

project's complexity and scope, a Special-Purpose Joint Powers Agency was set up under the provisions of California law between the cities of Los Angeles and Long Beach.

Depending on the urgency and the particular way in which a project evolves, the alternative solutions studied recognize that even though the main objectives of cargo hub access projects are to expedite the movement of goods and provide reliable travel times at competitive costs, such improvements also can improve terminal efficiency and provide benefits to the local, regional, and national economies, as discussed in Chapter 3. Skypass in the Port of Palm Beach not only improved access to the port, but also increased operational efficiency and added expansion area. Most of the cargo hub access improvements studied involved solutions that also provided benefits to local commuters or other users. Explicit recognition of community benefits and flexibility to respond to community concerns were key to overcoming resistance and to forging public–private partnership arrangements (e.g., significant scope changes were incorporated into project design or during the project approval process as a result of community concerns in the Alameda Corridor as well as the UPS CACH).

Private companies with an immediate need for access improvements next to or connecting to their terminals usually take the lead in articulating those needs, fund initial studies, participate actively in the planning process, collaborate with public-sector agencies, and are willing to adjust their plans to respond to community concerns and/or contribute financially to the implementation of the needed projects (as UPS and BNSF did when UPS selected its Chicago site). When required by market forces, public-sector agencies involved in the case studies demonstrated that they can respond quickly. This was particularly evident in the Red Hook Container Barge case study. Other examples include the selection of a hub site by UPS, the expansion of the Corwith Rail Yard, and the needs of a major port customer in the Port of Palm Beach that triggered near-term or immediate needs requiring a shift in priorities and quick response by the private-sector and public-sector highway and transportation agencies. Similarly, the improvement project for the Luís Muñoz Marín International Airport Access Road was approved quickly to respond to operational needs.

To obtain federal funds, investments must generally be evaluated within the framework of the area's long-term master plan. Planning for access improvements in those cases considers multimodal corridor and intermodal connector improvement opportunities for both rail and highways, as the Alameda Corridor, the Joe Fulton International Trade Corridor, Portway, and the Port of Tacoma Overpass/FAST Corridor have done. In the FAST Corridor, Portway, and Fulton Corridor case studies, long-term planning allowed for selecting phased improvement throughout the entire corridor. The mix of projects selected can include large and small projects that together create a long-term plan wider in scope than any one project could incorporate.

For small improvements, such as rehabilitation/repaving and signalization projects responding to rapidly growing truck volumes that result from shifts in market demand or when older facilities are not adequate to handle needs, the responsible public agencies are usually able to quickly respond, as was the case with Kedzie Avenue.

4.3.2 Financing

In structuring a financing package, available funds from federal, state, and other public sources, along with private participation when appropriate, were considered. Generally, except for routine projects, a package of multiple funding sources was required.

Creative approaches to using available funding sources to meet identified project needs were used in several case studies, even though those sources might not have been used to finance cargo access projects previously (e.g., CMAQ for Red Hook Container Barge and the FAA for the Luís Muñoz Marín International Airport Cargo Area Access Road) or contributors may not directly benefit from improvement (e.g., PFCs for the Luís Muñoz Marín International Airport study).

Economic development, infrastructure banks, and other general programs that can support access improvements were used in several case studies (i.e., CACH, Tchoupitoulas Corridor, Joe Fulton International Trade Corridor, and Palm Beach Skypass access improvements).

Some access projects were developed through public–private partnerships, particularly for major cargo hubs. In this way, the financial requirements and/or risks were shared among several parties (e.g., Alameda Corridor, FAST Corridor, Red Hook Container Barge, and UPS CACH). Only a few of the many projects involved in the twelve case studies were financed through a single source or organization. When it was not possible to find one funding source to implement a project quickly, different sources were tapped, and flexibility was required when anticipated sources were no longer available or were not able to fully cover their anticipated share (as the FAST program did when the state DOT share was no longer available, or as the Alameda Corridor did when it became clear that the federal funding would not be as large as initially anticipated).

Private companies and port/airport authorities benefiting from projects (particularly when the projects are a direct result of their expansion or operational needs) were willing to contribute financially or through user fees. For example, railroads and ports agreed to repay a major portion of the required investment through user fees in the Alameda Corridor, and UPS/BNSF privately financed most of the required access improvements for the UPS CACH (the largest investment, the $70 million rail yard, was funded solely through private sources, while UPS and BNSF contributed a portion of the funds for the highway/rail grade separation and road improvements).

Several case studies considered the competitive situation to identify whether user fees could fully fund or at least significantly contribute to funding requirements. User fees were employed only in the Alameda Corridor and Columbia Slough Railroad Bridge. In the case of the Red Hook Container Barge, the service is being provided without user fees because this was deemed necessary to maintain the competitive balance with other New Jersey terminals.

Loans or bond proceeds were used to structure the financing package as a supplement to other grants and private funds in only a few cases, with repayment through user fees or other private-sector or public-sector commitments. Such loans were obtained through TIFIA, and a special allocation for the Alameda Corridor (prior to TIFIA's existence).

In several cases (i.e., Skypass, Alameda Corridor, and Portway), it was necessary to adjust the financing approach as the projects went through the planning and design steps. This was particularly true when it became necessary to be able to respond to scope changes that might be required to obtain community support, local agency approvals, and/or environmental permits, as well as changes in funding availability.

Agreements to cover overruns or shortfalls were established when state and federal agencies or bond issuers were not able or willing to fully cover contingencies in case of revenue shortfalls or changes in funding availability. The Port of Tacoma provided additional funding for the Tacoma Overpass and the Ports of Los Angeles and Long Beach provided funds for the Alameda Corridor.

In several cases, project proponents worked with elected officials to change laws and/or regulations that were major obstacles to project implementation when the changes could result in significant cost savings or contributions to the needed investments (as was done in the Alameda Corridor, which used a design/build approach for the first time in local procurements and became the primary example for the TIFIA loan program). Similarly, the FAST Corridor proponents worked to obtain passage of Section 1118 funds.

4.3.3 Community Involvement and Environmental Process

Most of the case study projects established mechanisms to obtain local, community, and environmental group views as early as possible and maintained communication with interested groups throughout the planning and implementation process. Similarly, close interagency, public–private, and community involvement were used to resolve issues as they emerged, as demonstrated in the Alameda Corridor through the MOUs that were signed with all corridor cities.

When private companies or port/airport authorities were the major beneficiaries of a project, usually their representatives were involved formally with the community to develop support and explain the project needs and benefits, as well as to obtain input. UPS did so successfully through attendance at community meetings that resulted in changes to lighting plans and development of a community annexation program, as well as a development plan for part of the site not needed for hub development, which provided a community benefit. In addition to participation during the planning process, ACTA set up a program for keeping the community involved and informed of construction progress, lane closings, and so forth, including a regular newsletter sent to all corridor residents and businesses. FAST also set up mechanisms to inform local communities of the project's purpose, detours during construction, and so forth.

Project managers for several of the case study projects worked with community leaders to add features that helped local development. When UPS attracted welfare recipients to jobs as they were created and Alameda Corridor used nonfederal funds to encourage contractors to hire local workers and committed to awarding 22% of work to disadvantaged businesses and supporting programs to reindustrialize the area, local communities benefited.

Two of the case study projects (US–1 in Palm Beach and UPS in Chicago) chose not to seek federal funds, because of likely delays in meeting the environmental process requirements.

Several of the case study projects showed the importance of flexibility and willingness to adjust the program to respond to local, community, and environmental concerns (Palm Beach moved a storage tank to reach agreement on street closures and utility relocations, and Alameda Corridor shifted to a trench solution in response to community input).

Several of the case study projects developed a strong relationship with environmental organizations, in addition to the local governments, focusing on each party's needs and objectives, in order to successfully implement the project. In the Alameda Corridor, the project had positive air quality impacts (because it expanded rail capacity) but there were many other environmental concerns, such as noise and vibration, that were resolved through agreements with the local communities and environmental agencies. In the case of Skypass, the tight timeframe for implementation made it essential to set up close coordination with the environmental permit agencies to resolve various concerns raised.

CHAPTER 5

GUIDANCE FOR PLANNERS, OFFICIALS, AND THE PRIVATE SECTOR

5.1 INTRODUCTION

The previous chapter summarized lessons learned from the 12 case studies analyzed by the research team. The major conclusions regarding lessons learned were divided into three categories: planning and institutional coordination, financing, and community involvement and environmental process.

This chapter presents guidance for planners, officials, and private-sector companies on how to improve and finance cargo hub access needs. It summarizes best practices under different circumstances, as determined from the case studies, and presents some guidelines to better integrate consideration of cargo hub access into the state and regional transportation policy, planning, and decision-making process. The best-practice conclusions will be followed by an examination of three key elements for implementing and financing projects, as follows:

1. Identifying project beneficiaries and relating those benefits to putting together a financing mechanism,
2. Identifying sources for public financing with advantages and disadvantages for each source, and
3. Examining the circumstances under which user fees might be able to be used as a source of project funding.

5.2 BEST PRACTICES

Cargo hub access improvements are needed to address various objectives as discussed in prior chapters. The 12 case studies indicate that the main goal of most improvement projects is reducing congestion and delays. Other objectives are eliminating at-grade crossings, improving the condition of existing infrastructure (e.g., obsolete bridges and failed pavements), adding connections or other facilities to serve existing terminals or new facilities, and improving safety. These types of improvements are needed nationally, not only for cargo hub access, but also for improving general transportation service and performance. However, as noted in Chapter 3, there are many reasons why cargo hub access requires special attention by policy makers during the major phases of the transportation planning and development process.

As is the case with any transportation improvement, a financing package should be structured considering the beneficiaries, and most importantly, the readily available sources of funding and practical approaches to obtaining additional required financing. The case studies demonstrate the importance of the following:

- A lead sponsor to ensure that the project is implemented, which can be a private company (UPS), a public transportation agency (Chicago DOT), a port authority (Port of Palm Beach), an airport authority (Puerto Rico Ports Authority), or a new special-purpose agency (ACTA);
- A strong coalition of organizations to champion and support the access improvement;
- Flexibility in defining the access improvements and structuring the financing to accommodate all stakeholders, government jurisdictions, affected communities, carriers, and so forth; and
- Creativity and innovation to justify use of program funds and/or to help articulate the need for a new funding program or revised eligibility requirements.

Table 14 describes some best practices as extracted from the 12 case studies analyzed by the research team. The major conclusions regarding best practices from the case studies are summarized below and divided into the aforementioned three categories: planning and institutional relationships, financing, and community involvement and environmental process.

5.2.1 Best Practices—Planning Process and Institutional Relationships

1. The planning process is usually led by the agency or private company responsible for the cargo hub and/or the nearby access infrastructure. Typically, the lead agency is the state DOT, a port/airport authority, or a local transportation/highway agency. In most cases, the MPO or the statewide transportation planning process, typically led by the state DOT, can be the forum for initial discussion of need and possible solutions. An MPO freight task force or a statewide freight coordination group can be established for such purposes, depending on whether the problems, issues, and potential solutions in a hub

TABLE 14 Best practices—cargo hub access planning, financing, and community/environmental processes

Planning and Institutional Coordination	Financing	Community Involvement and Environmental Process
• Planning process led by agency or private company responsible for cargo hub, and/or involved in transportation infrastructure (state DOT, or other appropriate local/state agencies). • MPO freight task force or statewide freight coordination group established. • Long term freight corridor/access improvement needs identified with participation of key private sector users and freight stakeholders. • When cargo hub access issues involve multistate regional issues, ad hoc or special, multistate or regional, organizations or task forces may need to be established. • For typical, routine smaller improvements, MPO and statewide planning process and/or public agencies with responsibility for access roads can quickly respond. • For major projects to improve access to cargo hub complex, key to successful development is coordination between various public agencies/private companies to achieve the project's goal. • The existence of public/private task force or coordinating group can lead to quick identification of access issues and solutions. • For large, complex projects, once project need is defined and consensus reached on solution, a state or local organization should be responsible for implementation, or an ad hoc specific-purpose organization may need to be formally established. • Flexibility in incorporating recommendations and suggestions of various groups, including private companies, public sector organizations, and affected communities is key in reaching consensus on a practical and implementable solution. • For major hub complexes, it may be appropriate to consider various modal alternatives to reduce congestion by shifting freight traffic from trucks, if such options are feasible under a commercially viable price–service combination. • Priority investments should be evaluated within framework of area's long-term master plan after evaluation of multimodal corridor and intermodal connection improvement opportunities, particularly for rail and highways. • Planning process needs to react rapidly to incorporate responses/solutions to near-term private sector/terminal operational access needs that require shift of priorities and quick response by public sector highway and transportation agencies as a result of private facility/hub expansion. • For major hub complexes, multiproject cargo hub access programs should be explicitly identified as part of the planning process, identifying a mix of large and small projects that create a long-term plan wider in scope than any one project can incorporate. • Private companies that have a need for access improvements adjacent/connecting to their terminals need to articulate those needs and be willing to contribute to financing solutions. • When planning cargo hub access improvements, planners should consider how alternative solutions can contribute to other objectives, including community/environmental goals (reducing traffic congestion or expanding transit services), as well as cargo hub operational efficiency. • The planning process and alternative solutions studied should explicitly consider the important role of cargo hubs in state and regional economic development programs, recognizing that main objective of cargo hub access projects is to expedite movement of goods and provide reliable travel times at competitive costs.	• In structuring financing package, available funds from federal, state, and other transportation public sources along with private participation (when appropriate), should be considered, taking into account project objectives and beneficiaries. • Most cargo hub access projects can be financed through regularly available highway programs. Often programs do not have required amounts of funding, and special cooperation is essential to obtain the needed priority or to structure a package under more than one program. • For major cargo hub access programs and large projects, financing usually requires public–private partnerships, so investment and operating costs are shared fairly among public–private organizations, including risks, such as overruns, revenue shortfalls, and contingencies. • The financing approach may need to be adjusted as project goes through planning and design steps, to be able to respond to scope changes that might be necessary to obtain community support, local agency approvals, and/or environmental permits. • For larger projects in major hubs where users are identifiable, loans or bond proceeds should be considered to structure the financing package, with repayment through user fees or through contributions from future tax revenue sources. • When considering user fees, the competitive situation of the hub should be examined • In certain cases, economic development, infrastructure banks and other general governmental programs can support access improvements, when those projects create or preserve jobs and where they meet established program guidelines. • Although it is best to tie project funding sources as directly as possible to beneficiaries, creative approaches can tap available funding sources, even when those sources might not previously have been used to finance cargo access projects. • An appropriate participation by private companies and port/airport authorities benefiting from projects should be established (particularly when the projects are a direct result of their expansion or operational needs). • In obtaining financing for cargo hub access projects, planners, policy makers, and private companies will often have to work with their elected officials to change laws and/or regulations that may be obstacles to project implementation.	• Planners and policy makers need to explicitly consider local area needs/priorities as well as environmental process/mitigation requirements when planning and implementing cargo hub access projects. • As is the case with any transportation development project, there is a need to be flexible and adjust projects to respond to local, community, and environmental concerns. • Planners, private companies, and others involved in defining and implementing projects need to work with community leaders to define projects that help development locally. • Planners and implementing agencies should establish mechanisms to obtain local, community and environmental group views as early as possible and maintain communication with all groups throughout the planning and implementation process. • In all cases, close interagency, public/private, and community coordination (preferably through formal mechanisms) are key to resolving issues as they emerge. • When private companies or port/airport authorities are the major beneficiaries of a project, there is a need for their representatives to be involved formally with the community to develop support and explain the project need and benefits, as well as to obtain input. • Environmental concerns (e.g., air quality, vibrations, noise pollution and natural resource impacts) always need to be considered early when developing an access improvement project. • Any capital improvement project can impact the existing environmental situation, resulting in some environmental impacts during construction or operations of the new or expanded facility. It is crucial to develop a strong relationship/partnership with environmental organizations, in addition to the local government, focusing on each group's needs and objectives, in order to successfully implement a project.

complex or facility are primarily contained within a metropolitan area or cover a broader geographic area. In either case, long-term freight corridor and access improvement needs should be identified with participation of key private-sector users and freight stakeholders (e.g., carriers, ports, airports, terminal operators, and major shippers). In some cases, issues of freight access to hubs may involve multistate regional issues that cannot be addressed easily through the existing planning processes. In those cases, ad hoc or special, multistate, or regional, organizations or task forces may need to be established. However, to be eligible for federal funding, freight projects must be added to the MPO Long-Range Plan and the Transportation Department Program.

2. For typical, routine, small improvements, the regular MPO and statewide transportation planning process and/or the public agencies with responsibility for the access roads should be able to respond to cargo hub access needs (e.g., for rehabilitation/repaving and signalization projects when truck volumes grow rapidly or when older facilities need improvement to handle needs).
3. For major projects and for access programs to a major cargo hub complex involving many facilities, the key to successful development of cargo hub access improvement projects is the coordination between various public agencies and private companies to achieve the project's goal. The existence of a public–private task force or coordinating group can lead to the quick identification of access issues and solutions. For large, complex projects, once the project need is defined and consensus is reached on a solution, a separate organization or an ad hoc specific-purpose group may need to be formally established. Having one public organization with clear lead responsibility can help ensure that decisions are made expeditiously; however, all concerned parties will need to have a voice.
4. Flexibility in incorporating recommendations and suggestions of various groups, including private companies (e.g., terminal operators and carriers), public-sector organizations, and the affected communities, is key in reaching consensus on a practical and implementable solution.
5. For major hub complexes in major metropolitan areas, it may be appropriate to consider various modal alternatives to reduce congestion by shifting freight traffic from trucks if such options are feasible under a commercially viable price–service combination. There are many ways to resolve a cargo access road congestion problem. The option of solving the problem by using different modes may be effective in some cases, particularly when there is no other solution to the road congestion problem.
6. Priority investments should be evaluated within the framework of the area's long-term master plan after evaluation of multimodal corridor and intermodal connection improvement opportunities, particularly for both rail and highways. However, the planning process needs to react rapidly to incorporate responses and solutions to near-term private-sector and terminal operational access needs that require a shift of priorities and quick response by public-sector highway and transportation agencies as a result of private facility expansion, new hub developments, and other private initiatives. Public-sector agencies and the planning process, when required by market forces, need to be capable and should have the flexibility to allow quick approvals of changes in priorities and funding to respond promptly to changing needs.
7. For major hub complexes in major metropolitan areas, multiproject cargo hub access programs involving a prioritized list of phased improvements along an entire corridor in the hub complex area should be explicitly identified as part of the planning process. Through such phased programs, a mix of projects, including large and small projects, can be put forward that together create a long-term plan wider in scope than any one project could incorporate.
8. Private companies that need access improvements adjacent or connecting to their terminals need to articulate those needs and, if necessary, fund initial studies, participate actively in the planning process, collaborate with public-sector agencies, and be willing to adjust their plans to respond to community concerns and/or contribute financially to the implementation of the needed projects.
9. When planning cargo hub access improvements, planners should consider how alternative solutions also can contribute to other objectives, including community and environmental goals, as well as cargo hub operational efficiency. Planning freight access improvements should also consider how each improvement contributes to reducing overall auto traffic congestion or expanding transit service needs, because broadening the project objectives and meeting multiple needs could increase the project's priority and add potential funding sources. When interests and objectives coincide, public- and private-sector groups can implement high-priority needs quickly. Cargo hubs are almost always located in major metropolitan areas, where commuting and peak-period congestion exacerbate the cargo hub access problem. In many cases, solving cargo hub access problems can also resolve commuting and peak-period congestion in the same corridors.
10. The planning process and the alternative solutions studied should recognize that the main objectives of cargo hub access projects are to expedite the movement of goods and provide reliable travel times at competitive costs. Clearly, when goods move faster, the quality of the service improves. Hubs are then able to offer

a better service to attract more customers and make the hub more competitive. This can result in increased trade both domestically and internationally. In fact, hubs are located at key intermodal points allowing for connections between inland transportation modes and/or international hub or gateway traffic. The importance of cargo hubs to the U.S. and global transportation industry has risen dramatically. Indeed, concentration of trade through cargo hubs can provide significant economies of scale and, therefore, lower transportation costs. Cargo hub access improvements will positively influence both domestic and international trade because highway carriers and railroad operators are able to reduce their operational costs, which in turn improves the market reach of products. As the regional and state economies become increasingly tied to the global economy, the role of cargo hubs in state and regional economic development programs should be addressed formally in the planning process. A suggested approach is presented in Section 5.3.

5.2.2 Best Practices—Financing

1. In structuring a financing package, available funds from federal, state, and other public transportation sources, together with private participation, should be considered when appropriate, taking into account project objectives and beneficiaries. Generally, except for simple, routine projects, a package of multiple funding sources is required. Therefore, when it is not possible to find one funding source to implement projects, it is appropriate to structure the financing to use different sources. Cargo hub access projects often meet multiple objectives, so multiple funding sources are particularly appropriate in such cases.
2. Most cargo hub access projects can be financed through regularly available highway programs, but programs often do not have the required amounts of funding, and special cooperation is essential to obtain the needed priority or to structure a package under more than one program.
3. For major cargo hub access programs and large projects, financing often requires public–private partnerships that are able to share the financial risk among several parties. In such cases, it is important to work collaboratively to distribute investment and operating costs fairly among public and private organizations. Issues include covering risks such as cost overruns, revenue shortfalls, and contingencies.
4. To be able to respond to scope changes that might be necessary to obtain community support, local agency approvals, and/or environmental permits, the financing approach may need to be adjusted as a project goes through planning and design.
5. For large projects in major hubs serving a major cargo complex or in certain circumstances where users are identifiable, loans or bond proceeds should be considered to structure the financing package, with repayment through user fees or through contributions from future tax revenue sources. The competitive situation of the hub should be examined to determine when user fees can fully fund or at least significantly contribute to funding requirements, because user fees can change the competitive balance between cargo hubs (see the section on user fees later in this chapter for further discussion on the applicability of user fees to cargo hub access projects).
6. In certain cases, economic development, infrastructure banks, and other general government programs can support access improvements, particularly when those projects create or preserve jobs and where they meet established guidelines.
7. Although it is best to tie project funding sources as directly as possible to beneficiaries, creative financing approaches should be considered in order to use available funding sources to meet identified project needs, even though those sources might not previously have been used to finance cargo hub access projects.
8. Appropriate participation by private companies and port/airport authorities benefiting from projects should be considered (particularly when the projects are a direct result of their expansion or operational needs). In general, such organizations should be asked to contribute financially or through user fees in accordance with the benefits received.
9. To obtain financing for cargo hub access projects, planners, policy makers, and private companies often will need to work with their elected officials to change laws and/or regulations that may be obstacles to project implementation, particularly when elimination of regulations or funding restrictions can result in significant cost savings or contributions to the needed investments.

5.2.3 Best Practices—Community Involvement and Environmental Process

1. Planners and policy makers need to explicitly consider local area needs and priorities, as well as environmental process and mitigation requirements, when planning and implementing cargo hub access projects.
2. As is the case with any transportation development project, there is a need to be flexible and adjust projects to respond to local, community, and environmental concerns. To that end, planners, private companies, and others involved in defining and implementing projects need to work with community leaders to define projects that help local development.

3. Planners and implementing agencies should establish mechanisms to obtain local, community, and environmental group views as early as possible and maintain communication with all groups throughout the planning and implementation process.
4. In all cases, close interagency, public, private, and community coordination (preferably through formal mechanisms) are key to resolving issues as they emerge.
5. When private companies or port/airport authorities are the major beneficiaries of a project, there is a need for their representatives to be involved formally with the community to develop support and to explain the project need and benefits, as well as to obtain input.
6. Environmental concerns (e.g., air quality, vibrations, noise, pollution, and natural resource impacts) need to be considered early when developing an access improvement project. Any capital improvement project can affect the existing environmental situation, resulting in some environmental impacts during construction or operations of the new or expanded facility. In order to implement a project successfully, it is crucial to develop a strong relationship/partnership with environmental organizations, in addition to the local governments, focusing on each party's needs and objectives.

5.3 INCORPORATING BEST PRACTICES

The U.S. economy at all levels (i.e., national, regional, state, and local) is critically dependent on international trade and the efficient movement of goods at cargo hubs. Improving the productivity and competitiveness of cargo hubs can be an important economic development strategy for an area and an important priority for carriers, major shippers, and other businesses.

Cargo hub access, therefore, is an important issue for transportation planners, policy makers, and private companies using a cargo hub. The transportation planning process allows for the incorporation of freight and business interests. In addition, federal legislation over the past 10 years has encouraged formal consideration of freight needs and their importance to an area's development. However, freight needs often do not generate as much attention as a public policy issue as commuting problems do.

Cargo hub and freight transportation requirements vary significantly by metropolitan area and state. However, nearly every metropolitan area and state has some cargo hub facility or intermodal terminal that periodically requires access improvements that need to be considered in planning. Transportation planners should consider these cargo hub access requirements formally within the framework of their overall planning process to consider freight transportation needs. Such a process should consider (1) needs from the perspective of the major carriers and facilities that operate in an area and (2) the competitive transportation cost and service factors that affect those companies and facilities.

In general, to increase their competitiveness in today's global economy, carriers and terminal operators are seeking lower shipment costs, reduced delivery time, and increased reliability for the transportation and distribution of their products. Reliable transportation services also help businesses lower their investment devoted to inventory without influencing sales volumes. Timely delivery, reliability, and quality of service can be as important or more important than transportation cost, particularly to technology businesses and knowledge-intensive manufacturing of high-value products.

The two primary factors that can help to integrate cargo hub access needs into the overall transportation planning process are as follows:

- Educating planners so they gain experience with freight issues and cargo hub access needs; and
- Establishing stronger coordination and communication between the public and private/business sectors, particularly the carriers and shippers operating at the cargo terminals.

To consider the major cargo hub access needs formally in the planning process, an approach is presented below as to when and how in the planning process planners should carry out appropriate special analysis and/or present results related to cargo hub access, following the general process outlined in *NCHRP Report 421*.[1]

5.3.1 Steps to Incorporate Cargo Hub Access Needs into Transportation Planning

The proposed steps to incorporate cargo hub access needs more formally into the transportation planning process mirror the steps in ongoing state and metropolitan area planning and their project selection processes. The approach describes how cargo hub access needs can be considered more formally in each of the seven general steps in the project selection process typically carried out in any MPO or statewide planning process (see Figure 13). It is important to note that stakeholder involvement—not just data gathering, analysis, and forecasting—is an important component in achieving the objectives of these steps.

Step 1: Analyze existing conditions and historical development. During this initial step of the planning process, it is particularly important to gain a good understanding of the role of the intermodal facilities and cargo hubs in the area, the hubs' major carriers and support functions, and their competitiveness. For this purpose, performing all three of the following types of analysis and data assembly is suggested.

[1] *NCHRP 421: Economic Trends and Multimodal Transportation Requirements*, 1999.

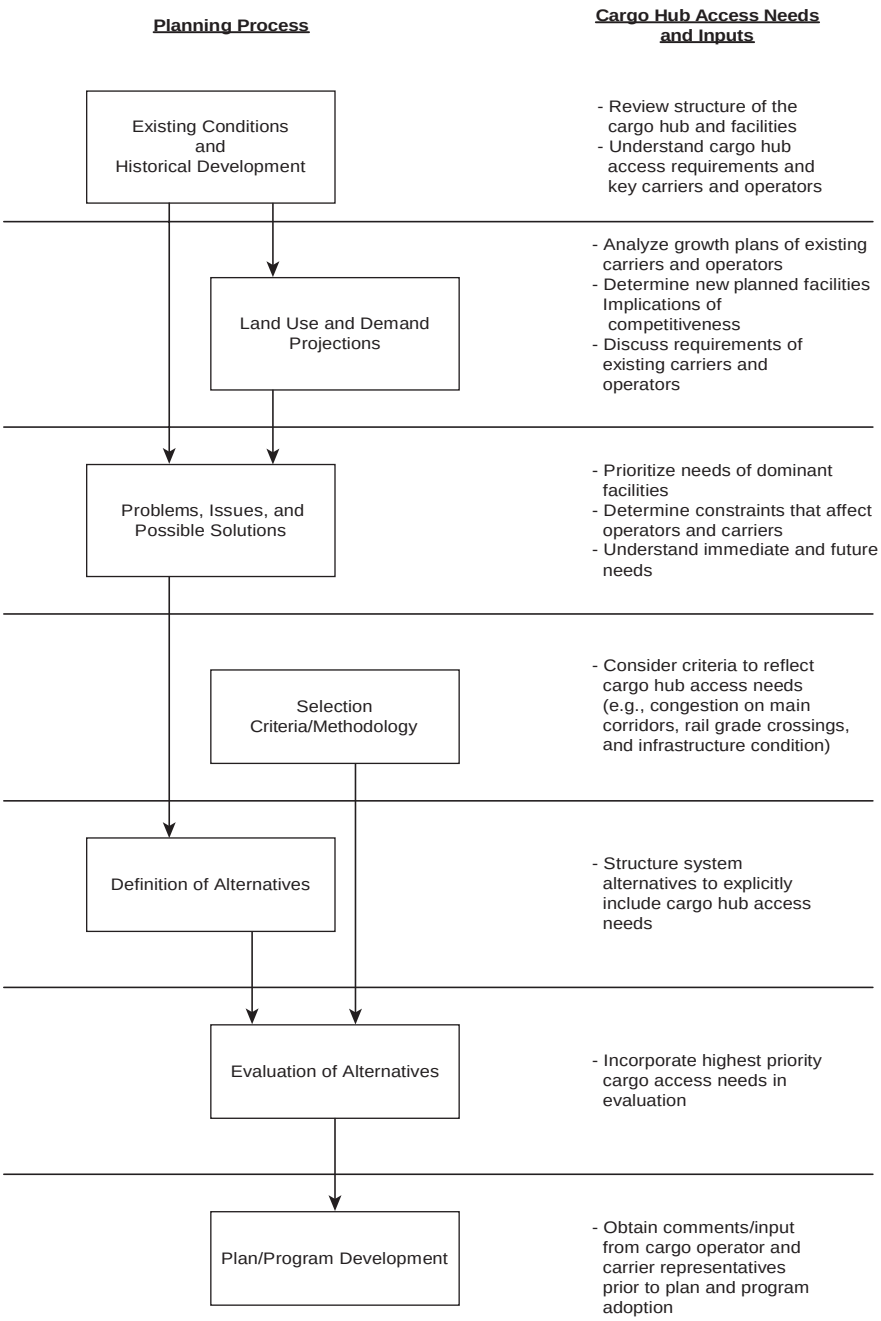

Figure 13. Planning process and cargo hub access needs and inputs.

- Review available sources of information, and assemble national and state reports and/or databases on freight traffic and cargo hubs and the role of the area's cargo terminals;
- Review the historical performance of the state and/or local intermodal terminals; and
- Understand the access condition and problems involving the major terminals.

Step 2: Develop demand projections. The next step in the planning process is to develop demand projections. For this purpose, planning agencies usually go through an effort involving their policy committee and key decision makers to articulate the area's development goals and options. As part of this effort, it is useful to analyze the competitive position of the intermodal terminals in the state or region and to consider expansion plans of carriers and terminal

operators, as well as the opportunities to attract additional new facilities.

The following analysis and data assembly are suggested:

- Consider the growth plans of existing carriers and operators.
- Work with economic development planners and industry representatives to identify which new facilities might be developed in the future.
- Consider access requirements of existing or future facilities.

Step 3: Identify the resulting problems or issues and propose solutions. Step 3 involves understanding carrier and operator needs, categorizing them, and examining strategies. Steps could include the following:

- Understand how the cargo access needs of carriers and operators are influenced by existing constraints on the transportation system.
- Categorize the hub area by the needs of the dominant existing or proposed cargo hub facilities.
- Examine strategies to meet cargo hub access needs.
- Produce a report on current and future cargo hub access requirements.

Step 4: Project selection criteria/methodology. This examination and selection of strategies may be made using the same process and criteria used to select transportation projects and programs for inclusion in a transportation plan or transportation improvement program (TIP). What is important is that the project selection criteria explicitly and formally include measures that reflect the structure of the area's cargo hub facilities and the important needs of its major carriers and operators. Examples of such criteria or special analysis that may be used to formally incorporate cargo hub access needs include the following:

- Travel time contours from major cargo hub facilities to Interstate highways;
- Congestion level on significant corridors or routes to/from cargo hub facilities;
- Competitive status of ports of entry, international gateways, maritime load centers, and/or airport hubs (based on competitive analysis of relevant factors);
- Rail grade crossings on routes to/from cargo hub facilities;
- Condition of major highway infrastructure that provides access to cargo hub facilities (e.g., bridges, pavements, and traffic signals);
- Rail clearance criteria for key intermodal rail terminals (e.g., double-stack container rail clearance implications for maritime load centers); and
- Level of service on highways providing access to major intermodal rail yards, port terminals, airports, intermodal rail terminals, and so forth.

The specific criteria or analysis appropriate in a particular state or metropolitan area will depend on the area's role as a major cargo hub and the results of the operator and carrier involvement activities in the previous step. In all cases, it is important that specific criteria and analysis be included in the evaluation process, so the cargo hub access needs of major facilities (not just the traditional commuter travel factors) are evaluated formally.

Step 5: Develop alternative system strategies to address problems or issues. Planners usually identify several system alternatives composed of a combination of projects, programs, and/or policy initiatives that address problems or needs previously identified.

The problems identified as important to cargo hub operators in an area, as well as the prior evaluation of the implication of specific projects and solutions to address cargo hub needs and priorities, should be considered explicitly in defining alternative system strategies. If prior steps have identified cargo hub needs and priorities clearly, planners should carefully structure system alternatives to ensure that these prior findings are incorporated in suggested alternatives.

Step 6: Evaluate alternatives and recommend a preferred alternative. Not all strategies will be able to achieve to the same degree the overall goals of the MPO or the state. During this step, strategies should be evaluated on the basis of the extent to which they meet all of the evaluation criteria previously identified in Step 4. The evaluation of alternatives should be aimed at selecting the alternative that most closely achieves the area's overall transportation and economic goals and programs. In addition, for nonattainment and maintenance areas, the strategies should be evaluated for conformity with the state implementation plan (SIP). This evaluation should review how the various transportation strategies (usually defined to solve a specific need) can be made as consistent as possible with additional transport, economic, air quality, and other environmental goals. During this evaluation, planners should strive to ensure that the evaluation provides a fair hearing for the most important and highest priority cargo hub access needs and, where appropriate, leads to a recommendation that incorporates solutions to cargo hub access priorities. When it is not possible to do so because of other constraints, planners should explicitly identify the rationale for their recommendations, for consideration and decision by the appropriate policy body or agency executive.

Step 7: Select strategies for implementation. The final step is to present draft recommendations for input by all key stakeholders, prior to action by the MPO policy body and/or the state executive responsible for plan adoption under state law. The public participation process or comment period should explicitly involve input by the cargo hub carrier and operator interests in the area.

Once a consensus is reached, the selected strategies, projects, programs, financing approaches, and policy initiatives are then added to the state and MPO long-range plan, TIP, and SIP.

In summary, the transportation planning process should incorporate the perspective of cargo hub access needs explicitly and formally in all steps. Data gathering, analysis of the current situation, identification of problems and solutions, criteria to select projects and initiatives that address the identified needs, and evaluation of alternatives should all be carried out to ensure that cargo hub access needs are adequately considered in the technical analysis and methodologies used. Similarly, the policy committee, technical committee structure, public participation process, and other mechanisms to gain input from various stakeholders and community representatives should be set up so as to incorporate representation from key cargo hub operators, carriers, and major shippers in the area. Special efforts (e.g., information meetings, focus groups, or workshops) to involve operators, carriers, and shippers should be added to ensure that the cargo hub access perspective, needs, and priorities are acknowledged throughout the process responsible for defining transportation needs and selecting the recommended approach to meet those needs.

5.4 IMPROVEMENT BENEFITS AND BENEFICIARIES

Several major groups benefit directly from cargo hub access improvements; others benefit indirectly. Direct beneficiaries range from primarily private groups to primarily public entities and include the following:

- The cargo hubs themselves (e.g., ports, airports, and private carriers that develop hub complexes) that are expanding their businesses, promoting additional services, and preserving or increasing their market share and overall capacity;
- The terminal operators, carriers serving those terminals, and shippers whose cargo is being handled by the terminals and carriers;
- Rail carriers that may increase business or the efficiency of their operations through access improvements (in some cases also benefiting passenger rail carriers);
- Other highway users (particularly commuters and emergency vehicle drivers) who travel the congested highways that provide access to the terminals; and
- The communities and local areas near the terminal facilities that are experiencing increased levels of truck traffic or delays at grade crossings.

(The preceding list is not intended to suggest a ranking based on the value of the benefits, but to provide a framework for discussing the types of benefits and the implications for project financing.)

The benefits generated from improved cargo hub access accrue not only to the direct users, but also to the users of the larger regional transportation network (by alleviating congestion and diversifying modal options) and to the national, regional, and state economies (through increased productivity and the competitiveness of regional businesses dependent on freight movements). This wide distribution of project benefits has implications for project funding. An equitable assessment of benefits/beneficiaries is appropriate to provide a basis for a fair allocation of costs among project beneficiaries. The beneficiaries range from shippers (who will receive more efficient, cost-effective service) to taxpayers (who may enjoy savings from infrastructure conservation and tax revenues from increased jobs and additional business). Benefits generally relate to transportation, the environment, infrastructure, quality of life, and commerce.

It is often difficult, regardless of project objectives, to link benefits and beneficiaries directly so as to fully assess who should pay for the required investments. In the case of cargo hub access projects, substantial benefits can accrue to diverse groups of shippers, consumers, and others who are not directly involved in cargo movement. The simplest analysis of benefits involves the direct computation of operating cost, travel time savings, and accident reduction to the direct users of a facility. This method of analysis is similar to how benefits of an investment in any highway facility are evaluated. Such a simple analysis, however, does not consider important indirect benefits.

In comparison with a commuter-oriented investment, the computation of benefits for cargo hub access improvements is much more complex. For that reason, particularly for major cargo hub investments of national significance where there are local user benefits as well as broad benefits to the national or regional economy, it is appropriate to consider a combination of user- and tax-financed contributions. Companies that produce and distribute the products that move through a cargo hub and consumers who use those products also benefit, although not directly as do truck operators, so a broad tax contribution, such as a national freight or cargo fee or tax, is a way to reflect the broad groups that accrue some of the benefits beyond the local area.

When a cargo hub access project has broad regional or national benefits beyond those directly accrued to the local users, it is often very difficult to even identify all beneficiary groups. In addition, because many cargo hubs are privately owned and/or operated facilities, policy analysts and observers often suggest that those companies or organizations should cover a large percentage of the access investment costs that relate to their facilities. It is not easy to reach a consensus on how much of a project should be financed by the many beneficiary groups. This increases the importance of public and private leadership in finding practical solutions, recognizing that private-user beneficiaries should often pay a share of required investments, and also recognizing the entire range of beneficiaries. Given that taxpayers in general,

overall highway users, and the communities at large also may benefit, they should all contribute their fair share. In many cases, the ultimate result is that financing packages are tailored to each situation and require the assembly of multiple public and private funding sources.

Understanding the range of private and public benefits of projects provides the foundation and justification for the range of financing mechanisms that are employed in providing for hub access improvements. A review of how cargo hub access improvements benefit or affect consumers, businesses, and communities in general, including a recognition of indirect beneficiaries, substantiates the legitimacy of local, state, and federal government interests and financial support for what might otherwise be characterized as strictly private-sector or port and airport projects. These benefits are arranged in a continuum from primarily private-sector benefits to broader community benefits, although broader benefits may flow from private-sector benefits. Such indirect benefits include the following:

- By reducing delays and increasing the reliability of cargo services, carriers can reduce transit and delivery times, and businesses can reduce inventory levels and logistics costs—such reductions in business costs can translate into reductions in consumer prices.
- Improved access to cargo hubs can increase the market range of industries competing in an increasingly global economy or increase the attractiveness of the cargo hub site—thereby preserving jobs or helping to attract new jobs and tax revenues to an area (as was demonstrated by the CACH case study where, in addition to creating jobs, the new cargo hub was replacing jobs lost as a result of the closure of a GM plant at the site).
- Increased efficiencies and service levels can help attract business to the cargo hub—thereby facilitating local economic development.
- Improvements near the cargo hub can reduce congestion and truck traffic on other roads, reduce air and noise pollution, and contribute to environmental quality not only in the immediate areas adjacent to the cargo hub access improvements, but regionally.

Communities also can be negatively influenced as a result of required home and business relocations or adverse environmental impacts for example. Yet in the study cases (especially, the Alameda Corridor and the UPS CACH), the active community participation and negotiations generally resulted in favorable outcomes for the communities involved, with any direct negative impacts minimized and/or mitigated in some manner.

Because the benefits of cargo hub access projects typically accrue to public as well as private interests, the question that planners, policy makers, and interested private carriers or operators generally face in reaching a consensus for financing projects is how to structure public–private partnerships that reflect benefits in proportion to beneficiaries in a reasonable manner for each project. There are no simple methodologies to fully quantify all of the benefits from cargo hub access projects. However, some methodologies can be used to estimate how delay reductions can reduce business costs, increase the number of jobs created, and increase tax revenues to state and local jurisdictions.

Table 15 shows the relationship between project types and type of benefit, beneficiaries, potential funding sources, and possible funding partners. This type of analysis can be carried out for any specific project and is intended to highlight the concept of linking benefits/beneficiaries to financial contributions, which can provide an initial list of funding sources for any cost allocation scheme. Ultimately, a specific cost-allocation agreement is achieved through negotiation among the parties involved, but the degree to which the project benefits (or is perceived to benefit) the different parties is a key factor in the negotiation and determination of funding. Although some funding sources are rather flexible, others have legal limitations, and these practical considerations determine the extent of the relationship between benefits/beneficiaries and financial contributions.

Identifying a logical partner for funding contributions, even when benefits can be quantified, does not necessarily mean that the funding source will either be available or possible to obtain for the particular project. For example, although most cargo hub projects can demonstrate benefits related to reduced highway congestion and possibly reduced air pollution, very few projects will be able to use available CMAQ funds. Therefore, it may be useful to look at a broader classification of funding related to public and private benefits. Federal, state, and local public and private financial assistance can be classified into four major categories:

1. Public-sector grants, where no repayment is necessary but which often require matching funds;
2. Private donations or contributions, where no repayment is necessary but which often also are tied to matching funds;
3. Public-sector loans, with government agencies responsible for repayment from future tax sources or other future government revenues, or private-sector repaying all or a portion of the loan, and
4. Publicly issued bonds or private-sector guaranteed loans, with repayment provided through user fees charged to facility users or through revenues generated from other sources, with or without private company guarantees.

In this scheme, a federal or state loan with repayment from future tax sources provided through a public-sector agency, such as a state DOT, is similar to a grant contribution from one of the federal or state transportation program funding sources.[2] Table 16 correlates the various funding contribu-

[2] An analysis of benefits and possible funding by level of government also might be useful in determining appropriate local, state, and federal support that is related to local, regional, statewide, or national benefits and interests.

TABLE 15 Benefits, beneficiaries, and potential funding sources for cargo-access improvement projects

Cargo Hub Project Types	Type of Benefit	Beneficiaries	Selected Potential Funding Sources	Possible Funding Partners
Highway and rail access improvements to cargo hubs of national significance and international services	• Increased transportation industry productivity • Increased reliability • Reduced inventory costs and logistics	• National, state, and local economy • Shippers • Carriers • Consumers	• Tolls and user fees • State/local grants or loans • Borders and corridors programs	• Special-purpose authority • State and local government • FHWA Section 1118
Port load center cargo hub access improvements	• Increased market share, increased business for cargo hub, and more efficient cargo movement through port hub • Streamlined connection between ports and rail yards	• Cargo hub operator (port, intermodal terminal operator)	• Dedicated cargo hub user fee • Operating revenues from cargo hub • Railroads	• Cargo hub operator(s) • Railroads • Special-purpose authority • Existing, port, airport, or transportation authority
Airport gateway cargo hub access improvements	• Increased market share, increased business for cargo hub • More efficient cargo movement through airport hub	• Cargo hub operator (airport, terminal operator)	• Dedicated cargo hub user fee • Operating revenues from cargo hub • FAA/airport grant/ PFC funds	• Cargo hub operator(s) • Railroads • Special-purpose authority • Existing airport or transportation authority • FAA
Rail access improvements to domestic rail cargo hubs	• Increased rail freight traffic • Increased rail capacity and efficiency	• Rail carrier • Port operators/owners	• Tolls • Wharfage fees • Railroads	• Special-purpose authority • Railroads
Cargo hub access improvements that add cargo hub expansion options and capacity and also benefit local commuters and reduce congestion in metropolitan areas	• Increased transportation capacity with diversified modal options • Improved shipping reliability • Reduced congestion • Reduced delays • Reduced vehicle emissions	• Shippers • Commercial vehicle operators • Auto users • Regional economy • Surrounding community, other highway users, and railroads	• Tolls • Railroads • Intermodal demonstration project • TIFIA • Surface transportation programs • CMAQ • State transportation funds	• Special-purpose authority • FHWA • FHWA (state and MPO) • State government
Cargo hub access improvements to develop new or expand existing facility	• Increased jobs and tax revenue • More efficient hub facility	• States and local • Private carrier or operator	• State/local grants • Private hub developer/operator	• State and local government • Private company developing hub
Cargo hub access improvements to eliminate grade crossings, add signals, and improve road infrastructure	• Reduced accident incidence through traffic reduction and grade separations	• Commercial vehicle operators • Auto users • Railroads • Emergency personnel	• CMAQ • STP	• FHWA (states and MPO) • Railroads

tion categories with those organizations ultimately most likely to pay, and some other implications and considerations for establishing the levels of public- versus private-sector funding for projects based on the benefits accrued from each project. The general approach to which organization should provide the up-front funding, which should bear the ultimate risk, and which should ultimately pay for the project, is part of agreeing on a reasonable framework for considering funding levels that should be supported by project beneficiaries. The types of contributions and funding support are displayed from what may be categorized as greatest expression of private-sector commitment and interest (e.g., dedication of current cash or assets in the form of a grant or donation to initiate the project) to the greatest expression of public interest (e.g., an outright grant of public-sector funds, whether block grant, earmark, or special-purpose grant such as CMAQ).

Identifying private companies that are likely potential direct contributors to a project is not a simple matter, but in most cases where it is possible to obtain private funding, it is well known which specific companies (e.g., railroads or terminal operators) are the direct private beneficiaries. A more difficult issue is determining what percentage or specific amount those companies should contribute. In general, companies that are direct beneficiaries of a project will be willing to discuss some financing contribution, but will need to consider the extent to which such contributions might change their competitiveness and profitability. In some cases, public-sector grants and loans require matching contributions, which can be used to initiate discussions and/or establish minimum desired contribution levels from private-sector entities.

In addition to considering private versus public benefits and how the two sectors should participate in funding a project,

TABLE 16 Categories of funding assistance related to public/private sector benefits

Type of Assistance	Examples	Repayment Requirements/Match Requirements	Implication of Level/ Type of Public/ Private Sector Commitment	Other Considerations
Private sector grant or donation	Cash contribution, ROW contribution, and/or in-kind support (planning, design, or operations commitment)	No repayment required	Cash contribution implies most significant private sector commitment to project initiation and ongoing success	Level of private sector contribution is major factor in indicating importance of project to private sector firms directly involved and is an essential element in public/private partnerships that are established in response to private sector needs for projects that are not part of long-term area plans
Bond financing through public credit market—specifically floated for project; or TIFIA or other government/public authority loans to be repaid by users	Special bond issues (e.g., Alameda Corridor)	Repayment guaranteed by private sector generally through user fees charged to user of facilities being implemented (Project Finance)	Implies commitment from primary direct user groups that will pay user fees through the life of the project and significant private sector interest in ongoing operation	Government may act as guarantor of bonds or offer tax incentives/tax free status to reduce interest rates below market level
Local, state, and/or federal loans or bond issues	Federal loans (TIFIA), FSTED program; State Infrastructure Bank loans, or state DOT, airport, or port authority bond issues	Repayment guaranteed by taxes: fees and/or general revenue not specifically tied to the project (in some cases may be repaid partly through user charges or tolls)	Implies significant public interest in project initiation, ongoing public sector interest restricted to financial viability; significant private sector interest in ongoing operation	Generally provides financing at lower interest rate than project-specific bond financing; repayment may be directly tied to certain future tax revenues or user fees (similar to revenue bonds)
Local, state, and federal grants	CMAQ, STP, state and local grant funding—part of most projects, different levels of national, state, or local significance	No repayment required	Implies significant public interest in project initiation, significant public interest in ongoing operation; CMAQ directly related to environment/congestion benefit	Implies significant, on-going public benefit; grant assistance, especially federal, may trigger environmental review, other requirements

there is the question of which public agencies or programs should contribute and what the appropriate contributions are for each. Federal, state, and local agencies, as well as port and airport authorities are major beneficiaries of cargo hub access improvement projects to their facilities. Most airports and ports are owned and operated by public-sector independent authorities or agencies of state or local governments that may receive state and/or local funding.

A theoretical mix of public and private benefits may be estimated by carrying out a simple analysis that identifies the major beneficiaries of a project and specific objectives of a project (similar to the listing of project objectives and major beneficiaries for the case studies presented in Table 9). From such a list, private-sector versus public-sector benefits can be separated and a basis for discussions among agencies and interested private companies provided. Similarly, public-sector benefits can then be listed to determine whether they are of national, state, or local significance as follows:

- National significance and types of programs that would logically be potential sources of funding considering the level of benefits that accrue to the national economy as compared with state or local benefits,
- State significance and any potential state economic development or special programs that relate to these benefits (e.g., port, airport, or other transportation programs, and economic development or infrastructure programs),
- Local significance, including local traffic, community quality of life, or environmental benefits, and any programs or funding sources that relate to these benefits (e.g., traffic, transportation, port or airport programs, and economic development programs).

Negotiations among parties to consider practical solutions (including the ability to provide funds) will, in the end, provide the mix of funding that will make it possible to implement a project. The funding mix actually achieved is the most

appropriate or practical mix of public and private funds relative to the benefits achieved and cannot necessarily be determined by a quantifiable analysis of benefits versus costs. However, the final outcome should represent the political expression of benefit, through the negotiations and tradeoffs of grant availability; bond limits; and federal, state, local, and private-sector priorities and commitment to the project.

For such an analysis or negotiation, the consummate test of whether the major interests and benefits are public, port or airport, or private rests on which organization ultimately pays for what specific portion of the project. If a federal loan or state issued and guaranteed bond is paid back through user fees or port/airport charges and revenues, it reflects the interests of the private companies, ports, or airports and their perspective on benefits accrued. This negotiation philosophy, which is supported by the case studies evaluated, ends up with a simple and practical solution: the organization that wants the project the most and perceives it will receive the most benefits from the project is willing to pay the most. This approach recognizes that it is not possible to quantify relative benefits for use in allocating financial responsibility, so what can be done is to identify beneficiaries and funding sources and negotiate among public-sector agencies and, where appropriate, between public and private partners. The negotiations may consist of tradeoffs of private and public funding availability and bond limits, versus federal, state, local, and private-sector priorities and commitments to the project, all related to relative project benefits as perceived by the various parties.

The political process of negotiation, however imperfect, ends up assigning costs to those private and public participants that benefit from the desired projects.

5.5 FINANCING TOOLS MATRIX

This section provides guidance to public and private-sector organizations seeking to fund the development of cargo hub access projects. The section focuses on the options available to obtain the capital and construction funds for access projects, although many of the funding sources mentioned can also be used to finance the initial planning study and design phases.

The funding mechanisms described represent a compilation of existing financing sources. As additional cargo hub access improvements are implemented and as the importance and value of such improvements are further understood, additional financing mechanisms probably will emerge. For example, new mechanisms (e.g., an intermodal connectors program) have been discussed and may be implemented as part of the reauthorization of TEA-21 legislation. In addition, because airport and port funding is considered through new legislative initiatives, such as AIR-21 and SEA-21, more financing mechanisms may become available.

This section and its supplemental appendixes (see Appendixes D, E, and F) provide a compendium of background information on potential funding sources and examples of their application within the United States. This section contains two parts as follows:

- "Framing the Financing Requirements" summarizes the definition of problems and issues that the intermodal access improvement is intended to solve and that should be articulated prior to pursuing funding.
- "Identifying and Selecting the Potential Funding Mechanisms" includes example "roadmaps" that assess potential funding sources for various types of cargo hub access improvements as well as a financial tools matrix that can be helpful in identifying funding sources and financing approaches.

This discussion is designed to provide practical, real-world approaches based on the work undertaken for this project.

5.5.1 Framing the Financing Requirements

To consider the best options for developing a funding package for an access project or program, the improvement need or problem should have been articulated to include the following:

- Type and operator(s) of the cargo hub (i.e., air cargo, maritime, rail, trucking, and/or multimodal complex);
- Freight transportation modes (e.g., trucks, rail, and/or barge) used to access the cargo hub that will be influenced by the improvement;
- Purpose(s) and need for the access improvements (e.g., whether to improve on condition of the facilities, reduce congestion, or accommodate planned growth);
- Type of improvements that can be used (e.g., grade separations, new roadways, new rail access, or other modal alternatives such as rail or barge service substituting for trucks);
- Whether the improvement is located on property controlled by an airport, seaport, transportation authority, railroad, or private business;
- Whether the improvement is located on existing infrastructure or would involve the construction of new, separate infrastructure;
- Level of funding required to undertake the project;
- Urgency of the improvement project explaining how quickly the improvement needs to be implemented; and
- Both direct beneficiaries (i.e., benefits limited to cargo hub users) and indirect beneficiaries (i.e., improvement also serves the surrounding community, other highway or transportation users such as passenger vehicles and transit).

These characteristics frame the discussion for selecting a financing package. The size, location, urgency, and beneficiaries dictate the type of options that may be available and can help decide which financing options to consider. If im-

provements are small or located on property controlled by a single organization, then the discussion and ultimate financing decisions may be internal to that organization.

As shown in the case studies, however, cargo hub access improvement projects can be large and/or involve multiple jurisdictions and independent port/airport authorities, as well as private and public organizations. In this situation, the case studies have shown that it is important to establish a coalition of support for the improvement early in its development. By the time the project is ready for the construction phase, the key stakeholders should be able to act as a cohesive group that articulates and pursues a funding package. A shared vision for large-scale improvements is essential for the successful funding and implementation of such improvements.

5.5.2 Identifying and Selecting the Potential Funding Mechanisms

A wide range of potential funding mechanisms exists for financing cargo hub access improvements. Small improvement projects may use a single funding source. Large improvement projects, as demonstrated in the case studies and inventory of projects, generally use a combination of funding sources and financing mechanisms.

The research team developed a set of flow diagrams as guidance to assist in identifying potential funding mechanisms for financing specific types of access improvements. Each of the three major cases (i.e., airport access projects; port access projects; and rail, truck, private, or multimodal cargo complex access improvements) are discussed below.

Airport Access Projects

Figure 14 illustrates the process for considering financing options for air cargo hub access improvements. Consideration of financing options for an air cargo hub access improvement depends on the location of the improvement. If the improvement is on property or roadways controlled by an airport or airport authority, then the funding mechanisms to be considered can include airport authority revenue sources and the FAA Airport Improvement Program (AIP). PFCs or other airport revenue sources can be used as the sole source for access

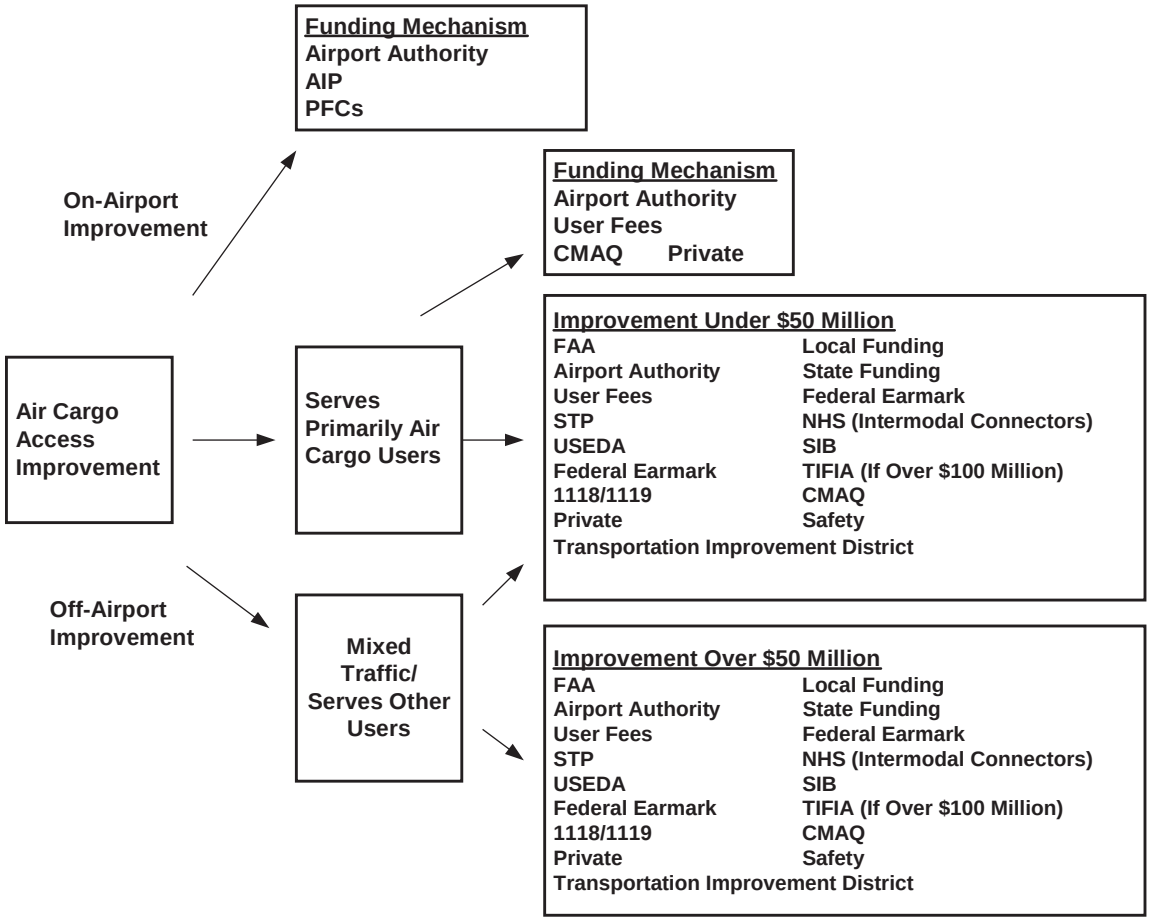

Figure 14. Considerations involved in determining potential funding mechanisms for an air cargo hub access improvement.

improvements or can be obtained to provide AIP matching funds. AIP funds can be used only on property controlled by the airport authority. Use of PFCs involves demonstrating to the airlines and FAA that the funds are being used for a project that is strictly related to the operation of the airport and are on property or roadways controlled by the airport authority.

If the improvement is located off-airport, then the discussion also involves identifying whether the improvement primarily serves the air cargo hub users or also serves other objectives (such as serving the airport passenger terminal, reducing congestion on existing roadways, or championing economic development objectives). If the improvement specifically benefits air cargo users and is a separate major costly facility, then user fees also might be applicable. (For a discussion of the potential applicability of user fees, please refer to Section 5.6.)

If the improvement is not on airport property, then the magnitude of funding required and the urgency of the improvement also must be considered when looking at possible funding sources and financing mechanisms. As previously noted, using state, local, and private funding instead of federal funds for an improvement can reduce the amount of time needed to undertake the project. However, various federal funding sources and mechanisms also should be investigated to finance the project, particularly if the investment is large or can be accomplished over a long period. Some examples of potential funding mechanisms are provided in Figure 14.

Port Access Projects

Figure 15 illustrates the process for considering financing options for port cargo hub access improvements. As is true with air cargo hubs, potential funding approaches for a port-related access improvement depend on the location of the improvement. If the improvement is on property or roadways controlled by the port authority, then the funding options can include the port agency, private funds contributed by the mar-

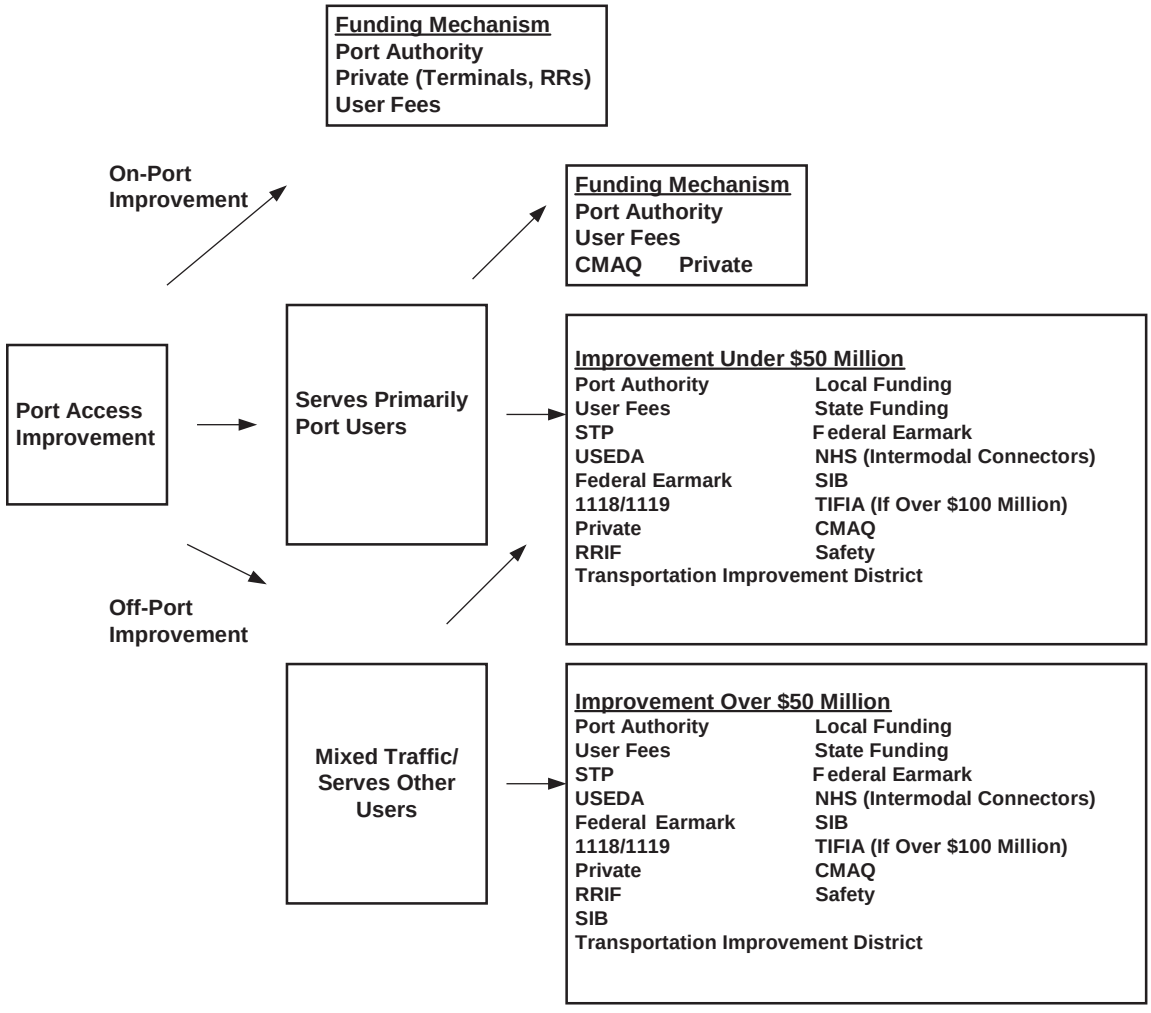

Figure 15. Considerations involved in determining potential funding mechanisms for a port cargo hub access improvement.

itime terminals or railroads operating in the port, or user fees that can be recouped from future fees and/or revenues paid by the facility users. (For a discussion of the applicability of user fees, please refer to Section 5.6.)

If the improvement is outside the port, then financing options will also be influenced by whether the improvement primarily serves the port users or also serves other purposes. If the improvement specifically benefits port users and is a separate facility connecting to certain port facilities, then the option of user fees might be considered, if applicable. (Please refer to Section 5.6 for a discussion of the applicability of user fees.) In addition, the size and urgency of the improvement will help determine the potential mechanisms available to fund the project. As previously noted, using state, local, and private funding instead of federal funds for an improvement can reduce the amount of time needed to undertake the project. However, various federal funding sources and mechanisms should be investigated to finance the project, particularly if the investment is large or can be accomplished over a long period. Some examples of potential funding mechanisms are provided in Figure 15.

The port access projects identified and studied by the research team illustrate the range of funding mechanisms that can be used. The Red Hook Container Barge was initially funded directly by the Port Authority of New York and New Jersey because of the urgency of the improvement. The barge then became the first freight project to use CMAQ funds to support the capital construction and operation of the improvement.

The Port of Tacoma Overpass Project, which was a part of the FAST Program in Washington State, used a combination of funding sources, including port authority funds, private funds from the railroads, state funds, and federal funds such as STP and Section 1118/1119 funding. The project was also designated as a TEA-21 high-priority project, and this designation enabled a direct grant from the federal government in the support the program.

Rail, Truck, Private, or Multimodal Cargo Complex Access Improvements

Figure 16 illustrates the process for considering financing options for cargo hub access improvements to a rail, truck, or other private or multimodal cargo complex. In such cases, access facilities on private land are fully the responsibility of private companies. However, similarly to the port and air cargo hubs, potential funding approaches for a private or multimodal cargo complex involve consideration of beneficiaries and whether the improvement serves only the cargo hub users or others as well. If the access improvement solely serves a private hub and has a limited set of beneficiaries, then it can be difficult to justify the use of public funds for the improvement. However, if the hub and related improvements provide measurable and major economic development or other benefits to the surrounding communities or transportation system, then public fund use often can be justified.

The time allocated can be considerably shorter for the implementation of access improvements to private hubs than the timeframe for an access improvement involving a port or airport. Accordingly, it is likely that a combination of state, local, and private funds will be used to undertake the access improvement. For example, the access improvements needed to support the development of UPS's CACH were funded entirely through local, state, and private sources. This facility was a major economic development initiative for the area, and the access improvements needed to be completed within a certain timeframe. The magnitude of the job and tax revenue generation of the new facility justified local and state expenditures for the access improvements. In addition, UPS and the Santa Fe Railroad were willing to partially fund the required access improvements, including contribution of required land for right of way.

Table 17 lists federal, state, local, and private sources that can be considered for financing various types of cargo hub access projects as well as applicable finance tools, short descriptions of funding sources and associated repayment requirements (grants or donations do not require repayment), applicable project types, the advantages of the funding source or mechanism and the current hurdles to using those sources or financing mechanisms.

Appendix D provides an inventory list of access improvement projects in the United States and the funding sources used. This information can serve as background material for a discussion of the funding sources for a particular improvement project. Appendix E provides additional details on federal funding sources. Appendix F contains information on specific examples of state funding mechanisms.

5.6 CONSIDERATION OF USER FEES

This section summarizes the role of user fee strategies in structuring various approaches to finance and implement cargo hub access projects.

Project beneficiaries or cargo hub users can help pay for the costs of cargo hub access improvements in many ways. These different approaches to structuring financing packages for implementing cargo hub access projects are aimed at linking the benefits that accrue to the direct users of a project with the costs to pay fully or partially for the improvement. In this discussion, the term "user fees" will be used as typically applied in a "pure project finance" scheme (i.e., where specific user fees dedicated solely to recovering the project costs are used to pay for the costs associated with that facility). However, it is important to recognize that other user-related taxes, fees, and charges can and have been used to finance cargo hub access improvements. These additional user-related taxes and charges range from highway user, air transport, and other transportation taxes and fees (e.g., gasoline taxes that are not specific to a project but can be used for that purpose) to facility revenues from charges at an adjacent cargo hub

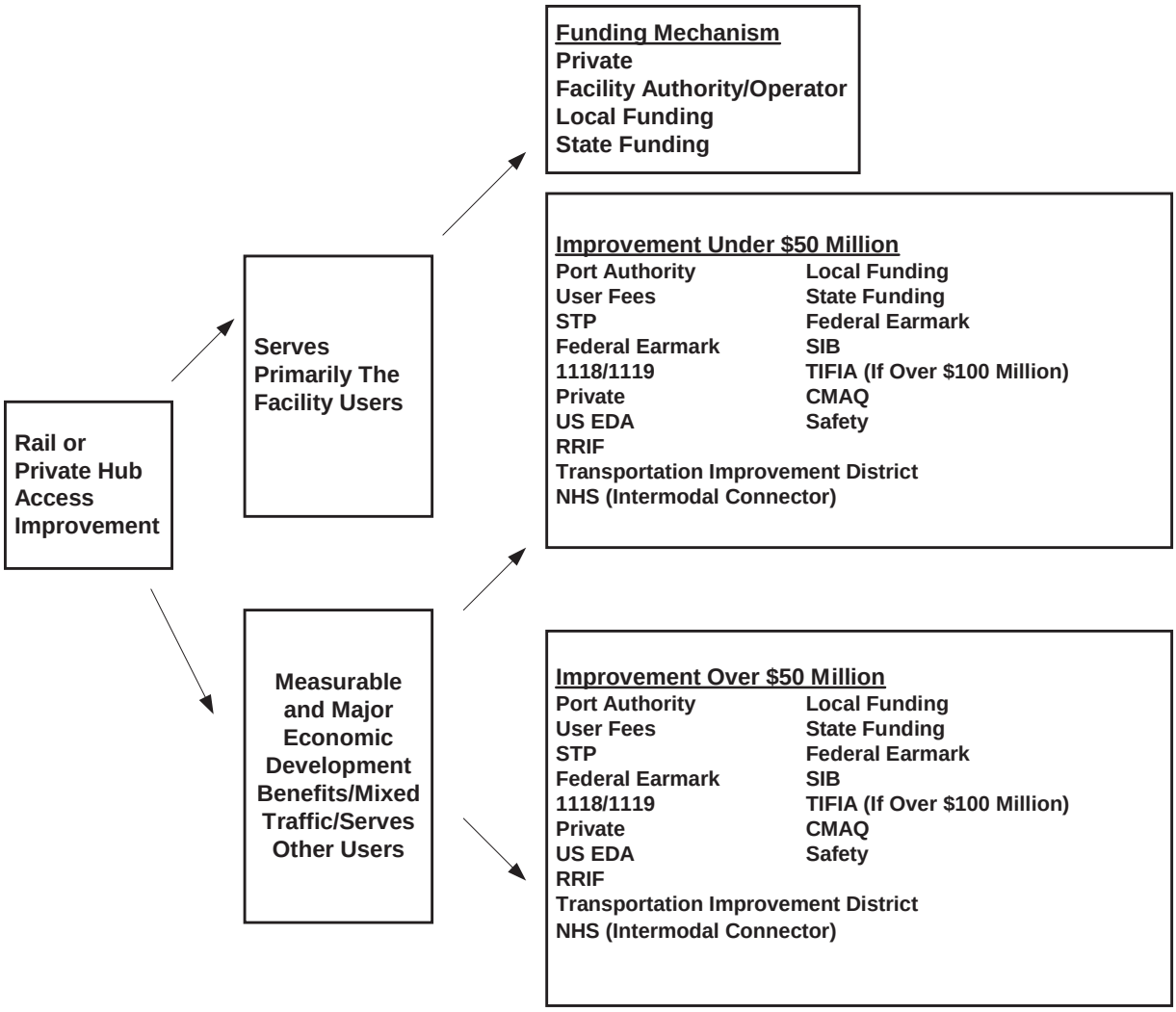

Figure 16. Considerations involved in determining potential funding mechanisms for a rail or other private cargo hub access improvement.

(which generally involve non-project-specific terminal revenues). This section is organized into three parts as follows:

- Definitions of user fees,
- Description of framework for user fee consideration in cargo hub access project financing, and
- Applicability of user fee strategies for cargo hub access financing.

5.6.1 Definitions of User Fees

Two types of funding are required for transportation facilities, regardless of whether they are related to cargo hub access:

1. Initial one-time construction and capital expenditures associated with developing the infrastructure or instituting the service, and
2. Ongoing operation and maintenance expenditures incurred once the improvement is operational.

Capital and construction costs may be funded through various financial mechanisms, including direct payment (pay as you go) by one or more organizations and/or through loans and/or the issuance of debt (bonds). However, consideration also has to be given to funding the ongoing operation and maintenance of the cargo access improvement.

User fees provide a mechanism for supporting the ongoing operation and maintenance of transportation infrastructure. In addition, user fees can create an identifiable revenue stream to obtain loans and/or support the issuance of bonds for capital investments and construction costs.

Three types of user-related taxes, fees, or charges traditionally have been used to finance transportation projects and can be used to finance cargo hub access projects. These user

TABLE 17 Matrix of possible funding sources for cargo hub access

Finance Tool	Source/Repayment	Modes/Project Types	Applicability	Current Hurdles
Federal Sources				
TEA-21 Surface Transportation Program (STP)	Federal tax revenues; Highway Trust Fund No direct repayment of the federal share 80/20 matching grant	Highways and local road access through public agencies Ports, airports, rail/intermodal yards, multimodal and private hubs (through public agencies) STP funds are often used in access projects. One example is the Tchoupitoulas Corridor in New Orleans.	Established grant source of roadway funds with a wide range of applications; does not require direct reimbursement of the federal government.	Cargo hub access projects must compete with all other transportation projects within the MPO and state for these funds; funds are subject to federal budget appropriations for transportation; federal timeframe for applying and receiving funds; federal requirements for undertaking the project.
TEA-21 High-Priority/ Demonstration Projects	Federal tax revenues; Highway Trust Fund No direct repayment	Highways and local road access through public agencies Ports, airports, rail/intermodal yards, multimodal and private hubs (through public agencies) The Kapkowski Road project (NJ) and the Lombard Road Overpass (OR) are TEA-21 high-priority projects.	Can be used for a wide range of access projects; can be used for planning and construction.	Must be designated as a high-priority project in the federal legislation; funds are subject to federal budget appropriations for transportation; federal timeframe for applying and receiving funds; federal requirements for undertaking the project.
TEA-21 National Corridor Planning and Development Program (Section 1118) and Coordinated Border Infrastructure Program (Section 1119)	Federal tax revenues; Highway Trust Fund No direct repayment of the federal share 80/20 matching grant	Highways and local road access through public agencies Major ports, airports, rail/intermodal yards, multimodal and private hubs (through public agencies) The FAST Corridor is being partially funded through the Section 1118/1119 Program.	Program is suitable for cargo hub access projects.	Current Section 1118/1119 budget filled with earmarked projects; funds are subject to federal budget appropriations for transportation; federal timeframe for applying and receiving funds; federal requirements for undertaking the project.
TEA-21 Transportation Enhancements	Federal tax revenues; Highway Trust Fund No direct repayment of the federal share 80/20 matching grant	Highways and local road access through public agencies Ports, airports, rail/intermodal yards, multimodal and private hubs	Can be used to improve the relationship of the cargo hub access and the surrounding communities; is a 10% set-aside of STP funds.	Cargo hub access projects must compete with other transportation projects within the MPO and state for these funds; funds are subject to federal budget appropriations for transportation; federal timeframe for applying and receiving funds; federal requirements for undertaking the project.
TEA-21 Congestion Mitigation and Air Quality Improvement Program (CMAQ)	Federal tax revenues; Highway Trust Fund No direct repayment of the federal share 80/20 matching grant	Roadway, rail, and barge access through public agencies Ports, airports, rail/intermodal yards, multimodal and private cargo hubs (through public agencies) The Red Hook Container Barge was the first freight project funded through CMAQ. The Kedzie Avenue access to Corwith Rail Yard in Illinois and the Columbia Slough Railroad Bridge in Oregon also used CMAQ funds.	Has been successfully applied for innovative cargo hub access projects in nonattainment areas; can be used for capital projects and operations.	Cargo hub access projects must compete with other transportation projects within the MPO and state for these funds; funds are subject to federal budget appropriations for transportation; federal timeframe for applying and receiving funds; federal requirements for undertaking the project.

TEA-21 Highway Safety Infrastructure	Federal tax revenues; Highway Trust Funds No direct repayment of the federal share 80/20 matching grant	Roadway and rail access through public agencies Ports, airports, rail/intermodal yards, multimodal and private cargo hubs (through public agencies)	Can be used to eliminate hazards at rail/highway grade crossings, a major issue area for cargo hub access; is a 10% set-aside of STP funds.	Cargo hub access projects must compete with other transportation projects within the MPO and state for these funds; funds are subject to federal budget appropriations for transportation; federal timeframe for applying and receiving funds; federal requirements for undertaking the project.
Transportation Infrastructure Finance and Innovation Act (TIFIA)	Repayment required Can be repaid through a variety of mechanisms, including dedicated hotel, sales, and revenue taxes, as well as user fees; federal tax revenues for "subsidy cost" of supporting federal credit	Roadway, rail, and barge access through public agencies Ports, airports, rail/intermodal yards, multimodal and private cargo hubs (through public agencies) TIFIA funds are being used for the Reno (NV) Transportation Access Corridor and the Cooper River Bridge.	Can be used to fund major access improvement programs; through loan guarantees and secured loans, can provide a more beneficial rate than commercial markets.	Cargo hub access projects must compete with other transportation projects within the MPO and state for these funds; funds are subject to federal budget appropriations for transportation; federal timeframe for applying and receiving funds: federal requirements for undertaking the project; amount of federal credit assistance is limited to one-third of the total project costs. For projects exceeding $100 million.
Railroad Rehabilitation and Improvement Financing (RRIF)	Repayment required Loans can be repaid through a variety of mechanisms	Rail access through public agencies or through direct loan to private entities Railroads and ports	Through loan guarantees and direct loans, can provide a more beneficial rate than commercial markets; federal program that can be used by the private sector.	Funds are subject to federal budget appropriations for transportation; federal timeframe for applying and receiving funds; federal requirements for undertaking the project.
FAA Airport Improvement Program—Entitlement Program	Federal tax revenues; Airport Trust Fund No direct repayment of the federal share 80/20 matching grant (PFCs can be used as match)	Air cargo users through public agencies Airports The Luis Muñoz Marin International Airport Cargo Area Access Road improvements in San Juan were partially funded through AIP.	Can be used to fund on-airport air cargo projects or on roadways controlled by the airport authority. AIP entitlements are available to airports with scheduled air passenger service and/or cargo operations.	Limited to on-airport projects or to access roads controlled by the airport authority and substantially dedicated to airport-related use.
U.S. Economic Development Administration (EDA) Grant Public Works and Development Facilities	Federal tax revenues No direct repayment of federal portion 50/50 matching grant	Roadway, rail, and barge access through public agencies The Alameda Corridor received a $2 million EDA grant.	Can be used to fund access projects with definable economic development benefits.	Funds are subject to federal budget appropriations; federal timeframe for applying and receiving funds; federal requirements for undertaking the project.
Legislative Earmarks	Federal tax revenues No direct repayment; no local match May require additional funds if earmarks do not fully cover total costs	Roadway, rail, and barge access through public agencies Ports, airports, rail/intermodal yards, industrial areas	Can be used to fund a wide range of access projects.	Requires legislative support.

(*continued on next page*)

TABLE 17 Matrix of possible funding sources for cargo hub access (Continued)

Finance Tool	Source/Repayment	Modes/Project Types	Applicability	Current Hurdles
State				
Authorities with Bonding Authority	User fees, revenues derived from the facility Repayment of principal and interest	Roadway, rail, and barge access through public agencies Ports, airports, rail/intermodal yards, and multimodal/private cargo hubs (through public agencies) The Port of Tacoma Overpass/FAST Program (WA), the Red Hook Container Barge (NY), and the Cooper River Bridge (SC) were directly funded by their port authorities.	Can be used to fund a wide range of access projects; Authorities can be created for major projects (such as the Alameda Corridor Transportation Authority).	Legislative action required to create authorities with bonding authority; must specify role and potential sunset provisions for the authority; must establish provisions for use of funds by the authority; must generate sufficient revenue to cover bond obligations.
TEA-21 State Infrastructure Bank (SIBs) Program	Repayment required Loans can be repaid through a variety of mechanisms 80/20 matching federal loan and credit enhancements	Roadway, rail, and barge access through public agencies Ports, airports, rail/intermodal yards, multimodal and private cargo hubs (through public agencies)	Can be capitalized through existing federal aid categories (such as STP); can be applied to a wide range of access projects.	Some states have not established SIBs.
State and Local				
State Transportation Funding Programs	State budget; user fees; tax revenue sources; State Transportation Trust Funds; State Bonding Programs	Roadway, rail, and barge access through public agencies Ports, airports, rail/intermodal yards, multimodal and private cargo hubs (through public agencies) Skypass at the Port of Palm Beach was partially funded through a grant from the Florida Seaport Transportation and Economic Development Program.	Can be used to fund a wide range of access projects of interest at the state level; may be available on a faster timeframe than federal funds; can be used as a match for federal funding mechanisms.	Cargo hub access projects must compete with other transportation projects within the state for these funds; funds are subject to state budget appropriations and potential voter referendums; state timeframe for applying and receiving funds; state requirements for undertaking the project; major access projects could overwhelm state funding resources.
Local Transportation Funding Programs	Local and municipal budgets; user fees; tax revenue sources	Roadway, rail, and barge access through public agencies Ports, airports, rail/intermodal yards, multimodal and private cargo hubs (through public agencies)	Can be used to fund a wide range of access projects of interest at the local level; may be available on a faster timeframe than federal or state funds; can be used as a match for federal funding mechanisms.	Cargo hub access projects must compete with other transportation projects within the area for these funds; funds are subject to local budget appropriations and potential voter referendums; major access projects could overwhelm local funding resources.
State				
Transportation Improvement Districts	Property or special taxes within the district	Roadway and rail access through public agencies. Communities also can benefit from the improvements. The Reno (NV) Transportation Access Corridor is using a special district assessment, along with hotel and sales tax backing, to support the TIFIA funding for the project.	Can be used to fund access projects in a specific area; may be available on a faster timeframe than federal or state funds; can be used as a match for federal funding mechanisms.	Can be difficult to establish districts; may require legislative approval; cargo hub access projects must compete with other transportation projects within the area for priority; major access projects could overwhelm local funding resources.

Transportation Agency Funding (e.g., port or airport authority)	Income received by the agency State agencies also may receive funding through budget allocations or referendums	Depends on the legislative mandate of the agency—could be responsibility for one or more modes.	Can be used within the definitions established for the authority or agency.	Transportation agency authority may not permit investments beyond facility boundaries; need for multi-agency coordination.
Economic Development Agency Funding	Income received by the agency State agencies also may receive funding through budget allocations or referendums	In general, the agency mandate centers on promoting economic development. Access projects with measurable, demonstrative benefits for an economic development initiative could receive some funding from this source.	Can be used within the definitions established for the authority or agency.	The project must be clearly linked with stated economic development goals; funding for access improvements also competes with financing for other economic development initiatives.
Private Funding				
Direct Funding	Corporate revenues; Guarantee of loans and bonds	Roadway, rail, and barge access private sector entities directly connected with the project. Related public infrastructure may also benefit. Burlington Northern Santa Fe and up Railroads contribution of approximately 5% of the funding for the FAST Corridor. Private sector entities are now also partially funding the Red Hook Container Barge.	Can be used to fund projects that benefit specific users; available on a much faster timeframe than public agency sources; can be used as a match for federal funding mechanisms; may not have the same requirements for undertaking and managing the project as the public sector. Upfront funding can eliminate the potential for user fees or longer term financing.	May not meet all public objectives for access improvements; benefits specific entities; corporate investors must consider the costs/benefits of the project and will seek a faster timeframe for seeing benefits/increased revenues from the investment.
Contribution of Land or Right of Way	Corporate revenues; Guarantee of loans and bonds	Private entities directly connected with the access improvement. Public sector entities benefit when their facilities positively benefit from the access improvement. UPS contributed land to build the access improvements for the CACH.	Can be used to fund projects that benefit specific users; available on a much faster timeframe than public agency sources; can be used as a match for federal funding mechanisms; may not have the same requirements for undertaking and managing the project as the public sector.	May not meet all public objectives for access improvements; benefits specific entities; corporate investors must consider the costs/benefits of the project and will seek a faster timeframe for seeing benefits/increased revenues from the investment. Private entities may also seek compensation from the public sector for the contribution of the land (e.g., reduced property taxes on remaining lands, a tax credit, replacement property, etc.). If the contribution of the right-of-way use is considered to benefit the public sector more than the controlling private entities, then the private entities may seek compensation for use of their property (such as in Alameda Corridor).

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TABLE 17 Matrix of possible funding sources for cargo hub access (Continued)

Finance Tool	Source/Repayment	Modes/Project Types	Applicability	Current Hurdles
Private Funding				
Special Tax	Corporations and others who pay tax	Public and private entities can benefit through the application of a special tax to fund access improvements. The Reno (NV) Transportation Access Corridor is using a special district assessment, along with hotel and sales tax backing to support the TIFIA funding for the project.	These taxes can be a revenue stream to support upfront bonding for a program of transportation improvements. In addition, the tax program can be developed as a limited-time program that ends when the projects are completed and paid for. Can be used to fund projects that benefit specific users; available on a much faster timeframe than public agency sources; can be used as a match for federal funding mechanisms; used in transportation improvement districts.	Gaining concurrence from private entities to enact a special tax program; developing an equitable tax structure; administering the tax program.
User Fees	Corporate revenues and/or users that benefit from the access improvements. Can be passed on to customers.	Public and private entities can benefit through the application of user fees to fund access improvements. The Alameda Corridor utilizes user fees as a revenue stream for the upfront bonding.	User fees can provide a revenue stream to support upfront bonding for a program of transportation improvements. Can be used to fund projects that benefit specific users; available on a much faster timeframe than public agency sources; can be used as a match for federal funding mechanisms.	Gaining concurrence from private entities to enact user fees; developing an equitable structure; potential negative impacts on transportation pricing for customers; private entities must have a visible improvement in revenues or operating costs.

taxes, charges, and fees can take many forms, and are categorized as follows:

1. Taxes include highway user taxes, air transportation, and other transport-related taxes and fees, such as
   - Highway user taxes and fees imposed on the owners and operators of motor vehicles (e.g., gasoline or fuel taxes, truck registration fees, weight-distance taxes, and oversize-overweight and trip permit fees); and
   - Air cargo waybill taxes, aviation jet fuel taxes, and other air transport user taxes and fees.
2. Charges include facilities' revenues and charges collected at adjacent terminals (e.g., tariffs and fees for operating services charged at various cargo terminals and other facilities, such as rail yards and port terminals); and
3. Fees include project-specific user fees that are collected from users of a facility and dedicated to repay its capital, operating, and maintenance costs (e.g., tolls and rail wheelage fees, and carload or per-container fees).

In its purest form, a project finance approach is one where a substantial portion of the funding (up to 70 or 80%) to build a project is obtained through a debt issue that is repaid fully over time by the dedicated revenues from the operation and facility users.

For example, the Alameda Corridor user fee was established specifically to finance the corridor's investment program. The fee is to be collected for a maximum of 35 years to pay the loans and bonds that provided the needed capital to implement the project. The debt incurred is backed solely by the revenues generated by the project, which is dedicated to that purpose.

The financial markets are willing to take the risks involved in a project finance approach, if the traffic and project cost risks are reasonable and there are sufficient assurances that the risks are manageable, so investors can expect to be repaid and can view the bond or other debt instruments as safe investments. It is important to note that the Alameda Corridor also used federal and state grants, port funds, and other miscellaneous funding sources for approximately 37% of the total required investment costs. Any project finance approach will generally require equity investments by the owner or a significant contribution from other sources in addition to the loan or debt issue.

Internationally, there is a trend toward privatization of ports, airports, and toll highways, as governments face revenue shortfalls and competing demands for limited funds. In such cases, private concessionaires are selected to build and operate new facilities or implement development and expansion projects at existing facilities and also to operate them. These private companies typically make use of the financial markets for a major portion of the required funds, dedicating their future revenue streams to debt repayment.

Typically, private concessions and the project finance approaches now extensively used internationally have not been used in the United States to finance transportation infrastructure, cargo hub projects, or access projects. The best example of a project finance approach for a cargo hub access project is the Alameda Corridor; several toll roads also have been financed through private concessions and project finance approaches in the past decade. Generally, in the United States, when debt or bond financing is used, it is not guaranteed by the revenues generated by one facility, but by the overall revenue and financial capacity of the sponsoring private company or the public agency or authority. Most toll highways, airports, and ports, as well as the construction programs of many state DOTs are financed through bonds, with interest and debt repayment from various user taxes and fees. Larger airports and ports in the United States rely, to a large extent, on revenue bond financing for funding their capital programs. These revenue bonds are generally not guaranteed by the full faith and credit of the state government or issuing jurisdiction, but solely from the tax, fee, and operational revenues generated by the agency from the users and the facilities, including federal aid. The Port Authority of New York and New Jersey, as well as the Maryland DOT, are examples of agencies that issue consolidated bonds to finance their construction program to be repaid from their overall future revenues. By pooling many projects, these bonds are considered safe by the investment community, because they are repaid from various user taxes, fees, and/or other revenue sources.

Typically, most private transportation capital projects at cargo hubs (including air cargo terminals, rail yards, port terminals, and package sort centers) also are financed through revenues collected from the users of those facilities, but are not always tied to specifically dedicated user fees. The needed investments for these facilities are more often provided by the cash flow or debt of the private companies or port/airport authorities, with the investment recovered through overall facility charges or through the operating revenue generated by the facility.

For the purpose of consideration in financing cargo hub access projects, user contributions can then be separated into those from general user fees and taxes described above; the contributions of private companies, ports, and airports from their general corporate or facility revenues; and specific user fees dedicated to financing a particular project. As noted previously, specific, dedicated user fees or revenues collected from a particular facility are commonly used in what is referred to as project finance (i.e., obtaining required financing to implement a project through the capital markets). However, in terms of considering contributions of various user groups to a particular project, it also is appropriate to consider the other two options—general transportation user taxes/fees as well as contributions from private companies or from cargo hub facility revenues.

Specific, dedicated user fees to implement a cargo hub access project are not easily applicable to most cargo hub access projects. However, general highway and other transportation user taxes/fees, as well as contributions from private companies, ports, and airports, often are applicable to cargo hub access projects. Essentially, they provide a relevant approach to obtaining user contributions to financing without involving specific fees tied to a specific access improvement. For example,

1. Rail yards are both a cargo hub or terminal facility and an alternative access mode for a large portion of the traffic to a port or package sort facility. The construction of a rail yard is often fully financed by the operating railroad, with cost recovery from the future rail users through facility charges (although ports have financed on-dock rail yards as part of their terminal development programs). The decision whether to implement a rail yard project is determined solely by the railroad or port sponsor, based on the analysis of market demand and future revenue generation potential. Even when no specific fees are established and dedicated to the project, such fees represent user financing sources for cargo hub access improvements. An example of this approach was the construction of the rail yard adjacent to UPS' CACH, which handles a significant portion of the UPS trucks and eliminates this truck traffic from local roads.
2. The construction of a rail grade separation connecting to a rail yard can often be associated with the rail yard project. The financing mechanism used for the rail yard, which often includes facility charges to recover infrastructure development costs, is then also used for the grade separation.

In summary, many types of user financing contributions can be considered in structuring financing packages for implementing cargo hub access projects. In the case studies considered in this research, the Alameda Corridor and the Columbia Slough Railroad Bridge are the only projects that were financed significantly through dedicated and project-specific user fees for a specified period. Obtaining nonspecific user taxes and fees or using revenues collected at an adjacent cargo hub facility is no different from considering all possible funding sources in structuring a financing approach to any project.

5.6.2 Framework for User Fees and User Contribution Consideration

User fees and user contributions have been used for a long time to help finance transportation improvements. As funding from public-sector sources becomes more limited, there is renewed interest in user tax contributions and user fees to expedite completion of needed projects and expand the funding sources available to implement proposed cargo hub access improvements.

Generally, consideration of user taxes, user-related contributions, and project-specific user fees is part of the overall process to determine how to best obtain the required funding to implement a project. Typically, at first there is no identified funding source and only a project concept or idea. The development of a financing approach goes through a several-step process that involves developing the project cost estimate by carrying out planning, engineering design, and environmental studies, while at the same time considering various funding sources. It is best to consider financing approaches early on, even before detailed cost estimates are available. At the same time, it is not always possible to put together the overall financing package until a fairly detailed cost estimate has been developed, particularly for complex projects involving major construction of new facilities.

Putting together a financing package for implementing a cargo hub access project will usually involve the agency planning the improvements (MPO or regional planning agency) as well as the highway or road agency responsible for the access facilities and the cargo hub or terminal operator. The lead implementing agency or organization for the access project—whether it is the state or city DOT, public works department or highway agency or the port/airport/railroad—will typically be the lead agency in putting together the financing package.

The first step in considering project-specific user fee financing is to identify whether a user fee can be applied to the project. The decision process for considering the applicability of project-specific user fees is shown in Figure 17. The first step involves identifying the need for user funding. Most cargo hub access projects (e.g., traffic lights, road rehabilitation, and grade separations) are relatively small and existing funding sources may be able to cover the funding requirements adequately. However, if the project is dedicated solely to cargo hub traffic and requires a large funding commitment, if sufficient funding is not available from sponsors and/or public sources, and/or if there is a separate and specific set of ongoing operating costs and identifiable cargo hub users that can be charged fees separate from the general public, a specific, dedicated user fee approach may be appropriate, particularly because it can provide a revenue stream for obtaining loans or floating bonds for the project.

In some cases, user fees are simply not appropriate for the proposed project. For example, added rail capacity on an existing line may more appropriately be provided and maintained directly by the railroad or agency that operates that service and costs can be recovered through the rate structure rather than through user fees on the project segment. Similarly, an existing road operated by state DOTs or other local public agencies is financed more appropriately or improved through their capital and maintenance programs than through user fees.

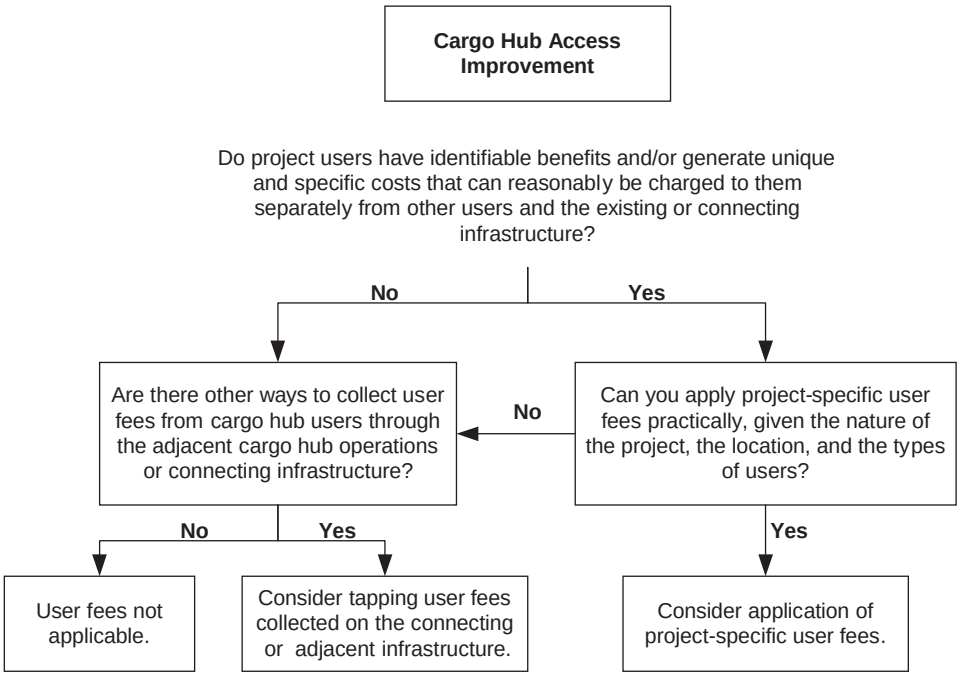

Figure 17. Decision tree for applicability of project-specific user fees.

The second step is determining the suitability and acceptability of user fees as a funding mechanism for the improvement. Even if project-specific user fees can be applied and benefits accrue to specific identifiable cargo hub users, the business and political context may make such specific project-user financing inappropriate. The factors generally considered regarding suitability are shown in Table 18. Of greatest concern, are two factors, as follows:

1. Competition—User fees can shift traffic to other hubs or other facilities and can change the market share of the cargo hub. If it is decided to apply such a fee, it is

TABLE 18 Appropriateness or suitability of user fees

Factors	Elements
Political	• Will there be acceptance of the user fee by other public agencies, elected officials, and communities, particularly if the fee will apply to not only cargo hub users but also the general public? • Can the user fee structure be designed so as to be equitable to different groups? • Will the user fee be viewed as a disincentive to use the access facility? Are there alternative routes for non-cargo and non-hub-bound traffic?
Market and Competitive	• Will the user fees influence cargo hub demand? • Will cargo shift to other hubs or other facilities? • How will cargo hub market share be influenced?
Private Sector Response and Impact	• What is the position of the private sector carriers and other cargo hub users regarding the user fee? • What will be the impact on various private terminal operators and carriers? Will the user fee change their competitive position? What is their financial condition?
Legal and Regulatory	• Can the fees be imposed legally? • Is regulatory authorization required?
Financial (particularly when using fees for bond repayment)	• Can a stable and/or growing revenue stream be anticipated after inflation? • Will the revenue yield be sufficient to cover debt service?
Administrative	• Are there practical mechanisms for revenue assessment and collection? • How expensive will the administrative costs be? • What is the evasion potential?

important to consider an appropriate level to generate needed revenues without substantially influencing demand, taking into consideration fees and costs at competing terminals.
2. Impact on general public or non-cargo-hub users—Even when appropriate, if the project cannot be dedicated exclusively to cargo hub traffic, there may be other traffic influenced, and the impact on such other traffic must be assessed carefully.

Both applicability and suitability ultimately affect whether user fees are a practical funding mechanism for cargo hub access projects. The case studies illustrate the few situations where project-specific user fees are practical, as most typical cargo hub access projects are improvements to existing facilities or short additional connections where it simply is not practical to consider user fees tied specifically to only that project. However, there are cases where project-specific user fees are the most logical and practical approach to project financing.

5.6.3 Applicability of User Fees to Cargo Hub Access Projects

Three general approaches have been considered for using user fees or other user contributions to finance cargo hub access investments:

- Project-specific user fee revenues dedicated and set to repay project costs,
- General-user highway or other taxes and fees available for transportation projects, and
- Private company and port/airport contributions from revenues or funding sources available to the adjacent or nearby cargo hub facilities that the access improvement serves.

The project-specific user fee approach has limited applicability for most cargo hub access projects, primarily because of the competitive factors that influence publicly operated cargo hubs and the political difficulties of instituting such charges to all users of a highway access facility. However, dedicated user fees may be applicable and appropriate in unique cases involving dedicated cargo hub access facilities and other large projects involving special circumstances.

Most cargo hub access improvement needs are multipurpose public-use highways that also are used by automobile traffic. In those cases, most projects are being implemented by using available highway user tax and fee funding sources or by obtaining private, port, airport, or economic development program contributions. There have been some legal and political hurdles to using these available funding sources for non-highway access improvements (particularly privately owned rail projects), although the last two Surface Transportation Program reauthorizations have added flexibility (e.g., TIFIA, CMAQ, and RRIF). These relatively new programs have been instrumental in broadening available funding sources for all types of cargo hub access projects. In many cases, user contributions to finance access improvements also have been funded increasingly with some contributions from the revenues of adjacent port, airport, and railroad facilities.

CHAPTER **6**

CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSIONS

Cargo hubs are increasing in importance as carriers and public authorities enlarge intermodal terminals and multimodal complexes intended to (1) handle growing shares of the cargo controlled by private networks and the nation's transportation system and (2) increase cargo movement efficiency. The nation's transportation system faces a significant challenge in providing and maintaining adequate access facilities as the number of these cargo hubs grows and existing hubs expand. Arterial highways, local streets, and other access facilities that connect these cargo hubs to Interstate and other major road facilities, which are often located in old parts of metropolitan areas, require significant investments to replace obsolete infrastructure, separate truck from rail or automobile traffic, provide adequate capacity, and/or improve safety. Often, the most practical solutions involve non-road investments, such as new rail connections, added rail capacity, new intermodal rail yards, barge services, or combinations thereof.

In summary, the case studies analyzed by the research team demonstrate that cargo hub access problems are resulting in increasing delays and congestion along local and major highways in metropolitan areas in all regions of the country. This "cargo hub access challenge" is likely to grow as increased truck and rail volumes moving through cargo hubs result in additional delays and congestion along corridors that are already congested or in need of improvement. The last mile to these international, national, and regional cargo hubs is often the bottleneck that influences fast and reliable intermodal connections the most, whether for local deliveries, coast-to-coast transport, or international shipments. Obsolete or substandard facilities, as well as delays and congestion, affect the efficiency of the U.S. freight transportation system and the competitiveness of U.S. businesses in an increasingly global economy. Inadequate facilities and congestion along the last mile to ports, airports, and other freight hubs increase the cost for and strain the ability of U.S. carriers to provide the competitive level of service that shippers demand.

Special policy attention is needed to address this cargo hub access challenge. This need for policy attention is heightened by several major trends that drive the need for improvements and highlight the importance of further development and growth, and increased efficiency of cargo hubs. These trends are as follows:

- Globalization and growth in international trade mean that any reduction of business costs for key growing economic sectors can translate into reduced consumer prices and U.S. industry competitiveness.
- Industry practice and emphasis in establishing larger hubs at strategic points for cargo transfer is increasing.
- State/local government and port/airport authority interest in attracting major hub operations to their areas is growing, because such hubs can be the catalysts for large-scale economic development initiatives and related real estate development.
- Intermodal connections at large hubs are a major source of delays and may be the single area where the greatest positive effect on cargo transit times and reliability may be possible.
- Cargo hub access needs are varied, involving all modes of transportation throughout the nation, and illustrate the complexity and challenges associated with identifying and financing solutions.
- Reaching consensus on practical solutions among several jurisdictions or public-sector agencies and private companies often involves surpassing significant hurdles.
- Particularly for large hubs of national significance, some project beneficiaries may not be located in or near where the access improvement project is performed.
- Local communities often do not understand that, even though heavy truck traffic may have some negative effects, it also produces positive economic benefits and access improvements can reduce some of the negative effects.
- When private carriers and shippers decide to build a new facility or expand an existing facility, the public sector needs to respond quickly.
- Delays and difficulties in meeting eligibility requirements for federal funding, as well as other obstacles to assembling financing packages that meet identified needs are common, especially for large cargo hub access projects with national benefits that involve various modes, many jurisdictions, and private companies.

Even though there are major challenges in addressing cargo hub access needs across the nation, the analysis of 12 case studies carried out in this research leads to the conclusion that most cargo hub access improvement needs involve public highways that are also used by automobile traffic and/or have rail grade separations. In those cases, projects are being implemented primarily by obtaining available highway user tax and fee funding sources, by obtaining private, port, airport, or economic development program contributions, and/or through special multi-agency programs set up at the regional level (e.g., ACTA, FAST, and Portway). This is an appropriate approach but, based on the analysis of the case studies, several major issues are apparent in the way that access improvements are being financed. These issues require attention, as follows:

1. The lack of funding sources dedicated to cargo hub access problems and the difficulties in meeting eligibility requirements for available public funding sources not established with this application in mind make it difficult to plan and implement projects as rapidly as demand grows (this problem may increase with the globalization of production and the emphasis on international trade).
2. Pure project finance approaches through project-specific user fees have limited applicability to large cargo hub access projects and generally are not applicable for most cargo hub projects.
3. Obstacles remain in putting together financing whenever access projects involve privately owned, non-highway (e.g., rail) facilities or cargo hub access operations.
4. Despite significant progress over the past decade in considering freight-oriented projects in state and metropolitan planning processes, cargo hub access projects have problems competing with commuter and other community-oriented programs for limited available funding.
5. Many uncertainties regarding how cargo hub access projects will be funded and adequately maintained for long periods of time forces project sponsors to continually look at meeting unfunded portions of cost estimates and to revise the financing approach as they seek to structure viable financial plans for addressing cargo hub access needs.
6. When private firms decide to build a new terminal or hub center for operations, the public sector often does not have the ability to respond as quickly as needed.

6.2 RECOMMENDATIONS

Based on the national inventory of cargo hub access projects (see Appendix D), and as summarized in Chapter 3, the research team concluded that there is need for special policy attention to the cargo hub access problem at the national level. Considering the large number of cargo hub access projects being implemented across the nation, often requiring creation of ad hoc task forces, as well as the innovative use of available funding sources, the research team recommends that national and regional initiatives to address cargo hub access should be considered to

- Recognize the cargo hub access problem by raising the awareness of elected officials, private shippers and carriers, professionals, and the general public, as well as by sponsoring regional workshops and forums to (1) encourage formal consideration of cargo hub access problems in the transportation planning process; (2) develop indicators and measures; and (3) gather data regularly to quantify the extent of the problem throughout the nation.
- Establish guidelines that ensure consideration of cargo hub access needs in the statewide and metropolitan transportation planning process, including measures of performance, definition of investment needs, consideration of demand shifting or congestion reduction strategies (as well as operational strategies), and evaluation of results of actual investments after they have been completed so there is an increased base of knowledge on the benefits and impacts of various approaches to cargo hub access problems.
- Encourage multi-jurisdiction and private–public collaboration to evaluate solutions and implement projects to address cargo hub access problems and needs.
- Encourage states and MPOs (particularly those with nationally significant cargo hubs) to address cargo hub access needs by considering port, airport, rail, and major private terminal operator and carrier expansion plans, as well as changing shipper logistics, in developing their long-range plans and transportation improvement programs.
- Establish a training or professional development program to encourage agencies and private companies to develop professionals on their staff who are qualified to address cargo hub access improvement planning and financing issues, including how to (1) use existing funding sources and (2) develop funding packages that take project costs and the primary beneficiaries of a project into consideration.
- Provide appropriate financing support, incentives, or other mechanisms to facilitate the structuring of practical funding programs for projects aimed at addressing cargo hub access problems and needs.

Through such formal consideration of cargo hub access needs, including incorporation of port, airport, and private terminal operator and carrier needs, the extent of the cargo access problem and future needs will be better measured and understood. Such a formal process also will help quantify the need for financing, the opportunities for achieving multiple

objectives through regionally supported initiatives, and the most important high-priority improvements that should be supported.

Based on the case study experience, the research team suggests categorizing cargo hubs for establishing planning priorities and addressing cargo hub access needs as follows:

1. Cargo hubs could be categorized at the national and regional levels on the basis of their national or regional significance, taking into account the volume and/or value of the cargo handled.
2. A large or major cargo hub of national significance could be defined as a cargo complex or area that handles a significant volume or dollar value as a percentage of total national cargo volume or dollar value (this is similar to the definition of airport hubs—the FAA defines large hubs as those handling over 1% of national enplanements, medium hubs as those handling 0.25 to 0.99%, and small hubs as those handling less than 0.25%).
3. Large or major cargo hubs of state or regional significance could be defined according to the area terminal(s) total volume handled (this is similar to FHWA's established criteria to designate intermodal connectors to the National Highway System [NHS], which rely primarily on traffic or cargo hub volume-related criteria).[1]
4. Planning (and possibly funding assistance) at the national level could encourage cargo hub access improvements, giving priority to access improvements for cargo hubs of national significance that benefit interstate commerce, international trade, business efficiency, and consumers nationally, as well as to cargo hubs of state or regional significance, which are important to state or regional economies.

In addition, based on the case study analysis, recommendations regarding the financing of cargo hub access projects are as follows:

1. The development of additional funding sources and/or financing mechanisms to facilitate the implementation of cargo hub access improvements should be considered [e.g., providing (1) dedicated funds for cargo hub access projects; (2) a discretionary program that can make funds available to the most important projects nationally; (3) legal authorization for additional optional sources that states, regions, or local areas can tap where needs are great; and/or (4) the added flexibility to make all types of cargo hub access projects specifically eligible for priority use of available funds, particularly all of the major categories of highway-user financed federal and state aid].
2. Remaining legal hurdles to using available funding sources for non-highway access improvements (particularly privately owned rail projects) should be reviewed to identify any obstacles to the use of federal or state highway funds for financing cargo hub access improvements to remove truck traffic from highways, separate truck from rail traffic, and/or improve connections between ports and intermodal rail yards (which also reduces delays and congestion for other highway traffic).
3. Guidelines for cargo hub access projects and other financing approaches could include consideration of who benefits most from a project and encourage appropriate contributions from the larger beneficiaries. Ultimately, it is important that federal or state guidelines emphasize practical solutions that get needs addressed promptly and provide flexibility to facilitate the use of existing funding sources. Funding guidelines also should encourage local areas, private operators, port and airport authorities, and railroads to help frame innovative funding approaches tailored to their specific needs.
4. Several specific mechanisms and/or initiatives that the research team believes should be considered to address cargo hub access needs and that appear to have merit as additional mechanisms to facilitate planning and financing of cargo hub access improvements are described as follows:
   - A cargo hub access program could be encouraged or required to be developed by all states and metropolitan areas or special multi-jurisdiction groups with cargo hubs of national and/or regional significance. These cargo hub access programs would develop solutions to cargo hub access needs influencing each area, with the option of using available federal and state funds and/or an optional specific source of funds to address cargo hub access needs (including capital, maintenance, and operating needs) authorized nationally.
   - An optional cargo hub access fee could be authorized nationally and collected regionally or directly from the users of adjacent terminals and facilities that benefit from the access projects so as to provide a dedicated source of funds for these improvements (see further discussion of optional cargo hub access fee concept below). Whether through such an optional cargo fee or other financing mechanisms, cargo hub access programs should consider benefits to adjacent terminals and other facilities when financing plans are being structured.

[1] FHWA has established criteria to designate intermodal connectors to the National Highway System (NHS), based primarily on the following traffic or cargo hub volume related criteria to define connecting roads between the NHS and *major* intermodal terminals: 100 trucks daily in each direction on the principal route connecting to an intermodal terminal, or principal roads connecting to maritime terminals or rail yards handling 500,000 annual TEUs or 500,000 tons per year and air cargo terminals handling 100,000 tons annually. FHWA also established secondary criteria, including access roads to those terminals handling 20% or more of the total freight volume by mode in a state, or roads that connect to an intermodal terminal that is being expanded significantly. (See FHWA, Federal-Aid Policy Guide, December 19, 1997, Transmittal 20, Subchapter E, Planning, Part 470, Highway Systems, Subpart A, Federal Aid Highway Systems, Appendix D—Guidance Criteria for Evaluating Requests for Modifications to the National Highway System.)

- In developing cargo hub access programs, the use of the revenue streams from any cargo hub access fees to use funds should be encouraged and facilitated. Debt and/or loans for cargo hub access projects can use TIFIA, State Infrastructure Banks, grant anticipation revenues vehicles (GARVEE), or other similar loans, lines of credit, notes, and bond issues. These mechanisms can increase funding resources available for, and accelerate implementation of, cargo hub access projects. Public policy should recognize that major projects cannot be funded on a pay-as-you-go basis, but will require debt financing.
- In developing cargo hub access programs, flexibility in project financing approaches should also be encouraged, providing options for individual cargo hubs, metropolitan areas, and states to establish "cargo hub access funds" to pool cargo hub access fees, tax sources, revenues from several facilities, and other private and public contributions to guarantee repayment of debt.
- Laws and regulations could be clarified so that all types of cargo hub access projects are specifically defined to be eligible for tax-exempt financing.
- Private contributions by carriers, terminal operators, and others could be made eligible for investment tax credits when such contributions are part of cargo hub access programs approved by governmental bodies.

All of the above initiatives and strategies have merit as part of a package to improve national planning and financing approaches to cargo hub access problems. In the following two sections, the research team expands further on two concepts for increasing revenues dedicated to cargo hub access or more generally, to freight and intermodal needs. The first is a proposal to create a national freight and intermodal transportation fund. The second is the optional cargo hub access fee concept proposed by the research team.

6.2.1 The Freight and Intermodal Transportation Fee Concept[2]

One interesting approach to provide a dedicated source of revenues for freight and intermodal projects (including cargo hub access projects) is being discussed as part of the ongoing reauthorization of the Federal Surface Transportation Program. This concept is being proposed by Jim Preusch. He advocates a new national revenue source for freight and intermodal transportation, funded by a Transportation and Intermodal (T&I) Fee. The T&I fee would be collected by U.S. Customs based on existing duties but separate from customs duties. T&I fees would also be set and collected for commodities with no existing duties and would be adjusted annually by the CPI. The revenues generated through the T&I Fee would flow into a special fund, which would be used for eligible freight and intermodal surface transportation projects. Project sponsors could be States, municipalities, regional and local agencies, and port authorities. Private companies could submit joint applications with public agencies. Project sponsors would be required to provide 20% in matching funds. The T&I Fee would essentially be paid nationally by the end consumer or user in the price of the product.

[2] Jim Preusch, "New Revenues for Freight and Intermodal Transportation," presented at a National Symposium on Transportation, International Trade, and Economic Competitiveness held in Long Beach, CA, on October 25, 2002.

6.2.2 The Cargo Hub Access Fee Concept

Another approach to providing a dedicated fund for cargo hub access projects is the concept of an optional cargo hub access fee program. Such a fee would be authorized at the national level and should be explored further to address the future needs for cargo hub access and other intermodal connections.

As has been demonstrated through the review of the 12 case studies, cargo hub access projects typically have multiple beneficiaries from both the public and private sectors. The concept of the optional fee concerns authorizing, at the national level, the establishment of a pool of funds regionally administered at each cargo hub (port, airport, rail intermodal facility, or other such cargo hub) and dedicated to access facility development, expansion, maintenance, and operations. Such a fund could be established with contributions from user fees (e.g., $1 per container, railcar, or truckload) charged at all facilities in a cargo hub and dedicated to cargo hub access improvements. Eligibility and management of the use of the funds would be based on established guidelines agreed to by the facilities where the charges are instituted following general guidelines set nationally.

The cargo hub access fee concept could be applied in a manner similar to PFCs, which are optional charges applied at airports that so choose to institute them. Federal law sets a maximum limit of $4.50 per passenger and certain procedures must be followed to obtain federal approval of the fee, which varies for small airports and medium and large hubs. The PFC program represents a significant source of capital improvement revenue for commercial airports, defined as those that enplane 2,500 or more passengers per year. Currently, airport owners may apply for PFC charges in the amounts of $1, $2, $3, $4, and $4.50.

Airports electing to impose a PFC are permitted to use the revenues to pay for all or part of the allowable cost of an approved project, pay bond-associated debt service and financing costs, combine PFC revenues with federal grant funds to implement an approved project, or apply the funds to meet the non-federal share of the cost of projects funded under the federal airport grant program.

The PFC program can be used for surface transportation projects and can be aimed at congestion and noise reduction

improvements, as well as for improvements to the terminal, safety, security, capacity, and other purposes. To make the cargo hub access fee concept more applicable to the various cargo hub access needs, legal authorization also could be provided for participation by private companies operating hubs of national or regional significance. In this manner, these private hub operators could institute cargo access facility charges to finance access improvements needed for their terminals.

There are some advantages in authorizing such a fee at the national level for funding of access improvements at nationally and/or regionally significant cargo hubs. All cargo hubs would have the option of instituting a fee, but would not be required to do so. If they so chose, they would consider their competitive environment, but the mechanism would exist for all hubs to choose to use such funds to contribute to the financing of cargo hub access needs, where and when needed. If such a program can be defined appropriately, national legislation could set the framework for nationally and regionally significant hub access programs, providing the option to each hub to choose whether, when, and at what level to participate. User fees could be collected from all companies moving through cargo hubs that decided to participate; probably such fees would be collected regionally at all facilities participating in the program. The program also could be structured to allow individual facilities to institute such a cargo hub access program and fee. Although similar in concept to the existing PFCs at hub airports, which are collected at the option of each airport, based on eligibility requirements set at the federal level, and with a maximum fee set by national legislation, many differences would have to be determined regarding where the charge would be collected and how the funds would be administered.

Under such a program, each hub could tailor its access program to its individual needs, and there also would be some consistency in cargo hub access funding approaches nationally. In addition, cargo hub access project sponsors would have dedicated funds for their projects and/or to match federal and state contributions. For projects aimed at improving cargo access in which cargo users should provide a portion of the financing, this source could be tapped. Such a program could then be an important mechanism toward facilitating financing packages that consider project beneficiaries and determining who should pay for what part of the improvement when it benefits automobile, truck, and rail traffic.

Authority for a dedicated fund for cargo hub access or freight and intermodal projects should be considered and could be further defined during the deliberations to structure the next Surface Transportation Program reauthorization. If, for whatever reasons, such a program cannot be approved or implemented nationally, states with significant cargo hub access needs and both private and public support for such a concept could develop this type of program. The major advantage of a national program is that it would set national guidelines applicable to all hubs. Individual state programs could eventually result in too many different types of fees and create competitive concerns by terminal operators, carriers, and shippers, as well as inconsistencies in revenue collection approaches and fee levels (as developed with motor vehicle registration and other commercial vehicle fees).

6.3 SUGGESTIONS FOR ADDITIONAL RESEARCH

Based on the case studies reviewed, the research team makes the following suggestions for additional research:

- An analysis of cargo hubs in the United States should be performed to select technical criteria and to develop information to define cargo hubs of national and regional significance, based on cargo handled at each hub, the size of facilities, and the services provided. This study found that such information is readily available for ports and airports, but not for rail yards, intermodal terminals, privately operated terminals, and other multimodal hub complexes.
- Analysis should be conducted to consider formally how benefits and objectives of cargo hub access projects should be related to project financing, particularly aimed at providing guidance or illustrative cases that planners and officials can use, to determine appropriate levels of funding by various beneficiaries and user groups.
- The case study analysis research should be expanded and updated regularly to maintain an inventory of cargo hub access projects, similar to the inventory that was developed through this research. Such a project inventory can serve planners and officials in helping to identify examples that can be useful in defining solutions and identifying financing strategies for cargo hub access projects.

APPENDIX A

ACRONYMS AND ABBREVIATIONS

3PL:	Third-Party Logistics Provider
A&D:	Arrival and Departure
AADT:	Average Annual Daily Traffic
AAPA:	American Association of Port Authorities
AAR:	Association of American Railroads
AASHTO:	American Association of State Highway and Transportation Officials
ACBOP:	Alameda Corridor Business Outreach Program
ACTA:	Alameda Corridor Transportation Authority
ACTF:	Alameda Corridor Task Force
ADHS:	Appalachian Development Highway System
AIP:	Airport Improvement Program
AIR-21:	Aviation Investment and Reform Act for the 21st Century
ALP:	Airport Layout Plan
AMPO:	Association of Metropolitan Planning Organizations
AMT:	Alternative Minimum Tax
APEC:	Asia-Pacific Economic Cooperation
ASI:	American Stevedoring, Inc.
ATA:	Air Transport Association
ATCT:	Air Traffic Control Tower
BNSF:	Burlington Northern Santa Fe Corporation
CACH:	Chicago Area Consolidation Hub
CDOT:	Chicago Department of Transportation
CLM:	Council of Logistics Management
CMAQ:	Congestion Mitigation and Air Quality Program
CMIB:	California Maritime Infrastructure Bank
COE:	U.S. Corps of Engineers
COFC:	Container on Flat Car
COG:	Council of Governments
CPI:	Consumer Price Index
CPUC:	California Public Utility Commission
CTA:	Chicago Transit Authority
CUTR:	Center for Urban Transportation
DCCA:	Illinois Department of Commerce and Community Affairs
DERM:	Department of Environmental Resources
DOT:	Department of Transportation
EDA:	Economic Development Administration
EIR:	Environmental Impact Report
EIS:	Environmental Impact Statement
EPA:	Environmental Protection Agency
EQB:	Environmental Quality Board
ERP:	Engineering Review Panel
FAA:	Federal Aviation Administration
FAST CAST:	FAST Corridor Interagency Staff Team
FAST Corridor:	Freight Action Strategy for the Seattle-Tacoma Corridor
FBD Program:	Ferry Boat Discretionary Program
FDOT:	Florida Department of Transportation
FedEx:	Federal Express
FHWA:	Federal Highway Administration
FIRST:	Freight Information Real Time System for Transport
FMSIB:	Freight Mobility Strategic Investment Board
FONSI:	Finding of No Significant Impact
FPFC:	Florida Ports Financing Commission
FPL:	Florida Power and Light
FRA:	Federal Railroad Administration
FS:	Florida Statute
FSTED:	Florida Seaport Transportation and Economic Development Council
GARVEE:	Grant Anticipation Revenue Vehicles
GCIF:	Grade Crossing Improvement Fund
GDP:	Gross Domestic Product
GM:	General Motors
GNP:	Gross National Product
HPMS:	Highway Performance Monitoring System
HPP:	High Priority Projects
ICAN:	Investing in Careers and Neighborhoods
ICTF:	Intermodal Container Transfer Facility
IDOR:	Illinois Department of Revenue
IDOT:	Illinois Department of Transportation
IITC:	International Intermodal Transportation Center
ILA:	International Longshoremen's Association
IM:	Incident Management
IPA:	Initially Preferred Alternative
IRFP:	Illinois Rail Freight Program
IRS:	Internal Revenue Service
IRSF:	Indiana Rail Service Fund
ISTEA:	Intermodal Surface Transportation Efficiency Act
ISTHA:	Illinois State Toll Highway Authority
JFK:	John F. Kennedy International Airport
JPC:	Joint Planning Committee
LA/LB:	Los Angeles/Long Beach
LACTC:	Los Angeles County Transportation Commission

LAWA:	Los Angeles World Airports
LAX:	Los Angeles International Airport
LDOT:	Louisiana Department of Transportation
LID:	Local Improvement District
LO/LO:	Lift-on, Lift-off
LTL:	Less-than-Truckload
MARAD:	Maritime Administration, U.S. Department of Transportation
MIA:	Miami International Airport
MIRLAP:	Michigan Rail Loan Assistance Program
MIS:	Major Investment Study
MOTBY:	Military Ocean Terminal Bayonne, NJ
MOU:	Memorandum of Understanding
MPO:	Metropolitan Planning Organization
MTA:	Metropolitan Transportation Authority
MTIP:	Metropolitan Transportation Improvement Program
NAFTA:	North America Free Trade Agreement
NARC:	National Association of Regional Councils
NCHRP:	National Cooperative Highway Research Program
NEAT:	Northeast Auto Terminal
NEPA:	National Environmental Policy Act
NHS:	National Highway System
NJDOT:	New Jersey Department of Transportation
NJIT:	New Jersey Institute of Technology
NOX:	Oxides of Nitrogen
NYNJ:	New York/New Jersey
NYSDOT:	The New York State Department of Transportation
OCIP:	Owner-Controlled Insurance Program
ODOT:	Oregon Department of Transportation
OPRF:	Oregon Port Revolving Fund
ORDC:	Ohio Rail Development Commission
OTTED:	Office of Trade, Tourism, & Economic Development
PAC:	Ports Advisory Committee
PANYNJ:	Port Authority of New York and New Jersey
PBS&J:	Post, Buckley, Schuh, and Jernigan, Inc.
PD&E:	Preliminary Design & Engineering
PFC:	Passenger Facility Charge
PIDN:	Port Inland Distribution Network
POLA:	Port of Los Angeles
POLB:	Port of Long Beach
PR26:	Puerto Rico Route 26 (Baldoroity De Castro Expressway)
PRANG:	Puerto Rico Air National Guard
PRHA:	Puerto Rico Highway Authority
PRPA:	Puerto Rico Ports Authority
PSRC:	Puget Sound Regional Council
PTI:	Partnership for Transportation Investment
RFAP:	(Pennsylvania) Rail Freight Assistance Program
RIAP:	Rail Industrial Access Program
ROD:	Record of Decision
ROW:	Right of Way
RPP:	(Virginia) Rail Preservation Program
RR:	Railroad
RRIF:	Railroad Rehabilitation Improvement Financing
RSTP:	Regional Surface Transportation Program
RTA:	Regional Transit Agency
Santa Fe:	The Atchinson, Topeka, and Santa Fe Railway Co.
SCAG:	Southern California Association of Governments
SCDOT:	South Carolina Department of Transportation
SCSPA:	South Carolina State Ports Authority
SCTIB:	South Carolina Transportation Infrastructure Bank
SFWMD:	South Florida Water Management District
SIB:	State Infrastructure Bank
SIP:	State Implementation Plan
SJU:	Luis Munoz Marin International Airport, San Juan
SPA:	(South Carolina) State Ports Authority
SR:	State Road
STP:	Surface Transportation Program
T & I:	Transportation Intermodal Fee
TDD:	(Union County) Transportation Development District
TEA-21:	Transportation Equity Act for the 21st Century
TEP:	Transportation Enhancement Program
TEU:	Twenty-Foot Equivalent Units
TIFIA:	Transportation Infrastructure Finance and Innovation Act
TIMED:	Transportation Infrastructure Model for Economic Development
TIP:	Transportation Improvement Program
TNBNC:	Tacoma Narrows Bridge Nonprofit Corporation
TOFC:	Trailer-on-Flat-Car
TOS:	Traffic Operative Systems
TRB:	Transportation Research Board
TRF:	Transportation Research Forum
TSM:	Transportation System Management
TTI:	Texas Transportation Institute
TxDOT:	Texas Department of Transportation
UP:	Union Pacific
UPRR:	Union Pacific Railroad
UPS:	United Parcel Service
US-1:	U.S. Route 1
USDOT:	United States Department of Transportation
USEDA	U.S. Economic Development Administration
VMT:	Vehicle-Miles Traveled
WMS:	Warehouse Management System

APPENDIX B

POWERPOINT PRESENTATION

A PowerPoint presentation summarizing the background, methodology, and results of the project can be downloaded from the NCHRP website at trb.org/nchrp under “NCHRP | All Projects | Area 8 | 08-39”.

APPENDIX C

CASE STUDIES

THE ALAMEDA CORRIDOR, LOS ANGELES/ LONG BEACH, CALIFORNIA

Project Profile

The Alameda Corridor project is a 20-mile, multiple-track rail connection from the Ports of Los Angeles and Long Beach facilities to downtown Los Angeles rail yards and to the intercontinental rail network. It is designed to consolidate 90 miles of existing rail tracks into a single integrated system, which represents the shortest and most direct rail route for Union Pacific (UP) as well as Burlington Northern and Santa Fe (BNSF) trains, the railroads operating in the corridor area.

Ten miles of the new rail corridor are being built below grade in an open trench, and all at-grade rail crossings along Alameda Street will be eliminated. The main rail improvements are the consolidation of railroad traffic, the construction of a double-track railroad with centralized control, depressed tracks from 25th Street to Route 91 eliminating at-grade crossings, and a continuous at-grade track to serve local industries. All other tracks will be maintained to be used to service local industries.

The main highway improvement is the reconstruction of Alameda Street with left-turn pockets and new synchronization of traffic signals. Many other major highway improvements (widenings, grade crossings, and bridges) are also part of the overall project.

The Project consolidates 90 miles of rail tracks with 200 roadway crossings into a single 20-mile-long, high-capacity facility connecting the San Pedro Bay Ports with the national railroad system (see Figure C-1). San Pedro Bay is the home to the Ports of Long Beach and Los Angeles, the largest port complex in the United States. Through the Alameda Corridor, cargo will move faster from the ports to its final destination, improving and increasing the use of intermodal transportation connections. Additionally, the project will widen and improve Alameda Street parallel to the rail facility, thereby reducing highway congestion and accelerating port truck traffic.

The estimated cost of the Alameda Corridor is $2.4 billion. The project evolved over more than 15 years of planning that brought together the public and private sectors to structure a unique financing arrangement. The construction is being financed by the public sector, although the rail carriers and the shippers will pay user charges when using the corridor after completion and pay off $1.165 billion in revenue bond proceeds and a loan of $400 million from the U.S. Department of Transportation. The financing also includes $394 million from the ports, $347 million in funds administered by the Los Angeles County Metropolitan Transportation Authority (pass-through grants from federal and state sources and sales tax revenues) and $154 million from other state and federal sources and interest income. The Alameda Corridor is among the largest public infrastructure projects in the United States.

It is expected that the Corridor will handle up to 100 trains per day traveling at 40 miles per hour. This should allow for a decrease in truck traffic, which will ease overall congestion. Additionally, the Alameda Corridor will help maintain California's two major ports as the main entry point for products from the Pacific Rim and a major point for moving outbound American exports to the Pacific Rim. U.S.–Pacific Rim trade doubled during the past 10 years.

Forecasts are for continuation of this growth in the future. The West Coast ports are in a strategically dominant position to connect to the rest of the nation as Pacific trade grows. Most of the major West Coast ports have expansion plans underway.

Cargo Hub Served

The Alameda Corridor project serves the largest maritime container cargo hub in the United States and the third largest in the world (after Hong Kong and Singapore).[1] The cargo hub has two major ports, the Port of Long Beach and the Port of Los Angeles (LA). As of 1996, more than 40% of ocean container cargo arriving in the United States (inbound foreign 20-foot equivalent units–or TEUs) moved through Long Beach and LA.[2]

The Port of Long Beach is ranked the sixth largest container port in the world. In 2000 it handled the largest volume of container cargo in the United States, followed by the Port of LA. (The two ports reversed position for the year ending June 30, 2001.) The two largest U.S. container ports, both combined as the San Pedro Bay Ports, are the third busiest container port complex in the world. In 2000, tonnage through the Port of Long Beach was 68 million metric tons, which includes 4,600,787 TEUs. Container throughput has increased by more than 175% since 1990. The volume of all types of cargo has increased nearly 50% in the past 10 years.

The Port of Los Angeles has 29 major cargo terminals, including facilities to handle automobiles, containers, dry bulk products, and liquid bulk products. Combined, these terminals handle more than 100 million metric revenue tons of cargo representing some $100 billion. Its six modern

[1] www.aapa-ports.org

[2] Source: Alameda Corridor Project Prospectus, Mercer Management Consulting/ Standard & Poor's DRI pg.II-4 (Jan. 1999)

Figure C-1. Alameda Corridor.

container facilities together handle in excess of four million units of cargo containers annually, making the port one of the top 10 busiest ports in the world.

Project Objectives

The primary goal of the Alameda Corridor project is to improve access to the Los Angeles/Long Beach port complex by consolidating railroad lines in one 20-mile-long multiple track rail corridor designed to link the port facilities to the rail yards east of downtown Los Angeles. The project is intended to serve international trade, reduce costs to shippers nationally, and reduce congestion and pollution locally. For the San Pedro Bay Ports, the main objective is to improve the capacity of its access infrastructure to meet future demand. Train and truck volumes are already at the limit of the railroad and highway access infrastructure linking to the Ports. The Alameda Corridor is intended to meet the port access requirements to the year 2020.

More specifically, the main objectives of the Alameda Corridor project can be summarized as follows:

- **Reduce highway traffic delays.** It is estimated that upon opening of the Alameda Corridor, traffic delays affecting cars and trucks can be reduced by 90% (over 15,000 hours of vehicle delay will be eliminated every day) by consolidating rail traffic and eliminating highway grade crossings.
- **Improve safety.** Safety will be improved by eliminating more than 200 street-level railroad crossings. Delays to emergency vehicles will be reduced significantly. Motor carrier and railroad accidents and toxic spills will be more effectively managed.
- **Improve access capacity and maintain competitiveness of ports.** For the San Pedro Bay Ports, utilization of existing rail and highway access facilities would result in increased congestion and the inability to efficiently handle the projected increases in cargo volumes. Train and truck volumes are already at the limit of the railroad and highway access infrastructure capacity to the ports. The Alameda Corridor is intended to meet port rail access requirements to the year 2020 and thereby make it possible for the San Pedro Bay Ports to remain the major cargo hub and gateway for the U.S. and its international trade partners.
- **Improve rail operations.** Average train speed along the corridor will increase to approximately 30 to 40 mph from 5 to 20 mph. Upon opening the corridor, locomotive hours of operation will be reduced by 30%. Assisted by state-of-the-art technology in centralized traffic control systems, the double-track corridor will provide a 75% reduction in the number of times trains have to stop and wait for other trains to pass.
- **Reduce environmental impact.** Today, when an 8,000-ft-long unit train stops, the congestion and related pollution from train and vehicle backup can have a significant impact on the area's air quality. This project will provide a significant benefit to the area by reducing railroad emissions by 28%, as well as reducing auto and truck idling emissions associated with grade crossing delays by up to 54%. Another benefit realized by the consolidation of rail traffic to a primarily industrial corridor is the reduction of noise and vibration exposure to residential neighborhoods. The construction of tracks in the below-grade trench, track construction on new base material, and the use of continuous welded track will help promote quieter operation. Also, sound walls will be provided, where appropriate, to mitigate vehicle noise along Alameda Street, in residential neighborhoods, and other sensitive areas.
- **Promote economic development.** The project was estimated to create 10,000 construction jobs. Improved traffic circulation and the elimination of grade crossings also create enhanced development opportunities along the corridor. In addition, an increase in the efficiency of international cargo flows benefits consumers and shippers throughout the nation.
- **Reduce construction impacts.** Right-of-way needed for a consolidated corridor can be reduced compared with several routes as is the existing situation, resulting in the fewest number of displaced persons and businesses as a result of the construction.

Organizations Involved in the Project

The project originated out of the planning process of the Southern California Association of Governments (SCAG). In 1981, SCAG created a Ports Advisory Committee (including local officials, the railroads, the ports, CalTrans, the U.S. Navy, the U.S. Army Corps of Engineers [COE], the Los Angeles County Transportation Commission, and others) to consider railroad improvements. This committee proposed the consolidation concept that would develop one rail corridor to the ports from the four rail routes then operated by the Southern Pacific (SP), Santa Fe (SF), and UP. Other interested organizations, including trucking companies, the California Public Utilities Commission, and the California Transportation State Commission, participated in the discussions that led to adoption of the consolidated rail corridor from the LA rail yards to the ports.

The planning process continued to be led by SCAG until 1989 when the Alameda Corridor Transportation Authority (ACTA) was created. After the creation of ACTA, the cities across the corridor became more intensely involved in the project. The corridor runs through or adjacent to the cities of Vernon, Huntington Park, South Gate, Lynwood, Compton, Carson, Los Angeles, Long Beach, and unincorporated parts of Los Angeles County. Several agencies (including sanitation districts and the Department of Public Works of Los Angeles County) of the City and County of Los Angeles also became actively involved during project implementation. After the railroad mergers of the 1990s, the two main railroads involved in the project were UP, which was formed through the merger of UP and SP, and BNSF formed through the merger of the Burlington Northern and the Atchison, Topeka and Santa Fe railroads.

Project Financing

The final total estimated cost of the project is approximately $2.432 billion, including contingencies, which are expected to be paid from several funding sources. The main cost components of the project are the initial rights-of-way acquisition, $394 million; construction, design and engineering, $1.7 million; and financing and legal costs, $338 million. Table C-1 shows the major funding sources of the project.

TABLE C-1 Estimated sources of Alameda Corridor project funds

Source	Cost (in Millions)
Port Contributions	$394
Federal Loan	$400
MTA Grants	$347
Series 1999 Senior Lien Bond Proceeds	$994
Series 1999 Subordinate Lien Bond Proceeds	$173
Other Sources	$124
Total	**$2,432**

SOURCE: Official Statement, ACTA, Goldman Sachs & Co. and PaineWebber, Inc., January 1999.

Port Contributions

The ports expended $394 million between 1992 and 1995 to acquire certain land, railroad rights-of-way, and other property interests and improvements. Up to $132 million of the amount is to be repaid by the authority, without interest, from user revenues. In addition, to expedite development of the project, the ports advanced approximately $107 million to pay for certain preliminary engineering, demonstration projects, and other construction, design, and engineering costs. This amount was reimbursed to the ports from proceeds of the Series 1999 Subordinate Lien Bonds.

Federal Loan

The loan for $400 million is being repaid from the revenues generated from the corridor, after payments on the Senior Lien Bonds, but prior to payment on the Subordinate Lien Bonds. If revenues are insufficient to maintain the requisite balance according to such schedule, no default would result under the federal loan agreement. It took a year to negotiate the federal loan terms. The loan is drawn in advance of construction and used for all purposes, except lobbying and advocacy.

MTA Grants

The MTA made an aggregate commitment of $347.3 million in four parts[3]

1. Proposition C funds totalling $8.6 million for preliminary engineering;
2. Federal funds and state and local matching grants totalling $80 million for the North End Segment;
3. A state grant for $40 million for the Washington Boulevard and Santa Fe Avenue grade separations; and
4. A total of $218.7 million for the North End, Mid-Corridor, and South End Segments.

Overall, approximately 76% of the MTA's $347.3 million is provided from pass-through grants from federal and state sources. The remaining 24% is provided from the MTA's Proposition C sales tax revenues. These revenues were approved by Los Angeles County voters in November 1990, in order to increase local sales taxes by 1/2% to provide funds for the expansion and improvement of rail and bus transit services and the improvement and maintenance of streets and highways. The provisions of Proposition C authorize 25% of the tax revenues to be used for freight rail service in order to facilitate vehicular traffic congestion relief.

Series 1999 Bonds Proceeds

A bond issue for $1.167 billion was successfully sold in January 1999, with repayment of principal and interest from project revenues and without any government, port, or railroad guarantee. The bonds are special, limited obligations of ACTA and were insured by MBIA Insurance Corporation (MBIA). The IRS concluded that the project was partially a railroad project (private activity) and partially highway grade separations (public purpose road projects), so over $519 million of the bonds are tax exempt and the remainder are taxable bonds. The Series 1999 Senior Lien Bond proceeds are expected to be used for construction costs of the project (including construction contingencies and program reserves), capitalized interest, bond insurance policy premiums, debt service reserve, surety policy costs, and cost of issuance. The Series 1999 Subordinate Lien Bond proceeds are expected to be used for reimbursement to the ports, capitalized interest, cost issuance, bond insurance policy premiums, the indemnification fund, and the respective subordinate Lien Service Reserve Account.

The Bond Insurance Policy unconditionally and irrevocably guarantees the payment required to be made by or on behalf of the authority to the Trustee of an amount equal to the principal and interest on the bonds as such payments shall become due but shall not be so paid. Standard & Poor's Rating Services and Fitch IBCA have rated the bonds "AAA."

Other Funding Sources

The other funding sources include $18 million provided as grants from the State of California, including an Intercity Rail Grant and a Flexible Congestion Relief Grant; $17.5 million reimbursement by the railroads to the authority for certain trackwork undertaken pursuant to the Operating Agreement; and approximately $89 million from investment earnings on the various monies held by the authority, including federal loan moneys and Series 1999 Bonds proceeds.

[3] *Alameda Corridor Project Prospectus*, p. 25 (Jan 1999).

Revenues

The order of priority in which the revenues generated by user fees and container charges will be allocated and disbursed each year is described in Figure C-2. However, the operating agreement allows the authority to modify this order of priority if necessary or beneficial for bond rating purposes. Revenues received by the Trustee are to be deposited in the revenue fund. Moneys in the revenue fund are to be set aside and transferred for the uses and in the order shown in Figure C-2. The Series 1999 Subordinate Lien Bonds are "first subordinate lien bonds" within the flow of funds.

The railroads and the ports are obligated only to make payments required by the operating agreement. The Series 1999 Bonds are not obligations of the State of California and are not obligations of any of the ports, cities, or railroads. The project is not security for the Series 1999 Bonds, and the Series 1999 Bonds are not secured by a lien on any properties or improvements of the authority, the ports, the railroads or the cities, or by a pledge of any revenues of the ports, the railroads or the cities.

Revenue Rates and Minimums

Rates and fees charged are increased effective January 1 of each year, commencing on January 1, 2003, based on changes to the Consumer Price Index, but no less that 1.5% and no more than 3% annually. After 35 years or after all payments are made (if before 35 years), there will be no further user

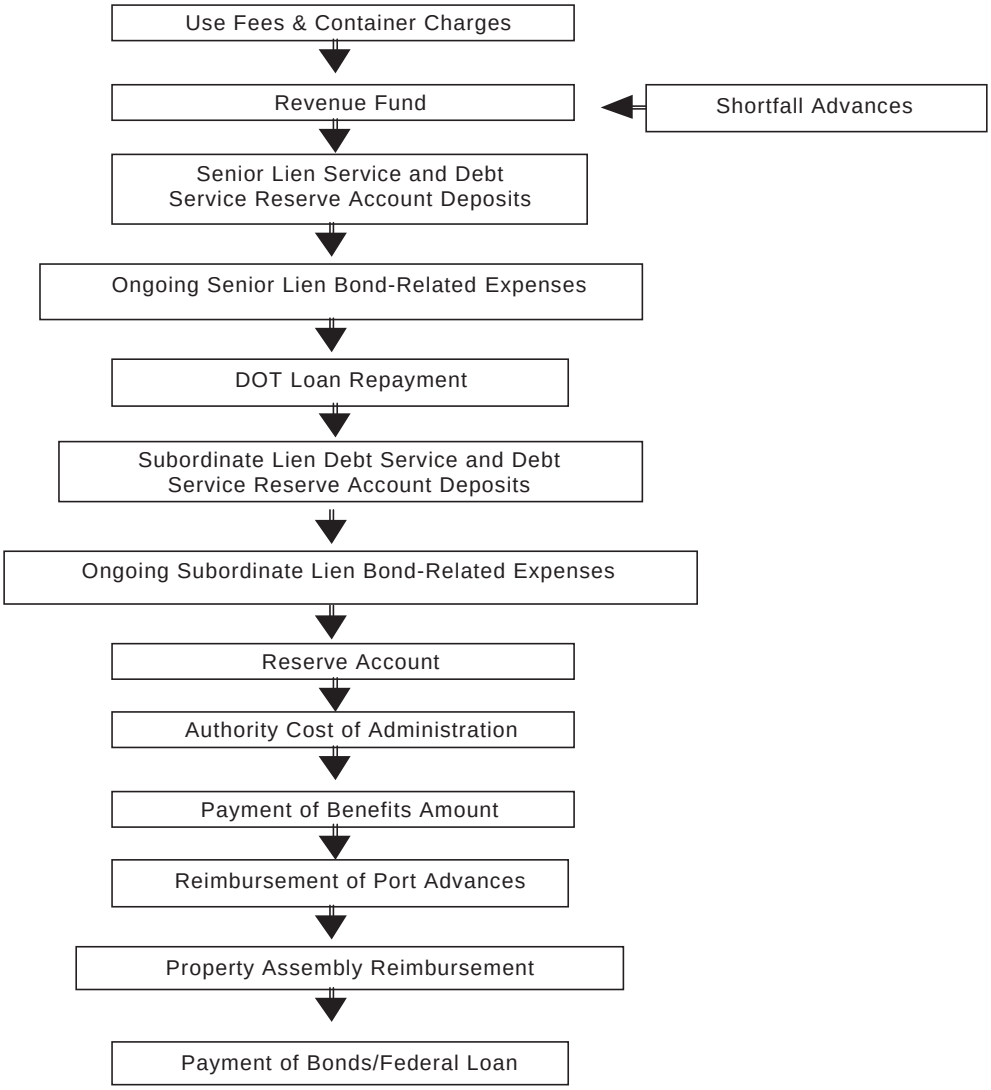

Figure C-2. Flow of funds.
SOURCE: Official Statement ACTA, Goldman Sachs & Co. and PaineWebber Incorporated, January 1999.

charges. If revenues are not sufficient to pay the bondholders, insurance will pay the debt service and principal payments. From the perspective of bondholders, the risk associated with the guarantee of volume provided by the ports is minimized as the Port of Long Beach and the Port of Los Angeles are among the top five in the world, and if railroads cease operations, others will take their business. From the perspective of the ports, their guarantee of revenues to cover shortfalls is likely to be repaid in the long term. After bondholders and the federal loan is repaid, the ports would be repaid for their contributions, up to the maximum amount of user charges collected during the 35-year period up to 2037.

Figure C-3 shows the anticipated dedicated revenues and how they are likely to eventually be sufficient revenues to repay any advances that the ports might have to make in the early years.

Private Companies Involved in Financing the Project

Railroads and/or trucking and shipping companies are the major private companies involved in indirectly financing the project, as they are the ones expected to pay the user fees that will generate revenues to pay for the corridor. As noted above, most of the project costs (other than the MTA grants and possibly some of the port contributions) are to be repaid through user fees ($30 per 40-foot full container, $15 per 20-foot full container, and $8 per empty container and per carload moved by rail or truck between the port and the intermodal yards located in downtown Los Angeles). These fees are to be paid even for trucks that are not using the corridor but move freight to be transported by rail. The fees will eventually be paid by industries and consumers that buy the cargo being shipped through the corridor.

To the extent that these shippers and carriers obtain other savings as a result of the project (e.g., reduced travel time, faster deliveries, reduced inventory costs, lower railroad operating costs, and lower drayage costs), the overall cost of moving cargo through the ports will decrease, the ports will be more competitive, and the various private companies and shippers that use the ports will benefit.

Local Communities' Participation in the Project

From the beginning, the project was widely supported by the communities, because they were affected daily by delays waiting for trains that blocked crossings and it was recognized that these delays would grow in the future. In 1985, SCAG created a task force to study the Alameda Corridor including all small cities and stakeholders. Through this mechanism, the corridor achieved public political support, and various groups were brought together from the ports, Cities of Los Angeles and Long Beach, and small cities affected by the traffic and safety problem. Eventually, the communities became part of the Alameda Corridor Transportation Authority when it was created in 1989.

There was some opposition to the project, at first, led by former State Senator Tom Hayden, who asked for more ben-

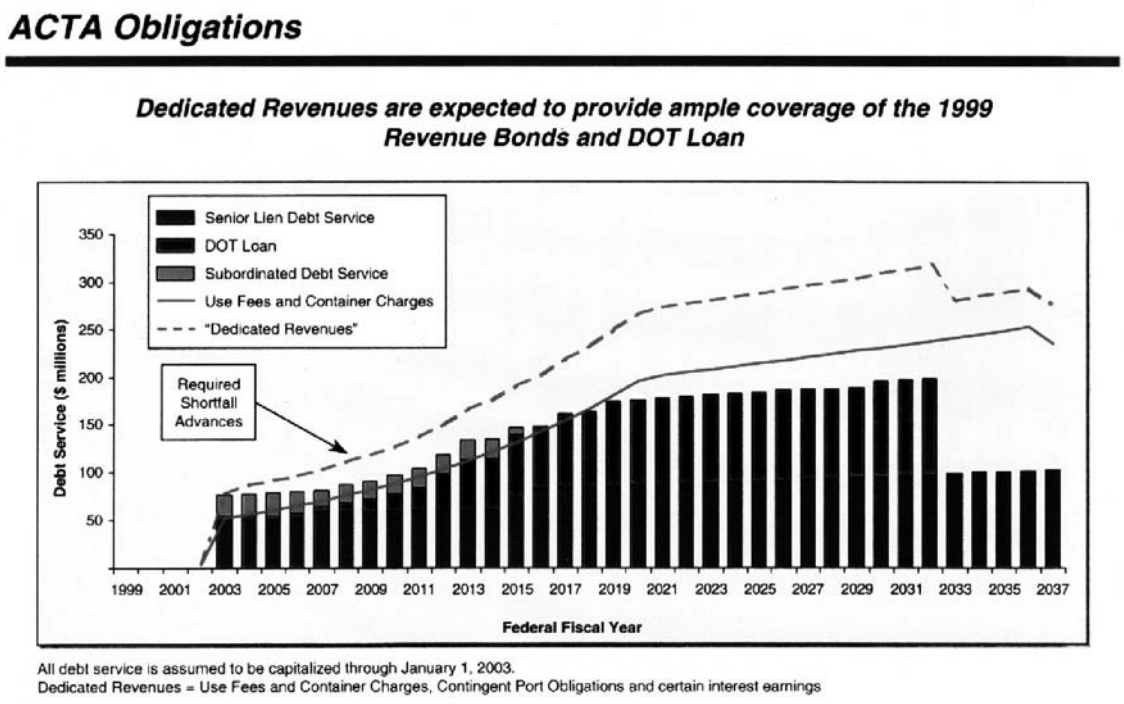

Figure C-3. Anticipated dedicated revenues.

efits for small cities, proposing that big shippers and corporations provide additional funds and benefits for small cities. However, throughout the process, cities were conscious of the great positive impact of the project and did not want to stop the project, since there were great returns to the communities in terms of improved infrastructure, bridges, economic development, jobs, and so forth.

The main idea supported by the communities, which eventually became part of the design concept, was the construction of the 10-mile trench, in order to minimize the impacts to the businesses along the corridor and maximize the positive impacts for the community. After this commitment to the trench and the settlement on the court suit were achieved, the communities generally supported the project. As the overall scope of the project increased, other additions and changes to the project were incorporated in the design at the request of the communities. Additions proposed by the communities included additional bridges, landscaping, pedestrian plazas, and Egyptian hieroglyphics in the Compton Boulevard bridge.

Although the project design concept was changed to reflect input from the communities, there were no major adverse impacts associated with the project in the corridor area. Since the area is mainly an industrial zone, many of the local industries use the trains for their transportation purposes. No major land use changes were associated with the project because right-of-way requirements and construction impacts of the project were small.

Project Results

After the financing for the project was firmly established, one of the primary objectives of ACTA was to construct the Alameda Corridor on time and on budget, safely, and with minimum disruptions to residents and businesses in the corridor area.

In October 1998, the ACTA Governing Board awarded the mid-corridor project (trench) contract as a design/build contract and approved the overall construction schedule. All other major construction contracts were in place or soon to be awarded. Also in October 1998, the ACTA Governing Board approved the program budget. Early in 1999, the sale of ACTA bonds was completed.

The project opened on April 15, 2002.

Project Beneficiaries and Their Financial Contribution

The project is expected to provide significant benefits to several groups: the communities, railroads, ports, shipping lines, shippers, and consumers of the cargo and products that use the corridor. The benefits to these groups and the contribution of these groups to the project financing are discussed in this section. There were several studies to quantify economic benefits from the project, but there was no attempt to relate the benefits directly to the financial structure.

Communities

The communities and cities along the corridor benefit significantly from the project, primarily through the reduced congestion, pollution, and noise. The corridor project itself also generated local jobs during construction.

As do the local communities, the Alameda Corridor helps the Los Angeles County MTA in the objectives to reduce congestion, consolidate rail traffic, eliminate highway grade crossings, improve safety by eliminating conflicts, and reduce truck traffic.

The communities are not contributing financially to the project. Residents, however, do contribute to the federal, state, and local tax sources that partially paid for the project. The MTA contributed approximately 14.3 % of the total project budget.

Consuming Public

The consumers of the goods and products that use the corridor are also key beneficiaries of the project. Faster deliveries and reduced costs to move cargo, the resulting increase in the level of service, and the potential for reduced inventories as a result of increased reliability, should be reflected in a reduction in consumer prices.

Shippers—Exporters and Importers

Despite likely rate increases, the shippers should experience reductions in their total logistics costs through reductions in transit time, inventory costs, and transportation costs. In addition, as the route becomes more competitive, it should make possible increases in the market reach of exporters and importers, and the overall volume of their trade. Shippers are paying most of the cost of the project over time since they will be paying the user fees that are eventually expected to repay the federal loan, bonds, and port contributions, which add up to over 80% of the total project budget.

Railroads

Railroads, together with the local communities, are the main direct beneficiaries of the project. Railroads benefit primarily in two ways: (1) increased business—their services become more attractive and they are able to handle increased volumes and (2) cash payments and facility improvements–they received cash payments for the rights-of-way they owned and their facilities were improved.

In summary, the railroads are direct beneficiaries of the project and they did not contribute directly to the project but received actual cash payments. Through their control of the rights-of-way, the railroads controlled a lot of the key decisions that led to the definition of the project concept and its financing. They used the control of the land as a way to obtain significant financial benefits. The railroads were clearly interested not just in a more efficient, higher speed and more reliable service, but also in obtaining cash for their companies from the project. Particularly for the SP, as was noted, it was a great opportunity in a very bad financial moment for the company. In addition to the cash paid to the railroads, and the opportunity to improve their services, the railroads got some additional improvements to their tracks and facilities.

Ports

The San Pedro Bay Ports benefit from the project by increasing their container cargo volume market potential. At the same time that the Alameda Corridor is being built, the ports are clearing the way for additional capacity through dredging and land acquisition, although they have obstacles as other ports have. Although the Ports of Los Angeles and Long Beach compete against each other, both of them (the San Pedro Bay Ports combined) compete against other West Coast ports to attract Pacific Rim cargo destined inland (mostly rail intermodal cargo). It is likely that Oakland will be a more effective competitor as its dredging program is completed. Seattle and Tacoma are also important competitors to the Ports of Los Angeles and Long Beach, and Seattle/Tacoma has shown rapid container growth since the late 1980s. Therefore, the Alameda Corridor is an essential project, together with various on-dock rail yard development, to increase the capacity of the San Pedro Bay Ports to handle increased container business. The ports contributed close to $400 million to the project budget, mostly for the right-of-way purchase. They also have agreed to cover revenue shortfalls. Eventually, the ports are likely to recover their contributions from the proceeds of the user fees to be collected over the next 35 years.

Summary of Beneficiaries and Contributors

The main contributors to the financing of the project are the shippers (whose user fees will repay the federal loan, the bondholders, and the port contributions), and the MTA (through various grants including pass-through funds from the federal and state government). The main direct beneficiaries are the adjacent communities and the railroads. The ports are not as directly affected, but the outcome of the project was a key element that would influence the success of the ports in the future. Other major indirect beneficiaries are the shippers and the consuming public, broad constituencies that cannot be brought together easily to discuss the problems or alternative solutions, because they are spread throughout the world and cannot grasp how this project benefits them.

Lessons Learned and Insights

The Alameda Corridor is an excellent example of the difficulties involved in identifying and reaching consensus on solutions to complex cargo hub access problems that involve more than one mode, multiple jurisdictions, and expensive alternatives. The project objectives changed from inception to actual implementation as world trade trends changed, mostly reflecting factors far removed from the area where the project is located. A special agency was created because it was unlikely that a project of this size and complexity could be built any other way in the proposed timeframe. The scope and size of the project changed dramatically over a period of more than 10 years, from $200 million to $2.4 billion. The size and scope of changes reflected compromises necessary to satisfy primarily the railroads (owners of the right of way), the environmental process, and the local communities (which had to issue permits for the project). Finally, adjustments and further refinements were needed to satisfy the providers of the financing.

The main lessons learned for communities and planning officials seeking solutions to such complex problems are as follows:

1. One organization has to be the main driver or catalyst to move the project forward (in this case the catalyst first was SCAG, then the ports, and eventually a separate agency—ACTA—was created).
2. If possible, under the auspices of the planning process, hold individual discussions and carry out planning studies with the involvement of key groups to identify needs, define problems, and identify possible solutions.
3. Once the problem has been sufficiently defined, set up a task force involving all interested groups to study the problem in detail and reach consensus on solutions.
4. Consider project costs and financing early on, but remain flexible and adjust project scope as issues are raised so that impacts are minimized and the coalition interested in implementing the project grows and solidifies. In the Alameda Corridor case, this flexibility was key to the eventual implementation of the project.
5. Involve the communities and other stakeholders throughout the planning process and be sensitive to environmental impacts so that the project impacts are minimized and the benefits are not only accruing to the out-of-area shippers, but also to the local communities.
6. At the same time that studies are carried out, environmental analysis is conducted, and community inputs are sought, look at possible financing sources.
7. To put together a financing package, consider a combination of user financing and grant funds that reflects the benefits of the project to both indirect beneficiaries, the nearby residents businesses and communities, and the carriers or direct users of the project.
8. Consider the impact of the user fee amounts on the competitiveness of the local area, ports, railroads, and other groups that may be required to pay for the project costs.

9. Work with government officials and private-sector carriers to structure project financing that, as much as, possible allocates the costs to the main beneficiaries, and when necessary, seek advantageous changes in laws and regulations to the extent possible.

LUIS MUÑOZ MARIN INTERNATIONAL AIRPORT CARGO ACCESS ROAD, SAN JUAN, PUERTO RICO

Project Profile

The proposed project consists of the widening of an existing access road (herein referred to as the Cargo Access Road) to the primary cargo area of Luis Muñoz Marin International Airport (SJU), San Juan, Puerto Rico. Figure C-4 shows the cargo access road, looking west toward the airport. This project is the first phase of a comprehensive access improvement program for the cargo area of the airport.

The primary objective of the project is to alleviate traffic congestion by improving cargo movements to and from Luis Muñoz Marin International Airport, by widening the cargo access road from two lanes to four lanes and improving the current traffic light system with PR–26. The project has backing from the local government, the Puerto Rico Ports Authority (PRPA), and cargo carriers. The project objectives are described in the following sections.

Reduce Traffic Delays and Congestion

The project is expected to alleviate traffic congestion and reduce delays on the cargo access road. The widening of the access road will also be tied with improving adjacent intersections at PR–26, which currently does not meet traffic demand at this busy intersection.

Figure C-4. Cargo access road, looking west toward the airport.

Meet the Demands of Cargo Carriers

Initially, the project was brought to the attention of PRPA by the cargo carriers who use the access road to transport their cargo to and from the airport. They complained to PRPA about delays and congestion on this road, as well as the age of the traffic light signal at PR–26.

Improve Competitiveness of the Airport

The improvement of traffic flow on the cargo access road will be beneficial to the cargo carriers, as well as the airport itself. Cargo carriers look for the fastest and most efficient ways to transport their goods. When their trucks are caught in traffic delays and congestion, it costs the cargo carriers money. The airport could be affected by a reduction in cargo handled; carriers might look for other alternatives if the airport becomes inefficient.

The volume of cargo and traffic moving through this two-lane road is very significant. During peak hours, which were determined to be morning, midday, and evening, there are substantial (half-mile or longer) traffic back-ups and long delays for outgoing traffic.

Cargo Hub Served

SJU is a major air cargo hub for the Caribbean Basin. In 2000, the airport processed 528,370,110 pounds of cargo. Approximately 55% (291,521,427 pounds) was inbound cargo and 45% (236,848,683 pounds) was outbound cargo. The airport is served by over 40 cargo carriers, including the major domestic and international airlines; integrated air cargo carriers such as FedEx, UPS, and Airborne; and small all-cargo carriers such as Tol Air and Martinaire.[4]

Air cargo activity at SJU has increased rapidly since the 1970s. The rapid growth of the Puerto Rican economy, spurred by government incentives to encourage industrial development, produced a corresponding increase in cargo imports and exports. In the mid-1980s, this growth was further encouraged by an influx of high-technology manufacturing plants to Puerto Rico.

These plants use inputs and produce products with a relatively high value-to-weight ratio, and they consequently use air transportation more frequently than more traditional manufacturers. A portion of the growth in air cargo has been diverted to Aguadilla (Rafael Hernandez Airport) since the late 1980s, which resulted in more moderate growth of cargo at SJU during the 1990s.[5]

The growth in air cargo at SJU has resulted in a significant expansion in cargo facilities, largely in the eastern portion of the airport. As of 2001, there were eight buildings largely dedicated to air cargo. These structures provide over

[4] Ibid.
[5] SJU Master Plan, November 2000, Chapter 3.

572,000 square ft of tenant space. Active companies providing cargo services at SJU include Tol Air, Delta Airlines, American Airlines, FedEx, UPS, Lufthansa, and Four Star Aviation.

In 1995 to 1996, a private developer, Caribbean Air Services, constructed three new cargo buildings south of Runway 10–28. These facilities house Emery, Airborne, and the U.S. Postal Service.

Project Financing

The widening of the cargo access road would be funded through two mechanisms: the Airport Improvement Program (AIP) and the Passenger Facility Charge (PFC) collected by the airport. No local funds or appropriations would be used to design or construct this project. Future phases of the project, such as interchange improvements, would be funded separately; the source of these funds is not known since the planning for the work is still in the conceptual stage.

The AIP provides federal grants for airport development and planning. AIP funding is usually spent on capital projects that support airport operations, including runways, taxiways, aprons, and noise abatement. The funds obligated for the AIP are drawn from the Airport and Airway Trust Fund (often referred to as the aviation trust fund), which is supported by a combination of user fees (mostly airline ticket taxes) and fuel taxes.

The law requires that AIP funds be apportioned by formula each year to specific airports or types of airports. Such funds are available to airports in the year they are first apportioned and they remain available for the two fiscal years immediately following. Among the recipients of apportioned funds are primary airports, cargo service airports, states and insular areas, and Alaska. Primary airports, of which SJU is one, are commercial service airports that have more than 10,000 passenger enplanements each year.

As a primary airport, SJU can receive entitlement funds based on the number of enplaned passengers from the previous fiscal year. The minimum annual amount apportioned to primary airports is $650,000, and the maximum is $26 million. The entitlement grants provide only about 75% of the allowable project costs, so the balance must come from other sources. In the case of SJU, this source is the PFC.

The PFC was first authorized by the Aviation Safety and Capacity Expansion Act of 1990, and subsequently amended, most recently as part of the AIR-21 legislation. The PFC represents an additional source of funding for airport infrastructure projects. This legislation allows public agencies controlling commercial service airports, after receiving approval from the FAA, to charge enplaning passengers using the airport a facility charge (from $1.00 up to $4.50). Hundreds of primary airports have taken advantage of this program. PFCs have been extremely popular with airports because they allow for a broader range of improvement projects than AIP and because they give airports more freedom from airline involvement in the project decision making process.

PFC collections and AIP funds are complementary in the overall funding of airport improvements. The majority of PFC-approved projects also are eligible under the AIP. One common use of PFC funds allowed at primary airports is as the local matching funds for AIP grants.

The PRPA first instituted a PFC at Luis Muñoz Marin International Airport in 1993. The $3 PFC was planned to accumulate over $132 million from March 1993 to March 2003. The PFC funds were to be used for terminal improvements, a new taxiway, and a runway extension. The program was later revised and expanded to encompass over $216 million in improvements, with PFC funds to be collected until April 2010. Most recently, the PRPA applied to revise their PFC program to provide for a higher facility charge and expanded projects, including the cargo access road. This new program will begin in 2002.

The PFC will be used as a matching share to cover the costs of the cargo access road widening project: $179,000 for the design process and $1,125,000 for construction.

Project Results and Lessons Learned

Since the project is not yet complete, the results of the access improvement cannot be assessed. The analysis and interviews conducted as part of the Master Plan indicated that a widened access road would improve conditions and reduce congestion. The full benefit of this project will be obtained only if the needed interchange improvements are implemented. As of mid-2001, the design portion of the project was on schedule. However, the timing of the construction portion of the project is not firm, since it is subject to the progress of the midfield taxiway.

Once the project is complete, there are no formal procedures for evaluating the effectiveness of the improvements. The PRPA will maintain contacts with its tenants and be receptive to any comments or concerns they have regarding the project.

This project has evolved from a simple road widening in the 1989 Master Plan to a major roadway improvement with the potential redesign of two interchanges. From this evolution, several important lessons can be learned that should be applied to future airport cargo access projects.

Lesson 1: Initial planning should carefully consider the interaction of proposed projects, particularly access improvements.

The November 2000 Master Plan recommended that the cargo access road be improved in the 5- to 10-year planning period. This recommendation was based upon forecasts of cargo demand and the presence of more critical projects, namely the midfield taxiway widening. What was not considered at that time was the relationship between the work needed to widen the taxiway and the priority of the road.

The widening of the midfield taxiway will require the relocation of several major airport tenants and the redesign of the central section of the airport. The widening of the cargo access road, and any possible realignment of this road, is logically an integral part of these other actions. Thus, the Master Plan should have identified the widening project as a short-term improvement.

In this case, the change in priority was not critical. The PRPA had ample financial resources to complete the necessary work. Other airports with more limited capabilities, however, could be adversely affected. Close coordination with the client on overall Master Plan improvements could help to avoid these situations.

Lesson 2: Interagency coordination is critical, particularly relative to prioritization of work.

The access improvements to the air cargo area are a high priority to the PRPA. However, the only way to fully address this issue is to improve the two interchanges on PR–26 and complete the modifications of PR–109 and Loiza Street. These improvements are under the jurisdiction of the Puerto Rico Highway Authority. This agency has yet to identify these projects as a priority. Thus it is possible that these important enhancements may not occur for several years.

The situation is further complicated by the ongoing San Juan Estuary Study by the Corps of Engineers and the ferry project under study by the Puerto Rico Tourism Authority. Either of these projects could delay or require significant changes to the interchange improvements at PR–26 and the cargo access road. It is possible that, even if the Highway Authority wishes to proceed quickly, those critical access improvements may be delayed for several years.

These concerns reflect the need for early and continual coordination between agencies. This is particularly important in the case of semi-autonomous agencies such as authorities, which normally might expect to proceed on major projects independently. The PRPA is sensitive to these issues and working hard to maintain good interagency coordination. However, this situation is difficult, given the number of agencies and their different needs and priorities.

Lesson 3: The impact of access improvements must be considered beyond the immediate proximity of the facility, with an eye toward unintended consequences.

The Cargo Area Access Road Corridor Study examined not only the immediate area adjacent to the cargo access road, but also the Campo Rico interchange. By doing this, it was found that the overall access to the cargo area could only be improved if the Campo Rico interchange was converted from a partial- to full-cloverleaf configuration. Had the study not examined this interchange, all of the other access improvements would have been ineffective. This shows the importance of carefully designing an access study to address regional issues.

Lesson 4: The FAA's funding programs provided an effective means for financing the project because the project was mainly within the airport boundary.

Airports require extensive infrastructure investment. The FAA's AIP provides substantial funds earmarked specifically for airports. This financial resource is critical to projects like this one. In addition, the ability of the PRPA to use PFC funds to act as the local matching share gives the airport client tremendous financial flexibility.

An added benefit of the AIP and PFC programs is that they integrate planning and user participation into the decision making process. A project is AIP-eligible only if it is part of an approved Airport Layout Plan (ALP), which is developed through a planning process that includes input from the public and airport users. In addition, a PFC can only be approved after it has been reviewed and commented on by tenants and other interested parties. Thus, the FAA's funding programs are designed to ensure that financial resources are allocated through an open process that gets input from both airport users and the public served by the airport.

In this case, the access improvements were initially an airport project entirely. Eventually, additional improvements will be necessary outside the airport property, such as the interchange improvement to a full cloverleaf. Interchange and similar access projects outside the airport facility usually require intense interagency coordination, as was the case for this project.

RED HOOK CONTAINER BARGE/PORT INLAND DISTRIBUTION NETWORK (PIDN), PORT OF NEW YORK/NEW JERSEY

Project Profile

This case study profiles the Red Hook Container Barge and the Port Inland Distribution Network (PIDN). The barge was a cutting-edge solution to a cargo hub access problem—the barge successfully provided an alternative mode and route for the movement of cargo through a congested area. The success of the barge in shifting port traffic from trucks to an alternative freight mode, thereby improving cargo hub access, has become a strategy that other ports are now trying to emulate as their roadway systems become congested. The PIDN is one example of the newest generation of mode and route shifting strategies for improving cargo hub access.

The Red Hook Container Barge has been in operation for 10 years and was the first freight access project funded under the ISTEA Congestion Management Air Quality (CMAQ) Program. The PIDN is a new concept being explored by the Port Authority of New York and New Jersey.

The barge and PIDN differ in terms of the eras and business climates in which each concept was developed, as well as in geographic scope. However, the projects share a goal of shifting container traffic from trucks to an alternative mode, thereby reducing congestion on access routes to and from port facilities. In addition, the Port Authority's experience with the barge has influenced the PIDN concept development.

The barge transports containers between the Red Hook Marine Terminal in Brooklyn, NY and Port Newark, NJ. The barge is designed to provide an alternative to the trucking of containers to and from the congested Brooklyn waterfront.

The PIDN was also conceived as a means of reducing direct truck trips to and from the agency's maritime terminals. In addition, the PIDN is designed to improve the efficiency of the maritime terminals by shifting containers immediately from the vessels to trains and barges for distribution from an inland facility rather than being stored at the port for truck pick-up. Similarly, export cargo can be consolidated at the inland facilities and transferred by barge and rail to the port. Accordingly, the PIDN is designed to create a "hub and spoke" system between the port and the inland facilities.

Current Barge Service

The current barge service operates exclusively between the Red Hook Marine Terminal in Brooklyn and a 20-acre satellite facility at American Stevedoring, Inc.'s terminal in Port Newark, NJ. The barges shuttle an average of eight-to-nine times between the two facilities each week, based on vessel calls. American Stevedoring, Inc. (ASI) has told shippers and receivers that if a vessel with their cargo is worked at their Brooklyn terminal on a given day, the cargo will be available by noon the next day at the Port Newark facility for pick up. The barge only handles containerized cargo.

There is no charge for the customers to use the barge. This financial arrangement places the Brooklyn terminal on an equal footing with the Port Newark/Elizabeth terminals for containers in terms of inland transportation costs. Typically, the cost associated with direct (non-barge) inland truck movements to and from the Brooklyn terminal can be two-to-three times higher than comparable trucking costs from the Port Newark/Elizabeth terminals.

In 2000, the barge transported 59,000 containers, which represented 94% of the total number of containers handled at the Red Hook terminal. In 1993, the barge transported 34% of the terminal's containerized cargo. The barge has become a key element in the successful operation of the Red Hook terminal.

American Import-Export Trucking, Inc., the trucking subsidiary of ASI, operates the barge under an agreement with the Port Authority. The Port Authority is the owner of the current barge equipment. The contracts between the two entities include an operating contract and a "Bareboat Charter Party" agreement. The contracts require that the barges solely be used for the movement of containers between the two ASI facilities; they cannot be used for any other cargo or on any other route. Moran, a leading tugboat company, was selected by the operator to tow the barges between Brooklyn and New Jersey.

The Impetus for the Barge—The Gowanus Expressway Reconstruction and Concerns at the Red Hook Terminal

Prior to the barge, access to the Red Hook Marine Terminal was limited to trucks. The trucks used the Gowanus Expressway and local streets to access the terminal. The Gowanus Expressway was the terminal's principal landside access to the U.S. mainland. The Gowanus Expressway connects to the Verazzano Narrows Bridge (between Brooklyn and Staten Island).

The inland route continues with the Staten Island Expressway and two bridges (the Goethals Bridge and the Outerbridge Crossing) into New Jersey. The Port Authority of New York and New Jersey surveyed the trucks at Red Hook in 1991 and found that 60% of the terminal's customers were west of the Hudson River on the U.S. mainland and, therefore, used the Gowanus route.

In 1991, the New York State Department of Transportation announced plans to reconstruct the Gowanus Expressway over a 10-year period, with significant lane closures during that time. The terminal operator and steamship lines calling on Red Hook believed strongly that the reconstruction would result in a prolonged and profound deterioration of the terminal's only highway connection to the U.S. mainland. One of the major steamship lines calling on the terminal immediately indicated that it would shift from Red Hook to a New Jersey terminal because of the Gowanus reconstruction. With other steamship lines and customers likely to follow, the viability of the terminal was in serious and immediate jeopardy. The terminal's future rested on the viability and reliability of its landside access.

Cargo Hub Served

The Red Hook Marine Terminal is one of the maritime terminals located in the Port of New York and New Jersey complex (Figure C-5). The Port of New York and New Jersey is the East Coast's largest port and plays a crucial role in international trade. In 2000, nearly 79 million tons of cargo flowed through the port.

The Red Hook Marine Terminal is located on the waterfront in Brooklyn, NY. It is currently the only operating terminal in Brooklyn and one of two maritime cargo and container facilities in New York City. The second New York City facility is the Howland Hook Marine Terminal in Staten Island.

New York City has a long and rich maritime history. However, as the maritime industry shifted to the use of containers, the geographic center of the port in the region shifted to New Jersey. The Brooklyn waterfront and the Red Hook Terminal remained viable elements of the regional port complex, with the closest locations to the port entrance, deep water, and a highly skilled maritime labor force.

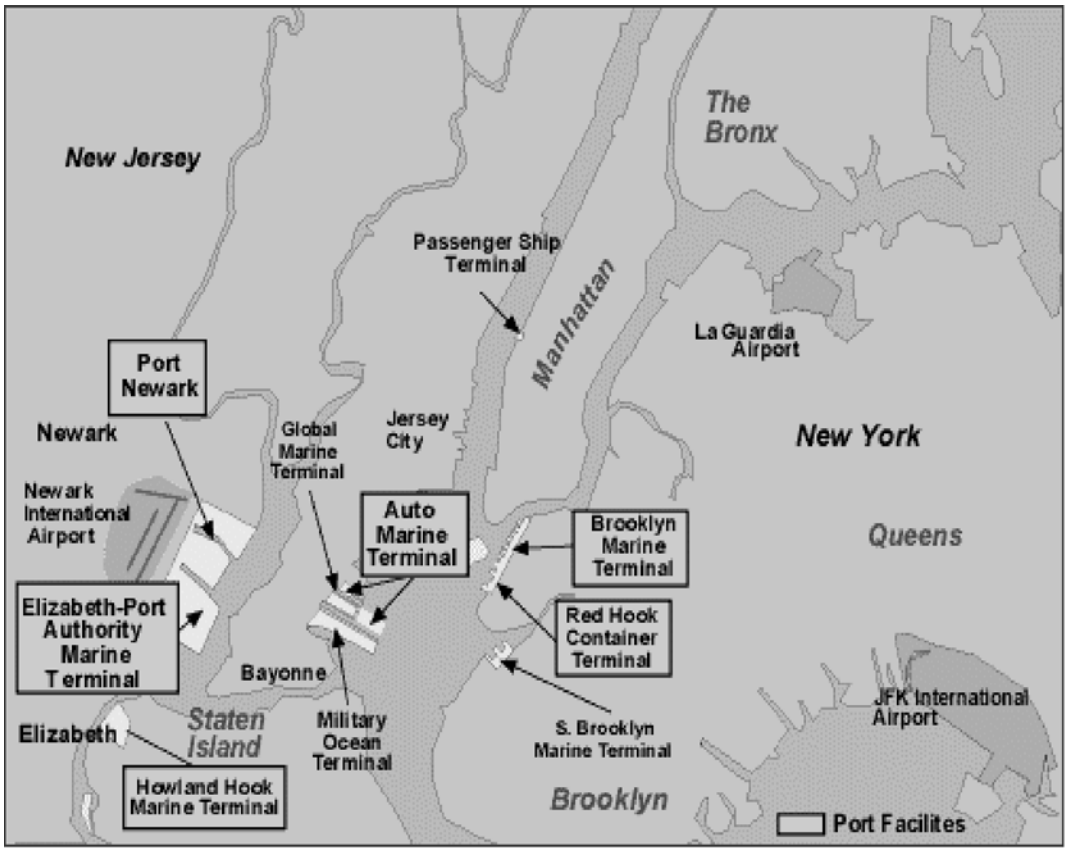

Figure C-5. The Port of New York and New Jersey.
SOURCE: Port Authority of New York and New Jersey.

In 1980, the Port Authority entered into a long-term agreement with the City of New York to develop a container operation at the Red Hook Terminal. The container terminal was completed in 1981. The Port Authority undertook additional investment in the terminal in 1986. In 2001, the City of New York purchased new cranes for the terminal.

The Red Hook Marine Terminal is now a 100-acre facility with four cranes, warehousing space, and two bulk handling yards. In 2000, the terminal handled 63,000 containers and nearly 173,000 tons of breakbulk cargo. While the terminals at Port Newark/Elizabeth tend to handle larger vessels and larger steamship lines, the Red Hook terminal has established itself as a key terminal in the port for the smaller steamship lines, as well as combination and breakbulk vessels. Recent initiatives by the terminal operator have resulted in Red Hook becoming the East Coast's largest cocoa bean terminal.

Prior to the barge, the Gowanus Expressway and local streets in Brooklyn were the only access to the terminal.

Project Financing

The objective of the initial barge service was to respond quickly and effectively to the concerns of the terminal's steamship lines and customer base. Accordingly, $2.8 million in Port Authority funds and $300,000 in New York State Economic Development Program funds supported the thrice-weekly initial barge service. Existing, readily accessible funding sources were used to initiate the barge service. There was no time to apply for federal funds. Because the goal was to retain the terminal's business, the terminal operator, steamship lines, and customers were not charged for the use of the barge—the barge was established as a fee-free service.

Once the business situation at the Red Hook Terminal stabilized, additional funding sources, as well as ways to improve the efficiency of the barge operation could be analyzed. Funding sources were sought for three aspects of the barge operation, as follows:

- An assessment of barge operation alternatives,
- Equipment purchase, and
- The ongoing barge operation.

In reviewing potential federal funding mechanisms, particular attention was paid to the Intermodal Surface Transportation Efficiency Act (ISTEA), which was enacted in December 1991. ISTEA was a landmark in transportation programming and financing. The Act instituted new flexibility in transportation funding mechanisms and promoted more

extensive local input in transportation decisions by empowering metropolitan planning organizations (MPOs) to a greater extent than earlier legislation.

ISTEA also created a new funding mechanism—the Congestion Mitigation and Air Quality (CMAQ) Program. The focus of the CMAQ program was to fund and support transportation projects that generated air quality improvements. The CMAQ program was also unique in that it could be used to subsidize operational expenditures, along with studies and capital expenditures—the expenditure types that were sought for the Red Hook container barge.

CMAQ appeared to be an excellent match to the barge program in terms of goals and expenditure types funded. Further, CMAQ was a new funding source, meaning that the barge project would not affect the federal funding planned for other regional transportation projects and initiatives.

The Red Hook container barge was the first freight project to apply for CMAQ funds. There was a steep learning curve because CMAQ was a new program and a freight project under the program was somewhat unanticipated. The anticipated projects largely involved transit and alternative-fuel initiatives. As an example, much of the original CMAQ application form had to be crossed out and filled out in an alternative manner for the barge project.

As of 2001, the barge has received $9.7 million under CMAQ (with the federal portion being $7.7 million); $2 million in Surface Transportation Program (STP) funds (of which $1.6 million was the federal portion); and $3.8 million in TEA-21 funds (of which $3 million was the federal portion).

Over the 10 years since the barge program began, the New Jersey Transportation Trust Fund has contributed $1.7 million to the barge program. New York State contributed an additional $1.8 million in 1995. The Port Authority has contributed approximately $39.8 million to the program. The terminal operator, ASI, has also contributed several million dollars to the continued operation of the barge.

These funds supported the operation of the barge, market and operational studies, and $14.7 million in capital investments in barge equipment, mobile cranes, and bulkhead and terminal improvements.

The barge remains a fee-free service for Red Hook container customers, and the barge cannot be used for any other purpose than to move containers between the Red Hook terminal and the satellite facility in Port Newark, NJ. As such, the barge produces no revenue to support its ongoing operation. Accordingly, funding must be sought continually to support the barge operation.

Project Results

The barge swiftly and effectively stabilized the Red Hook Terminal in terms of its landside access. The barge now handles nearly all of the containers moving through the terminal—a greater number than originally anticipated in the original CMAQ applications.

The original goal was to shift 45,000 containers to the barge by 1998. In 1998, the barge handled nearly 47,000 containers. In 2001, the barge is anticipated to move over 71,000 containers.

The stabilization and expansion of the Red Hook terminal allowed the operator to pursue new cargo types and customers. For example, the terminal expanded its breakbulk operations and has become the largest cocoa bean port in the United States.

However, the fee-free nature of the barge has also been its Achilles' heel. Constant negotiations, renegotiations, and the need to identify funding sources have hampered the continued operation of the barge, along with the number of containers that can be transported. Consequently, the terminal has had to turn away potential customers who cannot be guaranteed use of the barge.

The Port Inland Distribution Network (PIDN)

The Red Hook container barge was a cutting-edge example of a route- and mode-shifting strategy to address landside access issues in the 1990s. PIDN, an initiative being pursued by the Port Authority of New York and New Jersey, is an example of the newest generation of this class of access strategies being pursued by major ports throughout the United States.

PIDN is a direct response to concerns regarding increasing congestion around the major maritime terminals in the New York-New Jersey area and a desire to develop the port's business in an environmentally responsible manner.

These issues are crucial because the New York-New Jersey port anticipates that the number of TEU containers handled at its maritime terminals will grow from 3 million TEUs in 2000 to 14.4 million TEUs by 2040. The Port of New York and New Jersey is already a hub port with a growing hinterland.

The PIDN Concept

PIDN, as currently proposed, consists of a set of regularly scheduled freight trains and barge transportation services designed to link the Port of New York and New Jersey with a set of new inland container terminals, each serving one of nine "Dense Trade Clusters." Each freight train and barge connection is designed to replace individual direct truck movements to and from the port with high-volume, cost-effective container movements. These nine locations, based on analyses, offer the greatest margin of savings over trucking and, therefore, the greatest potential for inland modal diversion.

The nine Dense Trade Clusters account for 82% of the region's total trade and, in 1998/1999, constituted a market of over 2.3 million TEUs from all of the U.S. ports. The minimum market demand threshold of a Dense Trade Cluster was set at 40,000 TEUs per year, a level sufficient to support a single moderate-sized local trucking company. The area of

a Dense Trade Cluster was defined as being circular in form with a radius of 50 miles (which is the range of two round trips per truck per day).

The new freight train services could run between the port and the following:

- Pittsburgh, PA;
- Syracuse, Buffalo, and Rochester, NY; and
- Worcester, MA (which already has a daily train from the on-dock Express Rail facility at Port Newark/Elizabeth).

The proposed tug/barge services would run between the port and the following:

- New England—Bridgeport, CT; New Haven, CT; and Quonset Point, RI;
- Hudson River Service to Albany, NY;
- Mid-Atlantic Service to Camden or Salem, NJ and Wilmington, DE.

The inland container terminals are envisioned as offering U.S. customs services, gate clearance, empty storage, equipment storage and, potentially, value-added services (such as warehousing, distribution services, and manufacturing).

The Role of the PIDN in Port Access and Business Development

Landside access is of crucial concern to the port and is a requirement for business development and growth. The Port of New York and New Jersey is primarily a truck port. Currently about 12% of the cargo through the port moves inland by rail; the remainder—nearly 88%—moves by truck.

The current dominance of truck movements in the inland modal split is a result of the large consumer market surrounding this port—an estimated 79 million consumers reside within one day's drive of the port. Traditionally, rail movements have been cost effective in comparison to trucking after about 500 miles. However, as traffic continues to grow, along with the size of the port's hinterland, the potential congestion and environmental implications of the inland movements needed to be addressed proactively.

The PIDN has five objectives:

1. Reduce truck trips (VMTs),
2. Reduce inland distribution costs,
3. Improve air quality,
4. Increase throughput capacity at the port, and
5. Increase the market share of the Port of New York and New Jersey.

With PIDN, the Port Authority estimates that the truck share of the inland modal split could be reduced to 38% by 2020, with barge movements accounting for 39% of the inland modal split and rail freight accounting for 23%. Without PIDN, the truck share is anticipated to be about 86% in 2020.

PIDN is anticipated to reduce inland distribution costs by substituting less-expensive mass movement of containers for long-distance trucking. The key will be scheduled service and reliable delivery times. Local trucks will still handle local distribution to and from the inland terminal; instead of devoting one full day to move a single container, these trucking firms will now be able to handle two or three revenue trips per day.

Similar to the Red Hook barge experience, PIDN is expected to result in environmental benefits through the shifting of truck traffic to alternative modes. The benefits include air quality improvements, reduction in noise pollution, and net energy savings. Studies conducted by the Port Authority indicate that with PIDN fully developed, the total truck VMTs for the metropolitan region in 2020 could be almost 50 million less than in 2000.

The quick inland movement of containers from the maritime terminals is anticipated to increase the productivity of scarce land resources. Instead of containers waiting for truck pick-up at the maritime terminals, containers destined to the inland terminals will be shipped out immediately on the scheduled rail and barge services.

PIDN is also designed to increase the market share of the port by creating new transportation and logistics cost-saving opportunities. These opportunities are anticipated to increase the competitiveness of the Port of New York and New Jersey in the 75-to–400-mile radius market area. The objective is to capture maritime cargo that is currently moving to these geographic areas through other ports.

The Financial Considerations of the PIDN

Building on the experience of the Red Hook container barge, PIDN is envisioned as a self-sustaining transportation system. There are three elements to PIDN—the maritime terminals at the Port of New York and New Jersey, the barge and rail freight services, and the inland container terminals. Both capital and ongoing operational costs are being considered.

At the maritime terminals, PIDN will make use of the current and planned resources of the port, creatively leveraging investments in these facilities. The on-dock rail terminals can be used. Lift-on/lift-off container barges, similar to the ones used for the Red Hook container barge, also will be used. Building again on the Red Hook barge experience, either overhead cranes or mobile cranes can be used for loading and offloading the barges at the maritime terminals. Because the maritime terminals are within the geographical jurisdiction of the Port Authority (the jurisdiction consists of a 25-mile radius around the Statue of Liberty), the agency can invest in these facilities.

Freight trains and barge services will be provided on a for-fee basis and are expected by the Port Authority to be

financially self-sufficient. The studies to date acknowledge that a significant cost advantage must exist to induce a modal shift; for example, one study estimated that a 15% cost advantage might be required to induce a modal shift from trucks to rail. Because the freight trains and barges will move outside of the agency's geographical jurisdiction, the Port Authority has a limited ability to invest in the transportation equipment.

Similarly, the agency cannot currently invest in facilities outside of its geographical jurisdiction. Accordingly, the agency cannot financially support the development or operation of the inland terminals. These facilities must be developed through agreements with other public and private sector organizations in the Dense Trade Clusters.

The Port Authority anticipates investigating various funding sources for PIDN. These include state and federal sources, as well as private sector partners in transportation, warehousing, distribution, and logistics. Potential federal funding sources identified for the PIDN include the following:

- Up-front grants for planning, research, and development and pilot testing of intermodal barge services;
- Federal tax credits for private sector investment in maritime services that create greater capacity for moving freight;
- Incentive payments for truck diversions;
- Loan guarantees; and
- Funds to showcase new maritime intermodal freight distribution and handling technologies.

In addition to established sources for funds, the agency is also investigating "payments for public benefits." The Port Authority discovered that in the United Kingdom, payments are already being made in exchange for the ongoing creation of public benefits. Public benefits include environmental benefits, as well as the creation of transportation capacity. PIDN creates transportation capacity by removing trucks from the roadway system, freeing the capacity for use by other vehicles.

Current Status of PIDN

PIDN is in concept development and system planning. The Port Authority has initiated discussions with some potential inland terminal developers and operators, the first step in starting PIDN.

Much as the Red Hook container barge was a cutting-edge solution to an access issue in the 1990s, PIDN offers the potential to create a solution for the port access issues of the 21st century. Building on the barge experience, PIDN addresses cargo hub access issues through modal and route diversion, as well as creates a foundation for business growth and development.

SKYPASS BRIDGE PROJECT, PORT OF PALM BEACH, FLORIDA

Project Profile

The Skypass Bridge Project is a four-lane, 1,900-foot-long, 60-foot-high bridge that carries traffic on US–1 and allows ground linkage of the two parts of the Port of Palm Beach. The project, completed in 1999, elevates U.S. 1 (Skypass) over the Port of Palm Beach (Figure C-6). US–1 is a major north–south arterial traversing the entire East Coast of Florida. Prior to the construction of the bridge, the Port of Palm Beach was bisected by a four-lane arterial (US–1) separating a portion of the cargo handling and storage area from the waterfront wharfage area to the east. US–1 split the seaport into an east and west configuration. Half of the port lies to the east of US–1, fronted by the Atlantic Ocean. The western half contains the access to the Florida East Coast railroad yards and storage facilities. This separation inhibited daily port operations and resulted in congestion at key access points for both passenger commuter traffic using US–1 and for freight truck drayage and railroad operations associated with port throughput and storage. The Port of Palm Beach, in cooperation with the Palm Beach MPO, the Federal Highway Administration, and Florida DOT, began addressing this problem by developing the Skypass Project. The project connects the port physically and operationally and enhances vehicular access, cargo movement, and storage within the port. The total dollar value of the project was $31.6 million.

Project Objectives

The purpose of the project was to create a connection between the east and west portions of the Port of Palm Beach in order to increase the overall cargo handling capacity of the port and to facilitate internal freight movement. Due to the continual growth of the port, traffic congestion had been

Figure C-6. Completed Skypass.

increasing and the project's secondary objective was to reduce this congestion. Further, by elevating the regular local vehicle traffic on US-1, additional space was made available for port use below the bridge.

The construction of the bridge structure for vehicle traffic provided the vertical clearance underneath for movement of container cargo by high-lift mobile cranes. The Skypass also facilitated the port-operated internal rail switching train that formerly crossed US-1 approximately 10 times daily to connect the two sides of the port.

Cargo Hub Served

The Port of Palm Beach is situated in Palm Beach County, Florida, within the city limits of Riviera Beach. Prior to the construction of the Skypass bridge, about 15 acres were located between US-1 and the intracoastal waterway (wet side) and about 15 acres were located west of US-1 (dry side). This bisecting of the port by US-1 caused tremendous operational constraints—and with 5,000 trucks crossing US-1 daily, the impact to traffic on US-1 was substantial. The port is an important trade zone, with one million tons of U.S. waterborne cargo moving through the port in 1999 (ranked 87th in the United States) for a total value of $1.5 billion (45th in the United States).[6] It is also one of the region's largest employers. In the early 1990s, the port found itself in dire need of expansion room or else it would run the risk of losing its major tenants.

The Port of Palm Beach primarily provides for the movement of container cargo. The Port of Palm Beach is the 4th busiest container port in Florida and the 18th busiest in the continental U.S. with a traffic of 200,000 TEUs. In addition to intermodal capacity, the port is a major nodal point for the shipment of bulk sugar (domestic uses), molasses, cement, utility fuels, water, and breakbulk items. A major tenant of the port is Tropical Shipping, an integrated shipping services provider that operates throughout the Caribbean Basin. The port mainly serves the counties of Palm Beach, Martin, St. Lucie, Okeechobee, Highlands, Glades, Hendry, Brevard, Indian River, Dade, and Broward. The trading partners include countries in Central and South America, the Caribbean Basin, Northern Europe, and Canada.

Project Financing

In December 1997, 10 bids for the construction of Skypass were received. The three lowest bids came within 2% of each other. For a construction bid of $14.5 million, the project was awarded, with construction to begin in February 1998.

The project was financed under the Florida Seaport Transportation and Economic Development (FSTED) program created under Chapter 311, Florida Statutes. The FSTED program has resulted in accelerated construction at seaports.

The 1996 Florida Legislature appropriated $15 million per year to finance seaport transportation projects (in any Florida port) on a 50-50 basis (projects require a minimum 50% contribution from recipient ports). The appropriation resulted in a $222 million bond that, when matched with seaport funds, made more than half a billion dollars available for seaport construction. In just 2 years the ports obligated over 85% of the available funds.

The seaports have initiated over 70 projects under the FSTED bond program. These projects include new cargo berths, intermodal container transfer facilities, new cruise terminals, and road and rail improvements.

In addition to the Skypass project, the Port of Palm Beach is expending Seaport Bond funds on Slip 3, a new cruise terminal, and other infrastructure improvements.

Along with its bond program funds, the Port of Palm Beach was allocated $6.3 million in Florida Ports Financing Commission Excess Funds to build its FSTED-approved maritime office complex. The Florida Ports Financing Commission was established under a partnership with the FDOT and FSTED. The commission issues revenue bonds and lends the proceeds to ports for capital projects.

Total funding for the project (including access roads and utility relocations) was $31.6 million and came from different public sources. No private funds were involved, nor were user fees considered for users of the Skypass. Three separate bond issues (two in 1996 and one in 1999) as part of the Seaport Stat Grant and funded by FSTED contributed over half of the total funding. Two million dollars came from the Office of Trade, Tourism, & Economic Development (OTTED) as part of the preliminary design and engineering (PD&E) study grant. Finally, FDOT, together with Federal Aid provided under ISTEA legislation, also contributed a total of around $3 million for access roads and utility relocations, not Skypass.

Project Results

The project was completed on schedule within the 36-month requirement. The initial budget was also respected. The Skypass Bridge improved the quality of the service offered by the port and provided more space for cargo handling and movements.

Lessons Learned

The most important lesson learned was that a project such as this one can be carried out on an express basis with a single, central implementation agency. By having the port as the managing agency, decisions could be made quickly and the tight schedule met. Another key element in the process was the decision not to seek federal funding. By using state and

[6] Source: Official U.S. Waterborne Transportation Statistics—U.S. Maritime Administration.

port funds, potential delays from the National Environmental Policy Act (NEPA) process were avoided.

Financially, the support for the project was not from the port but rather from the state with the establishment of a Seaport Bond Program. The bond program has provided capital support for all of the major ports in Florida. By matching the Seaport Bond Program with port bond funds, the Port of Palm Beach successfully funded a significant portion of the Skypass project.

Initially, the Port of Palm Beach started the project as part of the federal NEPA process following their initial plan to obtain federal funds to pay for Skypass. However, after initiation of the NEPA process, the port obtained a Seaport Funding Grant. As a result, federal funds were not required for the completion of the project. (Federal funds were used only for ancillary projects such as access roads, representing less than 2% of the total project cost). Avoiding federal funding requirements allowed the process of planning and development to proceed at an accelerated rate. The effort by the port was important to securing these funds and avoiding a lengthy and cumbersome process.

CHICAGO AREA CONSOLIDATION HUB (CACH), CHICAGO, ILLINOIS

Project Profile

This case study involves a set of four cargo access improvement projects that were developed in conjunction with a new major private sort facility in the Chicago area. The driving force in this effort was the attraction to the site and development of the new sort facility. The UPS sort facility—the largest in the world—generated thousands of jobs and new tax revenues, as well as redeveloped a large industrial property in the Chicago area, eventually named the Chicago Area Consolidation Hub (CACH). The economic value of the UPS operation to the city, region, state, and private companies involved was a powerful motivation to quickly design, fund, and construct the needed access improvements. The UPS facility is a private company rail–truck hub that functions within one of the largest cargo hubs in the United States, the Chicago region, which also handles ship and air cargo movements. Figure C-7 shows the CACH facility.

The access improvements include a mix of roadway and rail projects that represent a microcosm of the various cargo access improvement types. Roadway improvements include both highway and local street projects. The rail projects include yard- and grade-separation projects. Financing differed for each of these access improvements. The case study also demonstrates how the private and public sectors can work together to create mutually beneficial results.

The UPS hub opened in 1995 is 1.5 million square feet and employs 11,000 workers; 65 miles of conveyor belts in the hub complex handle around 1.3 million packages daily and 7 million weekly.[7] Approximately 10% of the UPS daily domestic package volume and 0.6% of the U.S. GNP goes through CACH.

Figure C-7. Chicago Area Consolidation Hub (CACH) facility.

In order to make the hub operational and achieve UPS objectives of efficient intermodal connections, it was necessary to make some improvements to railroad and highway system access. Four major projects representing additions to the existing infrastructure were implemented to facilitate operations and manage the additional traffic in the area generated by CACH.

1. The Illinois State Toll Highway Authority (ISTHA) constructed an interchange access to the hub from Interstate Highway 294. UPS paid for about one third of interchange construction costs and built 75th Street as a connector from the Tollway ramps to Willow Springs Road and Santa Fe Drive. The cost of the interchange was approximately $16 million. As a public road, 75th Street is under the jurisdiction of, and dedicated to, the Village of Hodgkins. It is a full public access interchange, although the interchange would not have been constructed if not for the CACH project acting as a catalyst.
2. The Atchison, Topeka and Santa Fe Railway Co. (Santa Fe)—now Burlington-Northern Santa Fe (BNSF)—agreed to build an intermodal facility primarily to serve UPS needs at CACH. The intermodal facility operated by Santa Fe next to the UPS facility was built to allow UPS to speed up operations and provide direct connections from the hub to the rail system at a cost of approximately $70 to 75 million.
3. Santa Fe built a rail grade separation at the Willow Springs Road at-grade crossing, which was constructed

[7] Source: UPS

at a cost of approximately $10 million shared between the railroad and Illinois DOT (IDOT). Santa Fe built and paid for the rail overpass at the grade crossing with Willow Springs Road. The road under the overpass was fully reconstructed by IDOT.

4. Local street access to the site was improved at a cost of approximately $1.3 million to accommodate employee access and increases in truck traffic.

The capital needed for the four access and infrastructure projects equaled approximately $115 million ($27.3 million excluding the intermodal facility built by the Santa Fe Railroad).

Cargo Hubs Served

Chicago's network of roads and railroads, and its strategic location at the confluence of major waterways, have made it a major cargo and passenger hub from the heydays of shipping cattle and grain to eastern markets. Chicago's cargo center status grew as a transfer point for coal and iron ore to manufacture steel and it still remains the largest cargo transfer point in the nation. Chicago has also been a leader as containerization grew as a method of handling the movement of most merchandise cargo. The Chicago region handles 5.97 million trailers or containers a year (2000 volumes). This represents approximately 11 million TEUs. This region then can be viewed as the world's largest intermodal volume handler after Hong Kong and Singapore. Intermodal traffic volumes increased at an annual rate of 5.64% from 1995 through 2000. This region is also the largest volume handler in North America as of 2000—at a volume greater than the ports of Long Beach and Los Angeles combined. Chicago is a major transfer point for east–west movements, and for transfer of materials to and from the Great Lakes states. It is also a load center; it picks up from and delivers to a market area that extends from Duluth, MN, to Louisville, KY; from Joplin, MO, to Toronto, ON; and most points in between.

Project Objectives

The main goal of all four access projects is to provide access to the UPS hub by establishing a more direct and efficient connection between the hub and the highway and railroad systems. The projects are conceived to minimize the impact of the traffic generated by the new UPS hub by creating alternatives and adding capacity for the movement of UPS' cargo. The projects also had a positive economic impact on the Chicago area, the region, and the state, as new jobs were created.

The UPS hub and the intermodal yard can also be viewed as increasing the overall competitiveness of the larger Chicago Metropolitan Area cargo hub as the major intermodal cargo transfer center in the United States.

The main objectives of the projects can be summarized as follows:

- Provide direct access to UPS facilities, thereby making possible the construction of the CACH facility at the site selected by UPS.
- Reduce traffic impact of the UPS facility on existing local and state roads. The new UPS facility generates additional traffic around the whole area; the projects were designed to help traffic flow by limiting the number of UPS trucks using existing state and local roads. Approximately 2,700 inbound "feeder movements" occur at CACH each day, 50% use the Tollway and the Interstate system, and the other 50% moves by rail through the intermodal facility. Virtually none of the UPS vehicles travel on local roads (except for regular local deliveries).
- Improve the efficiency and competitiveness of the UPS hub. Due to the access improvements to the hub, UPS can achieve the objectives of the hub, which require fast inbound and outbound movements of a large number of packages daily. UPS can operate more efficiently and at a lower cost by having direct highway and rail access with sufficient capacity to handle the hub's daily package sorting requirements. Additionally, the quality of the service offered by the hub cannot be reliably provided without the direct, high-capacity access connections, so the projects improve UPS' competitiveness in the market.
- Help the Chicago area economy and improve the area's transportation system. The projects help create many jobs at the UPS hub, in addition to the direct jobs created for the construction and maintenance of the access facilities. The improvement of the overall transportation system also facilitates access to other nearby sites in the industrial area of Chicago. Since CACH itself is a major employer, the projects also increased employee access to the Chicago Area Consolidation Hub.

Organization and Private Sector Companies Involved

To make possible the completion of the needed access projects to CACH, two private sector companies and several public sector agencies worked together to form an effective partnership.

The two private sector companies involved were UPS and the Santa Fe Railroad (later BNSF). UPS led the effort throughout the process, working with Santa Fe and public sector agencies to identify the site and identify needed improvements that would make the site work. UPS and Santa Fe also sponsored numerous studies throughout the process to identify the potential impacts and community benefits of the desired improvements and to investigate alternatives.

The Santa Fe railroad also had a leadership role in the overall project. It took on responsibility for completion of the intermodal rail yard, which it agreed to dedicate almost exclusively to the UPS facility. UPS is a major intermodal shipper in the country, so the railroad responded to one of its major clients by making a huge investment similar in size to the investment made by UPS.

All of the major public agencies with responsibility for the area's transportation system were directly involved in planning and implementing the access projects. UPS selected the GM site after high-level discussions with state agencies, including the Illinois Governor's Office. In addition to the Governor's office, the planning and implementation of the access projects included the representative of the U.S. Seventh Congressional District, the Illinois Department of Commerce and Community Affairs (DCCA), ISTHA, and IDOT. After the site was selected, there was significant discussion with officials from the local jurisdictions and the agencies with responsibility for the area's highway and transit systems, including the Village of Hodgkins; the Village of Willow Springs; Grand Boulevard Federation; and three local transit organizations, the Regional Transportation Authority (RTA), Chicago Transit Authority (CTA), and the Pace Suburban Bus System.

Project Financing

According to information provided by UPS, the four improvement projects totaled about $115 million and were financed by various public and private sources. A detailed breakdown of the various project costs is not readily available. The available identifiable breakdown of the funding for each project is shown in Table C-2. These figures are not complete and add up to close to $100 million. They do not include the UPS contribution to public transportation improvements, certain additional costs for the grade separation (engineering fees, liability insurance costs, building demolition, hazardous waste removal, unsuitable removal), nor costs associated with rerouting trains during construction, costs of planning and environmental studies and certain mitigation measures by UPS and Santa Fe, etc.

No federal funds were used for the access projects, even though this is a major hub facility of national significance and a major interchange on an Interstate highway was built. The circumstances and requirements (an interchange on a toll highway needed on a fast track schedule) made it necessary for the state to pursue this project without federal aid.

There were also no direct user fees to finance the project, although trucks using the toll road would be paying tolls. Similarly, the Santa Fe rail yard was financed by the railroad that will then recapture its investment through the facility user charges that are part of the overall rate that BNSF charges its customers for its services. So, even though there were no specific user fees, in reality, the two largest access projects were financed by users. Tolls on the trucks using I–294 increased revenues to ISTHA, which helps pay for the portion of the interchange financed by the tollway. BNSF will surely consider its investment costs of the facility in setting user charges paid by shippers using the rail yard.

I-294 Interchange

The funding of the interchange connecting the hub site with I–294 was a public–private partnership. The Village of Hodgkins' share of the interchange project costs was $5.5 million. The Village of Hodgkins' obligation to provide the funds was wholly contingent upon the appropriation and receipt of a $2.5 million grant by the DCCA and upon the contribution of UPS, including donation of right of way, valued at $3 million. IDOT contributed $2.5 million. IDOT's funding came from its Construction Budget. ISTHA contributed the rest (approximately $7 million) with this funding coming from its construction fund. The total state contribution, including IDOT, ISTHA, and DCCA was about $12 million of the total cost.

Bond revenues were not used as part of the financing. Additionally, the Village of Hodgkins agreed to pay for all costs of preparation of all surveys, plats, and legal descrip-

TABLE C-2 Project cost and funding sources

Project	IDOT	ISTHA	DCCA	Local	UPS	Santa Fe	Total
I-294 Interchange	$2,500*	$7,000*	$2,500*	$650****	$3,000**		$15,650
Santa Fe Rail Facility						$70,000	$70,000
Rail Grade Separation	$5,000					$5,000	$10,000
Local Roads Improvements					$1,300		$1,300
Annexation Fees***					$450	$150	$600
Total Access Improvements	$7,500	$7,000	$2,500	$650	$4,750	$75,150	$97,550

Note: $ in thousands—figures are approximate.
* Not defined.
** UPS contribution including land for interchange right-of-way.
*** Annexation and Special Use Permit fees applicable to CACH as well as access projects (paid to Village of Willow Springs).
**** Estimated amount per agreement from Village of Hodgkins not to charge for plats, other information.

tions and for all the costs of acquisition up to a maximum of $650,000.

Intermodal Facility

No detailed cost estimate has been obtained for the construction of the intermodal facility. Based on available information from Santa Fe, it is estimated that the initial cost was between $70 and $75 million. Since Santa Fe also was responsible for the grade separation, the railroad has not been able to provide separate detailed information regarding the intermodal facility. The railroad costs for the UPS project at Willow Springs/Hodgkins add to approximately $75 million. This funding was private and provided entirely by Santa Fe.

Rail Grade Separation

The rail grade separation project was estimated to cost approximately $10 million. The funding came from IDOT and Santa Fe. No breakdown of the costs paid by each is available but it is understood that the project costs were shared equally. IDOT's share came from their Highway Improvement Program funds.

Local Road Improvements

The local road improvements were financed entirely by UPS for approximately $1.3 million. About $1 million was used for the 75th Street extension and the rest for the other improvements.

Another important aspect related to the economics of site selection was other incentives that were provided to UPS, particularly the Enterprise Zone designation and related benefits, including sales tax exemption on machinery and equipment for the UPS facility, job training funds, and identification of public transportation options.

The Enterprise Zone designation required the annexation of the CACH site into the Village of Hodgkins, which was one of the aspects that resulted in a lawsuit by the Village of Willow Springs. In order to resolve the lawsuit filed by the Village of Willow Springs objecting to the annexation of the hub site into the Village of Hodgkins and the inclusion of the hub site in the McCook/Hodgkins Enterprise Zone, UPS agreed to annex the excess property from the GM site into Willow Springs and pay annexation fees totaling $450,000. These fees were paid to get agreement so that the land where the hub was built was annexed from the incorporated jurisdiction of Cook County into the jurisdiction of the Village of Hodgkins, except for the excess property from the hub site that was annexed into Willow Springs. Annexation and special use permit fees paid to the Village of Willow Springs totaled $600,000. UPS contributed $450,000 as annexation fees and Santa Fe contributed $150,000 as a special-use permit fee.

A public transportation investment was also contributed by UPS to fund the expansion of the Pace bus route system. The cost commitment was approximately $0.70 per rider per day. This financing was guaranteed by UPS to the Pace bus system in the form of monthly commuter ticket purchases.

Project Results and Lessons Learned

Parties That Benefited

The major beneficiaries of the project were UPS and Santa Fe/BNSF, which also are the direct beneficiaries. UPS benefits from a centrally located hub with direct Interstate highway and rail access, improving its industry competitiveness, capacity to grow, and reliability in serving its customers. Santa Fe gets direct access to the largest national hub of what is the largest intermodal shipper in the country, representing an obvious long-term commitment (because of the location) to UPS use of the intermodal rail yard. It is understood that UPS made no minimum commitment of volume to BNSF, but the adjacent location represents a competitive advantage to BNSF to serve a large share of the new UPS hub cargo.

In order to amortize the startup costs, the fiscal benefits of the Hodgkins Enterprise Zone were provided to UPS. They include a reduction in real estate taxes to residential levels (16%) for up to 8 years, job training programs and reduced sales taxes on purchases of machinery and equipment.

In addition to UPS and BNSF, the communities and local municipalities were major beneficiaries, attracting new jobs and tax revenues, although they also were affected by some of the impacts from construction and operation of the facility. The following paragraphs summarize some of the major community and local jurisdiction benefits.

Community Benefits

UPS employs around 11,000 workers. The number of employees varies by season and according to the demands of the shift. Many part-time employees working at the hub are college students who live or attend school in the area. The "Welfare to Work" program through the Grand Boulevard Federation benefits both UPS and the community. Impacts of the facilities were mitigated and open space and other mitigation measures have other positive local benefits.

State and Local Municipalities

The direct and "ripple" economic effects of CACH and the four access projects from construction to full operations resulted in the growth of jobs, businesses, support services, retail, and tax revenues. During the construction phase more than 750 jobs were generated annually with salaries of more than $58 million. After operation began, the full-time

equivalents of more than 3,000 jobs were created, yielding more than $70 million in income annually.

Individual income and sales tax increased the state revenues in the project construction phase (more than $5 million per year). Each town receives a fixed portion of state income tax revenues, and schools receive a substantial amount of state support. Motor fuel taxes are shared by local government, and UPS pays approximately $3 million in Illinois motor fuel taxes per year. Local governments benefit directly from the project through municipal taxes, higher sales tax revenue, and related taxes such as the public utility tax. The tax revenues from the CACH facilities were offset by the reductions granted as a result of annexation into the Enterprise Zone.

Tax Revenue Generation and Distribution

Since UPS vehicles use Illinois toll highways, tolls and highway taxes paid by the company will also play a significant role in the total tax picture. The distribution of property taxes to area taxing districts is the responsibility of the State of Illinois and of Cook County.

UPS

The hub is now part of the McCook/Hodgkins Enterprise Zone in order to qualify UPS for an 8-year property tax incentive. Indeed, the real assessment ratio is reduced from 36% (of the hub's site market value) to 16% (residential rate) only for the incentive period. After 8 years, the assessment will go back to 36% (rate on all industrial establishments in Cook County). During the incentive period, UPS's taxes on the new hub are at least the same as GM taxes because UPS is taxed on a new facility at future costs and property values, which are higher than they were with the GM facility. Motor fuel taxes and tolls are a part of UPS's operating budget, both nationally and locally.

The Atchison, Topeka and Santa Fe Railway Co.

Santa Fe property taxes are determined differently then they are for UPS. The Illinois Department of Revenue (IDOR) determines a "system value" for Santa Fe's operating properties in all states. IDOR then allocates a portion of the system value to the State of Illinois.

Summary of How Project Results Are Evaluated/Monitored

Currently, 16 trains a day serve the UPS intermodal facility. There are 2,700 "feeder movements" at the UPS hub in any 24-hour period.

UPS states that virtually none of its daily "feeder movements" travels on local roads. This means that the improvements, the interchange and the intermodal facility in particular, were successful in minimizing traffic on local streets. Indeed, although UPS employs more people than the prior GM stamping plant, UPS traffic volume is spread over several periods of the day. In a sense, the UPS site-generated freight traffic replaced traffic that once existed in the area while the GM plant was operational. When it was operating at full capacity, the GM plant was employing 3,000 workers in two shifts. The GM plant produced a greater amount of freight traffic during peak hours.

The UPS facility operates 24 hours a day, five days a week, with an estimated maximum work force of 11,000 employees. UPS has scheduled its shifts in such a way that there is very little shift overlap and that none of the four part-time shifts, when the majority of employees report to work, overlap at all.

Economic Impact of Hub Access

The project has a positive effect on the economy of the local and regional areas as well as the state.

UPS commissioned a study on the direct and "ripple" effects of the CACH project and the I–294 interchange and other related projects from construction through full operation. The study estimated the effects on the growth of jobs, businesses, support services, retail, and tax revenues.

The impact of the project extends well beyond the direct employment generated by UPS, Santa Fe, and construction companies. These direct impacts initiate a process that adds business to suppliers and increases demand for consumer goods. In order to meet higher demand, these companies will purchase goods and services as well as hire new employees, who will spend their earnings in the local economy. This ripple effect will spread the benefits to the whole community. The study estimated ripple employment impacts of more than 1,300 jobs pre-operations and over 2,700 jobs after start-up. Ripple income was estimated at over $58 million annually prior to operations, increasing to over $70 million after operation start.

Lessons Learned

This case study leads to some conclusions on the importance of private carriers that operate hub facilities articulating their needs to the public sector agencies so that fast track, timely solutions can be implemented. The I–294 interchange project, as well all of the access projects, was implemented without federal funding—it could have been extremely difficult for the projects to be implemented within the desired timetable if federal funds were used. In this case, the powerful motivator of job creation and reuse of an existing industrial site resulted in state and local commitments of the required funds to make the UPS hub possible.

That the access projects and the required public funds were a relatively small amount of the total cost of CACH made it

practical to seek and obtain the required commitment primarily from state funding sources. Some other lessons learned are as follows:

- Economic value is a powerful motivator. The projected economic and employment benefit helped generate the support of the Governor's office, DCCA, IDOT, and ISTHA. When originally designed, the facility was to create 4,000 to 5,000 new jobs. When it was completed, the UPS facility brought 11,000 new jobs to the area, helping to reduce the impact of closure of the GM plant, and providing a visible benefit from the access improvements and the hub project.
- If it is a private hub, as is the UPS facility, then the chances of success are greater if the private sector is willing to fund a major part of the project's cost. Securing outside (e.g., federal or state) funding is often slow and cumbersome, with little or no guarantee of success. A successful, proactive organization must be willing to seed these initiatives, and that takes a substantial investment on the part of the company. This financial commitment is a tangible sign of the organizational level of dedication. The private company building the hub or the intermodal yard should be able to recoup its investment through its rates and charges.
- Good working relationships between public sector transportation agencies and private companies are key to success. The collaboration between UPS, Santa Fe, and the government agencies made the project possible. The arrangement with Pace has been integral to the success of the UPS project. Both sides have done a great job of developing the habit of saying "yes" to each other.
- Identify and develop community support. UPS and Santa Fe modified the plans so as to incorporate community and village suggestions. UPS and Congressman Davis had already worked together on a pilot jobs program called Investing in Careers and Neighborhoods (ICAN). Adding a transportation component was a natural next step.
- Keep working. UPS is committed to the many requirements to minimize the adverse impacts of the hub and remained flexible throughout the implementation process. The UPS commitment to the transportation program was made for the long term. To keep the program user-friendly, the company has made a dedicated effort to stay aware of changing demographics, political considerations, and funding opportunities.

PORT OF TACOMA OVERPASS, FAST CORRIDOR, TACOMA, WASHINGTON

Project Profile

This case study profiles the Port of Tacoma Road Overpass, the first project completed under the Freight Action Strategy for the Seattle–Tacoma Corridor (FAST) program in Washington State. The project eliminates at-grade railroad crossings and traffic lights and is intended to improve access from Interstate 5 to Port of Tacoma marine terminals as well as to increase rail capacity. The location of the project is shown in Figure C-8.

Project Objectives

The objectives of the Port of Tacoma Road Overpass project include the following:

- Improving the flow of cargo through the Port of Tacoma by increasing the speed and efficiency of truck and rail freight movements; and
- Improving the commuting time and safety for motorists in the Tideflats area. The $33 million project accomplishes these objectives by eliminating at-grade railroad crossings and traffic lights, along with facilitating the development of additional rail capacity in the area.

The Port of Tacoma Road is a key roadway link to the marine terminals. The project replaces an at-grade intersection of Port of Tacoma Road and State Road (SR) 509 with a new interchange. The overpass project raises Port of Tacoma Road and the regional Interstate freeway (I–5) over SR–509 and creates a new interchange between the roadways.

The creation of additional rail capacity through the elevation of the roadway is also a key access benefit and component of the project. The completed overpass crosses a total of 12 railroad tracks. These 12 tracks include the development of three new tracks, collectively known as the arrival and departure (A&D) tracks, and potentially seven additional A&D tracks in the future. The A&D tracks serve as key connections between the port's rail yards and the U.S. rail network.

The additional rail capacity allows unimpeded service to the port's Hyundai rail yard and enables the building of trains off active mainline rail lines. The project creates 8,000-foot-long A&D tracks for incoming and outgoing mainline trains. This staging capability improves rail efficiency throughout the Puget Sound Area. The "double bubble" portion of the new overpass construction has a height of 24 feet, allowing the passage of high-cube double-stack trains.

The overpass is one of 15 projects being undertaken during Phase 1 of the FAST Program. The FAST Program provided the context, structure, and enabling mechanism for the Port of Tacoma Road Overpass Project. The Port of Tacoma initially identified the project and is the funding sponsor in partnership with the Washington State Department of Transportation (WSDOT). The construction and project management was handled by WSDOT.

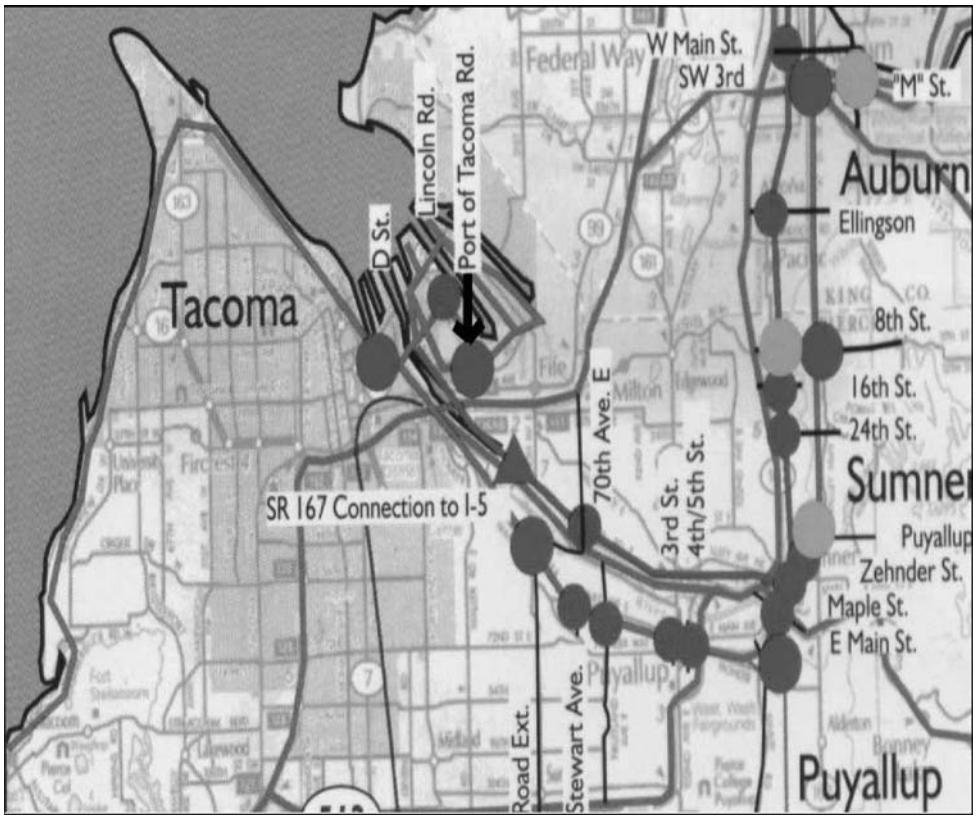

Figure C-8. Location of Port of Tacoma Road overpass project.

The FAST Program Goals and Structure

The FAST Corridor Program is a joint planning activity of the Puget Sound Regional Council (PSRC), the metropolitan planning organization for the area, and the Washington State Department of Transportation in consultation with other stakeholders. The program recognizes the importance of goods movement and freight mobility in the economic well-being of the State of Washington.

FAST focuses on a broad geographical corridor near the north–south rail lines connecting Everett to Tacoma. Most of the mobility issues are in a corridor between Tacoma and Seattle. The FAST Corridor focuses on the points where goods are transferred between transportation modes, such as rail yards and ports, or where roads and railroad tracks intersect. FAST members have determined that these intersection points and intermodal nodes are often the bottlenecks in their area's freight transportation system.

Equally important, the FAST members recognize that these bottlenecks and gaps in the freight system are not the responsibility of a single agency; rather, a partnership of agencies is needed to resolve these issues. Indeed, in the cover letter transmitting the Memorandum of Understanding (MOU) for the FAST Program, the need for partnerships is explicitly noted: "The FAST Corridor is a partnership, because the problems we are addressing are too large for any one agency to attempt to solve alone."

Cargo Hub Served

According to the U.S. Maritime Administration, the Port of Tacoma handled 11.5 million metric tons of imported and exported cargo in 2000, valued at over $19.8 billion. In terms of import and export tonnage, the port ranks 25th in the United States. Approximately 70% of the containers imported through the Port of Tacoma originate or terminate elsewhere in the continental United States.

The major commodities and shipment types handled by the Port of Tacoma include the following:

- Containerized cargo—The port handled nearly 1.4 million containers in 2000.
- Automobiles—The port handled approximately 133,500 units in 2000.
- Grain—The port exported 3.9 million metric tons of grain in 2000.
- Logs and wood chips—Tacoma handled 757,000 metric tons of logs and wood chips in 2000.

Project Financing

The funding for the Port of Tacoma Road Overpass Project illustrates the creative use and management of funding mechanisms. Funding for the project was developed within the framework of the FAST Corridor Program.

The FAST Corridor Program allowed the port to join with other agencies to leverage available funds to undertake 15 mutually beneficial projects in the Corridor. The other two funding strategies would have only yielded the Port of Tacoma Overpass Project.

Working within the FAST Corridor framework, the $33 million Overpass Project was ultimately funded from several sources. As a TEA-21 High-Priority Project, the Overpass received an earmark of $4.5 million. A new funding mechanism created in TEA-21—the Borders and Corridors Program (Section 1118 and 1119)—provided another $3.3 million for the overpass project. Note that the FAST Corridor Interagency Staff Team (FAST CAST) helped frame the Borders and Corridors Program as an element in the TEA-21 legislation. The Port of Tacoma has provided $5 million for the project through October 2001. Through the interlocal agreement, the Port of Tacoma is responsible for any cost overages for this project.

BNSF Railroad also contributed $1.1 million to the project. As part of the FAST CAST, BNSF had previously agreed to provide 5% of the Corridor package. UP also agreed to fund 5% of those projects directly influencing their rail lines.

The port, along with other FAST CAST members, worked together to identify the funding sources. They also worked with the Freight Mobility Strategic Investment Board created by the state, as well as with the state congressional delegation to secure the Section 1118 funding.

The specific funding elements were articulated in the Interlocal Agreement that the port executed with WSDOT for the project. Given the importance of the project, the need to expedite its construction, and a shortage of state funds, the port agreed to cover cost overruns associated with the construction of the overpass.

Lessons Learned and Insights

Several lessons and insights emerge from the Port of Tacoma Road Overpass Project, which was completed in 2001, and the FAST Corridor Program. They are as follows:

- An overall program involving multiple agencies can resolve freight access issues within a corridor or area. The FAST Corridor Program recognized early on that some freight mobility projects were too large for a single agency to handle.
- Interagency dialogue and trust can quickly identify and resolve issues. The FAST CAST worked together to identify freight mobility issues, develop a set of selection criteria, and advance the selected projects.
- Interchangeability of funds can keep a program of improvements moving forward. The ability to apply the funding provided by the ports, railroads, and the Section 1118 Program provided the "seeds" to undertake access improvement projects throughout the corridor.
- Unique opportunities should be seized. The FAST CAST was quick to identify and harness unique opportunities to obtain funds to support the corridor program.
- A multi-agency effort can be a "virtual" organization. Rather than create a new agency, as was the case with the Alameda Corridor, the FAST CAST developed an MOU and an overall framework for advancing their corridor projects.
- Individual projects, such as the overpass project, benefit from being part of an overall program. The Port of Tacoma Road Overpass benefited in terms of stakeholder outreach (the FAST CAST includes local communities), project funding, and project management.
- Access projects can involve more than one mode. The overpass project improved truck and rail access to the Port of Tacoma.
- Cargo access projects can also benefit transit and commuter movements. The overpass project also will improve the speed and safety of commuting across the Tideflat area—a clear and identifiable benefit for the local community, which builds support for the project.

COOPER RIVER BRIDGE, PORT OF CHARLESTON, SOUTH CAROLINA

Project Profile

The Cooper River Bridge is a $667 million project over the federal shipping channel in the Charleston harbor. The new Cooper River Bridge in Charleston, SC, will replace two obsolete bridges, built in 1929 and 1966. In the 1980s, the Port of Charleston envisioned the need for the construction of a new bridge. As the port gradually expanded in the Charleston harbor after the construction of the Wando Terminal, a new bridge was required to serve both the traffic needs of the community and the transportation needs of South Carolina and the nation.

The main objective of the project was to address the limited capacity that the port and the Charleston area faces because the two bridges are too narrow and have limited tonnage capacity (see Figure C-9). The bridges have weakened over the years and could barely support the tonnage that they had been designed to support. A few safety concerns also arose in the 1980s as one of the bridges showed a 19-inch shift in the alignment. The new bridge also will feature higher vertical clearance (186 feet compared to the 150-foot vertical clearance of the existing structures), as well as a

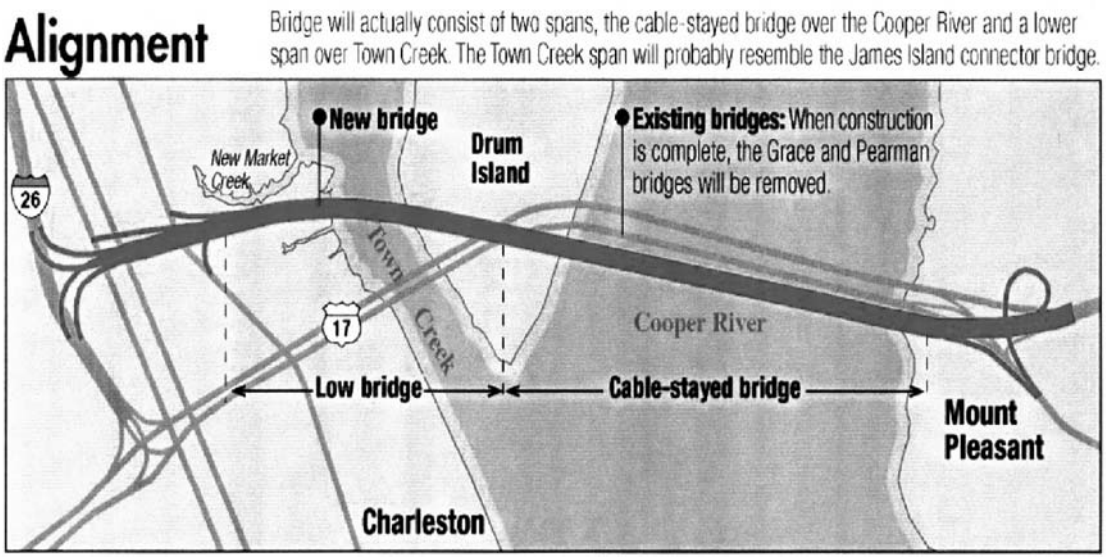

Figure C-9. Map of future Cooper River Bridge in Charleston, SC.

1,546-foot center span, thereby providing increased clearances for large commercial vessels. Although not the main reason for building the bridge, it will increase clearances for vessels going to the Port Authority's Wando Terminal, Charleston's major container terminal, located upstream in Charleston Harbor. In 1992, the environmental process for the construction of the new Cooper River Bridge was started. Construction began in October 2001, completion of construction is expected in 2006.

The new structure will provide eight travel lanes plus an ocean-side sidewalk/bikeway. The bridge will feature two diamond-shaped concrete towers supported on 10-foot-diameter high-capacity drilled shafts (see Figure C-10). Each of the lighted towers will be protected from ship collision by a large rock island. The main navigation channel will be 1,000 feet wide. The towers will be 600 feet high from water line to the top of the light features. Approximately 8,000-foot-long high-level approach spans will utilize composite steel girders and reinforced concrete piers. The pier columns also will be supported by 10-foot-diameter drilled shafts. The Charleston high-level approach passes over Town Creek, where a smaller, 250-foot-wide channel will be provided.

Figure C-10. Future Cooper River Bridge—Charleston, SC.

Cargo Hub Served

The Cooper River Bridge serves the Wando Terminal as it is a major route from the City and the Interstate Highway System to the terminal. The Port of Charleston is strategically located, providing easy highway and rail access to the Southeast and the Midwest. With daily express intermodal services, on-dock rail tracks, terminals within 2 miles of Interstate highways, and a favorable geographic location, Charleston is a logical hub for cargo from or to the Southeast and Midwest regions of the country.

The Port of Charleston is the second largest container port along the Southeast and Gulf Coasts and ranks fourth nationwide; on the East Coast, only the Port of New York and New Jersey handles more containers than Charleston. With $33 billion in cargo in 2000, Charleston ranks as the nation's sixth busiest seaport in dollar value of international shipments. In 2000, Charleston moved 1.6 million TEUs with an increase of 10% from 1999. In addition, the port-owned grain elevator handled 108,000 tons of bulk shipments. The main commodities moved include foodstuffs, forest products, machinery, and metals.

Project Financing

Since the new bridge was proposed, and with no available funding, state officials suggested a user-fee method through which the bridge could be financed. For at least a decade, the state had proposed a bridge funded with tolls. The mayors of

Mount Pleasant and Charleston had for just as long objected, resulting in an impasse that was broken only in 2001. Local legislators and officials requested the Port Authority and the port carriers to help fund the bridge, which also will serve port needs. The South Carolina State Ports Authority (SCSPA) Board supported the construction of a new Cooper River bridge. However, the Ports Authority noted that port business represents just 30% of the commercial traffic under and over the bridge. Additionally, the port agreed to a lower bridge over the Cooper River channel than the proposed one.

The State Infrastructure Bank was formed in 1997 to fund the six largest projects in South Carolina, which included the Cooper River Bridge Project. But the board also insisted that local communities contribute to the cost of their projects either through tolls or local tax contributions.

While other areas across the state agreed to tolls or higher taxes, Charleston County residents refused. In 2000, citizens of the county voted down a half-cent sales tax. Faced with a state threat to build a smaller four-lane bridge if local money did not materialize, in early 2001 the Charleston County Council agreed to contribute $3 million a year to the project for 25 years. The county has not decided how to raise the money, but will likely present the half-cent sales tax to voters in another referendum in 2002.

The SCSPA's reluctance to help finance the bridge nearly derailed the entire bridge funding package; until July 2001, when a resolution appeared as the State Infrastructure Bank and the DOT agreed to dedicate more money to cover the funding shortfall. Initially, the SCSPA made its contribution contingent on state lawmakers' approval of controversial plans to build a new container terminal on Daniel Island.

The new Cooper River Bridge is estimated to cost approximately $631 million, not including the estimated cost of $25 million to tear down the existing bridges. A direct federal Transportation Infrastructure Finance and Innovation Act (TIFIA) loan of up to $215 million has been approved. An additional $325 million bridge grant is being provided by the State Infrastructure Bank, whose sources include a portion of one cent of the gasoline tax, truck registration fees, and local taxes or tolls. The FHWA is contributing $127.5 million, including matching funds from the South Carolina Department of Transportation (SCDOT).

The State Infrastructure Bank is the only organization responsible for paying back the federal TIFIA loan, requiring approximately $15 million in annual payments. The SCDOT will participate in the repayment through annual payments of $8 million. The Governor's announced financing plan assumes that SCSPA will participate through a $3 million annual payment and the local government (Charleston County) through a $3 million annual payment during the 25-year repayment period. The State Infrastructure Bank will contribute the remaining $1 million in annual loan payments.

Project Results

The bridge construction contract was awarded in June 2001, when SCDOT signed the design and build contract. Construction began in October 2001 and is scheduled to be completed in 2006. The new bridge will improve traffic flow and replace obsolete bridges between Charleston and Mt. Pleasant (where the Wando Terminal of the SCSPA is located).

TCHOUPITOULAS CORRIDOR, PORT OF NEW ORLEANS, LOUISIANA

Project Profile

The Tchoupitoulas Corridor consists of several projects to provide a dedicated truck port access road and related improvements to the Port of New Orleans' recently expanded terminals. The project includes a rebuilt and improved city street (including a new four-lane boulevard for a section of this street), a new port access roadway (see Figure C-11), the repair and/or replacement of existing sewer and drainage systems, modifications to existing flood walls, and the relocation and consolidation of railroad trackage.

As truck traffic surrounding the port increased, the need to improve port facilities and address traffic flow issues in the area became evident. In the 1980s, the main access to the port was a two-lane, asphalt road in poor condition. Port traffic fed into local neighborhoods, and truck routes were posted through New Orleans' historic Garden District and near parks, universities, and retail areas. Citizens expressed concerns about safety and damage to historic buildings in the wake of so much truck traffic. Truck operators opposed restrictions that would increase travel times and distances. In 1983, the city mandated changes for the area including truck restrictions from the historic neighborhoods, reconstruction of the

Figure C-11. Tchoupitoulas Corridor Truck Roadway–New Orleans, LA.

local roadway, and construction of a new reserved truckway for port traffic. Unfortunately, at that time, the City had difficulty enforcing truck restriction ordinances and securing the necessary funding for the project. In 1989, the project received initial funding that started the implementation of the Tchoupitoulas Corridor concept. Construction began in 1992, completion is anticipated in 2003.

An average of more than 1,500 trucks a day will travel the Tchoupitoulas Corridor to reach the port's intermodal facilities and an intermodal rail yard after the four truck routes have been combined into one. The project separates port truck traffic from local traffic by providing two roadways, one exclusively for port traffic and the other dedicated to local traffic. The project improves the level of service of Tchoupitoulas Street and supplies the capacity needed for the consolidation of truck routes leading to the riverfront intermodal facilities.

The purpose of this project is to provide a roadway that will improve access into the port while removing heavy-vehicle traffic from existing city streets, as well as to reconstruct the existing Tchoupitoulas Street. The consolidation of heavy-truck routes leading to the port's recently expanded Mississippi River terminals entails the removal of three truck routes passing through residential neighborhoods. Part of the overall corridor, the Clarence Henry Truckway, or Tchoupitoulas Roadway as it is more commonly referred to, is a two-lane, 3.5-mile, heavy-duty road dedicated to trucks and built as part of a major improvement plan in the port area. The three year-old facility, which is reserved for port-related truck traffic, falls under the authority of the Port of New Orleans. The truckway has no toll, but only commercial vehicles or pre-approved vehicles on port-related business are passed through the security areas. Access to the port roadway is limited to four interchanges (two with 24-hour access), and only local deliveries are allowed access anywhere other than the east end of the facility. The port utilizes Intelligent Transportation System (ITS) technologies, including Automated Vehicle Initiative (AVI) and optical container readers at the truckway.

The project objectives are follows:

1. Provide a direct link from the Port of New Orleans to the interstate system,
2. Remove truck traffic from local neighborhoods,
3. Separate automobile and truck traffic on Tchoupitoulas Street,
4. Stimulate residential and commercial redevelopment in the surrounding area, and
5. Redevelop vacant and underutilized land and facilities in the port.

The Port of New Orleans also began a major terminal improvement program to coincide with the access and local roadway improvements.

Cargo Hub Served

New Orleans has been a center for international trade since it was founded by the French in 1718. The Port of New Orleans, Louisiana (Port NOLA), is the only deepwater port in the United States served by six class-one railroads. Its proximity to the Midwest via the 14,500-mile inland waterway system of the Mississippi, Missouri, Ohio, and related rivers and waterways make it the port of choice for bulk cargoes such as steel and grain. Fifty ocean carriers, 16 barge lines, and 75 truck lines serve Port NOLA. Seventy-three percent of its cargo goods are imports; it has the USA's top market share for import steel, natural rubber, plywood, and coffee. Port NOLA handled 38 million tons of cargo in 2000[8], including 12.2 million tons in general cargo and 26.8 million tons in bulk cargo. The port handles over 224,400 containers annually, more than 346,000 TEUs.

Project Financing

In 1989, the Louisiana legislature created the Transportation Infrastructure Model for Economic Development (TIMED) program to fund 16 transportation-related projects. To finance the TIMED program, which was envisioned to spur economic development and create jobs, the legislature levied a four-cent-per-gallon tax on gasoline and special fuels for 15 years (from January 1990 to December 2004). The Tchoupitoulas Corridor is one of the 16 transportation projects funded by the TIMED program in 1989.

Currently, the total budget for the Tchoupitoulas Corridor is estimated at $70 to $75 million. The original rough project estimate and initial funding was established in 1989 at $35 million appropriated by the Louisiana legislature through the TIMED program, which did not include many of the elements and the breadth of the current scope. Of this amount, $18 million was designated specifically to build the truckway, while the remainder was for reconstruction of local road sections. This was supplemented by approximately $13.7 million from federal Surface Transportation Program (STP) funds, and $8 million from the City of New Orleans utilizing bond proceeds as the project scope developed. Later cost estimates exceeded the funds appropriated by over $12 million, forcing a temporary halt to construction. The city and port, along with the Regional Planning Commission and the Louisiana Department of Transportation and Development subsequently reached agreement on cost sharing for the over-budget amount.

Project Status, Implementation, and Management

The Tchoupitoulas Corridor Project itself was implemented in several stages. Planning began in 1988 to 1989. Construction began in late 1992. The truckway is open to traf-

[8] www.aapa-ports.org

fic and a connection to the Ponchartrain Expressway is nearly complete. The most recent contract, currently under construction, has three phases: (1) from the Mississippi Bridge to Euter Street; (2) from Euter to Religion Street to the intersection of Felicity and Tchoupitoulas Roads; and (3) from Felicity and Tchoupitoulas Roads back to the Mississippi Bridge. Sections are open for traffic once they are completed, and have already had an impact on local traffic. The Public Works Department is currently investigating alternative alignments for the final contract of the project, which is expected to be bid in May 2002 and completed in mid 2003. The final section will be from Felicity Road to Jackson Avenue. The project has been managed by the New Orleans Department of Public Works since its inception, but the section reserved for truck traffic is under the authority of Port NOLA.

Community Involvement and Commitment

The program manager meets regularly with the local community groups to discuss the project and also provides assistance with landscape planning, traffic situations, and so forth. This communication with the community has helped gain support for the project. A small group of residents concerned about the noise that the project would generate filed a lawsuit, but the city prevailed. Overall, the community has been behind the project since its inception.

Project Results and Lessons Learned

With completion of the truckway and the opening of various sections of the corridor, truck traffic has been reduced in the local streets. The last contract is expected to be bid in May 2002 for completion in mid-2003. The project was originally envisioned to end in 1996, but fell back more than 5 years due to discussions and disagreements on project scope, cost, and funding.

The dedicated roadway for port and truck traffic has had a positive impact on access to the port and has dramatically reduced the volume of truck traffic in historic New Orleans' residential neighborhoods. Opening segments to traffic as they are completed ensures that residents and truckers enjoy an immediate benefit from the project.

The original $35 million estimate was basically a "10-minute, back-of-the-envelope" estimate, which then became the foundation for funding and future estimates. That initial estimate, for a different scope, and without time for study and evaluation, haunted the project for years.

Regarding the implementation of the project, the program manager notes that it would have been more time- and cost-efficient to have fewer contracts, consultants, and contractors working on the project. Such an approach would have required earlier detailed studies to define the full scope of corridor development and an earlier complete funding commitment. At the same time, the phased approach made it possible to open sections as they were completed and resulted in partial early benefits than otherwise would not have been possible.

The program manager believes that the lawsuit filed against the project was unavoidable, no matter how much the community was involved.

JOE FULTON INTERNATIONAL TRADE CORRIDOR, PORT OF CORPUS CHRISTI, TX

Project Profile

The Port of Corpus Christi is a major industrial and transportation complex in Texas along the Gulf Coast near Mexico. Joe Fulton International Trade Corridor is under development to improve access to the main facilities in the port area and provide better connections to the Interstate highways and rail links (see Figure C-12). The corridor will significantly improve access to over 2,000 acres of land along the north side of the port for existing and future development.

The corridor development will also open land for new industrial developments, as the corridor will make approximately 1,000 acres of land (which has no access) available for use as marine terminals and industrial sites.

The objectives of Joe Fulton International Trade Corridor are as follows:

- Connect two major highways—US Highway 181 and Interstate 37;
- Establish efficient intermodal links between highways, rail, and port facilities;
- Address environmental and safety concerns;
- Enhance access to existing industries;
- Facilitate international trade;
- Generate future economic development for south Texas;
- Connect to San Antonio via I–37;
- Connect to Laredo via 44/59; and
- Connect to Mexico (Rio Grande Valley) via US–77 (proposed I–69).

The highway project from US–181 to I–37 providing improved access to the north side of the ship channel is being planned as a two-lane roadway with left-turn lanes at intersections. The corridor is being planned as both a highway and rail connection. It is a combination of new and existing road and railway. The total length of roadway will be approximately 11.8 miles and the total length of the new rail segments will be approximately 6 miles.

The need for these highway and rail improvements in the port area has been building for the past two decades and is made increasingly important by the age of the Tule Lake Lift Bridge, built in 1959. The lift bridge was recently refurbished in an effort to extend its life for a few more years. With no backup rail service, a bridge shutdown would cripple the port's northside harbor facilities.

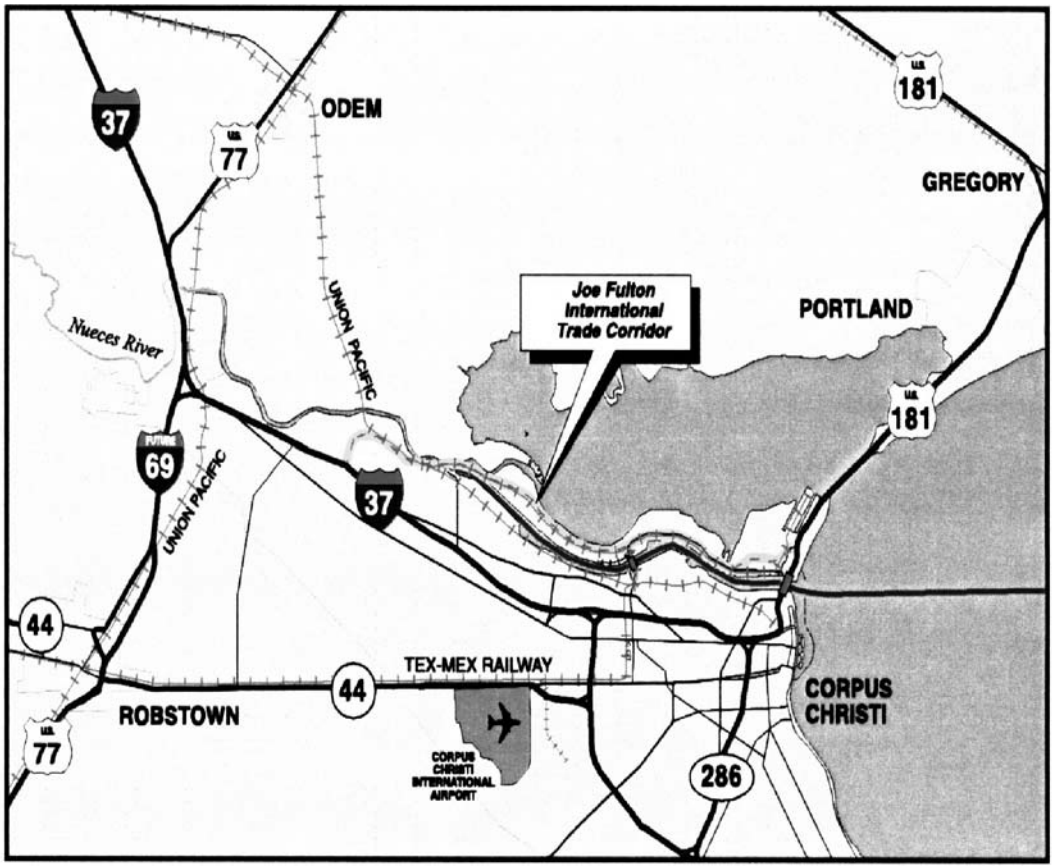

Figure C-12. Map of Joe Fulton International Trade Corridor—Corpus Christi.

Cargo Hub Served

The Port of Corpus Christi has the comparative advantage of being strategically located mid-way along the Texas Coast on the Gulf of Mexico, approximately 150 miles north of the United States/Mexico border. It has key access to state highways and the U.S. Interstate Highway System and excellent rail connections (being served by the BNSF, the Texas–Mexican Railway Company, and UP Railroad). The port channel, 45 feet deep, is connected to the Gulf Intracoastal Waterway, which provides access to the U.S. inland waterway system, the Gulf of Mexico, and the world's shipping lanes.

The port is considered the fifth busiest port in tonnage in the United States and moved more than 89 million tons in 2000. More than 78 million of the 89 million tons moved in 2000 were petroleum products. Another 7.1 million tons were dry bulk products, 2.2 million tons were chemicals, and 1.7 million tons were grain products. The port has also grown into a chemical industrial center, where leading worldwide companies of the chemical industry are located.

Project Financing

Total estimated costs for the project are $49.7 million. Funding is shared between state, federal, and local agencies. The Port of Corpus Christi has funded a considerable amount of preliminary work with assistance from the Texas Department of Transportation (TxDOT). The Corpus Christi MPO has adopted the project as part of the regional highway improvement plan. The Port of Corpus Christi has secured $10.3 million in federal funding (through the Surface Transportation Program of FHWA), $3 million from the regional program approved by the MPO, and $11 million from TxDOT for this project. A loan from the State Infrastructure Bank has been approved for $16.3 million to finance a portion of the port's share of the project, and $1.75 million has been provided directly by the port for the design phase. The port will continue to apply for an additional $10 to 15 million in federal funds. It took 10 years to arrange the financing for the project. The Port of Corpus Christi has led the project supported by TxDOT and its other regional partners.

Project Results

It has been estimated that the potential development in the 1,100 acres of land in the northwest area along the shipping channel will produce estimated growth of $250 million in new facilities, nearly 300 construction jobs, and approximately 200 permanent jobs over the next 25 years. These estimates, developed by the port, do not include any associated commercial development.

The feasibility studies have been completed for Joe Fulton International Trade Corridor. Design and permitting began in 2000. Environmental approvals and final design are scheduled to be completed in 2002. Thereafter, construction will begin in 2003, and the corridor is scheduled to be completed by 2006.

LOMBARD ROAD OVERPASS AND COLUMBIA SLOUGH RAILROAD BRIDGE, PORT OF PORTLAND, OREGON

Project Profile

This case study involves two projects that improve rail and highway access to the Port of Portland located in northwestern Oregon, as well as its main industrial park, the Rivergate Industrial District. The first project, the Lombard Railroad Overpass, is a roadway overpass bridge connecting to the port facilities that will provide a grade separation over the rail lines that serve the port. The second project is a railroad bridge, the Columbia Slough Railroad Bridge, that was completed in 1997. Improvements will ease congestion at a main entrance to the industrial park, improving truck and rail access to the port.

North Lombard Street north of Columbia Boulevard is a primary entrance to Port of Portland Terminals 5 and 6 and the Rivergate Industrial District (see Figure C-13). Approximately 50% of the automobile and truck trips that begin or end in Rivergate travel up North Lombard through the southern entrance at the North Columbia, North Lombard, and North Burgard intersection. There is a need to eliminate at-grade crossings, widen the road, and improve signalization. The project will construct a new bridge that will carry North Lombard, a primary access road into the Rivergate industrial area, over two rail lines serving the port marine terminals. The facility will be a four-lane roadway, with drainage facilities, sidewalks, and a bike lane. The Port and the City of Portland are planning to build this overpass of North Lombard Street. The project is in the initial stages of design, with construction expected to begin in the fall of 2002.

In 1995, an agreement was reached between the Port of Portland, UP, and BNSF to jointly provide the local share of funding for another important access project, the Columbia Slough Railroad Bridge (see Figure C-14). This bridge, built over the Columbia Slough and connecting the two halves of Rivergate, was built to improve rail service to the port. The project was expected to reduce both truck traffic and locomotive switching needed to support expected growth in freight movements. The bridge was completed in 1997. In

Figure C-13. Map of Rivergate Industrial Park in Portland, OR.

Figure C-14. Columbia Slough Railroad Bridge—in Portland, OR.

addition to the indigenous organizations that provided the local share of the project, Oregon DOT (ODOT) and FHWA also supported and participated in the planning and implementation of this rail bridge (CMAQ funds).

The two projects were handled separately but in both cases, the construction of the Columbia Slough Railroad Bridge and the ongoing effort to built the Lombard Overpass are a response to market demand for improving the intermodal rail and highway infrastructure. Portland's geographic location along the gorge route of the Columbia River (which provides a low-altitude, water-level route through the Cascade Mountains) and its competitive position for handling both bulks and automobiles, efficient rail and highway access are essential. The two projects are both efforts to improve the efficiency of the rail and highway infrastructure, as well as to eliminate conflict points.

Cargo Hub Served

The Port of Portland is located in northwestern Oregon, and it provides competitive cargo and passenger access to regional, national, and international markets. Every year, approximately 30 million tons of cargo is handled at 50 piers, wharves, and docks located within the Portland Harbor. A little more than half of this cargo moves to foreign seaports around the world. The remaining cargo moves domestically, to inland ports along the Columbia, Willamette, and Snake Rivers, or to other U.S. seaports.

Marine terminals in the Portland area export more wheat than any other port in the United States. Terminals in the Portland area and along the lower Columbia River constitute the second largest grain exporting center in the world (3.6 million tons in 1999). In addition, the port is 22nd in terms of total tonnage (over 34 million tons in 2000), the 16th largest container volume port (290,943 TEUs in 2000) and the third highest volume auto port in the country (494,000 tons).

Project Financing

Lombard Road Overpass

The Lombard Street Overpass is expected to cost $25.9 million. The project is (as of March 2001) at the 30% design level with federal funds making up about two-thirds of the project. With federal and city commitments (including $13 million of TEA-21 High-Priority funds, and $3 million of city funds), the project is funded at 87% (as of early 2002). Additional funding ($3.3 million) is being sought.

Columbia Slough Railroad Bridge

The Columbia Slough Railroad Bridge was part of a series of projects under the Partnership for Transportation Investment (PTI), which is an ODOT program that encourages states and localities to use a variety of sources for financing transportation infrastructures. The total cost of the project was $6 million (not including Wye connection funded by the railroads). The bridge received $2.1 million in federal demonstration funds from ISTEA, $900,000 from CMAQ funds, and $3 million from the Port of Portland. The Port of Portland leases the trackage to both BNSF and UP, equally. BNSF manages and is the switching carrier for both railroads. The lease charge paid by the railroads to the port is in the form of a "wheelage" fee based on a minimum annual guarantee of 10,000 railcars at $52.99 per railcar for 15 years payable monthly.

Project Implementation and Management

The Lombard Road overpass is being managed by the City of Portland with the Port of Portland. The City Council and the Port Commission signed an agreement to implement this project in 1995.

The Columbia Slough Railroad Bridge was constructed in two parts: a north Wye connection in North Rivergate totaling over $7 million, which BNSF funded, and the Slough bridge connection linking north and south Rivergate, which the port and federal sources funded (wherein the railroads pay back the port's portion, plus interest, through the wheelage fee). For the bridge itself, ODOT handled the project as a design–build bid concept.

Community Involvement and Commitment

These projects were two parts of the overall development proposed for the area. The rail bridge has increased efficiency for rail port operations and access. The Rivergate industrial and marine terminal area will add over 3,000 new jobs as businesses expand and new businesses locate in this area. The new overpass will reduce the truck–rail conflicts, improve ease of access to the area, and allow the rail lines

serving area businesses to operate more efficiently than they currently do. Truck traffic also will operate more efficiently at this primary access to one of the largest intermodal facilities in the Pacific Northwest.

Project Results

The rail bridge project was completed on time and within budget. Currently, the project is in its fourth year of lease to both rail carriers, handling cargo and providing efficient freight access to both port and nearby private facilities. The overpass project is in the initial design stage and planned for construction beginning in 2002.

The rail bridge project has improved rail service to the port. It also reduced truck and locomotive traffic switching needed to support expected growth in freight movements. Traffic congestion will be reduced and safety will be enhanced through the elimination of at-grade crossings when the overpass is finished. The rail bridge is an example of a successful project that was able to blend public–private investment to improve system efficiency for freight carriers and freight terminals. The overpass will further enhance access to the freight facilities as well as reduce delays, heighten safety, improve air quality, and enhance traffic flow for both trucks and automobiles in the area.

KEDZIE AVENUE ACCESS ROAD, CHICAGO, ILLINOIS

Project Profile

When Kedzie Avenue in Chicago was built during the early part of the last century, it seemed adequate for primarily noncommercial purposes. Running through a residential neighborhood in South Chicago, the curving city street was used by commuters going downtown and by shoppers. Truck traffic was extremely light.

With no major design improvements, the Kedzie Avenue that was built for a residential neighborhood was not up to the task of handling the truck traffic of the 1990s. BNSF trailer-on-flat-car (TOFC) rail yard (Corwith Yard Piggyback Terminal), which does 665,000 lifts per year and is designing an expansion for a future capacity of 1.2 million lifts year, is accessed by truck from I–55 via Kedzie Ave. The 2,000 truck trips generated every day by the BNSF Corwith Rail Yard were more than antiquated Kedzie Avenue could handle. The aging signal systems simply did not allow enough of the lined-up trucks to make left turns into the yard or make the turns to leave the yard. Kedzie Avenue became a major freight bottleneck in the middle of Chicago.

The project was designed to improve highway access to the Corwith Yard Piggyback Terminal. Kedzie Avenue was reconstructed and resignaled between I–55 and 47th Street, a distance of approximately 1½ miles (2 kilometers). The project signalized the Kedzie Avenue/47th Street intersection, modernized and synchronized signals along Kedzie Avenue, and greatly improved the quality of the road (see Figure C-15).

Cargo Hub Served

As discussed in the UPS case study (see Chapter 5), the Chicago region is one of the major cargo hubs or centers for freight movement in the country and in the world. The region is the world's largest intermodal volume handler after Hong Kong and Singapore. It is a major cargo transfer center for a multistate and international region; it is the distribution center for the Chicago and Midwest region, and is also a major transfer point for national east–west movements.

Project Financing

The total project cost was approximately $4.7 million, with $720,000 coming from the CMAQ Program and the $180,000 match plus approximately $3.8 million coming from Chicago Department of Transportation (CDOT) bond funding, which are repaid from city transportation revenues. CMAQ funded the signal upgrade and interconnection project. CDOT funded the pavement, drainage, lighting, landscaping, and widening components of this project.

Project Implementation and Management

The project was initiated in fiscal year 1997 with CMAQ and CDOT funding and completed in 1997. CDOT performed the design and construction.

Project Results

The $4.7 million upgrade to Kedzie Avenue helps meet the demands of constant truck traffic from BNSF's Corwith Yard, primarily to I–55. Average daily traffic on Kedzie Avenue is

Figure C-15. Access to Corwith Rail Yard before completion of the project—Chicago, IL.

more than 25,000 vehicles. The most recent count in 1998 indicated a daily volume of 1,040 trucks each way, plus 130 trucks each way for repositioning movements (empty trucks). Over 2,000 trucks daily are thus making the trip of approximately 1½ miles (less than 2 kilometers) to or from I–55.

The Kedzie Avenue project included roadway rehabilitation, widening by 1.2 meters, sewer and drainage improvements, traffic signal modernization and synchronization, lighting improvements, new trees and a new curb, and a gutter and sidewalks. Traffic signals were modernized at six locations, and a new signal was placed at the entrance to the yard. Chicago transportation officials say the improvements have eliminated the lengthy lines of trucks getting into and out of the Corwith Yard.

PORTWAY, PORT OF NEW YORK/ NEW JERSEY

Project Profile

Portway is a series of freight improvement projects that are designed to enhance and strengthen the access to and connections between key maritime, air cargo, railroad, the regional surface transportation system (highways and streets), and warehouse/distribution center concentrations in northern and central New Jersey. Portway's objectives include the following:

- Relieve current high levels of congestion in this busy intermodal freight service corridor and meet growing future demand for access generated by increased activity at port facilities, rail yard, and distribution centers;
- Add system redundancy to ensure the timely delivery of goods and services;
- Make improvements that increase safety and support seamless connections; and
- Promote economic development, job creation, and environmental improvements along the Portway Corridor.

Cargo Hub Served

The Portway Corridor serves the largest multimodal cargo hub complex on the U.S. East Coast, including the major port facilities in the Port of New York and New Jersey, which is the largest general cargo and container port on the East Coast. Freight operations in the Portway Corridor include the following:

- The Port of New York and New Jersey. In 2000, nearly 79 million tons of freight moved through the maritime facilities of the region. These maritime facilities are concentrated in the Port Newark/Elizabeth complex. As the demand for maritime cargo movement and facilities continues to grow, a portion of the Military Ocean Terminal in Bayonne, NJ (MOTBY) will be operated as a port to serve the latest generation of mega-container vessels. MOTBY is located adjacent to the Global Marine Terminal and the Northeast Auto Terminal (NEAT).
- The intermodal yards of three Class I railroads. CSX, Norfolk Southern, and Canadian Pacific annually move one million containers through the rail terminal in the Portway Corridor. In addition, the railroads project that the volume of containers moving through their facilities in this area will double within the next 20 years.
- Air cargo at Newark International Airport. Newark International Airport was the 18th largest airport in the world in 2000, with 1.1 million tons of cargo. The airport is also the regional hub for such integrated carriers as the U.S. Postal Service, UPS, and FedEx.
- More than 15,000 trucks travel to/from the port to move maritime cargo.
- More than 440 million square feet of warehousing space exists in northern and central New Jersey. This area has one of the largest concentrations of warehouses and distribution centers in the United States. Brownfield sites along the Portway Corridor also offer the potential for the development of additional freight-related value-added activities.

Current Status

Freight movement in the Portway Corridor currently shares roadway capacity with an increasing number of passenger and transit vehicles and uses older, inefficient infrastructure in some areas.

Portway is actively underway. Phase 1 extends from the Port Newark/Elizabeth complex to the Croxton rail yard (see Figure C-16). Three projects in the Phase 1 component are currently under construction with three more scheduled in the next 5 years.

The New Jersey Department of Transportation is currently assessing a range of concepts for the Portway Extensions, involving both roadway and rail access improvements to facilitate the movement of containers in the State.

Project Financing

The overall financing approach, along with the funding sources that will be used, is still under discussion. Potential funding mechanisms include state sources (such as the New Jersey Transportation Trust Fund and Bridge Bonds), financing available through other public agencies (such as the Port Authority and NJ Turnpike Authority), federal sources (such as STP, TIFIA, and earmarked projects) and public–private joint ventures. The funding sources for the two Phase 1 Portway projects currently under construction by NJDOT are shown in Table C-3.

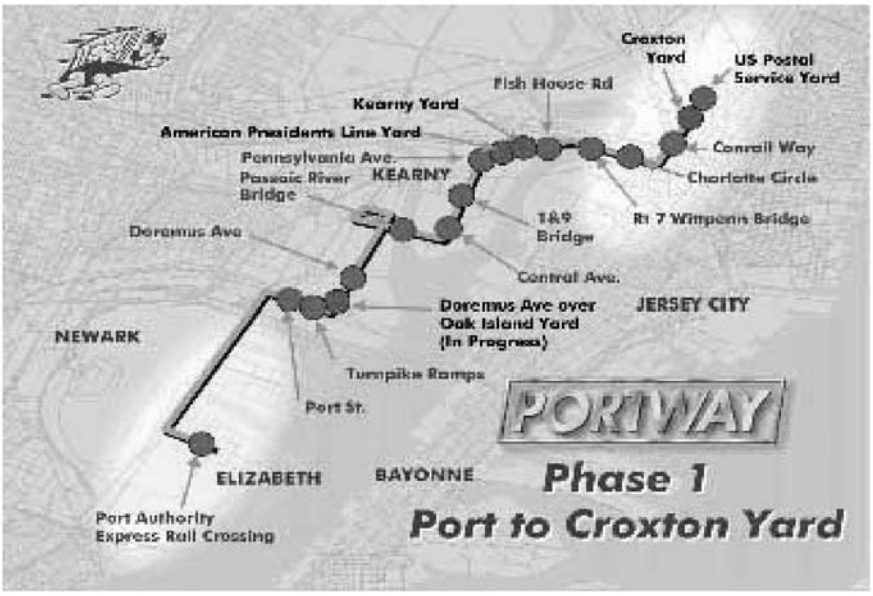

Figure C-16. Portway Phase 1.
SOURCE: New Jersey Department of Transportation.

The Phase 1 project under construction by the Port Authority is a $35 million rail flyover that replaces an at-grade rail-over-road crossing at the port. Port Authority funds are financing this project.

Project Implementation and Management

Phase 1 of Portway, which is currently underway, consists of 13 projects with an anticipated cost of more than $800 million. NJDOT is undertaking 11 of these projects, with the Port Authority of New York and New Jersey undertaking two projects. NJDOT manages the program as a whole. Collectively, these projects will create an 8-mile roadway from the port facilities to the Croxton Rail Yard, as well as improve road and rail freight access within the Port Newark/Elizabeth marine complex.

TABLE C-3 Funding sources for NJDOT Portway Phase 1 projects under construction

Doremus Avenue Bridge	
Source	**Amount (in Millions)**
1999 NJ Bridge Bond Special bond fund approved by NJ voters in 1999 for bridge repair, comes primarily from state sales tax and potentially from local property tax.	$16.000
NJ Transportation Trust Fund Sales tax of motor fuels, petroleum products, amount from the toll authority, and increase on fees from motor vehicle registration.	$20.500
Total	**$36.500**
Route 1 & 9 Charlotte and Tonnele Circle Improvements	
Source	**Amount (in millions)**
Federal NHS	$11.241
NJ Transportation Trust Fund	$0.967
Total	**$12.208**

SOURCE: New Jersey Department of Transportation

Three Phase 1 projects are under construction or anticipated to commence shortly:

- Construction of the Doremus Avenue Bridge started in July 2000. NJDOT is managing this project.
- Construction began in 2001 of a rail flyover over McLester Street, with the road being slightly depressed for the ExpressRail Yard in Port Elizabeth. The flyover will replace an at-grade rail crossing at the port, significantly reducing congestion related to intermodal train movements at ExpressRail. The Port Authority is managing this project.
- Construction of the Charlotte and Tonnele Circle Improvements is anticipated to begin in November 2001. NJDOT will manage this project.

The Portway projects undertaken by NJDOT proceed through five steps—concept development, feasibility assessment, final scope development, final design, and construction. Community outreach, environmental and engineering reviews, and financing are undertaken as each project moves through these steps.

Three of the Phase 1 projects are in Final Scope Development or Final Design as follows:

- Doremus Avenue Roadway (construction anticipated to begin in 2002);

- Routes 1 and 9 St. Paul's Avenue Bridge (construction anticipated to begin in 2004); and
- Route 7 Wittpenn Bridge Replacement (construction anticipated to begin in 2006).

Six Phase 1 projects are in the NJDOT Feasibility Assessment stage, which will take approximately 3 years as follows:

- A new, New Jersey Turnpike interchange;
- Doremus Avenue interchange with Routes 1 and 9;
- A new Passaic River Bridge crossing connecting Doremus Avenue and Central Avenue;
- Central Avenue, including an interchange with Routes 1 and 9;
- Pennsylvania Avenue and Fish House Road; and
- St. Paul's Avenue to Croxton Yards/Secaucus Road.

In addition, the Port Street roadway improvements are in the planning stages.

The selection of Portway by the FHWA and the U.S. Environmental Protection Agency (EPA) to be one of 10 initiatives nationwide to be included in the AASHTO Environmental Streamlining Pilot Program may accelerate the review process for the Phase 1 projects. The Pilot Program seeks to identify new methods for streamlining and advancing the delivery of transportation improvements while achieving environmental objectives.

Concept Development for the northern, eastern, and southern extensions of Portway began in January 2002.

Community Involvement and Commitment

Portway's community and stakeholder involvement elements are shaped by the steps and processes that NJDOT has developed to advance transportation projects. Stakeholder and community involvement begins in Concept Development. During Concept Development, NJDOT works with other public sector entities, along with private sector stakeholders and communities, to identify specific transportation problems, considerations, priorities, and potential improvement concepts.

As transportation projects move into Feasibility Assessment, the community and stakeholder involvement intensifies. Projects undergo a fatal-flaw analysis, including environmental, community, right-of-way, and utility considerations. NJDOT works with community and county engineers, elected officials, relevant agencies (such as the Port Authority and the New Jersey Turnpike Authority), and private sector organizations (such as the railroads, maritime terminal operators, and trucking firms) to review the project options. Working with these groups, NJDOT arrives at an "initially preferred alternative" (IPA). Additional involvement continues as the project moves through the subsequent steps and into construction.

In addition, Portway has an overall outreach effort through NJDOT and also works with the International Intermodal Transportation Center (IITC) of the New Jersey Institute of Technology (NJIT). The IITC, funded by a $2 million grant under the TEA-21 High-Priority Projects Program, seeks to work closely with public and private sector transportation stakeholders in the Portway Corridor to facilitate economic development and quality-of-life improvements, as well as leverage growth from the global trade assets of the area. NJDOT has participated in the stakeholder forums that NJIT has conducted under this program. Initiatives, such as the Brownfield Economic Redevelopment project, have helped inform Portway about the potential for redevelopment of parcels along the Corridor.

Project Results and Lessons Learned

Portway is in its early stages, with three of the Phase 1 projects in or entering the construction phase. While it is too soon to assess the results of the Portway projects, some lessons have emerged during the initial work. For example, NJDOT has taken into account the need to accommodate certain types of maritime cargo movements, specifically, over-dimensional project cargo, along with maritime containers that exceed U.S. weight limits. With permits, overweight containers can be transported over portions of the New Jersey roadway system. Accordingly, NJDOT is implementing a specialized design philosophy on Portway projects to appropriately handle large, heavy trucks. This design philosophy includes, where appropriate, higher strength pavement design, larger lane widths, larger turning radii, and reduced grades.

APPENDIX D

INVENTORY OF MAJOR CARGO HUB ACCESS PROJECTS

Access project types include:

M —Modify existing infrastructure
N —Build new infrastructure (not dedicated just to freight)
C —Develop dedicated corridor
DD—Develop distributed distribution/access system
H —Undertake concurrently with cargo hub development
I —Information system or other non-infrastructure solution

Project Name	Access Project Type	Project Location	Type of Cargo Hub Served	Brief Description of Project	Agency and Contact Name	Funding/Financing
Highway–Rail Crossing Elimination	M	Alaska	Port	Access to the port is by rail and truck on a single corridor, Ocean Dock Road. The rail tracks currently cross the road five times at grade. The project calls for moving the rail tracks to alleviate the number of crossings and improve safety.	John Lohrey, FHWA	ISTEA safety funds for the elimination of highway/railroad crossings
Airport Access Road	N	Alaska	Airport	A new 22-mile road link between Cold Bay Airport and King Cove (growing seafood processing center and harbor) will be developed to expedite the movement of fresh seafood products to the airport to be air-freighted to domestic and overseas markets.	John Lohrey, FHWA	STP for design and construction
Helena Slackwater Harbor Rail Access	C	Arkansas	Port	Seven miles of new railroad to provide rail access to the harbor, where a bulk goods transfer facility (primarily for agricultural products) is being developed	Cliff McKinney, Arkansas DOT	Revenue bonds
Alameda Corridor and Alameda East	C	California	Port	The Alameda Corridor consolidates the rail operations serving two ports. The Alameda Corridor is completed and operational.	Art Godwin, Alameda Corridor Transportation Authority (ACTA)	Total estimated cost of the Alameda Corridor is $2.4 billion. This includes $400 million in federal loans, $80 million in federal funds (including state and/or local match) and other pass through funds, part of total MTA grant for $347.3 million, $18 million state grant, $394 million from ports (up to $132 million to be repaid through user fees; ports also advanced $107 million that was reimbursed from bond proceeds), $1.167 billion bond issue (repaid through user fees), $17.5 million reimbursement by railroads to ACTA, and $89 million investment earnings on funds held by ACTA
Port Access Demonstration Projects	M	California	Port	A group of projects to improve rail crossings and truck access for goods movement to and from the Ports of LA/LB.	Dan Kopulsky, CalTrans	$42 million in ISTEA demonstration project funds
Port of Stockton Access Improvement	M	California	Port	Access improvements on local streets to improve the truck approach to the Port of Stockton	Andrew Chelsey, San Joaquin Council of Governments	$1.3 million in federal STP funding
Port of Hueneme Access Improvements	M	California	Port	This is an ISTEA Port Demonstration Project to improve truck access to the Port of Hueneme. The funds are being combined with those set aside for a planned project to build a Rice Avenue extension and full interchange with direct connectors to serve port truck traffic. This project is anticipated to significantly improve truck access to the Port from State Route 101.	Chris Stephens, Ventura County Transportation Commission	$8.9 million in ISTEA Demonstration Project funding; local funds for environmental and preliminary engineering work; substantial additional funds will be needed and federal funds will be sought

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Project Name	Access Project Type	Project Location	Type of Cargo Hub Served	Brief Description of Project	Agency and Contact Name	Funding/Financing
Harbor Boulevard Overcrossing	M	California	Port, warehouses, UPS facility	Study of improved access from State Road 50 and from Harbor Blvd by widening the overcrossing and revising eastbound ramps. The result is anticipated to be improved access to the Port of Sacramento, a UPS facility, and commercial warehouses in the port area.	Jody Lonergan, CalTrans	$15 million in federal funds have already been committed
Auxiliary Lane on State Route 99	M	California	Rail	Addition of two miles of auxiliary lane to facilitate truck access to and from the Fresno Intermodal Facility (truck/rail).	Steve Cordic, CalTrans	$4.7 million in federal NHS funds
I-380 Traffic Operations System (TOS)	C	California	Airport	Development of a dedicated route to the San Francisco International Airport. These operational improvements are anticipated to facilitate freight movement on the highway leading to the airport.	Jim Spinello, CalTrans	$501,000 in CMAQ and STP funds, along with state funds
Port of Long Beach Truck Queue Lease Clause	I	California	Port	New clause in marine terminal leases, starting with the Hanjin terminal. Under the clause, if truck lines form, port security will be called to move the trucks and Hanjin will be billed the cost.	Geraldine Knatz, Port of Long Beach	
Port of Long Beach Truck Appointment System	I	California	Port	The Port of Long Beach is helping to underwrite eModal's development of a software product that will be used to schedule trucker appointments at terminals throughout the Port.	Geraldine Knatz, Port of Long Beach	The Port of Long Beach allocated $75,000 for the system to support eModal.com
Air Cargo Access Road Construction	N	California	Airport	As part of an overall program to enhance air cargo capacity, an air cargo access road is to be constructed on the south west side of the airport. The road will be designed to support heavy truck traffic associated with air cargo activity.	Ken Merz, Sacramento County Airport System, Mather Airport	FAA and Sacramento County; Project Cost is $1.5 million
Los Angeles Airport Expansion	N	California	Airport	Major vehicle access improvements would include the LAX Expressway, which would draw traffic away from the San Diego (405) freeway and connect to an airport ring road to provide direct access to terminals and cargo areas.	LAWA, Board of Airport Commissioners	ARB
UPS Air Cargo Site Development	H	Colorado	Airport	Development of a UPS sort/distribution facility, including facility, airside access, and landside access improvements.		Total cost has been estimated at $28 to $31 million; UPS would pay for facility, utilities and roadway extension; Denver International Airport would pay for $20 to $25 million (using FAA AIP funds); UPS portion includes $1.6 to $2.8 million for roadways and utilities
Tomlinson Bridge Replacement	M	Connecticut	Rail	Replacement of a functionally and structurally deficient bridge. The new structure includes 4 road lanes, a sidewalk and a separated rail line. Project has been completed.	William Stark, Conn DOT	$100 million in federal and state funds
Port of Palm Beach Skypass and State Route 710 Relocation	M	Florida	Port, Rail, Storage Facilities	US–1 bisected the Port of Palm Beach. This separation affected port operations and created congestion. The Skypass project was designed to grade separate US–1, connect the port physically and operationally, and enhance access, cargo movement, and storage in the port.	Robert Hebert, Jr., Florida DOT	Total project cost is $40 million. This includes $0.6 million in ISTEA funds, $2 million from OTTED, $0.9 million from FDOT–ROW, 0.1 million in port cash, $16.7 million from FSTED Program (2 bond issues), $10 million from 1996 non-AMT Bonds issued by the port

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Project Name	Access Project Type	Project Location	Type of Cargo Hub Served	Brief Description of Project	Agency and Contact Name	Funding/Financing
Air Cargo Access Road Reconstruction	M	Florida	Airport	Existing cargo access road is to be reconstructed to support expanded cargo area.	Jeff Siddle, Hillsboro Airport Authority	FAA, state, and Hillsboro Airport Authority
Port Canaveral South Entrance Improvements	M	Florida	Port	The project will improve traffic flow and safety around Port Canaveral by replacing the existing entrance into the Port with an overpass for through traffic	Canaveral Port Authority	The Canaveral Port Authority and Florida DOT are funding this $22 million project
Hilo Harbor Access Road	N	Hawaii	Port	This project provides a second access road connecting the port to a major arterial.	Carter Luke, State of Hawaii, DOT, Harbors Division	$600,000 in federal STP and $200,000 in state funds
Sand Island Tunnel	M	Hawaii	Port	The Sand Island Container Yard is Hawaii's major container handling facility. Presently, a bridge serves the facility. In order to open a second main channel for the port, the project would replace the bridge with a tunnel.	Frederick Nunes, State of Hawaii, DOT, Harbors Division	Federal and state funds
Air Cargo Access Road Reconstruction and Realignment	M	Illinois	Airport	Portion of existing cargo road was removed to facilitate runway lengthening project. This project will realign and reconstruct cargo road.	Steve Micholson, Rockford Airport Authority	State funded
Bensenville Rail Yard Improvements	M	Illinois	Rail	The project will improve rail access to the yard and reroute a significant number of trains. The results will include increased train speeds and reductions in rail/traffic conflicts at at-grade crossings.	Gerald Rawlings, CATS	$2.1 million in CMAQ funds; note that CP Rail primarily funds the $35 million project
Chicago Area Consolidation Hub (CACH)	H	Illinois	Rail and UPS Hub	This is the world's largest package distribution facility. It is adjacent to the BNSF rail yard. Access improvements for this project included both road and rail. Specific improvements include grade separation at Willows Road, construction of an interchange on Interstate 294, construction of a road from the interchange (undertaken by UPS) and intersection improvements.	Mike Johl, UPS	CACH project cost $211 million; $0.6 million from Village of Hodgkins, $2.5 million from IDOT, $7 million from ISTHA, $2.5 million from State DCCA, $5 million from IDOT, $1.7 million paid by UPS, $0.15 million paid by BNSF, $4.7 million in UPS contribution, land for interchange ROW, $75 million
Upgrading of Cicero Avenue (Route 80)	M	Illinois	Rail	This bridge reconstruction raised clearances and removed intermodal operating obstructions in the vicinity of rail/truck transfer terminals.	Gerald Rawlings, CATS	Primarily Interstate Transfer Funds
Kedzie Avenue Access to Corwith Yard	M	Illinois	Rail	The BNSF TOFC yard (665,000 lifts/year) is accessed via Kedzie Avenue. Kedzie Avenue will be reconstructed and resignaled to improve access.	Timothy Matin, City of Chicago DOT	$700,000 in CMAQ funds, $3.8 million from CDOT
Tchoupitoulas Corridor	M	Louisiana	Port	The purpose of this project is to provide a new 4-lane blvd and rebuilt city streets to improve access to the Port of New Orleans, while removing heavy-vehicle traffic from existing city streets. Over 1,500 trucks travel on this corridor daily to reach the port's intermodal facilities.	Jim Reese, Port Authority of New Orleans	Funding included $13.7 in STP funds, $8 million of City bond money, $35 million from TIMED program, $12 million from New Orleans Regional Planning Commission, $12 million from Port of New Orleans.
Port of Baltimore Intermodal Container Transfer Facility	H	Maryland	Port and Rail	The project included a new port terminal, a new rail yard, a new access road, and other improvements at a total cost of $200 million and was completed in 1990.	Port of Baltimore, Michael Hild, Chief Engineer	Maryland Transportation Authority, CSX, Consolidated Coal Co., FHWA, City of Baltimore, and Port of Baltimore

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Project Name	Access Project Type	Project Location	Type of Cargo Hub Served	Brief Description of Project	Agency and Contact Name	Funding/Financing
BWI Airport Access Improvements	M	Maryland	Airport	Consists of two major roadway projects to improve access to the airport's cargo terminals. One project improves I-195 to connect I-95 to the airport. The second extends Elkridge Landing Road and reconstructs MD 170.		For I-195 project: total of $6.8 million, of which $6.25 million was from federal AIP with MDOT providing the remainder; for Elkridge and MD 170 project: state funds that also contributed to a light rail station
Kansas City Terminal Intermodal Enhancement (Flyover)	N	Missouri	Rail	The construction of this flyover will eliminate crossing delays at the third busiest railroad intersection in the U.S. The flyover will elevate the BNSF track over both the UPSP and KCS tracks, ending delays for 150 trains daily.	Douglas Luciani, Greater Kansas City Chamber of Commerce	Total cost of $70 million; Included creation of a transportation corporation made up of Kansas City Terminal Railway and Missouri DOT commission members. The new corporation (Kansas City Intermodal Transportation Corporation) will issue 20-year bonds backed by fees paid by the railroads and a pledging of assets by the railroads in the event that user charges are insufficient; federal funding and state highway trust fund revenues were deemed ineligible for use as a line of credit to improve bond ratings.
Reno Transportation Rail Access Corridor	C	Nevada	Rail and Port	The project involves construction of a below-grade 2.25-mile transportation corridor with two mainline tracks; construction of an access road adjacent to and on the south side of the tracks within the corridor; replacement of 10 at-grade rail crossings with bridges; and construction of one new bridge. The rail link is a critical corridor for the Port of Oakland.	The City of Reno	Total project cost is estimated at $242 million; The city plans to finance two-thirds of the project through a bond issue backed with hotel tax and sales tax revenue; for the remainder, the city requested a $79.5 million direct TIFIA loan (which will be backed by a senior lien on lease and sale income from railroad-donated property and a special district assessment, along with a junior lien on the hotel and sales taxes pledged to the senior financing)
Chemical Coast Doublestack Clearance Project	M	New Jersey	Port	The project will increase clearances along the Chemical Coast line, allowing double-stack trains to use the rail ROW to and from Port Newark/ Elizabeth and other intermodal terminals in northern New Jersey.	Don Lotz, Port Authority of NY and NJ	NJDOT Transportation Trust Funds and Port Authority funds
Portway	D	New Jersey	Port, Rail, Airport, warehousing centers	The project will create one or more dedicated corridors connecting maritime terminals, Newark International Airport, key rail intermodal yards, and warehousing centers.	James Snyder, NJDOT	$11.2 million from NHS, $16 million from NJ Bridge Bond, $21.4 NJ Transportation. Trust Fund, $35 million from PANYNJ
Brewster Road and "D" Street Improvements, Newark International Airport	M	New Jersey	Airport	Existing Brewster Road is being relocated and turn radii changed to accommodate larger trucks. New utilities are being installed, and access to State Route 1 & 9 is being revised to improve traffic flow.	The Port Authority of New York & New Jersey	Port authority funded
Union County Transportation Development District (TDD)	M	New Jersey	Airport, Port	The TDD is being undertaken in response to the intense redevelopment efforts underway or planned in this area and the need to ensure transportation infrastructure to support the area's activities. The cargo hubs in the area include Port Elizabeth (the main container terminals for NY & NJ) and Newark International Airport. The TDD also includes a large brownfield that is anticipated to be redeveloped as a major warehousing complex. The improvements range from local road improvements to a new interchange with the New Jersey Turnpike.	Mary K. Murphy, Union County	Financing approach for this project is still under development but will include public and private financial participation; Key private sector property owners and public sector agencies in the TDD are part of the Joint Planning Committee that will vote on the final financial approach

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Project Name	Access Project Type	Project Location	Type of Cargo Hub Served	Brief Description of Project	Agency and Contact Name	Funding/Financing
Reactivation of the Staten Island Railroad and Chemical Coast Connection	N	New Jersey, New York	Port	Reactivation of the rail line, combined with the creation of new connections to the Conrail Chemical Coast line will restore rail access to the Howland Hook Marine Terminal, which is crucial to the continued expansion of the facility.	James Badgley, New Jersey DOT	Combination of federal, state, and PANYNJ funds
Freight Information Real-Time System for Transport (FIRST)	I	New Jersey, New York	Port	This new web-based system is designed to provide port users with "one-stop shopping" for the information required to make decisions regarding cargo pick-up and delivery at the port. An appointment system for cargo pick-up and drop-off will be included, along with information on traffic and gate conditions. The system is designed to improve customer service and access to the maritime terminals.	Karen Tobia, Port Authority of New York and New Jersey	$1.9 million funded through the port authority, with additional funding through the I-95 Corridor Coalition
Port Inland Distribution System (PIDN)	DD	New Jersey, New York	Port	The PIDN would create a series of inland terminals and corridors to the Port of New York/New Jersey. Several inland terminal locations are under consideration. Among other objectives (such as market reach), the PIDN would reduce the number of trucks traveling directly to port terminals, thus alleviating congestion.	Bill Ellis, Port Authority of New York and New Jersey	
Red Hook Container Barge Project	N	New York	Port	The barge provides improved access to the Red Hook Marine Terminal in Brooklyn, which was severely constrained by truck congestion. The barge provides an environmentally-friendly alternative to truck use, eliminating an estimated 54,000 truck trips per year.	Don Lotz, Port Authority of New York and New Jersey	$7.7 million in CMAQ funds (Operational & Equipment), $1.6 million in STP funds, $3 million from TEA-21 Section 1104 Congestion Relief, –$1.7 million from New Jersey DOT, –$1.8 million from New York, $2 million from CMAQ local match, $0.4 million from STP local match, $0.8 million from TEA-21 local match, $39.8 million from PANYNJ, several million contributed by American Stevedoring Inc. (terminal operator)
Drury Lane Interchange and Airport Access Road, Stewart International Airport	N	New York	Airport	Construct New Interchange with I-84; widen existing Drury Lane to 4 lanes from 2; construct new 4 lane airport access road to permit development of major cargo area and improve terminal access.	Donald Fegan, New York State DOT	FAA and NYSDOT; total construction cost estimated at $40 million
Lombard Railroad Overcrossing	N	Oregon	Port	The construction of the overpass will ease congestion at the main entrance to the Port of Portland, improving truck and rail access to the marine terminals.	Susie Lahsene, Port of Portland	Commitment of $16.8 in STP funds, including $13 million TEA-21 High-Priority, $3 million (state and local), $1.75 million (port terminal), $1 million (private)
Columbia Slough Intermodal Expansion Bridge	N	Oregon	Port	The rail bridge project connects the Port of Portland to inland rail yards and eliminates the need for truck drayage.	Susie Lahsene, Port of Portland	$2.1 million in ISTEA Demonstration Funds, $0.9 million in CMAQ funds, $3 million from Port of Portland

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Project Name	Access Project Type	Project Location	Type of Cargo Hub Served	Brief Description of Project	Agency and Contact Name	Funding/Financing
Albina Railroad Crossing	M	Oregon	Rail	This project will eliminate an at-grade crossing, removing truck/rail conflicts and improving access to the UPSP intermodal yard.	Steven Kale, Oregon DOT	
Port of the Dalles (Chenoweth) Interchange	N	Oregon	Port	Construction of the new interchange on I-84 will provide a second access to the Port of the Dalles and reduce potential truck/rail conflicts.	Steven Kale, Oregon DOT	
Cargo Road Interchange	N	Pennsylvania	Airport	Construction of the new interchange on PA Route 60 will provide improved access for cargo transportation to the Greater Pittsburgh International Airport.	Jack Griffin, Moon Transportation Authority	Total cost of $15.4 million, of which $12.32 comes from federal STP and the remainder from local and private sources
Delaware Avenue Improvements	M	Pennsylvania	Port	The project restores Old Delaware Avenue and implements additional improvements such as directional signage to improve access to and from the marine terminals in Philadelphia. The project focuses on improved safety and traffic flow.	John Salyer, PennDOT	$3 million, of which $2.4 million came from ISTEA Section 1108 special funds and $600,000 from the local port authority
Pennsylvania Clearance Project	M	Pennsylvania	Port	This project removed impediments to double-stack rail service to the Port of Philadelphia, clearing 163 obstacles to the Ohio and New York borders.	John Brown, PennDOT	$83 million project cost used a combination of private funds and state-sponsored bonds, along with highway bridge projects that were funded through the TIP process
Agile Port System Intermodal Corridor	DD	Pennsylvania	Port	Being developed under the Delaware River Marine Economic Council, this project would develop a series of inland terminals and dedicated corridors linked to the Port of Philadelphia. The first corridor is between Philadelphia and Harrisburg. The Philadelphia Regional Agile Port System would also have an informational hub to facilitate the cargo handling and movement.	Susan Howland, Delaware River Marine Economic Council	
Airport Cargo Access Improvements, Luis Muñoz Marin International Airport	M	San Juan, PR	Airport	The existing 2-lane access road to the airport cargo area is being widened to 4 lanes, with signalization improvements at the interchange with the Baldoroity De Castro Expressway.	John Colon, Puerto Rico Ports Authority	$3.9 million from AIP (construction & design), $1.3 million in PFCs ($4.50 per passenger)
Cooper River Bridge	N	South Carolina	Port, Warehousing	A new 2.5-mile bridge structure will be built to replace two existing, structurally deficient bridges that connect Charleston and Mount Pleasant. The new facility is designed to meet steadily increasing traffic demands and provide a vital link to the Port of Charleston.	South Carolina Department of Transportation	$215 million from TIFIA loan, $96.6 million from FHWA (TEA-21) including SCDOT matching funds, $325 million State Infrastructure Bank grant
American Way/Democrat	M	Tennessee	Airport	To improve truck flows, this project widened the existing route that accesses Memphis International Airport.	Glenn Beckwith, Tennessee DOT	$16.4 million, of which 75% was federal (STP) and 25% came from the state
Barbour's Cut Intermodal Access Improvements	M	Texas	Port	This project removed 1,200 trucks per day from Houston-area highways by extending the ramp point at the Barbour's Cut Container Terminal. The project also connected three rail tracks to the main line, estimating many dray trips to and from the port.	Tom Kornegay	$15.33 million, of which $7.665 million was from the federal CMAQ program and the remainder was local funds
Brownsville/Matamoros Railroad Relocation Demonstration Project	N	Texas	Port	This project consisted of several elements that eliminated highway/rail crossings and improved rail access to the Port of Brownsville.	Horner Gutierrez, Texas DOT	$33.7 million total, funded with federal Railroad-Highway Demonstration funding, ISTEA Demonstration Project funding and local private match

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Project Name	Access Project Type	Project Location	Type of Cargo Hub Served	Brief Description of Project	Agency and Contact Name	Funding/Financing
Access to UP Intermodal Yard	N	Texas	Rail	The project consists of constructing a new ramp from I-35 to provide access to the UPSP Intermodal Yard north of Laredo, providing more direct access to the yard. Previously, trucks had to go several miles south of the yard and then travel on a narrow two-way frontage road, resulting in hazardous conditions.	Bob Austin, Laredo District, Texas DOT	$300,000, of which $240,000 is federal and the remainder is from the state
Joe Fulton International Trade Corridor	C	Texas	Port	The project involves the construction of an 11.5-mile road from the intersection of Carbor Plant Road and I-37 to US Highway 181. The project will add additional access to the port and an alternative route for trucking.	Rick Maldonado, Port of Corpus Christi Authority	$10.3 million in STP funds (Port to apply for additional $10 to 15 million) $11 million from TxDOT, $3 million from MPO Regional Highway Improvement Plan, $16.3 million from State Infrastructure Bank loan to port, $1.75 million from Port of Corpus Christi
Manassas Railroad Alignment Improvement Study	M	Virginia	Port	The project involved relocating rail to improve track alignment and safety, along with eliminating delays at at-grade crossings. The project facilitates double-stack train movement through Virginia and to the Inland Port Terminal at Fort Royal.	J. D. Austin, Virginia Dept. of Rail and Public Transportation	$40 million from public and private sources
SW Harbor Project/ Terminal 5	H	Washington	Port	The overall package includes roadway, rail yard and shoreline mitigation improvements to Terminal 5. The roadway portion involved the construction of a new grade-separated overpass of the rail line to the terminal. The rail portion is designed to eliminate a dray of several miles.	Charles Sheldon, Port of Seattle	Total was $265 million; roadway portion was $8.5 million, of which $3.58 million came from federal sources through TIP; sources included regional STP, STP competitive, and local funding
Harbor Island Project/ Terminal 18	H	Washington	Port	The overall package includes roadway, rail yard, and shoreline mitigation improvements to Terminal 18. The roadway portion involved constructing an arterial overpass of the rail lines to separate rail traffic from other surface modes. The rail portion is designed to eliminate a dray of several miles.	Michael Burke, Port of Seattle	Total is $270 million; roadway portion is $15 million
Immunex Project at Terminals 88 to 91	N	Washington	Port	The project will provide grade-separated vehicular access to Terminals 88 to 91 and will allow for the development of a new plant for Immunex Corporation. The project also improves access to and from the nearby Magnolia community in Seattle by grade separating a heavily trafficked rail corridor for intermodal commercial traffic, as well as pedestrians, bicycles, and passenger vehicles.	Phil Harrison, City of Seattle	Total is $14.5 million, of which $10 million is from King County, the City of Seattle, the Port of Seattle, and Immunex (including funds generated through property tax revenues); $1 million in statewide competitive STP funds; and $3.46 million from an Economic Development Authority grant

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Project Name	Access Project Type	Project Location	Type of Cargo Hub Served	Brief Description of Project	Agency and Contact Name	Funding/Financing
Freight Action Strategy for the Seattle-Tacoma Corridor (FAST Corridor)	C	Washington	Port	The FAST Corridor calls for providing new grade separations via a series of overpasses and underpasses to be built at key points throughout Pierce and King Counties where roadways and railroad tracks intersect at-grade. FAST also includes truck access projects.	Peter Beaulieu, Puget Sound Regional Council, Andrea Riniker, Port of Tacoma	Funding comes from the federal government; Ports of Tacoma, Seattle, and Everett; the State of Washington; and a number of cities and counties in the corridor area; one innovative funding element is a commitment by the BNSF to fund 5% ($18 million) of the total corridor costs rather than pay a share of the costs of selected individual grade separation projects: FAST anticipates receiving 25% of the funds needed through the TEA-21 Section 1118/1119 program
Portnet Seattle	I	Washington	Port	The Port of Seattle will work with a subsidiary of PSA to implement PSA's information technology in Seattle. The system unifies information from a variety of sources to maximize the efficiency of cargo movements. The ability to schedule appointments for trucks may be included	Mic Dinsmore, Port of Seattle	
Tacoma Narrows Bridge Project	N	Washington	Port	The primary feature of this project is construction of a new suspension bridge parallel to the existing bridge. Other elements include upgrading the existing bridge, a new toll plaza, and new interchanges. The bridge is the only land link across Puget Sound and serves the Port of Tacoma.	Tacoma Narrows Bridge Nonprofit Corporation (TNBNC)	Costs are estimated at $835 million subject to the negotiation of a guaranteed fixed-price, design-build contract with United Infrastructure Washington (a subsidiary of Bechtel Enterprises); TIFIA assistance will include a $240 million secured load and a $30 million line of credit available during the project's first 10 years of operation; over $500 million of tax-exempt bonds will be issued to pay for the majority of the project costs; all project debt is anticipated to be repaid through the bridge tolls, which will begin at $3.00 per round trip
Port Access Demonstration Project	M	Washington	Port	The project is designed to enhance port-related infrastructure to make the facility a more efficient marine terminal.	Udo Mehlberg, Port of Tacoma	$100,000 in funding from the Port of Tacoma and CCDOT
Port Access Demonstration Project/ Intermodal Center	DD	Washington/ Oregon	Port	This project is designed to enhance regional access via an inland intermodal center.	Udo Mehlberg, Port of Tacoma	The Port of Tacoma and CCDOT are funding the project
Rail line between Port of Tanjung Pelepas in Malaysia and Thailand	M	Malaysia-Thailand	Port	The rail line is designed to improve access to new Port of Tanjung Pelepas in Malaysia		
Betouwe line between Port of Rotterdam and Germany	M	Netherlands-Germany	Port	The Betouwe line is intended to improve rail access to the Port of Rotterdam		

APPENDIX E

FEDERAL FUNDING SOURCES

FEDERAL HIGHWAYS ADMINISTRATION (FHWA) PROGRAMS

1. FHWA Surface Transportation Program (STP)

STP is available for almost any roadway improvements on any federal-aid highway, including NHS. Improvements to accommodate other modes, including rail freight, are also eligible. STP was introduced in 1991 under the Intermodal Surface Transportation Efficiency Act (ISTEA). The program was set up to fund roadway projects other than those classified as local or rural minor collectors, bridge projects, or transit capital projects. Roadway projects could involve construction, reconstruction, rehabilitation, resurfacing, restoration, or operational improvements of the road.

The Transportation Enhancement Program (TEP) has 10% set-aside under STP and has a specified list of eligible project types that must relate to surface transportation. Among the specified categories, key opportunities for freight projects include the preservation of abandoned rail corridors.

Another 10% of STP obligation authority is set aside for safety-related projects in accordance with two programs: Hazard Elimination (Section 152) and Railway/Highway Crossings Program (Section 130), discussed below.

2. FHWA Congestion Mitigation and Air Quality (CMAQ) Improvement Program

Projects eligible for CMAQ funding must reduce carbon monoxide, volatile organic compounds, oxides of nitrogen (NOx), and particulate matter in a Clean Air Act nonattainment and maintenance areas. Intermodal freight projects are eligible for CMAQ grant funding if they demonstrate reduced traffic emissions. However, freight projects compete against highway and transit projects that also alleviate air pollution.

CMAQ has been used in more innovative freight projects than most other federal funding programs. A key feature to note includes the eligibility of rail track rehabilitation and corresponding infrastructure that lead to a reduction of truck traffic.

Congress apportions obligation authority to each state based on population and the severity of the area's air quality problems. The state is then responsible for programming the money for various projects throughout the year. States work with Metropolitan Planning Organizations (MPOs) to decide which transportation activities in the approved State Implementation Plan get funding from CMAQ. Programs may vary from congestion relief strategies, to transit projects, to alternative fuel projects, to public education and outreach activities.

CMAQ project approvals have included rail and barge freight facilities as a substitute for truck movements. CMAQ funds also have been used to support a private intermodal terminal under a lease agreement—typically a hurdle for public funding expenditures. Funds were also used under a state loan agreement to create a revolving CMAQ account in Ohio. Other CMAQ funds either fully funded a project or provided gap funding (seed money to match private funding).

3. FAA Airport Improvement Program (AIP)

The U.S. Airport and Airway Improvement Act of 1982 (amended in 1983 and 1987) authorized the Airport Improvement Program (AIP) to assist in the development of a nationwide system of public-use airports adequate to meet the projected growth of aviation. The Act provides funding (in the form of federal- and state-administered grants) for airport planning and development projects at airports included in the *National Plan of Integrated Airport Systems* (FAA AIP Handbook). AIP funding is available for construction (maintenance is generally prohibited) and is limited to airports included in the *National Plan of Integrated Airport Systems*, within the following classifications:

- Cargo service airports receiving cargo in excess of 100 million pounds annually and
- Primary commercial airports that enplane more than 10,000 passengers annually.

Specific advantages of the FAA AIP Grant Program include the following:

- A large budget ($555 million): $300,000 to $16,000,000 per year for primary airports based upon the number of passengers enplaning annually.
- Eight percent (maximum) of the annual cargo service apportionment—a favorable funding ratio (in most cases) for state and local governments (90% federal, 5% state, 5% local).

AIP also provides state block grants to nine participating states, including Illinois, Michigan, Missouri, New Jersey, North Carolina, Pennsylvania, Tennessee, Texas, and Wisconsin. The matching provisions are the same for both the AIP airport grant and the FAA State block grant programs: federal share is 90%; the remaining 10% is divided between

state and local government or authority, on a discretionary basis. A recent federal provision, first tested under a pilot program and now proposed for codification in the 1982 act, would allow for a "flexible nonfederal match." This would permit the project sponsor to offer an overmatch to better compete for federal resources.

4. Demonstration Projects/High-Priority Projects

TEA-21 authorized $9.4 billion in funding to target 1,850 high-priority projects. FHWA and the Office of Intermodalism compiled surveys into the *Compendium of Intermodal Freight Projects*. The *Compendium* survey results indicated that 20% of the projects identified in the survey were funded under ISTEA demonstration and "priority intermodal project" earmarks. Review of state and MPO data resulted in findings similar to those of the *Compendium.* In effect, demonstration funding and/or TEA-21 High-Priority Projects substitute for dedicated state intermodal programs. These types of projects come from a process that bypasses any coordinated short- or long-range planning efforts.

5. FHWA Transportation Infrastructure Finance and Innovation Act of 1998

Title I, subtitle E (Finance), chapter 1 (section 1501) of TEA-21 introduces the Transportation Infrastructure Finance and Innovation Act of 1998 (TIFIA). TIFIA establishes a $10.6 billion federal credit program for projects of "national significance" such as intermodal facilities, border crossings, and multi-state trade corridors that are of a scale that exceeds the capacity of existing federal and state assistance programs. TIFIA is intended to complement existing funding resources by filling market gaps and leveraging substantial private co-investment. The TIFIA credit program provides for three types of financial assistance, as follows:

- Secured loans,
- Loan guarantees, and
- Lines of credit.

Eligible projects include highway and capital transit projects, as defined by Title 23 and Title 49, Chapter 53, United States Code. This includes all highway projects, rail capital projects, international bridges and tunnels, publicly owned freight transfer facilities on or adjacent to the National Highway System (NHS), and grade crossing improvements. Additionally, the following criteria are listed under TIFIA in TEA-21. A project must

- Be included in the state transportation plan,
- Be included in approved State Transportation Improvement Program (STIP)/Transportation Improvement Program (TIP) at time of agreement, and
- Project costs must be equal to or exceed the lesser of
  a. $100,000,000 **or** 50% of the amount of federal highway assistance apportionment funds to the state for the most recent fiscal year (except ITS projects),
  b. For intelligent transportation system projects (i.e., projects principally involving the installation of an intelligent transportation system) eligible project costs shall be reasonably anticipated to equal or exceed $30,000,000, or
  c. Project financing must be repayable, in whole or in part, from tolls, user fees, or other dedicated revenue sources.

Under the TIFIA credit program, publicly owned intermodal freight facilities on the NHS are considered eligible projects. The Secretary of USDOT evaluates and selects projects based on a variety of factors including national significance, credit-worthiness, and private participation.

6. FHWA State Infrastructure Banks (SIB)

The SIB pilot program was established under the 1995 NHS Designation Act (Section 350) and appropriated $150 million to participating states. Federal pilot program disbursements to individual state SIBs varied from $1.5 to $12 million; the most common state allocation was $1.5 million. Approximately 40 states participated in the ISTEA pilot program with varying levels of success. TEA-21 authorized four states to capitalize their SIB programs with federal-aid funding.

Program eligibility is limited to Title 23 and Title 49, Chapter 53, United States Code, however; some states (Ohio and Missouri) took the initiative to establish state-funded infrastructure bank accounts to address other modes. Missouri, though, is constrained from capitalizing its non-highway SIB accounts by its State Highway Trust Fund restrictions against non-highway uses.

As established under the NHS Designation Act, State Infrastructure Banks had two main implementation hurdles: (1) low capitalization funding and (2) developing a loan program within a framework traditionally oriented to grant disbursement. TEA-21 only reauthorized four states to capitalize the bank from TEA-21 federal appropriations, which compounded the capitalization hurdle. To date, the remaining 36 states still maintain active SIBs, although most are significantly undercapitalized with $1 million or less in these accounts. Of the nonauthorized states, some have been able to fund projects.

Despite these hurdles, there are some noteworthy case studies of SIB lending for freight-related highway development. Pennsylvania, for example, used its SIB to fund a highway connector project to connect a state highway to the Pittsburgh International Airport freight warehouse area, repaying the loan from a Transportation Improvement District (TID). However, it is important to note that Pennsylvania was not reauthorized

to draw down funding under TEA-21 to recapitalize its SIB. Therefore, Pennsylvania SIB can only be recapitalized by loan repayments and state appropriations. Laredo, Texas, was also successful at using its SIB to finance the construction of a freight-related highway toll bridge project.

7. FHWA National Highway System (NHS)

The National Highway System (NHS) is comprised of 163,000 miles of rural and urban interstate system roads, international border crossings, major intermodal transportation facilities, the defense strategic highway network, and strategic highway network connectors. The purpose of NHS is to provide an interconnected system of principal arterial routes that serve major population centers, international border crossings, ports, airports, public transportation facilities, other intermodal transportation facilities, and other major travel destinations; meet national defense requirements; and serve interstate and interregional travel. NHS funding supports highway construction, safety and operational improvements, transportation planning, technology transfer activities and ITS, traffic control, bicycle, and vanpool projects on the NHS facilities.

Under ISTEA and furthered in TEA-21, NHS connections to intermodal freight facilities that fall within designated patterns of truck volumes are eligible for NHS funds. Many of these connections are on local roads and city streets that might otherwise not be eligible for funding.

8. FHWA Section 130 (Highway–Railroad Grade Crossings Program)

The Highway-Railroad Grade Crossings Program was established in 1913 through the Highway Safety Act, later codified as Section 130 in Title 23 of the United States Code. This program provides federal money to states in order to fund projects aimed at reducing the incidence of accidents, injuries, and fatalities at railroad crossings. To accomplish these safety objectives, the funds can be used to install or improve signs and pavement markings, flashing light signals, automatic gates, crossing surfaces, and crossing illumination.

9. Borders/Corridors

The Borders/Corridors Program established funding packages to support planning studies and infrastructure development at national border crossings and along major freight corridors. Funds are eligible for Title 23 purposes (highway improvements) including feasibility studies, corridor planning and design activities, location and routing studies, multistate and intrastate coordination of corridors, and any management plan for the corridor that includes environmental review or construction. All projects applying for Section 1118 or 1119 funding must be included in their respective STP and the STIP and, where sponsored by an MPO, be included in the TIP and MPO long-range plan. Many of the "high priority" corridors that are eligible for funding were previously identified through ISTEA and have been included in state transportation plans.

There are geographic limitations on borders funding—within a 100-mile radius of the U.S. borders. This constrains freight project development for goods processed outside the border areas.

10. (Department of Commerce) Economic Development Administration (EDA) Funds

The U.S. Department of Commerce, Economic Development Administration, offers grant funds for public works projects that promote or retain employment. Under EDA's Public Works and Development Facilities Program, grants are provided to help distressed communities attract new industry, encourage business expansion, diversify local economies, and generate long-term, private sector jobs.

Proposed projects must be located within an EDA-designated Redevelopment Area or Economic Development Center. An applicant may be a state, political subdivision of a state, special-purpose unit of state and local government, or a public or private nonprofit organization or association representing the redevelopment area. Port improvement projects are eligible for funding under this program.

Priority consideration is given to those projects that

- Improve opportunities for the successful establishment or expansion of industrial or commercial facilities;
- Assist in creating or retaining private sector jobs in the near term, as well as providing additional long-term employment opportunities, provided the jobs are not transferred from other labor market areas;
- Alleviate the long-term unemployment within low-income families residing in the area served by the project;
- Fulfill a pressing need of the area and can be started and completed in a timely manner; and
- Demonstrate adequate local funding, with evidence that such support is committed.

According to EDA, distress may exist in a variety of forms, including high levels of unemployment, low income levels, large concentrations of low-income families, significant declines in per capita income, substantial loss of population because of the lack of employment opportunities, large numbers (or high rates) of business failures, sudden major layoffs or plant closures, and/or reduced tax bases. Potential applicants are responsible for demonstrating to EDA, through statistics and other appropriate information, the nature and level of the distress their project efforts are intended to alleviate. In the absence of evidence of high levels of distress, EDA

funding is unlikely. Typically, funding from this source is difficult for ports to obtain due to the employment requirements. Most port projects do not generate high levels of direct employment; instead, these projects are likely to have measurable impacts on indirect or induced employment levels, neither of which meets EDA eligibility requirements.

The following statistics are published by EDA and provide some benchmark for determining the level of economic distress for a given area. EDA investments have targeted distressed communities with the following characteristics:

- Unemployment of 9.6% (median 24-month average) or more,
- Per capita income of $7,666 (median) or less,
- Eighteen percent or more of residents below poverty level (median), and
- Eleven percent or more of minority.

Funds in the amount of $178 million have been appropriated for this program for FY 1998. The average funding level for a grant is $886,000, which demonstrates that this is not a large source of funding for ports.

11. FHWA Appalachian Development Highway Program

The Appalachian Development Highway System (ADHS) was created to provide a system of highways and access roads to foster economic development in the Appalachian regions of 13 states—Alabama, Georgia, Kentucky, Maryland, Mississippi, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia, and West Virginia. Funding from this program may be used for the construction, reconstruction, or improvement of highways on the 3,025-mile ADHS.

12. FHWA Transportation and Community and System Preservation Pilot (TCSP)

TCSP program is a comprehensive initiative of research and grants to investigate the relationships between transportation and community and system preservation and private-sector-based initiatives. States, local governments, and MPOs are eligible for discretionary funds to plan and implement strategies that improve the efficiency of the transportation system; reduce environmental impacts of transportation; reduce the need for costly future public infrastructure investments; ensure efficient access to jobs, services, and centers of trade; and examine private sector development patterns and investments that support these goals. A total of $120 million is authorized for this program for FY 1999–2003.

The North Jersey Transportation Authority won a TCSP grant to identify infrastructure needs for the trucking community using the Port of Elizabeth facilities.

13. FHWA Ferry Boat Discretionary Program

The Ferry Boat Discretionary Program (FBD) was created by ISTEA Section 1064 to support the construction of ferry boat systems connecting to the National Highway System. This marine highway program supports the construction of boats and ferry terminals.

The set-asides for Alaska, New Jersey, and Washington are for the construction or refurbishing of ferry boats and ferry terminals and their approaches that are part of the NHS. Due to the large number of requests, $2 million or less is typically awarded, in order to disburse funding to as many states as possible.

14. FRA Railroad Rehabilitation Program and Railroad Rehabilitation and Improvement Financing (RRIF) Program

The Railroad Rehabilitation and the Railroad Rehabilitation and Improvement Financing Programs were established by the Railroad Revitalization and Regulatory Reform Act of 1976. The authorization for the purchase of preference shares (Section 505) terminated on September 30, 1988. Section 511, under which loan guarantees were available, was amended by Section 7203 of TEA-21. Section 7203 establishes a new program entitled Railroad Rehabilitation and Improvement Financing (RRIF). Under the RRIF Program, direct loans and loan guarantees are available for terms up to 25 years. Eligible applicants include state and local governments, government-sponsored authorities and corporations, railroads, and joint ventures that include at least one railroad. RRIF funding may be used as follows:

- To acquire, improve, or rehabilitate intermodal or rail equipment or facilities, including track, components of track, bridges, yards, buildings, and shops;
- To refinance existing debt incurred for the above purposes; and
- To develop and establish new intermodal or railroad facilities.

15. FHWA GARVEE Bonds

The Grant Anticipation Revenue Vehicle (GARVEE) bond is a financing instrument with principal and/or interest repaid with future federal-aid highway funds. GARVEE bonds can be used one of two ways: (1) direct GARVEE bonds in which federal assistance directly reimburses debt service paid to investors and (2) an indirect reimbursement in which federal funds reimburse expenditures on other federal-aid projects and the state DOT subsequently uses a portion of those funds to pay debt service on the debt-financed project. In the second type, the debt-financed project does not need to be a federal-aid project. Four projects have used GARVEE bond

financing under this new program—Boston's Central Artery, Ohio's Spring–Sandusky Interchange, New Mexico's Corridor 44, and Mississippi's Four Lane Highway Program.

TITLE 23 ELIGIBLE ACTIVITIES

The term "construction" means the supervising, inspecting, actual building, and all expenses incidental to the construction or reconstruction of a highway, including locating, surveying, and mapping (including the establishment of temporary and permanent geodetic markers in accordance with specifications of the National Oceanic and Atmospheric Administration in the Department of Commerce); resurfacing, restoration, and rehabilitation; rights-of-way acquisition; relocation assistance; elimination of hazards or railway grade crossings; elimination of roadside obstacles; acquisition of replacement housing sites; acquisition and rehabilitation, relocation, and construction for replacement housing; and improvements that directly facilitate and control traffic flow, such as grade separation of intersections, widening of lanes, channelization of traffic, traffic control systems, and passenger loading and unloading areas. The term also includes capital improvements that directly facilitate an effective vehicle weight enforcement program, such as scales (fixed and portable), scale pits, scale installation, and scale houses, and also includes costs incurred by the state in performing audits related to federal-aid projects that directly benefit the federal-aid highway program.

The term "highway" includes roads, streets, and parkways and also includes rights-of-way, bridges, railroad–highway crossings, tunnels, drainage structures, signs, guardrails, and protective structures in connection with highways. It further includes that portion of any interstate or international bridge or tunnel and the approaches thereto, the cost of which is assumed by a state highway department including such facilities as may be required by the United States Customs and Immigration Services in connection with the operation of an international bridge or tunnel.

The term "highway safety improvement project" means a project that corrects or improves highway hazard locations, eliminates roadside obstacles, and/or improves highway signing and pavement marching. The term "operational improvement" means a capital improvement for installation of traffic surveillance and control equipment; computerized signal systems; motorist information systems; integrated traffic control systems; incident management programs; and transportation demand management facilities, strategies, and programs and such other capital improvements to public roads as the Secretary may designate by regulation, except that such term does not include resurfacing, restoring, or rehabilitation improvements; construction of additional lanes, interchanges, and grade separations; and construction of a new facility on a new location.

TITLE 49 ELIGIBLE ACTIVITIES

The term "railroad" includes the following:

- A bridge, car float, lighter, or ferry used by or in connection with a railroad;
- The road used by a rail carrier and owned by it or operated under an agreement; and
- A switch, spur, track, terminal, terminal facility, and/or a freight depot, yard, and ground used or necessary for transportation.

The term "transportation" includes the following:

- A locomotive, car, vehicle, motor vehicle, vessel, warehouse, wharf, pier, dock, yard, property, facility, instrumentality, or equipment of any kind related to the movement of passengers or property, or both, regardless of ownership or an agreement concerning use; and
- Services related to that movement, including receipt, delivery, elevation, transfer in transit, refrigeration, icing, ventilation, storage, handling, and interchange of passengers and property.

The term "commuter bus operations" means short-haul regularly scheduled passenger service by motor vehicle in metropolitan and suburban areas, where within or across the geographical boundaries of a state, and utilized primarily by passengers using reduced-fare, multiple ride, or commutation tickets during morning and evening peak period operations.

APPENDIX F

EXAMPLES OF STATE-LEVEL FUNDING MECHANISMS

Project	Funding Source	Type	Eligibility	Specific Use
California Maritime Infrastructure Bank		Bonds	California ports	Infrastructure projects including dredging and land acquisition
Florida Seaport Transportation & Economic Development	General fund	50/50 grant	Public ports	Transportation, dredging, construction, equipment, and land acquisition
Illinois Rail Freight Assistance	General fund	Loan/grant	Municipalities, port authorities, railroads	Light-density rail rehabilitation and rail spur construction
Illinois Economic Development Program	General fund	50/50 grant	Local government agencies	State assistance for highway improvements that are needed to provide access to new or expanding industrial, distribution or tourism developments
Illinois Truck Access Route Program	General fund	50/50 grant consisting of $30,000 per lane mile and $15,000 per intersection or 50% of the total project cost, whichever is less	Local government agencies	Assist local government agencies in upgrading roads to accommodate 80,000 lb trucks; routes are to provide access to points of loading/unloading, as well as truck support facilities
Indiana Rail Service Fund	General fund	Loan/grant	Class III railroads and local governments	Rehabilitation, acquisition, and grade crossings
Michigan Rail Loan Assistance	General fund	90/10 loan	Railroads for lines generating more than 50 carloads per track mile	Construction and rehabilitation
Minnesota Port Development Assistance	General fund	Loan/grant	Commercial port improvements	Construction, dredging, equipment, and disposal facilities
Missouri Transportation Corporation	Private market	Tax-exempt bonds	Based on public benefits and ability to repay bond issuance	
North Carolina Rail Industrial Access Program	General fund	50/50	Local governments, community development agencies, railroad companies, and industries	Construct or rehabilitate tracks required by a new or expanded industry
New York Industrial Access Program	General fund	60% grant/40% interest free loan up to a maximum of $1 million	Municipalities, industrial development agencies or other governmental agencies involved in economic development.	Projects must be an integral part of an economic development effort, which seeks to retain, attract, expand, or revitalize an industrial facility; NYS considers this program to be “funding of last resort”
Ohio Rail Development Commission	General fund	Loan/grant	Railroads, local governments, and port authorities	Rehabilitation, construction, acquisition, and grade crossings
Oregon Port Revolving Fund	Lottery/ general fund	Loan	Ports projects (except refinancing) for economic development and maintenance of infrastructure	Small-to–medium-sized loans for port infrastructure and economic development
Pennsylvania Appalachian Local Access Road Program	General fund	Matching grants up to $1 million with a local match of between 20 and 50%	Local government agencies	Any new local access road into a commercial, industrial, or recreational area that will retain or create jobs in any of the state’s 52 eligible Appalachian counties
Pennsylvania Airport Assistance	General fund	75/25 grant	Based on traffic volume and cash flow	Small airport development projects
Pennsylvania Rail Freight Assistance	General fund	50/50 grant	Rail and shipping corporations	Construction and rehabilitation of rail and intermodal facilities
South Carolina Transportation Infrastructure Bank	Fuel tax	Loan/grant	Highways and transit	Construction and improvement of highway and transportation facilities
Tennessee Airport Program	Fuel tax	90/10 grant	Development projects	Safety, landside, airside, and improvement consistent with state local plans
Virginia Rail Preservation	General fund	Grant/loan	Class I (loans), Class II and II (grants)	Rail improvement and rail spur construction
Washington Freight Mobility Strategic Investment Board	General fund	Grant	Projects on strategic freight corridors primarily aimed at increasing capacity or reducing barriers	Projects with freight mobility improvement benefits
Wisconsin Freight Rail Infrastructure/Preservation	General fund	Zero-interest loans	Rail track rehabilitation, improvement, and preservation	Track rehabilitation, intermodal facilities, rail spurs

[1]Match required after first $100,000.

APPENDIX G

BIBLIOGRAPHY AND SOURCES OF INFORMATION

This appendix contains a representative listing of relevant studies, papers, articles, and public documents that the team drew upon as part of this study.

The first section presents a representative bibliography of general documents that were used to develop the final report. The second section presents a listing of sources of information that were used to analyze and develop the 12 case studies.

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Airport Master Plans (such as JFKIA, EWR, Denver, LAX, Sea-Tac, Chicago, Miami, Bradley, Stewart, Logan, T. F. Green, Alliance, New Bedford, Philadelphia International).

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AASHO	American Association of State Highway Officials
AASHTO	American Association of State Highway and Transportation Officials
APTA	American Public Transportation Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATA	American Trucking Associations
CTAA	Community Transportation Association of America
CTBSSP	Commercial Truck and Bus Safety Synthesis Program
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
IEEE	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
NTSB	National Transportation Safety Board
SAE	Society of Automotive Engineers
TCRP	Transit Cooperative Research Program
TRB	Transportation Research Board
U.S.DOT	United States Department of Transportation