

# Effects of the Panama Canal Expansion on Texas Ports and Highway Corridors

executive

summary

*prepared for*

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# Executive Summary

## ■ Key Findings

- The proposed expansion of the Panama Canal will have significant impacts on Texas ports, their surrounding communities, and the highways and rail lines that serve them.
- Full realization of the Trans-Texas Corridor initiative will help ensure that the State is able to absorb the growth in freight traffic that will result from the Canal expansion and ensure that it can meet the challenges of serving evolving freight and passenger mobility needs.
- It is critical that existing Trans-Texas Corridor and other transportation planning activities explore different approaches to ensure sufficient rail capacity and/or highway capacity for trucks will be provided.
- Capitalizing the Texas Rail Relocation and Improvement Fund (RRIF) will allow railroads in the State to more effectively improve their infrastructure and operations, allowing them to more effectively serve growing volumes of international trade.

## ■ Summary

Expansion of the Panama Canal, through the development of new channels and the widening and deepening of existing ones, will allow it to maintain and even enhance its market share for trade between Asia and the United States. This expansion, scheduled for completion by 2015, will significantly impact the intermodal transportation system in Texas and accelerate growth at all of the state's seaports. In the short term, these impacts will be felt most heavily on and around the Port of Houston, the State's largest container port and a key trading partner for goods shipped via the Panama Canal. Through joint marketing with the Panama Canal Authority, the development of the new Bayport Container Terminal, and improvements to existing access routes, the Port is already preparing for the anticipated increase in container traffic resulting from the Canal expansion and other global maritime and trade trends. The Texas Department of Transportation (TxDOT) is also preparing for the impacts of the Canal expansion, particularly through the Trans-Texas Corridor initiative. Completion of this critical set of projects will help ensure that the state is able to absorb the growth in freight traffic that will result from the Canal expansion and ensure that it can meet the challenges of serving evolving freight and passenger mobility needs. In addition, the Trans-Texas Corridor initiative will enhance the competitiveness and connectivity of the state's port facilities,

allowing them to more effectively serve growing regional and national markets, create and retain jobs, and improve the state's overall economic vitality.

In the longer term, the Panama Canal expansion will have other impacts to the State's transportation system, as other Texas ports make improvements to capture market share, shippers evaluate their supply chain and develop new distribution centers and warehouses, and increasing volumes of intermodal freight result in transportation, environmental, and land use issues at or around Texas' port facilities. These and other impacts raise key policy questions to consider as the Texas Department of Transportation (TxDOT), metropolitan planning organizations (MPOs), economic development agencies, and other public and private freight stakeholders work to improve the safety, security, and efficiency of people and goods movement statewide.

## ■ Background

The Panama Canal is one of three common routes, along with the Suez Canal and the United States intermodal system, connecting Asian-based manufacturers and exporters with major consumer markets on the United States Gulf and East Coasts. The combination of congestion at the Ports of Los Angeles and Long Beach (which handle approximately half of all United States imports), increasing costs and decreasing reliability on the United States intermodal system (particularly rail connections), and the proliferation of distribution and warehousing centers near ports along the Gulf and Southeast coasts of the United States, have combined to make the Panama Canal route (also known as the "all-water" route) a more attractive option to shippers serving these markets, particularly those shipping consumer goods in intermodal containers.

As a result of these and other trends, the Panama Canal's share of total container shipments between Asia and the United States has increased from 11 percent in 1999 to over 38 percent in 2004 and container volumes through the Canal are expected to grow by nearly 6 percent annually over the next several years.<sup>1</sup> Although the Panama Canal remains a critical conduit for trade between Asia and the United States, there are concerns about the ability of the Canal to absorb future growth in trade volumes. At these estimated growth rates, the Canal is expected to reach its practical capacity sometime between 2009 and 2012.

The capacity constraints affecting the Panama Canal are driven primarily by the physical limitations of the Canal itself. The maximum size of vessel which can use the canal is dictated by the effective dimensions of the lock chambers (currently 100 feet times 1,000 feet). Today (2006), more than 45 percent of the ships utilizing the Canal match those exact dimensions. These ships, known as Panamax vessels, have significant impacts on traffic and operations throughout the Canal. Most of these ships cannot cross safely at

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<sup>1</sup> Panama Canal Authority, 2006.

speed, slowing operations and generating longer queues. In many cases, the Canal can only serve Panamax ships in one direction at a time.

Rapidly growing trade between the United States and Asia is driving many shippers to utilize “post-Panamax” vessels (those larger than the dimensions permitted through the Panama Canal), despite the fact that only a handful of ports have sufficient infrastructure to handle these ships, and growing congestion at and around those ports can degrade overall shipment reliability. The advent of these “mega-ships,” which are forced to use the Suez Canal or the United States intermodal system to access United States Gulf and East Coast markets, could threaten the existing market share for the Panama Canal.

Recognizing these trends, the Panama Canal Authority is proposing to undertake a \$5.25 billion expansion project that would involve the construction of two lock facilities (one on each side of the Canal); the excavation of new access channels to the new locks and widening of existing channels; and the deepening of the existing navigation channels. If approved by Panamanian voters on October 22, 2006, construction is expected to begin in 2007 and the new set of locks would begin operation by 2015.<sup>2</sup> In addition to these significant infrastructure investments, the Panama Canal Authority has developed strategic partnerships with key United States ports, including the Port of Houston, to boost trade through the Canal. This combination of wider navigation channels and locks (to allow post-Panamax ships to navigate through the Canal), coupled with strategic marketing partnerships with key United States ports, will increase demand through the Canal itself and for ports along the Gulf and East Coasts, including those in Texas. Table 1 shows the expected growth in traffic through the Panama Canal both with and without this expansion.

**Table 1**     **Expected Growth in Tonnage through Panama Canal**  
*2005-2025 (In Millions)*

Market Segment	2005 Tons	Year 2025 Tons	
		Without Expansion	With Expansion
Containers	98	185	296
Dry Bulk	55	49	73
Liquid Bulk	34	19	28
Passenger	10	13	19
Car Carrier	36	40	58
Refrigerated Cargo	19	15	22
General Cargo	7	3	4
Other	20	6	8
<b>TOTAL</b>	<b>279</b>	<b>330</b>	<b>508</b>

Source: Panama Canal Authority, 2006.

<sup>2</sup> Panama Canal Authority (ACP) – Proposal for the Expansion of the Panama Canal. April, 2006.

As shown in Table 1, the share of expected overall tonnage growth through the Canal will decrease for most market segments from 2005 to 2025 if the expansion is not implemented. These decreases will occur for two key reasons. First, the Panama Canal Authority is focused on serving the intermodal market, as that market segment is its primary revenue generator.<sup>3</sup> Even without an expansion, the Canal would still focus on the intermodal container market, often to the detriment of these other market segments. Second, as described earlier, large ships often cannot transit the Canal (as currently configured) at speed, causing queues and other operational delays. Because the Canal would continue to focus on serving the intermodal market even without an expansion – and as the volume of this traffic continued to rise – these existing delays would be exacerbated, and would primarily affect the Canal’s “secondary” customers, i.e., noncontainer (bulk, passenger, or general cargo) shipments. Over time, these noncontainer carriers would seek out other less-congested and more cost-effective routes, avoiding the Canal altogether. Completion of the proposed expansion, however, will allow the Canal to effectively strengthen its market share for intermodal traffic while maintaining or slightly enhancing service for most other market segments.

## ■ Impacts on Texas Ports and Highway Corridors

Even though only a handful of ports in Texas serve significant volumes of containerized traffic (currently Houston, Galveston, and Freeport), the impacts of the Panama Canal expansion will not be limited to only those facilities. Rather, the expansion may have significant impacts on many Texas ports, their surrounding communities, and the highways and rail lines that serve them. These impacts, along with key policy and planning strategies that TxDOT may wish to consider to address these impacts, are described below.

### *Growth at Texas Ports Will Be Accelerated*

Texas ports are already growing significantly, and are expected to grow by more than 40 percent (on average) between now and 2035. Some specific market segments – such as containerized traffic – are growing even more rapidly, in some cases greater than 10 percent per year. The expansion of the Panama Canal will accelerate these existing growth patterns, particularly at the ports in Texas that currently handle containerized traffic. Even without the Canal expansion, the Port of Houston (which handles over 80 percent of the State’s container throughput) expects its containerized traffic to grow between 16 and 23 percent over the next several years. When the expansion is complete, the Port of Houston’s growth rate will most likely increase significantly, placing pressure on terminal operators, trucking companies, railroads, state and local transportation

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<sup>3</sup> Intermodal traffic accounts for 35 percent of total volume through the Panama Canal, and over 40 percent of total revenue.

planning agencies, and other stakeholders in the maritime and transportation communities to maintain operational efficiency on or around port facilities. Accelerated growth in Houston and other intermodal facilities may encourage other ports in the state to make physical infrastructure improvements either to act as overflow or reliever facilities for the larger load-center ports or to serve markets that may be displaced from these larger ports altogether.

In response to these trends, many ports within the State are enhancing existing or developing new container terminals to more efficiently handle the growing volumes of containerized traffic, including:

- **Port of Houston, Bayport Terminal**, a new facility expected to be constructed over the next 15-20 years. The initial development phase, scheduled to open in the late summer of 2006, will accommodate approximately 300,000 TEUs; when fully developed, this facility will approximately triple the available capacity for containerized traffic at the Port and allow it to more effectively handle Panamax and post-Panamax ships;
- **Texas City International Terminal**, an intermodal terminal being jointly developed by the City of Texas City and Stevedoring Services of America, which will serve as the terminal operator; and
- **La Quinta Trade Gateway**, a container terminal being developed by the Port of Corpus Christi to compete with, or offer congestion relief from, existing container terminals in Texas and other Gulf states.

While the completion of these new facilities will allow these ports to capture additional market share for intermodal traffic, the impacts of these new facilities will most often be felt locally and regionally, through increased highway traffic around port areas, increased congestion on intermodal access routes, and worsening air quality in some areas. Completion of these facilities also heightens the importance of fully realizing the Trans-Texas Corridor initiative, as goods moving through these ports and terminals will need to efficiently and reliably access markets within Texas and across the region. Without completing the suite of Trans-Texas Corridor projects, it is unlikely that the state's existing transportation system will be able to absorb this anticipated growth in freight traffic.

### **Key Planning and Policy Strategies**

- Continue development of Trans-Texas Corridor projects. Completion of the Trans-Texas Corridor will help ensure that the State is able to absorb the growth in freight traffic that will result from the Canal expansion and ensure that it can meet the challenges of serving evolving freight and passenger mobility needs. In addition, the Trans-Texas Corridor initiative will enhance the competitiveness and connectivity of the State's port facilities, allowing them to more effectively serve growing regional and national markets, create and retain jobs, and improve the State's overall economic vitality. It is critical that this set of projects continues to advance toward implementation and TxDOT should work closely with the Texas Port Authority Advisory Committee (PAAC) and other key stakeholders to ensure that Trans-Texas

Corridor plans, programs, and strategies reflect the potential impacts of the Panama Canal expansion on key facilities and corridors.

- Ensure that freight trends and issues, including the potential impacts of the Panama Canal expansion, are fully integrated into transportation policy, planning, and programming activities at the statewide, regional, district, and metropolitan levels.

### ***The Performance of Intermodal Connections Will Be Strained***

The growth in freight traffic, particularly container traffic, associated with the expansion of the Panama Canal may further strain intermodal access to key ports and terminals in the State and prevent port facilities from effectively serving key regional and national markets. Population and travel growth in urban areas, particularly in and around Houston, coupled with the increases in freight traffic expected to occur as a result of the Panama Canal expansion and other global and trade trends, will strain the ability of existing highway and rail infrastructure to meet passenger and freight mobility needs. Completion of the I-69/Trans-Texas Corridor and Trans-Texas Corridor 35 will help absorb some of this growth, but it is critical that existing I-69/Trans-Texas Corridor and Trans-Texas Corridor 35 planning activities explore different approaches to ensure sufficient rail capacity and/or highway capacity for trucks will be provided.

Compounding the problem is the fact that the “last mile” intermodal connectors may not have sufficient capacity to handle expected increases in freight traffic either. Although several ports, including the Port of Houston, have undertaken efforts to make improvements to these critical linkages, the capacity gains resulting from these improvements may not keep up with the increases in demand. Making improvements to these facilities can be challenging, as many are local roadways and some local agencies are hesitant to invest scarce transportation funds on improvements whose benefits accrue regionally, nationally, or to the private sector freight industry.

Rail is an important and growing port service alternative at larger ports, but high infrastructure development costs and network capacity bottlenecks both within and outside the State can limit its potential as a viable option to trucking for some ports. Capitalizing the Texas Rail Relocation and Improvement Fund (RRIF)<sup>4</sup>, which was established in 2005, would allow railroads in the State to more effectively improve their infrastructure and operations, allowing them to retain or enhance their market share, expand the transportation options available to shippers, and improve overall mobility and economic competitiveness statewide.

Similarly, some ports have invested in intelligent transportation systems (ITS) to improve flows of cargo through port facilities. However, advances in ITS technology have not fully kept pace with growth in overall freight volumes at most ports and terminals. In many cases, the operational efficiencies gained by deploying ITS applications have been

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<sup>4</sup> Texas Constitution, Article 3 Section 49o

overwhelmed by the volume of freight moving through these facilities. Although other strategies, such as enhanced gate operating hours and physical improvements to marine access routes could reduce many of the impediments to cargo flow, such improvements must be made systematically and require close cooperation between port operators, users, and state and local transportation officials.

### **Key Planning and Policy Strategies**

- Identify key bottlenecks on the highway and rail systems and determine how those bottlenecks may be affected by the anticipated growth in container traffic caused by the Panama Canal expansion.
- Work with the PAAC – along with partner agencies (i.e., MPOs and local planning agencies), and the private sector freight community (i.e., ports, railroads, shippers, and other stakeholders) – to describe the existing performance of intermodal connectors, identify key issues, and develop appropriate investment strategies.
- Capitalize the Texas Rail Relocation and Improvement Fund (RRIF)<sup>5</sup> allowing railroads in the State to more effectively improve their infrastructure and operations, retain or enhance their market share, expand the transportation options available to shippers, and improve overall mobility and economic competitiveness statewide.
- Work with the PAAC, individual ports, and the private sector freight community to investigate the use of ITS or other operational strategies to improve mobility on and around port facilities.

### ***Distribution and Warehouse Development around Port Areas Will Be Accelerated***

Distribution centers and warehouses are often located in close proximity to intermodal ports and terminals, allowing shippers and carriers to serve regional and national markets more effectively. Major retailers, including Radio Shack, JC Penney, Wal-Mart, and Target have already invested in major distribution centers around the Port of Houston, and Houston was ranked as the second most “logistics-friendly” metro area in the country,<sup>6</sup> based on its strong transportation and distribution workforce, highway and rail infrastructure, water port access and air cargo facilities, and other factors. Increasing volumes of containerized freight at Texas ports caused by the expansion of the Panama Canal will accelerate the development of these shipper-controlled distribution centers and warehouses around key ports and intermodal facilities, particularly around the State’s existing container ports of Houston, Freeport, and Galveston.

Because these distribution centers and warehouses are often located in close proximity to ports and intermodal facilities, they favor trucks as their primary mode of transportation.

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<sup>5</sup> Texas Constitution, Article 3 Section 49o

<sup>6</sup> *Logistics Today Magazine*, 2006. Beaumont-Port Arthur ranked number 54; Brownsville number 95.



While trucks are able to serve these facilities most effectively, they also contribute to congestion at terminal gates and along port and terminal access routes, as drayage operators serving these centers often make multiple trips to and from port facilities per day. The development of distribution and warehouse facilities can also have important land use and transportation implications. Despite the close relationship between transportation – particularly intermodal freight transportation – and land use, many DOTs, MPOs, and local agencies find it difficult to coordinate freight transportation and land use planning activities to ensure that new facilities are compatible with existing land uses or that land use decisions are consistent with freight mobility and operational needs. The proliferation of new distribution centers and warehouses generated by the Panama Canal expansion will require more effective integration of land use into transportation planning at all levels – including project, corridor, and system-level plans – to ensure that safety, security, mobility, and environmental needs are being met.

### **Key Planning and Policy Strategies**

- Ensure that freight and land use implications are incorporated into current and future transportation planning activities, particularly corridor and system-level plans, at the statewide, regional, district, and metropolitan levels.
- Encourage MPOs and other local planning agencies to work closely with ports to ensure that land use and master planning activities or strategies are coordinated.
- Develop a better understanding of how port-related drayage movements affect the performance of the transportation system and the overall mobility of people and goods in and around key port facilities.

### ***There Will Be Pressure to Increase Channel Depths***

The new generation of containerships, including many of the post-Panamax ships that will be attracted to the expanded Panama Canal, typically require channel depths of at least 50 feet, particularly for fully loaded vessels. Few Texas ports currently have the ability to handle ships of that depth. Although at 45 feet, the Port of Houston will have one of the deeper channels among Gulf Coast ports, it will still lag behind several of its major East Coast competitors for containerized traffic, including the Port of New York/New Jersey, which has plans to increase its depth to 50 feet, and the Port of Hampton Roads (Virginia), whose channel is already at a depth of 50 feet.

In order to effectively compete for the container traffic increases expected to result from the expansion of the Panama Canal, many Texas ports will need to deepen their existing channels. Although the cost of dredging is shared by the Federal government (U.S. Army Corps of Engineers) and local sponsors (typically a port or port authority), limited Federal funds for dredging projects, coupled with the high cost of dredge spoil disposal (which is the responsibility of the local sponsor), makes channel deepening projects challenging. Those ports that are not able to effectively improve their channel depths may evolve into “niche” ports serving key commodities or local markets, rather than major load-centers for regional, national, or international shipments.

### **Key Planning and Policy Strategies**

- Consider developing a program to provide matching funds for dredging operations at key ports around the State to allow for a more comprehensive, systematic investment strategy for dredging activities.
- Consider capitalizing the Texas Port Access Account Fund, authorized in Chapter 55 of the Texas Transportation Code. This account authorizes funds for port improvement projects such as dredging, infrastructure improvements, and other enhancements.

### ***There Will Be Air Quality and Other Environmental Impacts***

As described earlier, growth in overall freight traffic at Texas ports – which will be accelerated with the expansion of the Panama Canal – has caused many ports in the State to investigate or undertake significant capacity improvements. In addition to dredge spoil disposal, a sensitive environmental issue in many areas, such expansions can also create other serious environmental concerns, as ports are usually located in environmentally sensitive waterfront areas and access improvements may generate additional truck or rail trips in air quality nonattainment regions. In addition, neighborhoods adjacent to ports and those that are most seriously impacted by expanding port traffic often house the poorest citizens in the community. Many ports are under pressure to resolve their access problems while minimizing additional community impacts.

In many cases, a variety of state, Federal, and local agencies are involved in the planning and approval of port improvements. Interlocking requirements for coordination among Federal, state, and local agencies, along with permit and environmental approvals, can significantly expand the time required to plan and implement projects, often driving up the cost of a project significantly. Without effective interagency coordination, improvements in such complex areas may stumble. The problem of meeting maritime system needs is further complicated by pressures to “reclaim waterfronts” with competing nonmarine development, such as housing and high-value commercial/industrial land uses that may generate higher revenues for local governments.

In order to mitigate these and other environmental impacts, it is critical that TxDOT work closely with its regional, local, and private sector partners to balance transportation improvements with environmental needs. The development and implementation of plans and strategies that improve the capacity and efficiency of the highway system, relocate high volume freight rail corridors away from nonattainment areas, or improve circulatory patterns in and around port facilities can often enhance freight mobility while simultaneously improving air quality in many regions.

### **Key Planning and Policy Strategies**

- Work with the PAAC, other stakeholders in the maritime community, MPOs, districts, and other planning agencies to ensure that potential environmental issues related to the Panama Canal expansion and other global maritime trends are identified and

accounted for within the transportation planning process at the statewide, regional, district, and metropolitan levels.

- Consider developing a program to preserve critical commercial infrastructure, facilities, or land parcels (including brownfields), particularly around smaller ports in the State, to ensure adequate capacity exists to address future maritime system needs.