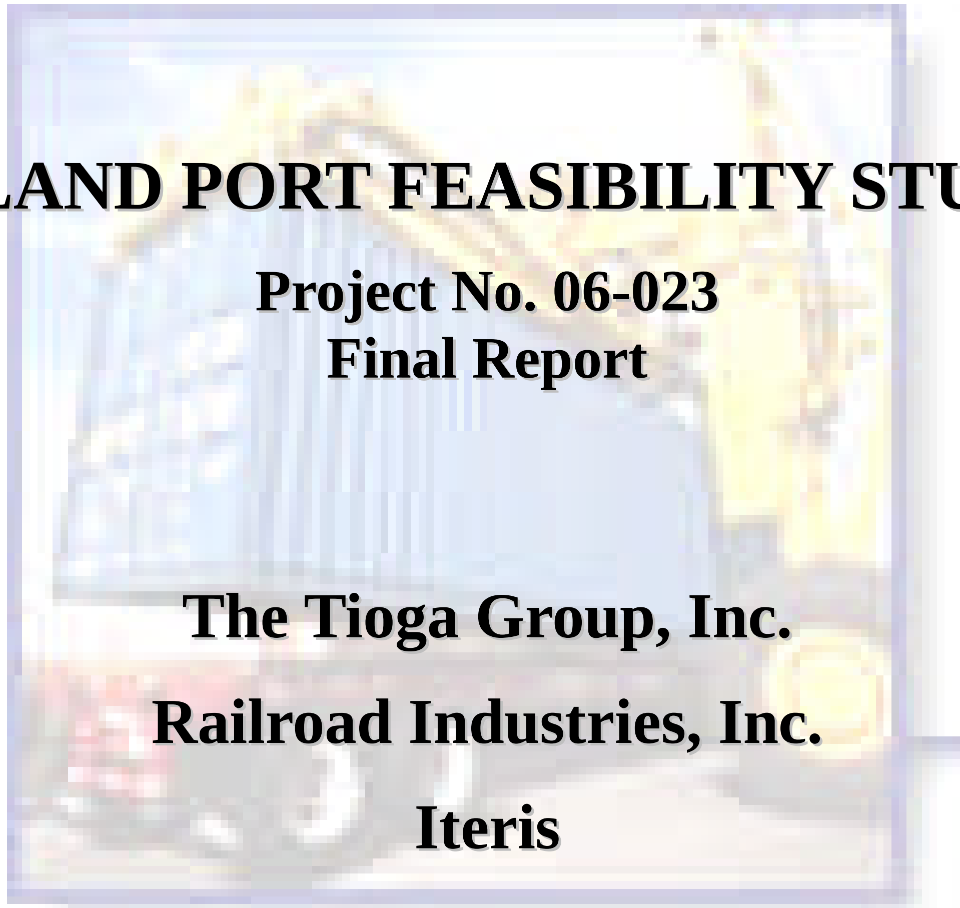


INLAND PORT FEASIBILITY STUDY

Project No. 06-023
Final Report

The Tioga Group, Inc.

Railroad Industries, Inc.

Iteris

Prepared for:

SOUTHERN CALIFORNIA ASSOCIATION of GOVERNMENTS

818 W. 7th Street, 12th Floor
Los Angeles, CA 90017-3435

August, 2008

Contents

Exhibits

I. Summary and Conclusions

Project Overview

The purpose of this project was to determine whether and how inland port concepts could be implemented to reduce truck VMT and generate other public benefits in the SCAG region. From project inception through analysis of technical feasibility and potential benefits it was generally anticipated that the answer would depend on technical findings. As the study team progressed through Inland Empire site selection, implementation analysis, and community acceptance issues a very different picture emerged.

Feasibility and Benefits

The study team's overall conclusion is that the inland port/rail shuttle concept is sound and would benefit the region if it could be implemented. Rail shuttle service to the heavily developed central part of the Inland Empire is technically feasible and would reduce net truck VMT. The reductions, however, are not large because the 60-mile rail movement still requires local drayage inland, offsetting the rail savings.

According to port survey results, there are about 3,500 daily truck trips between the Ports and Riverside and San Bernardino Counties combined. Two daily round trip intermodal trains could divert a maximum about 33% of these trips. While analytically significant and a net reduction in congestion, such diversions would not be noticeable to the general public. There would, however, be a noticeable increase in truck activity in the immediate vicinity of the inland port terminal. In the Mira Loma area, where the level of truck activity is already objectionable to some community members and a concern to regional planners, a noticeable concentration of "new" trucking activity would be politically unpalatable.

The net change in truck VMT within the Inland Empire would be small, as most of the VMT savings would be between the Ports and the Inland Empire. Truck trips would be diverted from I-710, I-605, I-10, SR-60, and SR-91. To serve a point in Ontario, for example, a truck trip from the Ports on I-710/I-10 would be replaced by a shorter trip on I-10 (or perhaps on surface streets) from the inland port. Regional truck VMT would decline, but truck VMT within the Central Inland Empire would increase.

The inland port concept faces a paradoxical planning barrier in attempting to serve the existing Inland Empire traffic base. The model results clearly indicate, as expected, that a terminal location in the Mira Loma area would maximize the VMT reductions and generate the most benefits. Such locations are scarce, however, and would also meet the most local opposition. Sites farther from Mira Loma are somewhat easier to find and may be more acceptable to local communities and regional agencies, but would not yield the same near-term VMT reductions.

Implementing Steps

As the Task 1 and 2 report points out, there is no current organization with a charter to develop or run a rail shuttle/inland port service. Advocates would thus face a substantial effort to organize a shuttle service.

Implementing an inland port/rail shuttle system would require several steps, each with significant barriers to be overcome.

Target Markets. The primary near-term geographic market is the Mira Loma area in the Inland Empire. The Barstow and Victorville markets are developing and would be likely candidates for future logistics parks served by inland ports.

Choose and Secure Terminal Sites. The study team identified a small number of candidate sites for Inland Empire terminals serving Mira Loma. Given volatile Inland Empire real estate conditions however, these sites may be committed to other uses on short notice. The SCLA site at Victorville and the open site west of Barstow appear relatively secure but will not remain open indefinitely.

Provide Port-Area Rail Capacity. At the Port end of the system, Pacific Harbor Lines must be able to efficiently gather railcars with eastbound import containers and distribute railcars with westbound empty and export containers. Substantial improvements in the port rail network will be required, eventually over and above current rail improvement plans.

Rail Service Agreement. A rail service agreement in likely to resemble a commuter rail operating agreement. In return for operating payments and capacity funding, the railroad(s) would agree to operate a fixed schedule of rail shuttle trains, or to allow a contractor to do so. The agreement would encompass locomotive and rail equipment supply, operating windows, etc.

Port Area Rail Capability

The port area rail system is not currently capable of efficiently supporting a rail shuttle service. If, as expected, rail shuttle trains must be assembled from multiple on-dock terminals, the process would be slow and costly due to lack of yard capacity and inefficient legacy connections. Besides handicapping a rail shuttle in competing with trucks, force-fitting rail shuttle operations would hinder the assembly and operation of higher-priority long-haul container trains.

The Ports have engaged in ambitious rail improvement planning. Implementation of those plans is stalled however. Delays in rail improvements mean that when new capacity is finally added it will be quickly filled with long-haul business.

Mainline Rail Capacity

If a rail shuttle of any kind is to become operationally feasible, the region will likely need to engage either or both railroads in a partnership to expand rail capacity. The SCAG Region as a whole is experiencing enormous pressure on its rail capacity, creating an implementation barrier for rail shuttle service.

- Growth of container traffic at the ports is rapidly escalating the demand for double-stack rail service.

- The region's domestic economy generates an increasing volume of domestic rail traffic, both intermodal and conventional carload. The domestic intermodal business competes with international intermodal business for terminal capacity as well as main line capacity.

- Growth in commuter and regional rail passenger operations coincides with using freight demand on many lines.

A rail container shuttle between the San Pedro Bay ports and an inland port in the Inland Empire or beyond would therefore have low priority within the region's overall rail needs..

Each container truck on the highway is the congestion equivalent of 2-4 passenger cars, with the higher equivalence corresponding to more congested conditions (as on Interstate 710) or steeper grades (as on Interstate 15 over Cajon Pass). At an average passenger car occupancy of about 1.2, each diverted container trip is therefore the equivalent of diverting 2.4-4.8 commuter trips. The region is presently subsidizing regional and commuter rail passenger service. Whether a rail shuttle/inland port combination can be as effective in reducing congestion as rail passenger service depends on the volume of "customers" each can divert from the highways and the relative subsidies required for each. In terms of VMT avoided, the region would probably be better off using the available rail capacity for longer haul, interstate container movements that might otherwise have been trucked.

Inland Empire Terminal Sites

The window of opportunity for an inland port in the Mira Loma area has closed. There are few remaining sites for a terminal in the immediate Inland Empire (e.g. Mira Loma), and they are going fast. There is vehement local community opposition to an inland port development in the Mira Loma area. With the current scarcity of terminal sites and county priorities for job creation, there is now no realistic opportunity to implement an inland port/rail shuttle concept in the Mira Loma area.

A decade ago there would have been multiple terminal sites, less community sensitivity, and reserve rail capacity. If a rail shuttle had been put in place serving a Mira Loma terminal at that time, that service would have diverted at least some of the port truck traffic that has since developed. While the opportunity might have existed then, the public sector demand for such a solution probably did not. Port trucks were not then viewed as a major source of congestion. While the concept of subsidizing freight operations to reduce congestion is a major implementation barrier now, it would have been an even greater barrier ten years ago.

Current Inland Empire planning priorities do not favor an inland port. As the detailed terminal site discussion indicates, there are few suitable sites remaining in the central portion of the Inland Empire. Regional planning priorities are focused on job creation for the remaining sites. On the basis of jobs per acre, an inland port cannot compete with value-added logistics, conventional distribution centers, manufacturing, or offices. Even though an intermodal rail terminal may be consistent with zoning in some areas, it would not be consistent with local planning strategies.

Should an inland port be proposed for a central site, it is likely to face political, procedural, and even legal challenges from community groups, local jurisdictions, and regional planning agencies.

Beyond the Inland Empire

As future inland port candidates, the key question facing both Victorville and Barstow is the emergence of a market for port container movements. Not every distribution center has a significant volume of port container traffic. Many of the early facilities at SCLA are associated with the aircraft and air transport industry, and others primarily ship and receive domestic goods (or imports that have already passed through another supply chain and are no longer linked to the Ports). While these customers can benefit from a conventional intermodal facility and the transportation options it provides, they would not be customers for an inland port/rail shuttle combination.

For both Victorville and Barstow the question is one of timing. Establishment of a rail shuttle/inland port service would encourage development of port-oriented import and export facilities in either or both locations. Clustering future port-oriented development around an inland port facility would tend to rationalize land use patterns and minimize long-term VMT consistent with SCAG's goals.

Costs and Funding

The costs of an inland port/rail shuttle would be substantial: operating subsidies that could exceed $200 per round trip, and multi-million-dollar capital investments in rail terminals and line haul capacity. The service could never be financially self-sustaining, regardless of fuel prices or other economic developments.

Capital costs, while substantial, are probably not a major barrier to implementation. State and Federal infrastructure funding takes many forms, ranging from the Proposition 1b infrastructure bonds to TIFIA loans.

The service would require a permanent operating subsidy, for which there is no current source. The State of California is engaged in a massive bond funding effort for major goods movement infrastructure projects. It is clear that the statewide need greatly exceeds the $20 billion in bond funds. Funds for inland port implementation are very unlikely to come from the current bonds, and there is no follow-up bond initiative on the horizon.

The operating subsidy required to divert truck trips to the rail shuttle would be determined by the cost gap in Exhibit 97. The estimates suggest that the required subsidy would be at least $200 per container at current cost levels.

Exhibit 1: Rail Shuttle and Truck Costs for Inland Empire Round Trips

	RT Cost
50-container train	$ 679.18
100-container train	$ 587.85
200-container train	$ 514.33
Truck	$ 300.00

The 100-container train scenario would move 50,000 round trips per year (2 round trip trains per day, 250 days per year), and would require a nominal annual subsidy of $14.4 million at a unit cost difference of $287.85 per unit (Exhibit 2). Increasing truck costs due to the Port's Clean Truck Plans (CTP) could narrow the cost differential and thus reduce the subsidy requirements. Analysis of likely trucking cost impacts yields the comparisons in Exhibit 98.

Exhibit 2: Truck Cost Scenarios and Subsidies

Impact Source	*Inland Empire Truck Cost*[i]	*Nominal Subsidy per Unit*	*Annual Subsidy for 50,000 Units*
Current	$300	$287.85	$14.4 million
TWIC	$373	$214.85	$10.7 million
TWIC + LMC/IOO CTP	$446	$141.85	$7.1 million
TWIC + Employee CTP	$540	$47.85	$2.4 million

The Transportation Worker's Identification Card (TWIC) requirement is expected to increase labor costs. The Clean Truck Plan (CTP) with Licensed Motor Carrier/Independent Owner-Operator (LMC/IOO) or Employee Driver options would increase both labor and capital costs further. At the extreme, the annual subsidy for 50,000 units on a rail shuttle might be reduced from $14.4 million at current price levels to $2.4 million. These comparisons must be approached with caution, however, as the estimated impacts of drayage industry changes are highly uncertain and the same changes will also increase the cost of inland drayage for the rail shuttle operation.

There is a significant political barrier to be passed in creating a subsidy plan for rail freight operations of any kind. There are *no* current funding programs to subsidize freight operations. Rail passenger services are routinely subsidized, but freight subsidies are rare. A rail shuttle/inland port sponsor agency would have to create an entirely new subsidy system, without precedent. Given the current and controversial port container fee proposals, any subsidy proposal is likely to meet with commercial, political, and community objections. An operating subsidy for a relatively small reduction in truck traffic would not receive much local support.

Given multiple unmet funding needs for regional transportation of all kinds, Herculean efforts to funding the capital and operating needs for an inland port/rail shuttle service seem unwarranted.

The potential for large drayage cost increases due to TWIC requirements and the Ports' Clean Truck Program may eventually reduce the amount of subsidy and should be monitored, but are unlikely to eliminate the need for subsidy.

Institutional Barriers

None of the major stakeholder groups are enthusiastic about the rail shuttle/inland port concept.

- The Ports are justifiably more concerned about implementing their master rail plans and adding both on-dock and off-dock terminal capacity for long-haul inland rail movements.

[i] Ibid.

- The railroads do not see near-term business opportunities for rail shuttles, and are wary of public subsidy and public intervention in rail freight operations. Their highest priorities are conventional intermodal terminals and mainline capacity for long-haul business.

- The ocean carriers have minimal interest in rail shuttle/inland port operations and are skeptical of its success. They are far more concerned over port capacity and fees.

- Potential customers likewise have minimal interest and are skeptical.

- Regional planning agencies have other priorities and do not see the benefits of a rail shuttle/ inland port concept as justifying major investments of political capital or funding.

- Some Mira Loma community organizations are vehemently opposed to an inland port (at least as they imagine it) and have begun organizing resistance in advance of a definite inland port proposal.

- There is interest in an inland port in Victorville (SCLA), in Barstow, and in Antelope Valley, but those markets have yet to develop.

Conclusions

The study team was forced to conclude that while an inland port/rail shuttle service had intrinsic merit and would benefit the region, the concept also faced daunting implementation barriers while ranking low on the list of regional priorities. While an inland port/rail shuttle is a good idea, the efforts required to overcome the implementation barriers would not be justified, especially when the region has other, more pressing needs for goods movement resources.

Regional planning agencies should, however, monitor the development of port-related distribution businesses in Victorville (SCLA), Barstow, and the Antelope Valley to determine if markets for an inland port/shuttle service could or would develop there. SCAG should also monitor the status of available rail capacity on the main lines (as SCAG is already doing) and at the ports.

The one event that might make a difference is the outcome of the Port's Clean Truck Program. If that program results in reduced truck capacity and higher truck costs, the demand for rail shuttles might grow. The capacity and terminal issues would remain.

The conflicting demands on the regional rail system argue for further development of a regional rail plan encompassing both freight and passenger operations. Current and previous studies of rail capacity and the forthcoming multi-jurisdiction goods movement action plan address some of the issues and should supply a good foundation for additional analysis.

II. Background and Scope

Project Objectives

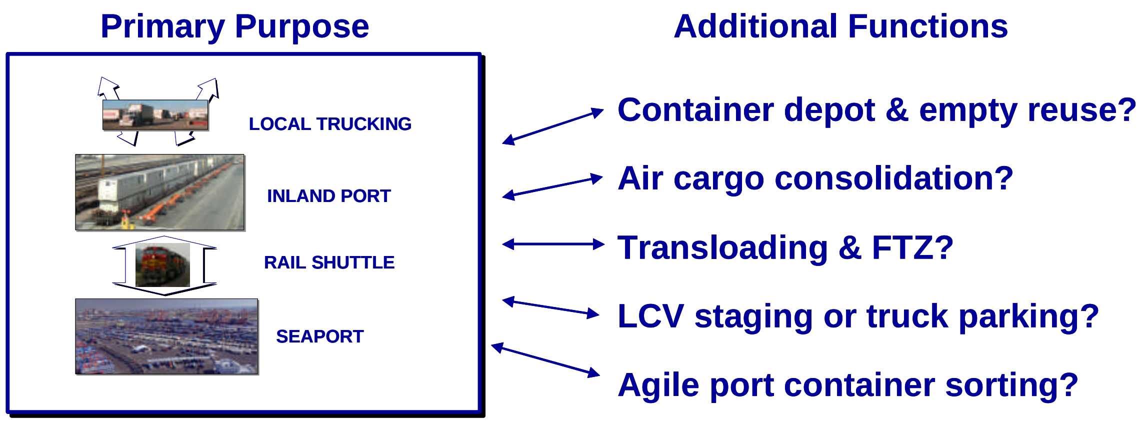
SCAG and other agencies are confronting serious long-term freight mobility issues in Southern California. Straightforward capacity increases that worked in the past – more highways, larger ports – are not enough for the future. Moreover, capacity increases that compromise the environment, tax the budget, and impinge on sensitive communities may no longer be possible or desirable.

Inland Ports and related initiatives have been proposed as solutions to freight mobility issues. The basic form of the inland port concept is illustrated in Exhibit 3. As originally implemented in the Virginia Inland Port, the concept calls for a rail shuttle linking a seaport with an inland terminal functioning as a satellite.

Exhibit 3: Basic Inland Port Concept

As Exhibit 4 suggests, the concept has been expanded to include other transportation and logistics functions, and could be expanded further.

Exhibit 4: Expanded Inland Port Concept



These concepts in their many forms appear to hold considerable promise as part of a comprehensive regional strategy. The limited experience with inland ports in the US, however, does not by itself provide SCAG and other agencies with sufficient guidance to determine which inland port facilities and functions would be feasible and cost-beneficial in Southern California.

SCAGs set the following major goals for this study.

- Determine the relevant purpose and benefits of an inland port for the SCAG Region and the various functions it might usefully include.
- Identify the potential utility of an inland port to users and stakeholders in the goods movement system.
- Identify the potential for freight traffic congestion relief, emissions mitigation, and rationalization of regional land use patterns.

A rail shuttle connecting the seaports with an inland facility could have the potential to simultaneously reduce truck traffic and congestion and promote jobs and economic growth inland. Intermodal transportation offers attractive flexibility to planners seeking long-term solutions to goods movement problems. A rail shuttle connecting major ports with nearby inland destinations would be a logical extension of the success enjoyed by long-haul double-stack container trains and landbridge services.

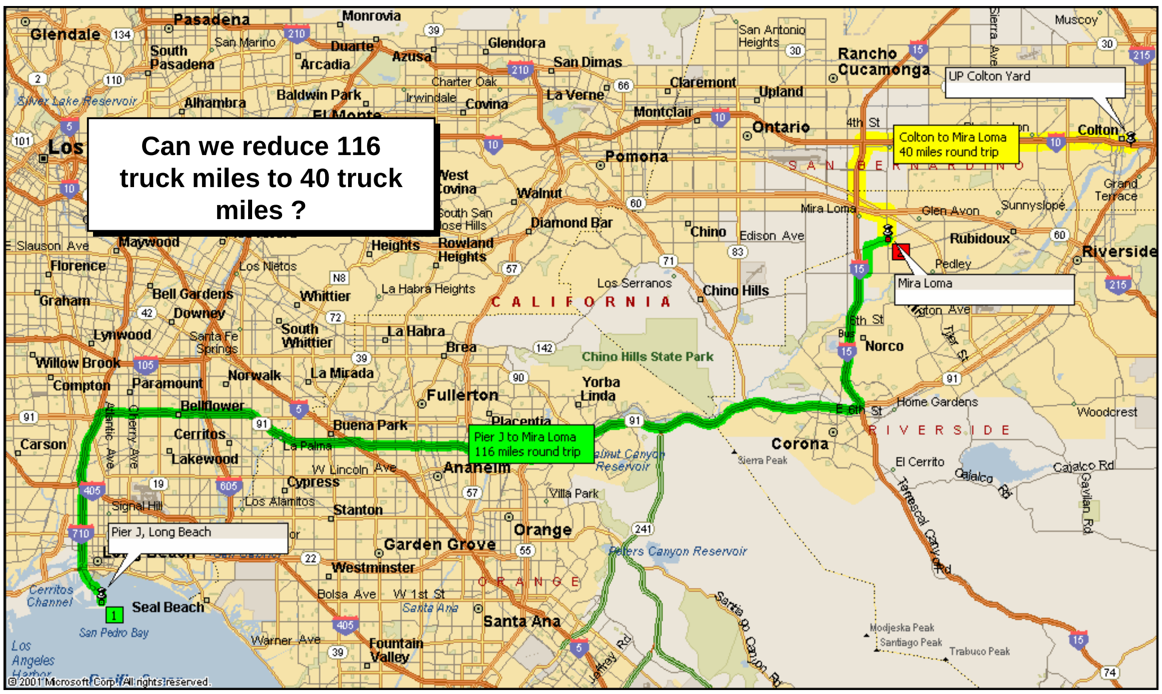
- From a public transportation policy and planning perspective there may be opportunities to either decrease total VMT associated with these functions or manage tradeoffs between transportation and other considerations.
- From port throughout perspective, development of an inland port and implementation of "agile port" concepts may allow the Ports to handle expected growth more efficiently.
- From an economic development perspective there may be opportunities to locate new types of businesses inland and expand the scope of others.

- From a land-use perspective there may be opportunities to rationalize legacy development patterns near ports. Container depots and the truck trips they generate, for example, are unpopular with residential and commercial users.

With new federal funding becoming available for intermodal projects, new interest in freight issues on the part of California state government, and ongoing debate over the regional impact of trade growth, the time is right to take the inland port/rail shuttle concept to the next level of analysis and potential implementation.

The key to success is truck VMT reduction. For example, to serve the concentration of distribution centers in Mira Loma, the industry currently trucks containers about 58 miles from the ports and 58 miles back, a total of 116 truck miles (Exhibit 5). If a rail shuttle could take those containers to a nearby point such as Colton by rail, it would incur only 40 round trip truck miles between Colton and Mira Loma.

Exhibit 5: Example of Mira Loma Trip VMT Savings



Tasks 1-2 established the underlying traffic flows, economic factors, and potential reductions in truck VMT and emissions. The focus in the final stage of the project was on operating strategies, implementation issues, and community acceptance for a rail shuttle and terminal sites in the Inland Empire or beyond.

Scope of Work

The broad potential benefits of an inland port include facilitating goods movement, encouraging economic development, reducing traffic congestion, and otherwise promoting the regional objectives of the 2004 RTP. The overall study objective was to determine which of these benefits can be realized, in which kinds of facilities, and at which sites.

To attain this objective the study scope covered the following Tasks.

- Task 1: Define the concept and purpose of an Inland Port facility. As the Technical Approach explains, the study team developed multiple Inland Port scenarios to allow for multiple feasible combinations of functions.

- Task 2: Describe existing Inland Port concepts in the SCAG Region. The study team expanded the scope of Task 2 to also consider: 1) existing regional facilities performing "inland port" functions; and 2) inland ports and related facility examples in other regions.

- Task 3: Conduct interviews and surveys to determine feasibility, potential demand, and community acceptance. In this phase, the study team determined the operational, physical, and economic feasibility of the concepts and scenarios developed in Task 1, separately and in combination.

- Task 4: Estimate the costs and benefits. The study team estimated the full range of capital and operating costs for the feasible concepts and scenarios emerging from Task 3. The costs were compared with the public and private benefits to identify and prioritize cost-effective inland port approaches.

- Task 5: Final Report and Site Evaluation. The study team matched viable cost-beneficial inland port concepts with appropriate sites in the SCAG Region. The study team developed site requirements for successful inland port implementation and then evaluate specific proposed sites against those requirements. The findings, evaluations, and conclusions were compiled in a fully documented final report and associated data.

The completed feasibility study will enable SCAG and other agencies to navigate through the myriad possible inland port concepts and focus on those with the best chance of real world implementation and concrete public benefits.

Summary of Task 1& 2 Findings

Inland Port Purposes and Benefits

Study Tasks 1 and 2 concluded that an inland port following one or more of the models established elsewhere could serve the following purposes in the SCAG Region.

- **Freight Traffic Congestion Reduction.** By diverting port-related truck trips to rail, development of an inland port could reduce the net truck VMT required to transport future cargo volumes.

- **Emissions Reduction.** By diverting port-related truck trips to rail, development of an inland port could also reduce the net emissions (especially diesel particulate matter) associated with future freight flows.

- **Economic Development.** By encouraging efficient patterns of logistics-related business development, the presence of an inland port could assist in achieving long-term land use policy goals for inland areas.

- **Increasing Port Capacity**. By reducing the dwell time of those import and export containers it handles, and inland port can increase the effective throughput capability of port facilities.

Matching Inland Port Strategy With Locations

Early in the project the team looked at 29 case studies of inland ports and related developments and classified them by type. The two that show the most promise for the SCAG region are the Logistics Park and Satellite Marine Terminal models.

- "Logistics Park" – e.g. Alliance, Victorville, Quincy, Joliet, Richards-Gebaur, Huntsville

- "Satellite Marine Terminal" – e.g. Virginia Inland Port

The Logistics Park approach, typified by Alliance, Texas, uses a core of transportation and logistics facilities to encourage adjacent development of distribution centers and other truck trip generators. It is a long-term strategy to influence land use and rationalize goods movement patterns.

The Satellite Marine Terminal approach links an inland point, such as the Virginia Inland Port, to a specific seaport, such as Norfolk. This would be a single-purpose facility designed to serve an existing customer base and function as an extension of the Los Angeles and Long Beach marine terminals.

The different types have different functions and site requirements.

- Satellite Marine Terminals, Logistics Parks, and Agile Port terminals all provide potential benefits in different ways.

- Different possible Inland Port sites would serve different purposes.

- Sites closest to current markets offer near-term potential as satellite marine terminals.

- More distant sites in developing areas have greater potential as logistics parks.

- Strategic rail sites offer potential as agile port terminals.

A satellite marine terminal should be close to existing customers. A logistics park to influence land uses needs a site in a developing area.

To incorporate agile port functions, what counts is the strategic location within the rail network.

- The objective of agile port operations is to reduce container dwell time at port terminals and increase their throughput capacity.

- The core of the concept is rail transfer of unsorted inland containers from vessel to an inland point where sorting takes place.

- The agile port concept trades off additional cost (handling) and inland space for increased port throughput.

Project team analysis suggest that agile port concepts have limited near-term potential in Southern California, partly due to implementation barriers and partly due to reduced need.

- **Complexity.** The complexity of a port system with two ports, 14 terminals, multiple on-dock rail facilities, four off-dock terminals, and two line-haul railroads presents formidable operational and management challenges for an agile port system.

- **On-Dock Capacity.** Ironically, the intensive use of current on-dock facilities for long-haul intermodal trains leaves little, if any, capacity for agile port operations.

- **PierPass.** PierPass and the OffPeak program have successfully shifted 30-40% of the marine terminal truck trips to evening or early morning hours, thereby reducing terminal congestion and reducing the need for agile port operations.

- **Vessel Stowage Improvements.** The use of information to reduce the need for extra handling is a key component of the agile port concept, but is already being used to advantage.

Agile port operations are untested[ii], and a system as large and complex as the San Pedro Bay ports would be a difficult first application. Neither the Ports nor the railroads see a near-term need for agile port operations.

Sites in the Central Inland Empire (e.g. Mira Loma) would be poor choices for an agile port terminal. Sites such as SCLA at Victorville or the potential site mentioned near Barstow would be far better. The Barstow site, in particular, offers the kind of open land and rail access desirable for agile port implementation.

Site/VMT Tradeoffs

A key goal of Tasks 1 and 2 was to estimate the potential VMT savings from different rail shuttle/inland port scenarios.

- MMA developed preliminary estimates of the truck VMT reduced by the construction of an inland port facility.

- MMA used detailed port truck origin and destination data based on trucker surveys that were conducted at each port terminal in 2004.

- Three inland port facility locations were analyzed: Colton, San Bernardino International Airport (SBIA) and the Southern California Logistics Airport (SCLA).

[ii] Although a demonstration at the Port of Tacoma did highlight the improvements possible through better use of information

The sites nearer to Mira Loma (Colton and SBIA) offer a more favorable ratio of truck VMT saved per locomotive mile. The SCLA site shows a much lower ratio of VMT saved due to:

- Longer truck trips between Victorville and Mira Loma
- Longer rail trips between the Ports and SCLA.
- Additional locomotive power required to climb Cajon Pass.

Tasks 3-5 Objectives

Having established technical feasibility and estimated potential benefits in Tasks 1 and 2, the study team turned to issues of relative costs, institutional feasibility, and community acceptance. Specific issues addressed in this report include:

- Matching inland port strategy with potential locations.
- Site/VMT tradeoffs.
- Alternatives for Inland Empire sites.
- Rail capacity constraints.

III. Inland Port Goals and Purposes

Reducing Truck VMT and Emissions

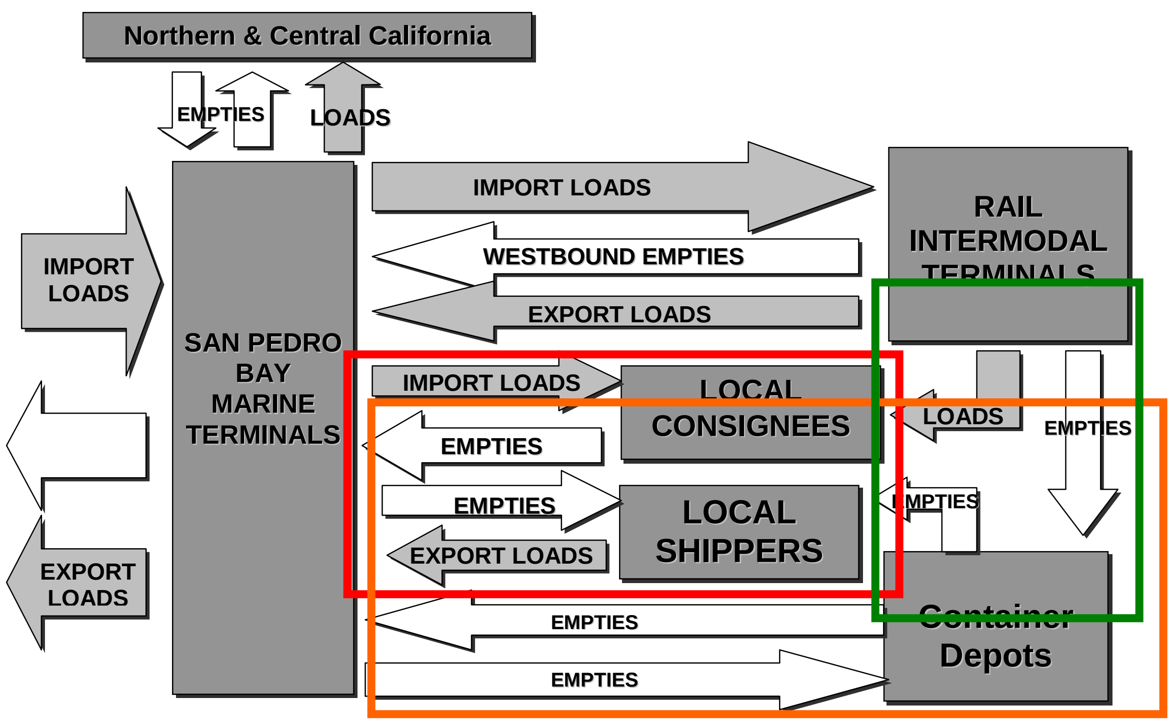
From most perspectives the primary goal of inland port development would be net reductions in truck VMT and total emissions for port traffic. The idea of an intermodal rail shuttle (or possibly an alternative line haul technology) between the ports and the inland port is an integral part of the concept.

Southern California Regional Container Flows

The ability of an inland port/rail shuttle combination to reduce net truck VMT and regional emissions depends, first and foremost, on the container flows it can transport and divert from over-the-road (OTR) trucking.

As Exhibit 6 (taken from the SCAG *Empty Ocean Container Logistics Study*) illustrates, there is not just one container flow, but a number of individual flows.

Exhibit 6: SCAG Region International Container Flows



The primary object of implementing a rail shuttle is to shift some of the local import and export moves now made by truck (outlined in red in Exhibit 6) to rail/truck combinations. The potential contribution of an inland port/rail shuttle combination, however, may be significantly greater.

As the *Empty Ocean Container Logistics Study* established, there is a very substantial movement of empty containers between local consignees, local shippers, port-area container depots, and marine terminals (outlined in orange). Diverting some of these flows to rail, and encouraging the relocation of depots to an inland port, would also serve SCAG's goals and objectives.

Finally, there are also a number of westbound domestic “backhaul” movements in marine containers into the SCAG region from points east, mostly by rail. These flows (outlined in green) result in empty marine containers in the Inland Empire and other regional concentrations. Some of these marine containers are currently returned to BNSF’s San Bernardino intermodal terminal and periodically moved to Hobart by rail and trucked to the ports. To the extent that more of these containers could be returned by rail or their drayage trips shortened, SCAG’s objectives would also be served.

Local Port Truck Trips

Most of the flows discussed above are linked to the ports, and were the subject of recent truck driver surveys. The results of these surveys were made available by the ports for use in this study.

Exhibit 7 displays daily and annual estimated 2005 and 2010 port truck trips derived from the driver surveys and port forecasts.

Exhibit 7: Estimated Truck Trips from Port Driver Surveys[iii]

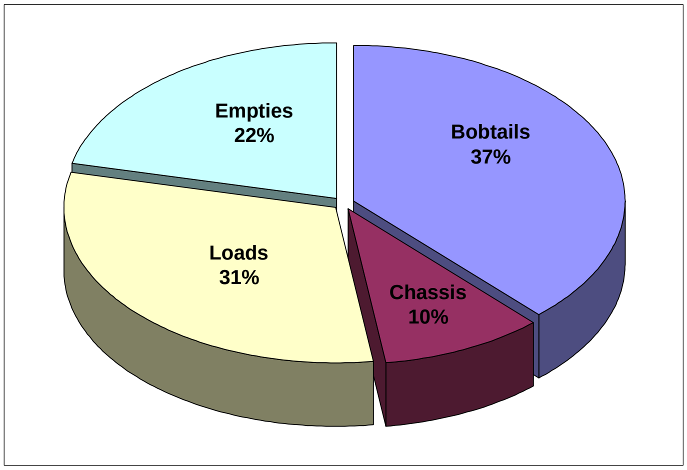
2005 Truck Trips	Bobtails		Chassis		Loads		Empties		Total	
	Arrival/ Export	Departure/ Imports	Arrival/ Export	Departure/ Imports	Arrival/ Export	Departure/ Imports	Arrival/ Export	Departure/ Imports	Arrival/ Export	Departure/ Imports
Per Day Totals	10,507	10,023	3,148	2,179	4,840	11,740	8,384	3,242	26,878	27,185
Annual Total	2,927,114	2,792,536	877,145	607,128	1,348,437	3,270,873	2,335,643	903,269	7,488,340	7,573,806

2010 Truck Trips	Bobtails		Chassis		Loads		Empties		Total	
	Arrival/ Export	Departure/ Imports	Arrival/ Export	Departure/ Imports	Arrival/ Export	Departure/ Imports	Arrival/ Export	Departure/ Imports	Arrival/ Export	Departure/ Imports
Per Day Totals	12,527	11,879	3,639	2,717	5,562	16,097	12,397	3,962	34,125	34,655
Annual Total	3,489,976	3,309,494	1,013,952	756,854	1,549,450	4,484,659	3,453,861	1,103,899	9,507,238	9,654,906
Share of Total	19%	19%	6%	4%	9%	22%	16%	6%	50%	50%

As Exhibit 8 shows, the loaded moves that drive the system account for a little less than a third of the total. It is therefore imperative to account for the empty container, bare chassis, and bobtail moves in both designing the system and estimating its impacts.

[iii] Note the nomenclature conventions, which are based on the marine terminal gate perspective. “Arrivals” are inbound at the gate and include export loads, export empties, inbound empty chassis, and inbound bobtails. “Departures” are outbound from the gate and include import loads, empty containers for export loading, outbound empty chassis, and outbound bobtails.

Exhibit 8: Truck Trip Shares



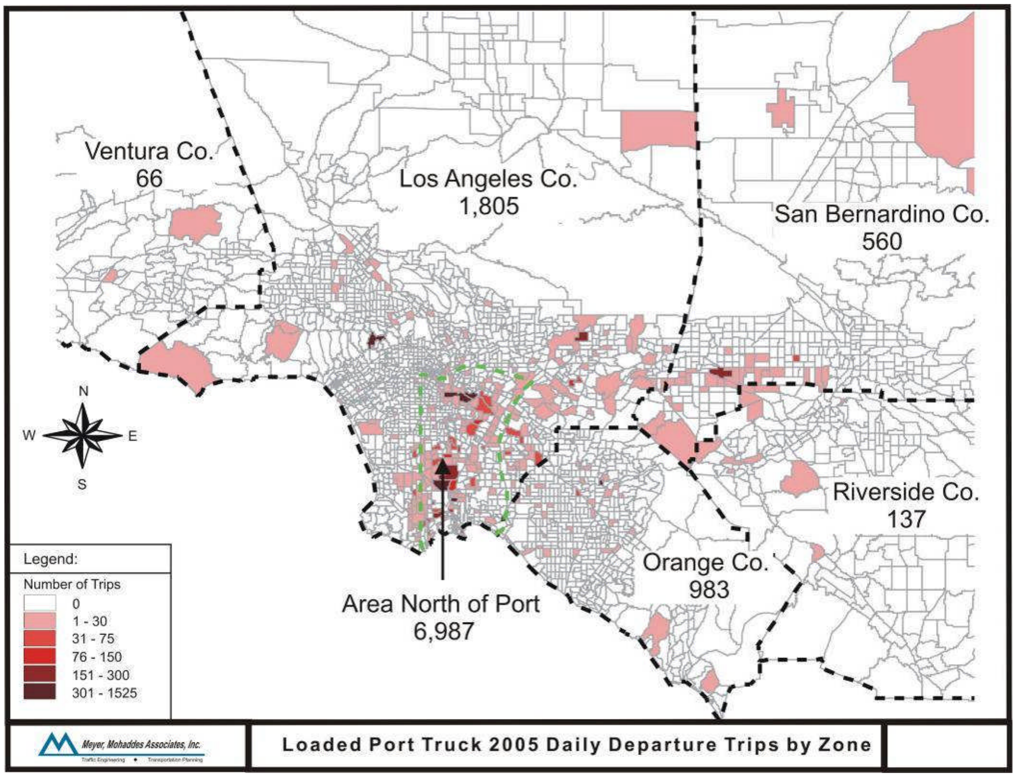
Previous port trucking studies have divided the flows by county, with the area immediately north of the ports separated out from the rest of Los Angeles County. This study follows that convention. The data for daily loaded container truck trips are summarized accordingly in Exhibit 73.

Exhibit 9: Regional Loaded Port Truck Shares

2005 Loaded Trucks	Port Area	Other LA Co.	Inland Empire	Ventura & Orange Cos.	Total
Import Loads (Departures)	66%	17%	7%	10%	100%
Export Loads (Arrivals)	58%	20%	8%	14%	100%
Total Loads	**64%**	**18%**	**7%**	**11%**	**100%**

Exhibit 10 shows the port survey data for loaded truck moves allocated to Transportation Analysis Zones. The concentration of activity immediately north of the ports is obvious. Within the Inland Empire of San Bernardino and Riverside Counties, port truck traffic is concentrated around the Ontario Airport and in the adjacent Mira Loma area. Exhibit 11 displays the same data for total trips, including empty containers, bare chassis, and bobtails. Exhibit 12 and Exhibit 13 are parallel tables for estimated 2010 trips.

Exhibit 10: 2005 Loaded Truck Departures (Imports) and Arrivals (Exports)



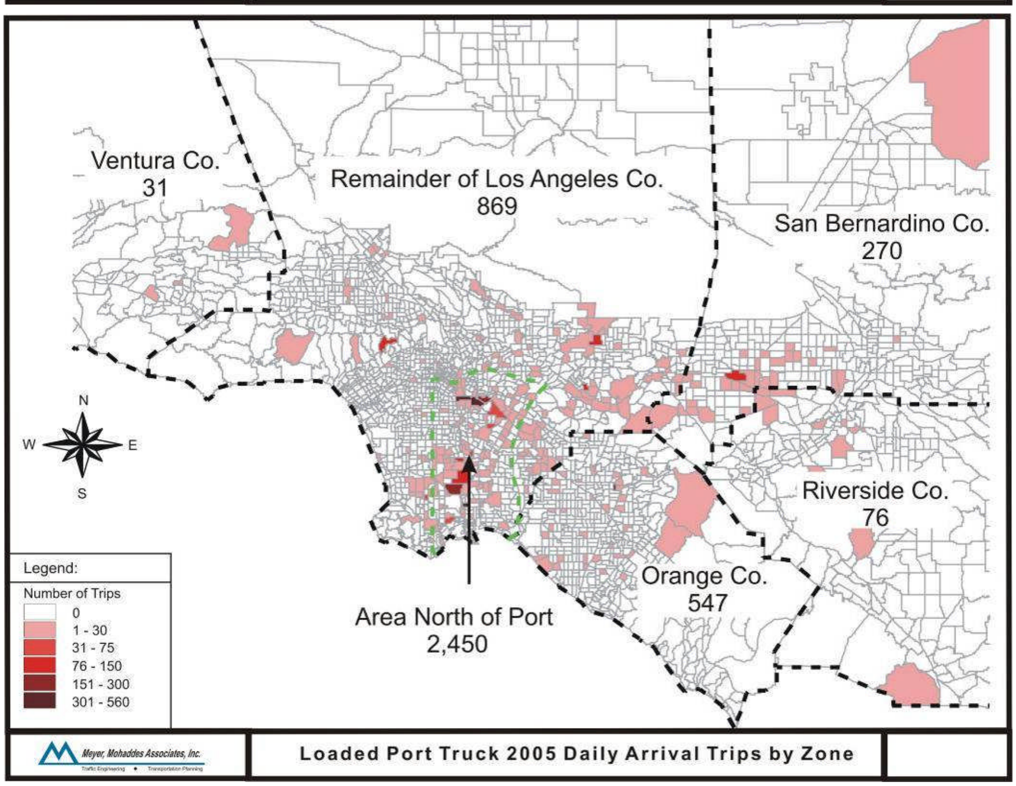
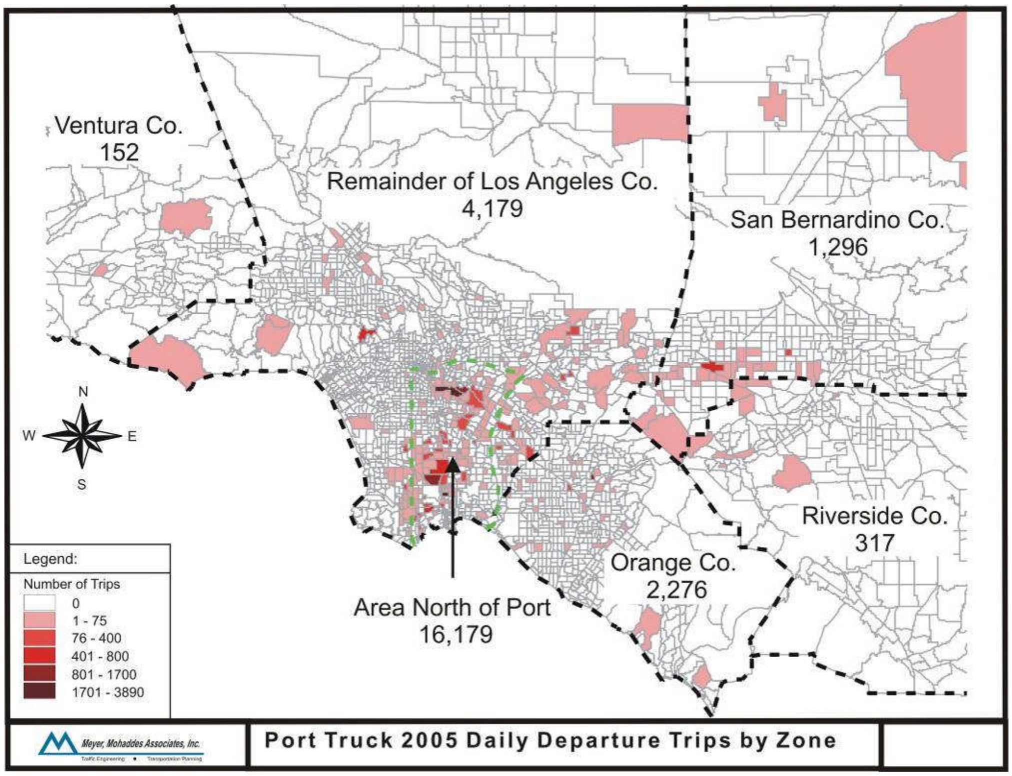


Exhibit 11: 2005 Total Departures (from Port Gates) and Arrivals (to Port Gates)



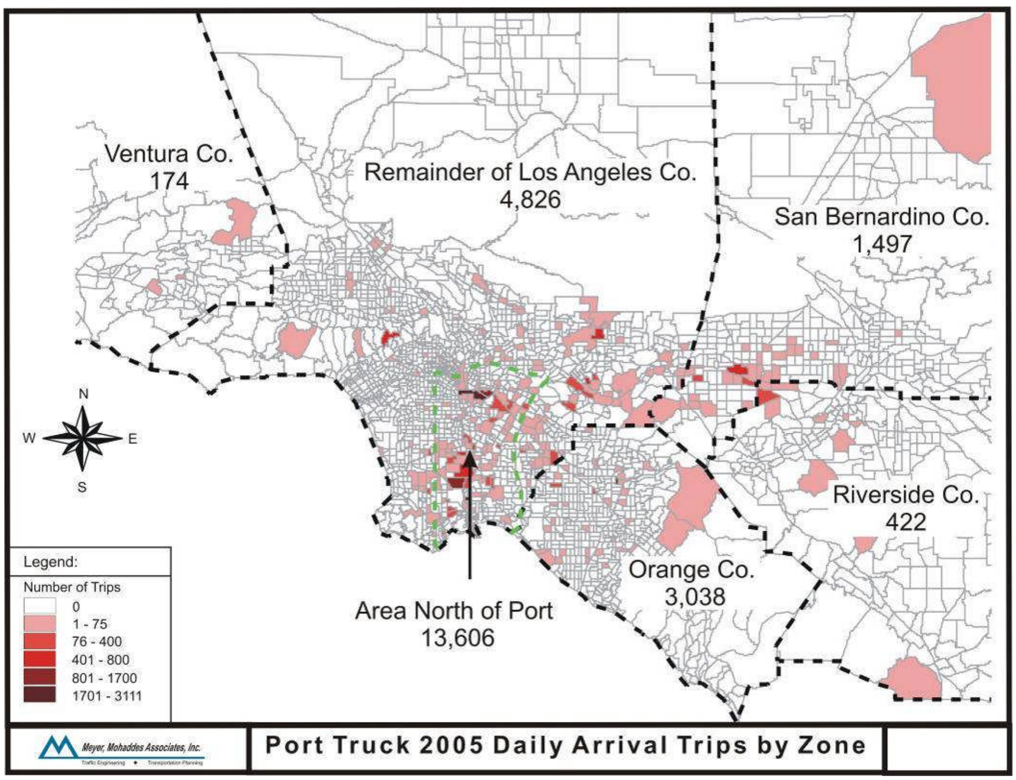
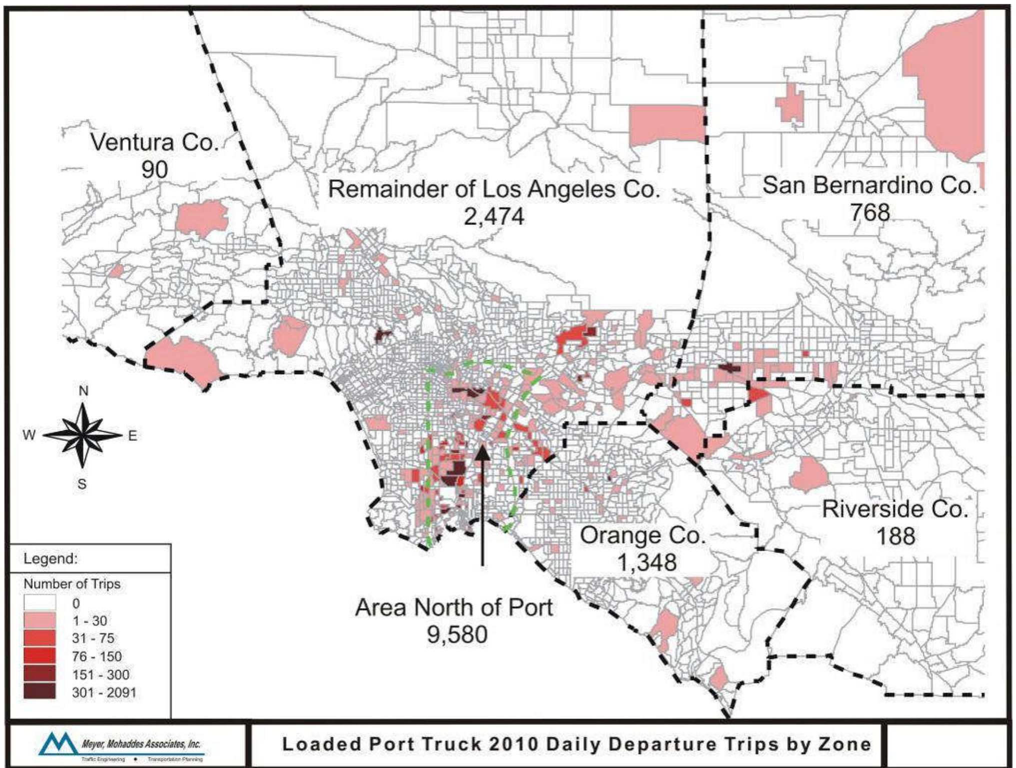


Exhibit 12: 2010 Loaded Truck Departures (Imports) and Arrivals (Exports)



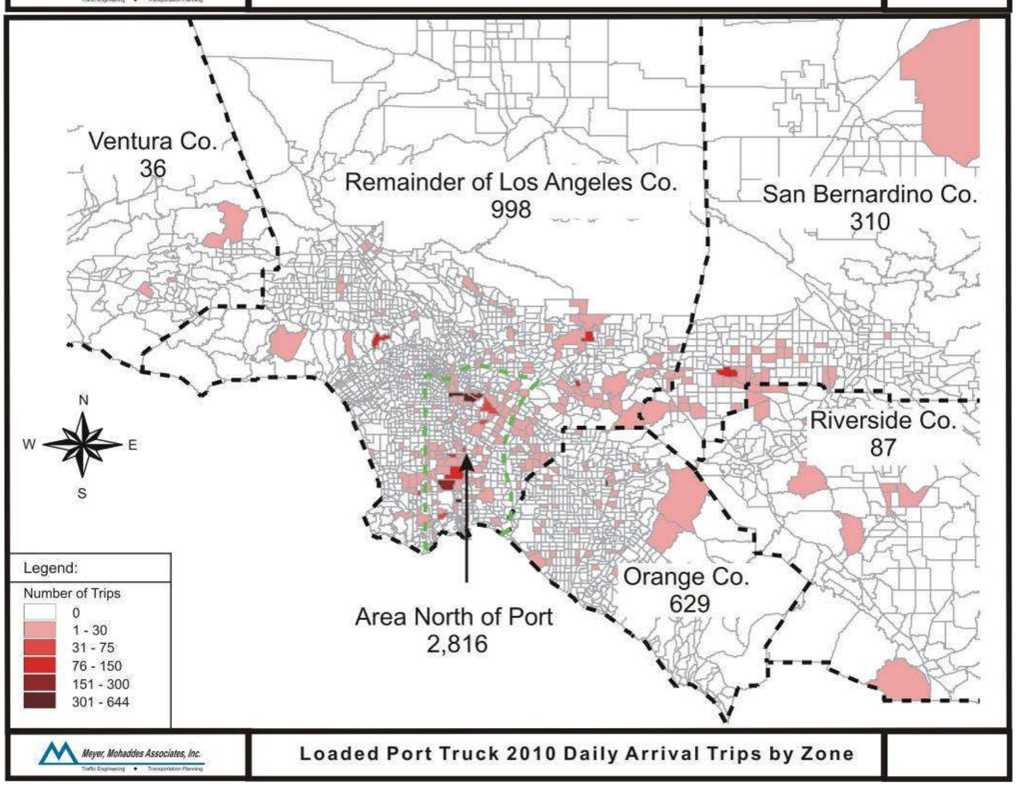
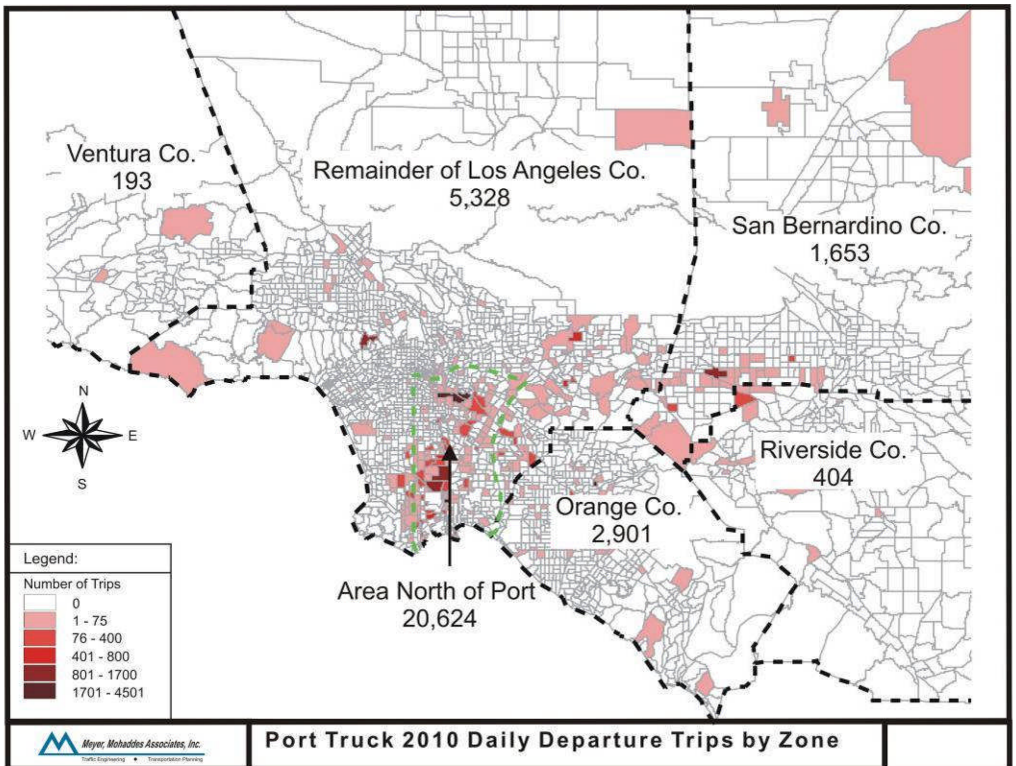
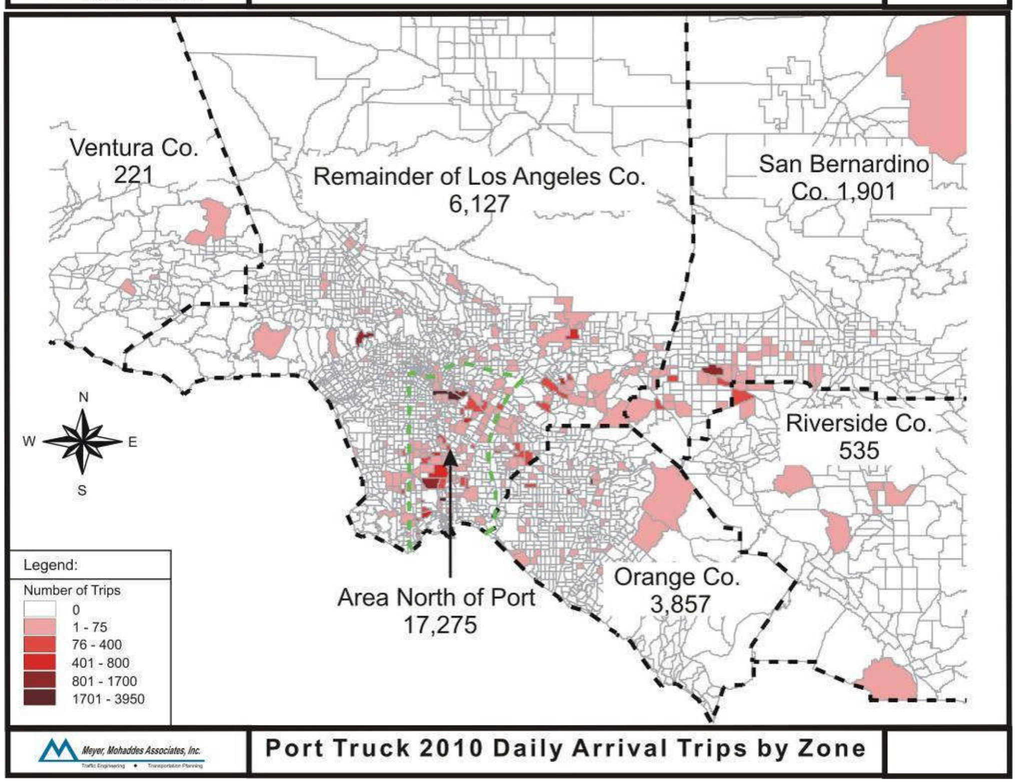


Exhibit 13: 2010 Total Departures (from Port Gates) and Arrivals (to Port Gates)





The truck trip data shown in Exhibit 10 through Exhibit 13 are summarized for the Inland Empire counties in Exhibit 14 and expanded to annual equivalents. In 2005, there were an estimated daily total of 3,532 truck trips between the Ports and the Inland Empire counties, of which 1,613 were port to region (eastbound) and 1,919 were region to port (westbound).

Exhibit 14: Estimated 2005 and 2010 Port Truck Trips to Inland Empire Counties

2005 Truck Flows	Daily			Annual		
	San Bernardino	Riverside	Total	San Bernardino	Riverside	Total
Port to Region						
Import Loads	560	137	697	156,016	38,168	194,184
Empties, Chassis, Bobtails	736	180	916	205,050	50,148	255,198
Subtotal	1,296	317	1,613	361,066	88,316	449,382
Region to Port						
Export Loads	270	76	346	75,222	21,174	96,396
Empties, Chassis, Bobtails	1,227	346	1,573	341,842	96,396	438,238
Subtotal	1,497	422	1,919	417,064	117,569	534,633
Total						
Loads	830	213	1,043	231,238	59,342	290,580
Empties, Chassis, Bobtails	1,963	526	2,489	546,892	146,544	693,435
Grand Total	**2,793**	**739**	**3,532**	**778,130**	**205,885**	**984,015**
2010 Truck Flows	**Daily**			**Annual**		
	San Bernardino	**Riverside**	**Total**	**San Bernardino**	**Riverside**	**Total**
Port to Region						
Import Loads	768	188	956	213,965	52,377	266,342
Empties, Chassis, Bobtails	885	216	1,101	246,561	60,178	306,739
Subtotal	1,653	404	2,057	460,526	112,554	573,080
Region to Port						
Export Loads	310	87	397	86,366	24,238	110,604
Empties, Chassis, Bobtails	1,591	448	2,039	443,253	124,813	568,065
Subtotal	1,901	535	2,436	529,619	149,051	678,670
Total						
Loads	1,078	275	1,353	300,331	76,615	376,946
Empties, Chassis, Bobtails	2,476	664	3,140	689,814	184,990	874,804
Grand Total	**3,554**	**939**	**4,493**	**990,144**	**261,605**	**1,251,750**

The underlying Inland Empire market appears to be large enough for rail service. By current standards a full double-stack container train carries between 200 and 300 containers, with the railroads attempting to increase the average total in a quest for efficiency and capacity utilization. If 50 containers is envisioned as a start-up or demonstration train size and 100 containers can be envisioned as a short shuttle train, there is enough business in the market to support a short daily train each way for each railroad (200 containers each way) with a small initial market share.

While loaded and empty containers are clearly part of the potential rail shuttle market, bare chassis movements will require additional study to determine which, if any, would be candidates for a rail shuttle. Many bare chassis are trucked between port terminals, rail terminals, and container depots, but there would rarely be a reason to move a bare chassis to or from a customer location. Bobtail movements will also require additional study. Bobtail tractors will not move on the rail shuttle, but some of their activity will be transferred to the inland locations.

Preliminary Inland Port Potential

Exhibit 15 shows the locations of over 1000 regional distribution centers (DCs). The same Ontario/Mira Loma concentration shown in the port survey data is apparent in this map. The study team developed a preliminary analysis of the potential for an inland port/rail shuttle serving this DC concentration as an indication of the overall potential of the inland port concept in reducing truck VM and emissions.

Exhibit 15: Regional Distribution Centers

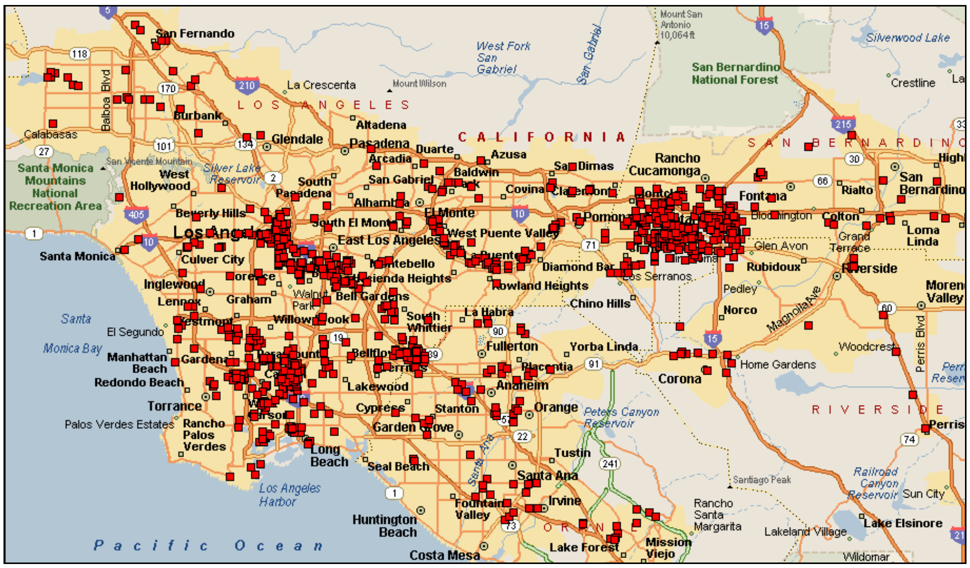


Exhibit 16 shows estimated drayage times to inland areas under congested highway conditions (30 mph on highways and 20 mph on surface streets). Under those conditions, the 56.5-mile drayage times to the large concentration of DCs in the Ontario Airport/Mira Loma area are 120-150 minutes.

Exhibit 16: Port to DC Congested Travel Times

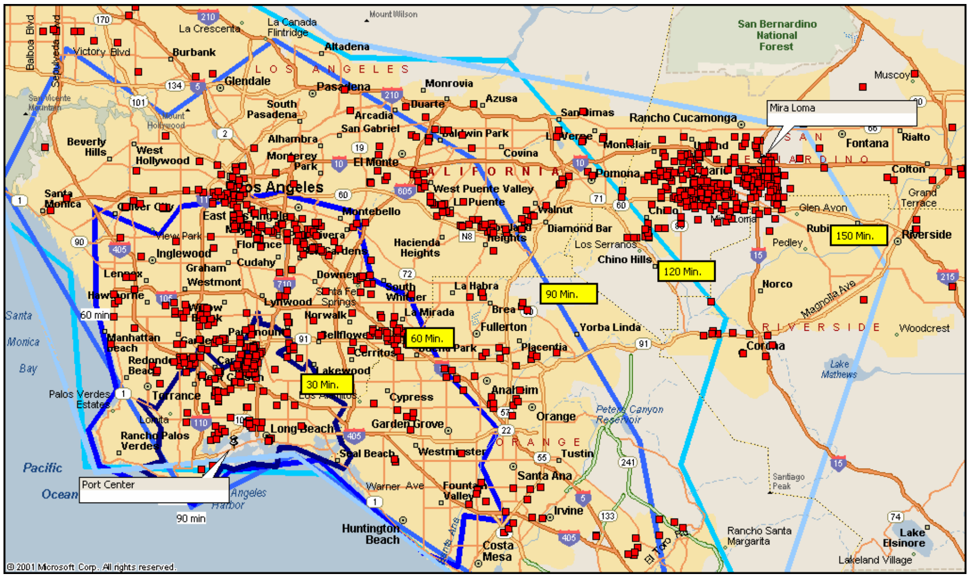
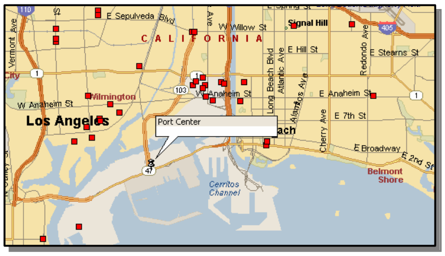


Exhibit 17 provides a rough estimate of drayage time and distance between selected locations and Mira Loma (defined as the junction of I10 and I15) under those congested conditions.

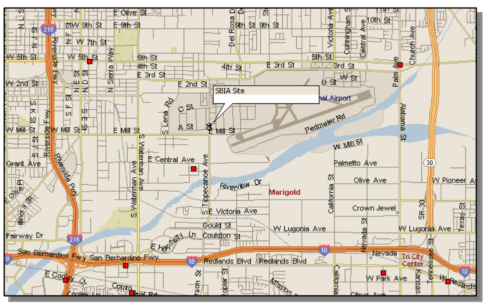
Exhibit 17: Mira Loma Round-Trip Drayage

	Port Center		Colton		SBIA		SCLA	
Activity	**Minutes**	**VMT**	**Minutes**	**VMT**	**Minutes**	**VMT**	**Minutes**	**VMT**
Terminal Pickup	30	1	15	1	15	1	15	1
Outbound Driving	140	56.5	13	10.6	23	18.4	50	44.3
Container Drop/Pick	30	1	30	1	30	1	30	1
Inbound Driving	140	56.5	13	10.6	23	18.4	50	44.3
Terminal Return	30	1	15	1	15	1	15	1
Round Trip Total	**370**	**116**	**86**	**24.2**	**106**	**39.8**	**160**	**91.6**
Time savings			**284**		**264**		**210**	
VMT Savings				**91.8**		**76.2**		**24.4**



“Port Center” (defined as the junction of the Terminal Island Freeway and West Ocean Blvd. on Terminal Island) is about halfway between the two ports. The round trip drayage move between there and Mira Loma would require a little more than 6 hours and cover 116 miles.

Colton (defined as the intersection of Riverside Ave. and East Slover) has been mentioned as a possible site for a demonstration inland facility. The round trip drayage move between there and Mira Loma would require about 86 minutes and cover 24.2 miles. About 30 minutes of the time savings is due to the faster truck turns (15 minutes) assumed for an inland facility, versus 30 minutes at a marine terminal.



San Bernardino International Airport (SBIA) was one site previously considered for a new BNSF terminal in the Inland Empire. The round trip drayage move between there and Mira Loma would require about 106 minutes and cover 39.8 miles. Here too, about 30 minutes of the time savings is due to the faster truck turns (15 minutes) assumed for an inland facility, versus 30 minutes at a marine terminal. VMT savings would be 76.2 miles per trip.

The Southern California Logistics Airport (SCLA) at Adelanto near Victorville has also been promoted as an inland port site. The round trip drayage move between there and Mira Loma would require about two hours forty minutes and cover 91.6 miles. Again, about 30 minutes of the time savings is due to the faster truck turns (15 minutes) assumed for an inland facility, versus 30 minutes at a marine terminal. VMT savings a would be 24.4 miles per trip.

These are by no means all the possible inland port locations or trips, but these examples do serve to illustrate the potential VMT savings and associated tradeoffs.

Exhibit 18 shows an analyses of the rail-truck tradeoffs involved in serving the Mira Loma area from three examples of possible inland port locations, assuming that all rail moves originate on-dock.

Exhibit 18: Analysis of Rail-Truck Tradeoffs

	Inland Port Location Example		
	Colton	**SBIA**	**SCLA**
Approx. One-way Rail Miles from Port	91	83	113
Approx. RT Rail Miles	182	166	226
Est. Locomotives per train	2	2	3
Est. Locomotive Miles per Train	364	332	678
Est. Rail Switching Miles Per Train	10	10	10
Est. Total Locomotive Miles per Train	**374**	**342**	**688**
VMT Savings Per Truck Trip	91.8	76.2	24.4
VMT Savings: 50-Container trains	4,590	3,810	1,220
VMT Saved per Locomotive Mile	**12**	**11**	**2**
VMT Savings: 100-Container Trains	9,180	7,620	2,440
VMT Saved per Locomotive Mile	**25**	**22**	**4**
VMT Savings: 200-Container Trains	18,360	15,240	4,880
VMT Saved per Locomotive Mile	**49**	**45**	**7**

- The sites nearer to Mira Loma (Colton and SBIA) offer a more favorable ratio of truck VMT saved per locomotive mile required, as should be expected.
- The SCLA site shows a much lower ratio of VMT saved per locomotive mile for three reasons:
  - Longer truck trips between Adelanto and Mira Loma
  - Longer rail trips between the Ports and SCLA.
  - Additional locomotive power required to climb Cajon Pass.
- Adding drayage trips between marine terminals and a central departure point for a rail shuttle would reduce the advantages.

This analysis suggests that there is a real potential for VMT and emissions reductions if a nearby inland port serving the Inland Empire passes more detailed economic, commercial, and operational tests. The scale advantages of rail service are also evident, as the longer train lengths divert more truck trips in each movement.

While the SCLA site does not initially appear well-suited to reduce VMT for trips between the ports and Mira Loma, the comparison would obviously be different for trips between the ports and Victorville, or for inbound intermodal movements from other regions.

Directing Economic Development

Case studies of inland ports suggest that successful developments in appropriate locations can have a powerful influence on the pattern of economic development. The SCAG region is both the beneficiary and the victim of robust economic development, making the location and pattern of that development a chief concern to local and regional planning agencies.

The ability of logistics-based development to act a magnet for the more transportation-dependent businesses implies that inland ports and logistics ports could be tools to influence the future development patterns at infill sites in the Inland Empire and elsewhere, but even more so in undeveloped areas such as the Victor Valley.

Exhibit 19 lays out the relationship between conventional economic development programs, logistics-based developments, and inland ports. The table is cumulative from left to right: logistics-based developments have all the issues and tools of general economic development, plus their own more specific items. Inland ports also have all the considerations of general economic development and logistics-based development

Exhibit 19: Economic Development and Inland Ports

Economic Development	Logistics-based Development	Inland Ports
Goal: Attract beneficial businesses and organizations to the region. **Message:** The region is an attractive, low-cost, and high-yield place to do business.	**Goal:** Attract logistics-based businesses. **Message:** The region/site offers specific logistical advantages (beyond its general business advantages).	**Goal:** Attract trade-based businesses. **Message:** The region/site offers specific advantages for handling international trade (beyond its general business and logistical advantages).
Anchor Tenants: Any business, but often manufacturers.	**Anchor Tenants:** Distribution centers, carrier facilities.	**Anchor Tenants:** Carriers, Customs, FTZ, transloaders.
Issues & Tools • Location assistance • Zoning & Permitting • Telecom & Utilities • Basic roads • Tax Incentives • Labor pool • Marketing assistance • Financial incentives • Cost of doing business • Local business climate	**Issues & Tools** • Freight transportation infrastructure (truck, rail, air, water) • Location on trade lanes & corridors • Role in supply chains • Freight carrier participation • Regional & national market access • Cost of logistics • Local receptivity to freight & logistics	**Issues & Tools** • Customs functions • Port of Entry status • Foreign Trade Zone • Security • Location on trade lanes • Distance to border • Cost of trade movements • Local receptivity to trade

Conventional Economic Development

The mission of most economic development and planning agencies is expressed in terms of regional competitiveness, jobs, well being, etc. Here are typical examples of economic development mission statements.

- SCAG: *Leadership, vision and progress, which promote economic growth, personal well-being, and livable communities for all Southern Californians.*
- Mid-Ohio Regional Planning Commission: *To enhance the quality of life and competitive advantages of the region by working through local governments and other constituents.*
- Kansas City Port Authority: *To enhance the economic vitality of Kansas City, Mo., through transportation, trade, commerce, and riverfront development within the statutory authority granted by the State of Missouri and the City of Kansas City.*

Economic development agencies ordinarily try to attract all kinds of beneficial businesses and organizations. Their major roles are promotion and facilitation. The promotion is carried out through advertising, liaison with developers, brochures, informational campaigns, etc. Facilitation commonly covers site selection, tax incentives, zoning, permits, utilities, and other "checklist" requirements for any kind of business. Economic development agencies basically try to sell the city or region as a low-cost, high-yield, and attractive place to do business. The core of their approach is the same whether they are trying to attract a major international manufacturer or a small entrepreneurial start-up.

Economic development agencies will address transportation issues but tend to emphasize passenger transportation and access to regional markets. Economic development agencies use a wide range of regulatory and financial tools, as shown in Exhibit 19. Most states have trade promotion functions, usually within the State Department of Commerce. These efforts are intended to attract importers and exporters and to promote exports from businesses in the state. These efforts can employ some of the same tools as economic development – advertising, tax incentives, technical assistance – but they are rarely site-specific and do not ordinarily deal with freight and trade infrastructure.

Logistics-based Development

One of SCAG's applicable objectives is:

> *Developing long-range regional plans and strategies that provide for efficient movement of people, goods and information; enhance economic growth and international trade; and improve the environment and quality of life.*

DCs used to be located to serve a given local or regional market at the least cost, usually by locating them at or near the center of the market. A category of DCs is emerging, however, intended for forward distribution of transloaded or sorted goods to more distant points in a corridor. The two Wal-Mart DCs at Joliet (see Appendix) are reportedly intended primarily to receive import loads from the West Coast and distribute sorted goods to points Chicago and east. By focusing on the *freight transportation and logistics* advantages of a candidate site, logistics-based developers bring additional tools and leverage to bear on location decisions. The Alliance Texas development discussed as one of the case studies in the Appendix is the earliest and best-known logistics-based development.

Inland Ports

On the spectrum in Exhibit 19, inland ports take the concept of logistics-based development one step further. By conceptualizing an inland location as a "port", with all the ancillary port facilities and services that can be translated inland, this approach focuses on trade-based businesses for which conventional economic development and logistics-based development may not be enough. An inland port will not thrive in a poor economic location or with poor logistics, so the other two functions are still necessary. The presence of Customs and FTZ services can be regarded as thresholds for an inland port. Inland port initiatives should also be contrasted with efforts to attract individual importers and exporters. Locating an individual importer or exporter does not ordinarily require establishing Customs functions (as those are performed at the actual seaport or elsewhere), nor does it require establishing a broad-based logistics infrastructure. Both logistics parks and inland ports would be tools for attracting importers and exporters, but most such location decisions are made on a company-by-company basis.

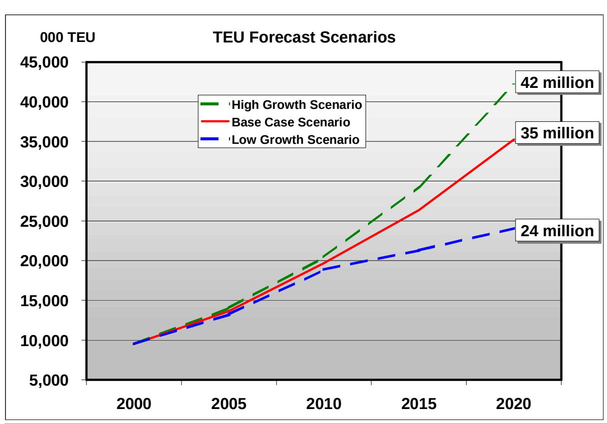
Some authors have perhaps cast the "inland port" net too widely, defining "inland port" to include major clusters of distribution centers and logistics businesses such as the whole Inland Empire, even though there is no uniting initiative or planning effort, no Customs functions, little or no interaction between the facilities, and no emphasis on international trade. Defining the term "inland port" so loosely can be confusing and does not help us create an inland port identity or strategy for Southern California.

Increasing Port Throughput

If a rail shuttle/inland port combination can provide a more efficient way to move container between the ports and regional customers, perhaps the system can also improve total port throughout.

Long-term cargo growth expectations (Exhibit 20) have put pressure on San Pedro Bay port facilities.

Exhibit 20: Long-term Port Container Cargo Forecasts



- Terminals are becoming space-constrained.
- Highway congestion and gate queues are increasing.
- Empty containers are clogging terminals.
- Chassis logistics consume time and space.

These conditions are prevalent, in varying degree, at all West Coast ports. Existing terminals are primarily wheeled operations (containers parked on chassis) wherever possible, with empty containers and excess chassis stored on-dock. Where land is readily available and relatively inexpensive, this is a low-cost, high-performance system. As land become scarce and expensive, terminals will eventually have to shift to systems that use land more productively to handle the volume and accept the higher operating cost and increased complexity. (Exhibit 21)

Exhibit 21: Container Terminal Operating System Progression

	Terminal System	Gate System	Chassis System	Empty Storage	Rail Transfer
Past	Wheeled	Manual, paper	Individual lines	On-dock	Off-dock
Present	Mostly wheeled, some stacked	Manual, paper & computer	Individual lines, some pooling	Mostly on-dock, some depots	Half on-dock, half off-dock
Transition	Mostly stacked, some wheeled	Semi-auto-mated& paper	Steamship line chassis pools	Mostly depots, some on-dock	Mostly on-dock
Long-term	Stacked	Automated	Customer or trucker chassis	Off-dock depots	Primarily on-dock

In the peak season of 2004, congestion in the Southern California ports made world headlines and sent ocean carriers and customers searching for alternatives. That congestion was due to multiple factors, including the inability of rail connections to move all the cargo being tendered as quickly as required and the inability of the marine terminals to move containers through the port and accommodate more ships. The 2005 peak season passed without serious congestion problems, but the issue of port network capacity and throughout remains.

The potential to increase port throughput in an inland port development lies in the possibility of reducing on-terminal container dwell time. Container yard capacity and fluidity is the major factor in overall throughout capability, so a given reduction in average container dwell time translates almost directly into a comparable increase in terminal capacity. There are two avenues to be explored:

- **Reductions in dwell for on-dock rail shuttle containers that would otherwise have been drayed.** At present, there are some indications that on-dock rail containers may have *longer* average dwell times that trucked containers, presenting a challenge for new rail operations. The analysis will have to encompass import loads, export loads, and empties, since the three groups have dramatically different dwell time issues.

- **Reductions in dwell through application of agile port concepts**. As Chapter VIII discusses in more detail, the objective of the various agile port ideas is to significantly decrease vessel turn time and container dwell time through applications of operations and information technology.

Rationalizing Port-Area Land Use

Existing marine terminals are primarily "wheeled" operations (containers parked on chassis) wherever possible, with empty containers and excess chassis stored on-dock. As land becomes scarce and expensive, terminals will eventually have to shift non-essential functions off terminal, potentially to inland locations.

Ports have always been more than simply locations where ships were loaded and unloaded. The commerce passing through seaports attracts a wide variety of warehousing, processing facilities, and ancillary services. Exhibit 22 shows the locations of over 200 intermodal trucking firms and 10 container depots extending over 20 miles inland from the Ports of Long Beach and Los Angeles. This diagram does not include many other kinds of port-related businesses or airport-related businesses.

Exhibit 22: LA/LB Port-related Businesses

The expanded "inland port" concept (Exhibit 4) incorporates the idea that some port facilities could be duplicated or complemented at inland locations, thus promoting economic development and logistics integration inland while reducing the demands on scarce space at the seaport. The concept is intuitively attractive as port-area land values have risen, and warehousing and distribution facilities have sprung up in Southern California's Inland Empire and other areas increasingly distant from the seaports.

For the first 30 years of containerization marine terminals tended to include ancillary non-revenue functions, such as container storage, cleaning, preparation, maintenance, and repair. In the last 20 years, however, such functions have been increasingly shifted to off-terminal locations for cost and capacity reasons.

- The former "50 mile rule" required all cargo and container handling functions to use longshore labor. When that rule was relaxed, shipping lines began relocating and outsourcing ancillary functions to avoid the high cost of longshore labor.

- The physical expansion of marine container terminals slowed while cargo volumes continued to grow, placing a premium on terminal space. Non-revenue functions and other activities that did not require water for vessel access were increasingly shifted off-terminal.

In most areas ancillary operational functions remain clustered near the port to minimize total cost, to facilitate container logistics, or out of simple inertia. Locational decisions for these functions incorporate the same factors as other commercial location choices. From a commercial cost perspective there may be opportunities to reduce total cost or increase capacity by relocating to lower-cost property. From a public policy perspective there may be opportunities to rationalize land uses in the vicinity of the ports.

The potential for inland location will vary with the details of the operation. Depots for refrigerated container maintenance and preparation might remain close to the seaport because of the multiple trips between the "reefer" depots and the marine terminals themselves. Ordinary container depots for storage, maintenance, and repair of dry containers can often be relocated inland as land uses and economics dictate.

Summary Inland Port Purposes and Benefits

From the preceding discussion it appears that an inland port following one or more of the models established elsewhere could serve the following purposes in the SCAG Region.

- **Freight Traffic Congestion Reduction.** By diverting port-related truck trips to rail (or, conceivably, another non-highway technology), the development and operation of an inland port could reduce the net truck VMT required to transport future cargo volumes between the ports and regional destinations. Most specifically, an inland port has the potential to reduce the truck congestion on I710 and other routes connecting the ports with inland locations. The amount of the reduction will depend on the volume of container trips that can be attracted, and the location of the inland port relative to the seaports and their customers. The reductions could be increased if the inland port can also accommodate domestic intermodal movements.

- **Emissions Reduction.** By diverting port-related truck trips to rail, the development and operation of an inland port could also reduce the net emissions (especially diesel particulate matter) associated with future freight flows. The net reduction will be a function of the line haul technology used between the seaports and the inland port as well as the net change in truck VMT. Emissions from terminal handling equipment will also have to be factored into the assessment.

- **Influencing Economic Development.** By encouraging efficient patterns of logistics-related business development in the vicinity, the presence of an inland port could assist in achieving long-term land use policy goals for inland areas. Encouraging freight traffic generators to group around intermodal hubs will increase overall system efficiency and mitigate the adverse impacts on adjacent land uses.

- **Increasing Port Capacity.** By reducing the dwell time of those import and export containers it handles, and inland port can increase the effective throughput capability of port facilities. Also, by providing and inland location for some ancillary port services, the inland port can make additional near-port land available for priority port needs.

In other regions inland ports and logistics parks are intended to expand the market reach of specific ports or facilitate new logistics-related development of the type already occurring in the Inland Empire. As the major challenge facing the SCAG Region is accommodating the economic and goods movement growth already anticipated, neither extending market reach or spurring even more development are considered appropriate inland port objectives for this study.

IV. Case Study Findings

The Appendix presents 29 case studies of inland ports, logistics parks, and other related developments. The study team has attempted to draw out a few broad conclusions with implications for this project.

A Realistic Market Assessment Is Critical

The lack of a market assessment was a critical factor in the failure of the Neomodal project, and was probably a significant factor in the failure of the Port of Montana and Shelby, Montana projects. While a market assessment was prepared for the Albany, NY barge service, the large disparity between expectation and results suggests that the assessment was not realistic. The Kingman, Yuma, and Shafter efforts appear to lack formal market assessments. Unless remedied, this shortfall greatly increases the risk associated with those projects.

A realistic market assessment takes on additional significance when one goal of the project is to encourage new customer behavior, i.e. using a rail shuttle to the Inland Empire or locating a DC at an inland port.

A thorough and realistic market assessment is the foundation for a reliable business plan. Such a market assessment should cover at least these basic points.

- **Identification** of the customer base for the services to be offered. In a complex field such as intermodal freight transportation, it is particularly important to establish exactly who would buy the services or use the facilities, how many such customers exist, and where they are located.

- **Estimation** of total market size. If every potential customer took every opportunity to use the services offered, what would be the total volume?

- **Documentation** of customer decision factors and priorities. How do customers make their choices, and what is important to them? How do they balance cost, speed, reliability, convenience, simplicity, etc.?

- **Analysis** of competition and competitive response. What other choices does the customer have? What are the competition's strengths and weaknesses? How will the competition respond to the project?

- **Estimation of market share and volume growth.** Any new service or facility must progress from startup to maturity, gradually fulfilling its market potential. Implicitly assuming that the new service or facility will serve the entire potential market is a common mistake. It is also easy to ignore the adverse scale economies of small start-up volumes in large new facilities.

- **Identification of outside influences and risk factors.** Exogenous factors affecting the success of an "inland port" project could include fuel prices, ocean carrier routing practices, shipper relocation, competing projects, etc. Sensitivity analysis is the most common technique for this task.

Reality Checks Should Be Made Early In The Project Development Process

The commercial world of freight transportation and logistics is complex and changing. Even the most rigorous staff or consultant analytic efforts must be subjected to "reality checks" through contacts with potential customers, contractors, vendors, competitors, and other stakeholders. "Ivory tower" plans are inherently risky.

Involving commercial entities from the start is one way of maintaining contact with commercial realities. Several case studies note the importance of willing railroad participation. If railroads, ocean carriers, or other key participants are unwilling to participate the project sponsors should find that out at the beginning of the planning stage, not after a facility has been built.

Examples of analytic steps that require reality checks include:

- The use of averages for distances, costs, rates, or other key variables when the distribution of real-world values is skewed or divided.
- The use of past data that do not reflect significant recent real world changes.
- Assuming that competitors and other outside influences will maintain current business patterns and practices.

In each case, the lack of a reality check can set the project up for failure.

Project "Champions" Are Needed To Implement An Inland Port Initiative

Public agencies are rarely structured to initiate, build, and manage projects that must compete in the commercial world. The exceptions are usually port and airport authorities, and the case studies for VIP, Huntsville, and Metroport illustrate the successful "championing" of such agencies in inland port projects.

Public agencies created for the express purpose of developing and promoting an inland port or logistics airport have often been less successful. The Neomodal, Port Montana, Shelby, and Shafter projects are, so far, unsuccessful. It cannot be said with certainty whether the project concept was flawed, the organization was unable to carry out the project, or more time is required for ultimate success.

The most successful logistics park projects to date are the Alliance Texas and Joliet developments, both of which were "championed" by major business park development firms (Hillwod Group and CenterPoint). These and similar firms have a track record of assessing and acting on commercial opportunities and the "staying power" required for multi-year development efforts. Whether acting as master developers or in some other role, major development firms have other capabilities that public agencies typically lack.

- National and international marketing and sales staff.
- A portfolio of properties and projects.
- Contacts and credibility with major national firms (e.g. manufacturers, retail chains, 3PLs).

Successful Inland Ports Require Willing Carrier Participation

Early and willing railroad participation was a key factor in the success of the VIP, Huntsville, Joliet, and Alliance projects. The Shafter project lacks willing railroad participation and is attempting to force the railroads to participate. Other projects that anticipate rail service, such as SCLA, may find that service difficult to secure.

Service by cargo or parcel air carriers distinguish the airport projects with substantial cargo activity (Huntsville, Alliance, Rickenbacker) from those that have primarily attracted aircraft industry or ancillary businesses (SCLA, SBD, March).

The major factors in service decisions by all carriers in all modes are basically the same.

- **Volume.** The potential business volume must be sufficient to justify capital investment, equipment and labor time, and management attention. Whether the unit of service is a train, an airplane, or a delivery truck, there is a minimum volume threshold to engage the carrier's interest. The volume also determines service frequency and the possibility of attracting more than one carrier to obtain the benefits of competition. The central role of volume is one reason why market assessments are so critical.
- **Profit Potential.** Profitability may be influenced by volume, length of haul, balance, commodity, shipment size, and other factors. Profitability must be gauged in both an absolute sense (e.g. a minimum return on investment or operating margin) and relative to other carrier opportunities (e.g. compared to other business on the same railroad line or other stops for the same airplane).
- **Capacity.** Any carrier will want to insure that capacity used to serve the inland port project is not taken from more lucrative business, and that there remains a margin of capacity for foreseeable growth.
- **Network fit.** Railroads, airlines, and trucking firms are all network business, although the nature and flexibility of the network varies.

Railroads have a fixed network of lines, terminals and connections, and an operating strategy for using that network. A new proposed service that fits neatly into the network is much easier than a service that requires changes in the network, changes in other operations, or changes beyond the network. For example:

- The Keary-Worcester shuttle can accommodate small volumes of short-haul intermodal business because much of it moves as added cars on existing trains.
- The Detroit Intermodal Freight Terminal (DIFT) project stalled over the reluctance of Contrail to share Livornois Yard.
- The Neomodal terminal was located on the Wheeling and Lake Erie regional railroad, off the CR, CSX, or NS networks.

In the air cargo case, the issue is whether or not a flight to and from the proposed facility fits within the carrier's hub and spoke network. Specific factors might include:

- Distance and flying time between the project airport and existing hubs.
- Appropriate cutoff, departure, arrival, and delivery times.
- The schedules of existing multi-stop flights.

For rail intermodal, air cargo, and LTL trucking, the operative question is whether the relevant market is best served through the proposed new facility or via truck from an existing facility in the same region.

For a truckload carrier the decision is simpler. If profitable westbound loads from the project site can be matched with profitable inbound loads to customers nearby (or vice versa), truckload carriers who operate in the region will usually want the business. The balance of outbound and inbound loads is the critical factor. Where loads are imbalanced or the carrier must reposition the empty unit farther to obtain a balancing load, the carrier will demand a higher rate.

Long Development Times Should Be Anticipated

Most of the successful inland port developments described in the case studies have had long gestation periods. Of these examples, some appear to have been successful from the beginning and increased in scope over time while others took a long time – decades – to reach a sustainable business volume.

- Virginia Inland Port—planning began in 1984, opened in 1989, reached target volume in 1999.
- Alliance Texas—planning began in 1988, airport opened in 1989.
- Port of Huntsville—airport began operations in 1967, international air cargo service began in 1991.

For this reason it is difficult to label any existing project a permanent failure. A project may indeed be "ahead of its time", as Huntsville was, and eventually succeed as the market develops or other necessary changes take place. For a project to be a decade or more "ahead of its time", however, means that the land, capital investment, and other resources are unproductive for a long period and generating no public or private benefits.

The market assessment and business forecast are critical in deciding whether and when to start a project. Where project sponsors engage in overly optimistic "aspirational forecasting" public resources can be ill-spent. Forecasting is not an exact science, however, and project plans and financing should be sufficiently robust to sustain the effort through a slower than anticipated startup.

The Project Should Have A Clear, Valid Value Proposition

To complement the market assessment there needs to be a clear understanding of how the project proposes to create value for its customers. That "value proposition" must be verified in the marketplace, just as market assessments must be subjected to reality checks.

In the case of the all-cargo airports, some may have confused capability (i.e. a long runway and hanger space) with a value proposition (which must specify how those assets can be used to benefit the target customer).

Some of the inland port projects that seem to have stalled for commercial rather than regulatory reasons have vague or questionable value propositions. The Montana, Neomodal, and Battle Creek projects are examples.

The value proposition is a significant issue for proposed "Inland Trade Processing Centers" such as the Richards-Gebaur, Kingman, and Yuma efforts.

- Most "processing" is simply clearance by Customs though electronic systems with little or no onsite presence or employment.
- Most importers and exporters seek to minimize "processing", which they view as a cost factor rather than as source of value.
- The notion of trade processing as a source for employment or value might more narrowly include physical Customs inspection, FTZ operation, Customs brokerage, freight forwarding, etc.
- Security functions will not move inland.

Importers would prefer faster Customs clearance and the flexibility of in-bound or secured movement to inland alternatives to congested ports or borders. Customs and Border Protection would likewise appreciate additional processing capacity and flexibility. Neither importers nor CBP, however, are likely to pay for the use of inland facilities. Unless CBP can be induced to pay rent, ITPCs will not generate any revenue for their developers.

V. Inland Port Concepts

Review of the case studies presented in the Appendix reveals a wide variety of projects, facilities, and initiatives in the "inland port" field with varied relevance to SCAG's inland port goals. A set of proposed categories is presented below.

Satellite Marine Terminals

These facilities offer the key commercial and operational functions of a seaport at an inland location. Shippers, consignees, truckers, brokers, and other commercial entities interact with the satellite terminal just as they would with a marine terminal.

- Import containers are released from steamship line/stevedore custody to customers or their representatives, with Customs clearance or forward movement in bond.
- Export containers are received from customers or their agents for steamship line booking.

In both cases the customer has no responsibility for movement between the satellite terminal and the seaport. All such movement is accomplished under the steamship bill of lading or equivalent.

The Virginia Inland Port (VIP) is the only North American satellite terminal of this kind, and is the pioneering inland port facility. No other North American "inland port" accepts or delivers containers under steamship bills of lading in the same fashion as a marine container terminal. VIP was not a congestion relief effort, an economic development initiative, or an effort to increase the terminal capacity at Norfolk. VIP may have eventually filled some of these functions, but VIP was begun as an effort by the Port of Norfolk to expand its market reach in competition with Baltimore.

Metroport Auckland, in New Zealand, is very similar in concept to VIP. Metroport is linked by rail to the Port of Tauranga, and helps the port balance its cargo and compete with the Port of Auckland. Metroport is linked to Tauranga by frequent rail shuttles.

There are no other known inland ports connected to a specific seaport, or operated by a "deepwater" port authority (some are operated by specialized inland port authorities or river port authorities).

All-Cargo Logistics Airports

Closure of military bases across the country has led to the establishment of several logistics-based industrial developments around former military airports. Examples described in the case studies appendix include Vatry, March, San Bernardino, Rickenbacker, Kelley, and the Southern California Logistics Airport (Victorville). In each case, promoters are attempting to attract tenants based on air cargo capabilities. SCAG's 2004 RTP also documents some of these same cases in Appendix D-6. Success of all-cargo airports has been mixed, for several reasons.

The air cargo field can be divided into three segments.

- **Air express and parcel.** The overnight express business was the building block for the development of FedEx, DHL, UPS Airborne, and other "integrated" air carriers providing door-to-door delivery of time-sensitive documents and small parcels. This segment of the industry has continued to grow rapidly and has been the beneficiary of the e-commerce boom. These carriers dominate the air cargo field in terms of both tonnage and number of flights.

- **"Heavy" Air Cargo.** True "all-cargo" air operations focused on moving commercial goods rather than documents and parcels are limited in scope. Before the development of integrated parcel and express carriers, "air freight" was identified with all-cargo aircraft operated by specialist firms such as Flying Tigers, Emery Air Freight, and Cargolux, and by a few passenger airlines that had freighters (Northwest being a prominent example). This business now overlaps with the express carriers who carry a wide range of shipment types and sizes.

- **"Belly Cargo".** A substantial part of all air cargo travels in the baggage or "belly" space on passenger flights. For many years belly cargo accounted for the majority of air cargo tonnage. As shown in Exhibit 23, however, this percentage varies widely by airport and now averages around 30% in Southern California. As the RTP Appendix notes, the availability of passenger flights and belly cargo capability can significantly increase the ability of an airport to offer more air cargo destinations and capacity, especially in the international market.

Exhibit 23: Dedicated and Belly Cargo Shares at Regional Airports

		1994		2000		2002	
		Tons	%	Tons	%	Tons	%
LAX	Dedicated	783,585	46%	1,173,947	60%	1,224,182	62%
	Belly	919,860	54%	782,631	40%	747,144	38%
ONT	Dedicated	353,317	93%	448,902	97%	538,069	98%
	Belly	26,593	7%	13,884	3%	9,391	2%
LGB	Dedicated	27,454	99%	51,483	99%	58,531	>99%
	Belly	277	1%	520	1%	75	<1%
BUR	Dedicated	24,801	80%	29,629	95%	40,815	95%
	Belly	6,200	20%	7,407	5%	2,274	5%
JWA	Dedicated	12,360	78%	13,770	76%	13,312	85%
	Belly	3,418	22%	4,349	24%	2,334	15%
PSP	Dedicated	0	0%	0	0%	0	0%
	Belly	297	100%	144	100%	82	100%
TOTAL	Dedicated	1,201,517	**59%**	1,717,731	**68%**	1,874,909	**71%**
	Belly	956,645	**41%**	808,461	**32%**	761,300	**29%**
	Combined	2,158,162		2,524,692		2,636,209	

Source: SCAG 2004 RTP, Appendix D-6

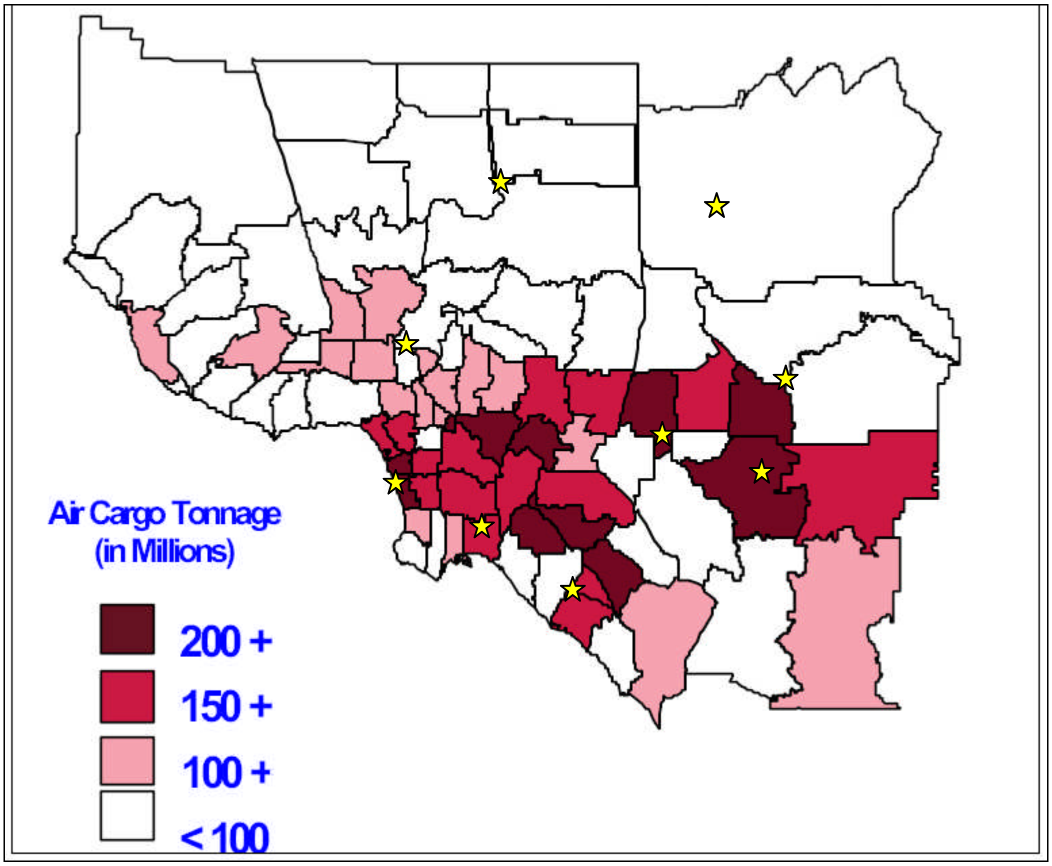
Developers of all-cargo airports hope to attract clusters of air cargo customers, what the RRTP Appendix refers to as “catalytic demand”. Relatively few manufacturers and distributors have such a great reliance on air cargo that they would locate at an all-cargo airport unless that location also had good highway and market access. Classic examples of air-dependent firms include those dealing in high-value perishables (e.g. flowers, seafood). Many of the firms with such heavy air cargo or express needs are located at major existing air express hubs such as Memphis. Examples include distributors of computer parts (e.g. IBM or Dell). The RTP Appendix notes that the combination of ground and air access at March and San Bernardino has attracted major distribution centers for Kohl’s, Phillips Electronics, and Walgreen’s.

Study team review suggests that air-focused developments have been more successful in attracting tenants in the aircraft industry itself whose need for runway access is paramount (e.g. executive aircraft firms, aircraft maintenance firms, flight schools). SCLA, for example, has the following tenants:

- The Boeing Company
- General Electric
- Pratt & Whitney
- Leading Edge Aviation Services
- Southern California Aviation
- Victorville Aerospace
- Mercy Air Services

Almost all of the all-cargo airport projects are at former military bases. Military bases, however, were most often built away from major cities and isolated from major cargo markets. Two exceptions to the pattern of military base closures have been successes. The Huntsville airport is a former general aviation facility. The Alliance Texas Logistics park has a purpose-built cargo airport as a key component, but it was also built around rail intermodal and auto service facilities. In both cases, the emergence of a local air cargo market base was critical to success. Exhibit 24 shows the approximate location of the major regional airports in relation to projected air cargo demand.

Exhibit 24: Projected 2025 Total Air Cargo Demand



Source: SCAG 2004 RTP, Appendix D-6

Multi-Modal Logistics Parks

Multi-modal logistics parks such as Alliance Texas, Joliet Arsenal, and Huntsville have been the most successful “inland ports” at attracting economic development. Location is a major factor in their success: Alliance is just north of Ft. Worth along a major trade corridor, Joliet is just west of Chicago, and Huntsville waited 30 years for its location to eventually develop. In the Alliance and Joliet cases, the master developers had a major role in their success.

A critical distinction is that logistics-based advantages can complement and strengthen the basic attractions of a city, region, or site, but cannot override poor location. This distinction is evident in some of the case studies, notably in the Neomodal and Global TransPark developments that have so far failed to attach the expected volume of business or development. Logistics-based development is much more likely to succeed with the involvement of a specialized master developer such as CenterPoint Properties (Joliet) or the Hillwood Group (Alliance Texas, Alliance California). Another key factor in successful logistics development is willing long-term commitments from the railroads, air cargo operators, or other carriers. The difference between logistics-based development and market-based development is illustrated by the emergence of trade and transportation corridors as distribution center (DC) candidates.

Rail Intermodal Developments

Examples of "inland ports" built around rail intermodal terminals without air or other modes (except truck, which is ubiquitous) include Quincy, Port of Montana, and Neomodal. Rail intermodal service was one of several key elements in the Alliance development. The Shafter, California proposal is also based on a proposed intermodal terminal. Rail intermodal terminals have strong economies of scale. Railroads, therefore, are highly selective about the markets in which they locate terminals, and they usually have only one terminal in a relatively large market. Rail intermodal service also has strong scale economies, and railroads may not be willing to extend service to speculative developments.

While many different industries use rail intermodal service to some degree, virtually none of them do so as direct railroad customers. The actual railroad intermodal customers are truckload motor carriers, (e.g. Schneider National, JB Hunt, Swift), LTL motor carriers (e.g. UPS, Roadway), intermodal marketing companies (IMCs, e.g. Hub City Alliance), and the international steamship lines.

The most successful rail intermodal-based developments start with an intermodal facility serving an existing market rather than having the scale economies of intermodal operations dependent on future development success. Serving an existing market avoids the classic "chicken and egg" situation in which competitive intermodal service requires a minimum volume and the minimum volume requires competitive service. Alliance Texas is also example of a successful rail intermodal approach. The core BNSF facility was built as a replacement for a previous facility serving the Dallas-Ft. Worth market. The Alliance terminal could therefore operate on an efficient scale and offer competitive service options and frequency from the beginning. The proposed Shafter development faces the chicken-and-egg problem; there is little or no existing customer base or demand to justify a terminal there, and such demand is unlikely to emerge without either terminal or service.

Trade-processing Centers

The Kingman, Yuma, and Richards-Gebaur initiatives base a large part of their strategy on relocating various "trade-processing" activities from congested and costly border gateways to inland points. A key issue for these initiatives is the definition of "trade processing" and their ability to define and market a value proposition.

Given a broad commercial goal of moving imports and exports as quickly and economically as possible, "trade processing' functions would generally be regarded as sources of cost and delay to be avoided or minimized. In an important sense, trade prefers not to be processed.

Unavoidable trade processing steps are primarily related to Customs and other government regulatory and security functions. For most containerized cargo Customs clearance is accomplished electronically through the CBP Automated Manifest System (AMS), with no physical cargo or container contact. There is no relationship between the AMS data entry and cargo location. A significant part of the carrier and NVOCC data entry and processing is actually outsourced to foreign companies. For the great majority of containerized cargo, therefore, there are no "trade processing" functions that could be relocated inland from the seaport.

Networks, Corridors, and Shuttle Services

The case studies also discuss three network and corridor projects: the Port Authority of New York and New Jersey, Port Inland Distribution Network (PIDN), the Heartland Corridor, and the North American Inland Ports Network. The growing use of the corridor concepts is evident in the CANAMEX and River of Trade Corridors. None of these projects are "inland ports", but they attempt to link and network inland ports and seaports in various ways.

There have been a handful of rail and barge shuttles operated between seaports and inland ports. Success has been mixed. One prominent demonstration project, the barge service between the Port of New York/New Jersey and Albany, New York has recently been discontinued.

Economic Development Initiatives

The KC SmartPort program is an economic development initiative, not an inland port at a fixed site. As such, the SmartPort program illustrates the potential economic development value of logistics-based and inland port approaches without being tied to the features of any one facility.

VI. Matching Inland Port Goals and Concepts

A major objective for Task 1 and 2 of this study was to identify promising inland port concepts to be carried forward into detail feasibility and implementation analysis. The study team's review of case studies, SCAG objectives, and the regional context indicates that different but overlapping inland port concepts can serve the full range of SCAG's objectives and should be carried for ward into the balance of this study.

Truck VMT and Emissions Reduction

For the primary purpose of reducing net truck VMT – and therefore highway congestion and emissions – the "satellite marine terminal" model is the applicable inland port concept. The available data on port truck trips indicate an adequate market size to consider an Inland Empire rail shuttle linking a new inland port to the ports of Los Angeles and Long beach.

To determine the detailed feasibility of an inland port/rail shuttle development the remaining project tasks will need to analyze the following issues.

Location and site. BNSF has been frustrated in trying to expand their existing San Bernardino intermodal terminal or finding a site for a new one. BNSF is looking at the potential of SCLA for the future, but the SCLA location is not advantageous for a rail shuttle from the ports. Union Pacific has a candidate site at West Colton for the proposed demonstration project, but further analysis will be required to determine if the site is suitable for long-term development. If alternative line haul technologies (e.g. maglev or LIM) can provide access to suitable sites off the main railroad lines the choice of possible sites might be broadened.

Capacity. Both railroads are facing capacity limits on trackage between the ports and the Inland Empire, specifically on lines east of the Alameda Corridor. Grade separation projects as part of the Alameda Corridor East effort will increase safety but not rail capacity. The same routes are also involved in plans for increased regional rail passenger service. A public-private program to increase total rail capacity between the ports and the Inland Empire will almost certainly be a requirement for railroad participation in a rail shuttle.

Bobtail, empty chassis, and container depot trips. The effect of an inland port/rail shuttle combination on bobtail, empty chassis, and off-dock depot trips is not clear and will require more detailed analysis in subsequent study tasks.

Port rail operations and infrastructure requirements. Under both the "satellite marine terminal" and "agile port" concepts there is a presumption that the appropriate inland port trains can be efficiently assembled from two ports and multiple terminals. At a minimum, these operations will add time and cost that must be analyzed and incorporated in the feasibility assessment. At a maximum, there may be a need for additional rail infrastructure to accomplish this purpose.

Institutional issues. If operational and economic issues can be favorably resolved there are still institutional issues to be addressed. Such issues include the form and implementation of operating subsidies, jurisdiction and governance of an inland port, and the marketing and management of both rail shuttle and inland port facilities.

Market appeal and potential. The key question is how many container trips could be diverted to a rail shuttle. Contact with ocean carriers and customers who control the container movements will be required to assess the market potential and the rate and service combinations required to achieve target volumes.

Truck VMT and truck/rail tradeoffs. The potential for net VMT and emissions reductions depends on the relationship of inland port location to shipment origins and destinations. The net emissions reduction also depends on the tradeoff between reductions in truck miles and additional rail miles, including any port area switching needed to make up shuttle trains and inland port switching needed at the other end of the movement. The study team will develop a spreadsheet model of the tradeoffs and link it to the geospatial distribution of origins and destinations by TAZ.

Inland port/railroad relationship. Most discussions of inland port have implicitly assumed that there would be one such facility. There are, however, two competing railroads serving the Ports of Los Angeles and Long Beach. An inland port developed and served by BNSF would not be accessible to UP or to UP's customers, and vice versa. There are multiple possible scenarios to be considered in the balance of the project, including:

- Single inland port, single railroad access.
- Single inland port, dual railroad access with neutral terminal operator.
- Dual inland ports, one for each railroad.
- Single inland port served by contractor-operated rail shuttle over Class 1 tracks.
- Single inland port with maglev or LIM access.

Directing Economic Development

The operative questions for economic development goals are:

- What inland port features would be required to favorably influence economic development (beyond the expected influence of SBIA, March, and SCLA)?
- What would be an appropriate mechanism to provide such inland port features and to direct economic development accordingly?

Key elements identified from the case studies include:

- Realistic market assessment.
- Locations.
- The role of a development "champion."

The case studies also imply that significant shifts in economic development may occur slowly, over a decade or more.

VII. Inland Port and Rail Shuttle Issues

Railroad Participation and Capacity Requirements

The willing participation of either or both railroads is a prerequisite for development of an inland port and rail shuttle. Plans for rail participation in either start-up or long-term operations must encompass rail operating, pricing, and equipment options, and, most importantly, capacity.

Capacity will be the primary issue in railroad participation, not cost. Long-term railroad participation in a short-haul rail shuttle will be contingent on public funding for increased capacity. The situation is parallel to that of passenger rail services in California, whose expansion has been facilitated by strategic state investments in additional track capacity, signaling, and other measures to expand total rail capacity.

Studies consistently indicate that unsubsidized short-haul rail shuttles in the 50-100 mile range will not be commercially viable or attractive business propositions for the railroads. It is equally clear that developing and operating intermodal facilities is unlikely to be a profitable stand-alone venture. Both will require subsidies or other forms of financial support to succeed in a competitive environment.

Both Class 1 railroads are experiencing traffic growth, driven by transcontinental intermodal movements that generate far more revenue than short-haul intermodal movements such as regional shuttle trips. An operating subsidy to make up the difference between commercial rail intermodal rates and the trucking competition will not be nearly enough to interest the railroads if they have to turn away higher-yield business due to capacity constraints.

Recent national discussions of public-private partnerships for freight have included the possibility of public investment in rail capacity in return for rail service and rate commitments on target movements. The scope for direct public investment in inland port and rail shuttle operations facilities has expanded since the inception of the inland concept as traffic growth has brought both BNSF and UP closer to their trackage and terminal capacity limits in both Northern and Southern California. A multi-jurisdictional or comprehensive public-private agreement for rail freight projects in California could have great advantages to both parties and facilitate progress on many pending issues.

Inland Terminal Planning Factors

Physical Considerations

When a new terminal site must be developed, the site should be evaluated based on the following characteristics:

- **Proper Size.** The terminal must be sized appropriately to handle the anticipated customers and volume. Intermodal terminals can exceed 300 acres. The requirement to economically assemble large parcels of land for new intermodal terminals severely limits the number of available site options, particularly in highly developed metropolitan areas.

- **Proper Shape.** The ideal site is very long (for large terminals, more than a mile in length), relatively narrow, and parallel to the railroad's main line. This parallel orientation permits an efficient facility design that minimizes operating costs. The length of the facility is driven by the expected volume and train sizes, while its width is driven primarily by trailer and container storage requirements.

- **Low-Cost Development.** The cost of developing terminal capacity varies dramatically. There are no returns or profits associated with intermodal terminal land ownership. Terminal contractors make their money from providing lifts, and the railroads make their money by providing train service.

- **Expandability.** Experience indicates that demand for terminal capacity will grow significantly over the anticipated life of a successful facility. Therefore, the availability of additional land nearby for development, to support future growth, is highly desirable.

- **Highway Access.** Efficient, uncongested highway access to customers is a critical element in site selection and will strongly influence the projected volume forecast for a proposed new terminal. Local drayage is relatively expensive, typically $40 to $60 per hour. Accordingly, available highway infrastructure and associated congestion levels define the market area that is practically available to the projected terminal. Road condition is also important, as heavy tractors, trailers, and containers will inflict damage on light-duty roads and will suffer damage on poorly maintained roads.

- **Rail Access.** New intermodal terminals are most often developed along existing intermodal railroad main lines, thereby avoiding capital requirements to develop additional railroad main lines. Access should also be complementary to existing or emerging local operating patterns.

- **Local Community Considerations.** The attitude of the local community and various associated government agencies is a very important consideration for an intermodal terminal. Where attitudes are cooperative and supportive, the new site can often be easily developed and the related public infrastructure can be improved to expedite access to the terminal. Where there is community opposition the process may proceed, but at much greater cost both in terms of time and money. Infill sites are often disadvantaged in this respect.

An ideal site for the development of a intermodal terminal has high quality access to both the railway and highway networks, is near a large cluster of customers, is big enough to support the expected volume and to allow for expansion, is inexpensive to develop, and is in a friendly community.

Planning Guidelines

Tioga has developed the following information as an aid for intermodal terminal planning conceptual stage. The guidelines presented are based on industry norms and are general in nature. The fact that makes this kind of analysis reliable is that intermodal terminals in North America are similar enough that practical guidelines for development of new facilities can be determined by observation of existing operations. Practical exceptions abound, but can generally be understood in terms of unique, case specific factors that should be incorporated in planning as they are identified.

The guidelines have been used and refined over the past decade as The Tioga Group has performed capacity and benchmarking studies for Class I railroads and the AAR. The AAR published some of the results in 1993. An additional set of findings was published by the Eno Foundation in 1999.

- **Capacity Measure** – Production at intermodal terminals is most commonly measured in lifts. A lift is the transfer of a trailer or container from a rail car to the ground or from the ground to rail car. Secondary lifts are defined as lifts between the ground and a chassis and are not counted in the measures below.

- **Lifts Per Acre** – The general guideline is 2000 annual lifts per acre. One caution is necessary with this guideline. Terminal operators tend to be very inconsistent in the manner in which they measure and report terminal acreage. A facility planned at 2000 lifts per acre should be able to incorporate common intermodal functions including car storage. The land does not need to be a regularly shaped parcel. 2000 lifts per acre is a relatively conservative guideline and particularly well-operated and well-designed facilities on regularly shaped parcels can do much better.

- **Loading Track Length** – This is the track that is accessible to sideloaders or cranes. The planning factor that is recommended is 1500 annual lifts per 100 ft of track. The guideline implies that there will be regular resets of the loading tracks, particularly on busy days. Most facilities do not achieve this level of use and have surplus capacity. Those that exceed this level of use, typically do so at a service penalty. Facilities that successfully exceed this level typically service a relatively large number of trains throughout the day.

- **Rail Car Storage Requirement** – The terminal must have enough track to buffer the operation and the imbalances imposed by the weekly operating cycle. In some locations this means track lengths 2.5 times the loading track length.

- **Parking Requirement** – The range for this guideline is relatively wide 100-300 annual lifts per trailer parking spot. In making a planning estimate a judgment must be made regarding the operation and character of the traffic. International traffic tends to move much more slowly than domestic. Also some terminals are designed to offer container yard services for international shippers; this guideline does not apply in that case and any land reserved for long-term storage purposes should not be considered as available for general use by the terminal. Parking space accounts for most of a terminal's footprint and is often the limiting factor in terminal capacity.

- **Gate Transactions Per Lift** – The planning assumption is 1.5 per lift. Theoretically this number could be as low as one gate move per lift or as high as four. Exceptions might include terminals that are performing car-to-car transfers and facilities that are also serving as container yards. Clearly one move per lift is much more efficient than four and the draymen will be working to produce the most efficient case.

Operational Cycles

There are common operational cycles implied in these relationships as follows:

- **Daily Cycle** – Terminals typically strive to match shipper practices. For most facilities this means handling inbound trains in the morning and outbound traffic in the afternoon or evening.

- **Weekly Cycle** – Most customers ship five or six days per week. This means that intermodal terminals handle most outbound traffic Monday through Friday; a small minority is handled Saturday and an even smaller portion of the outbound is handled Sunday. For an inland port the shipper cycle will be combined with the marine transportation schedules of the ships loading in the nearby ports. In Los Angeles and Long Beach much of this activity happens on the weekend. The combination of shippers being closed on the weekend and large volumes of import marine cargo being handled on the weekend implies that there will be a very large requirement to receive and unload cargo over the weekend that will not be dispatched by truck until Monday or Tuesday (when there is often a shortage of drivers).

- **Annual Cycle** – Generally, intermodal terminals have relatively small seasonal peaks in March and October and have a significant low period in late December and early January.

Inland Empire Intermodal Terminal Projects

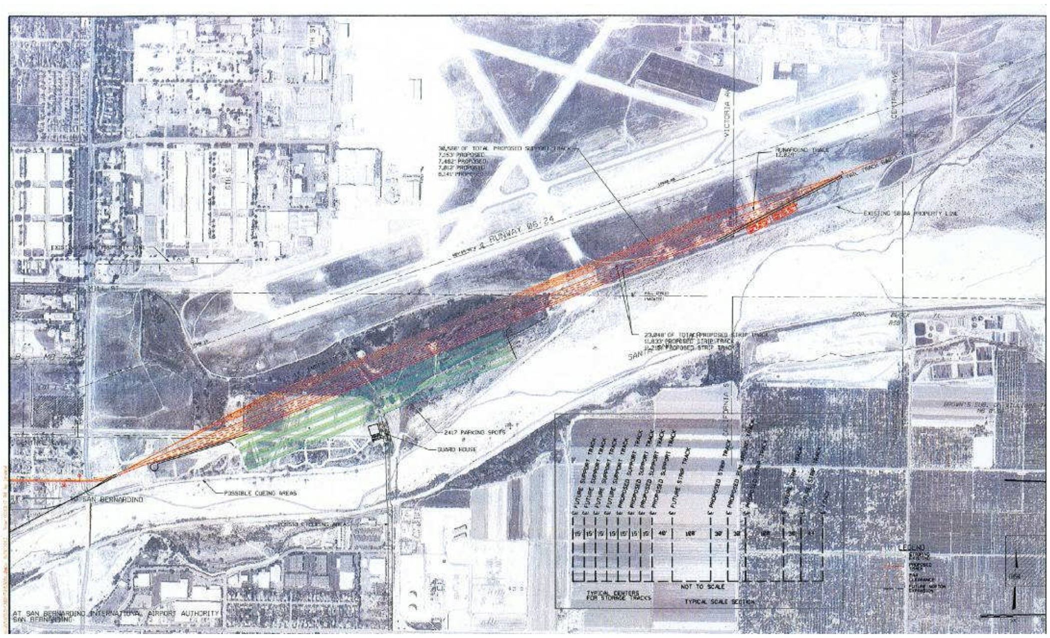
Expanding intermodal terminal capacity in an existing market is ordinarily not accomplished until there are obvious capacity-related operating problems and a clear justification for capital investment. Most often, additional terminal capacity is developed by expanding an existing terminal. Terminals are typically designed taking into account long-term development plans, and it is generally more efficient to fully exploit an existing site before developing new sites. This is certainly true considering the complexity of permitting and other regulatory processes. It is also very likely that an existing terminal is already in a commercially and operationally satisfactory location within the metropolitan area.

BNSF Railway has sought to develop a second intermodal terminal in the Inland Empire because its San Bernardino terminal is at capacity. Previous sites considered are discussed below.

San Bernardino Airport Site

Closure and reuse of Norton AFB as San Bernardino International Airport presented an opportunity to assemble a large enough parcel of land to build a new intermodal terminal (Exhibit 25). BNSF, SANBAG, and the City of San Bernardino cooperated in a series of traffic studies to determine the traffic impacts such a facility would have on the area.

Exhibit 25: Preliminary Intermodal Terminal Plans for Norton/SBIA Site

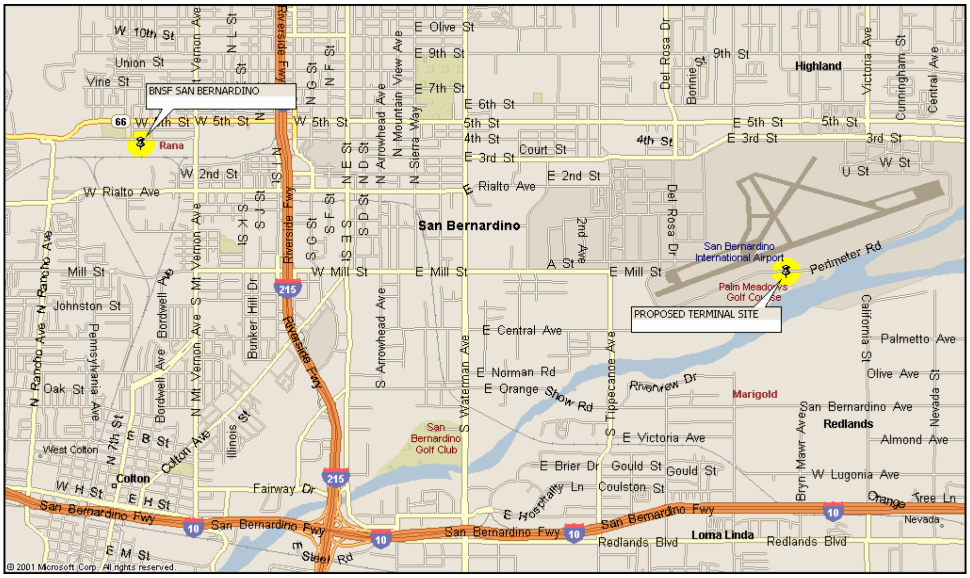


BNSF eventually elected not to pursue the project. The project faced typical barriers found in most large developments:

- Assembly of parcels from multiple owners, and the timing related to assembly;
- Minor environmental concerns with on-site species impacts; and
- Capital and operating costs.

The disruption of running trains through downtown San Bernardino to connect the existing BNSF facilities with a new terminal at Norton (Exhibit 26) turned out to be the most difficult and decisive barrier to the project. While the assembly, cost, and environmental problems might have been manageable, the difficulty of creating an acceptable, efficient rail connection across developed areas of San Bernardino was considered impractical to mitigate.

Exhibit 26: BNSF Norton/SBIA Site Access



This access problem highlights the difficulty of creating new intermodal facilities in developed urban areas. This instance is a specific example of the larger problem facing the SCAG region, and all urban areas: the industrial and population growth that creates the demand for freight transportation simultaneously creates barriers to meeting that demand.

Note that by locating adjacent to SBIA, such a new BNSF facility would have created a multi-modal development.

Devore Site

Consideration was been given to potential intermodal terminal sites along the rail corridor between San Bernardino and Cajon Pass, specifically at Devore (Exhibit 27). One site that was investigated is a privately held parcel west of I-215. As shown in the aerial photo, however, the parcel is constrained by geography, wedged between the hillsides and the floodplain. Analysis by BNSF concluded that an efficient intermodal terminal on the site was not feasible for two reasons.

- Site configuration would force much of the available land to be devoted to approach trackage, reducing the potential terminal space.
- The prevalent grades of 2.2% on adjacent trackage would raise serious operating, cost, and congestion issues.

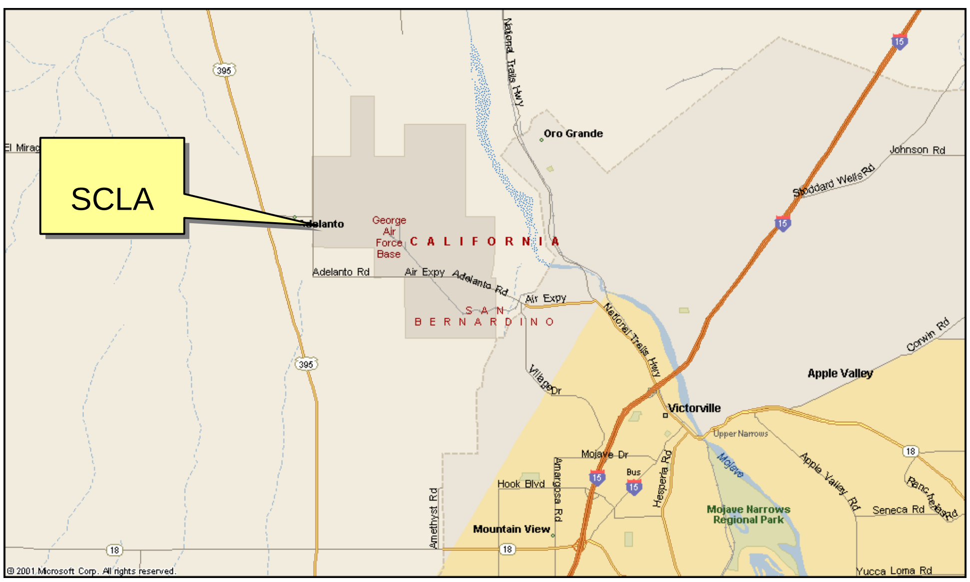
Accordingly, the site is considered impractical as an intermodal terminal.

Exhibit 27: Proposed Devore Terminal Area

Southern California Logistics Airport Site (Victorville)

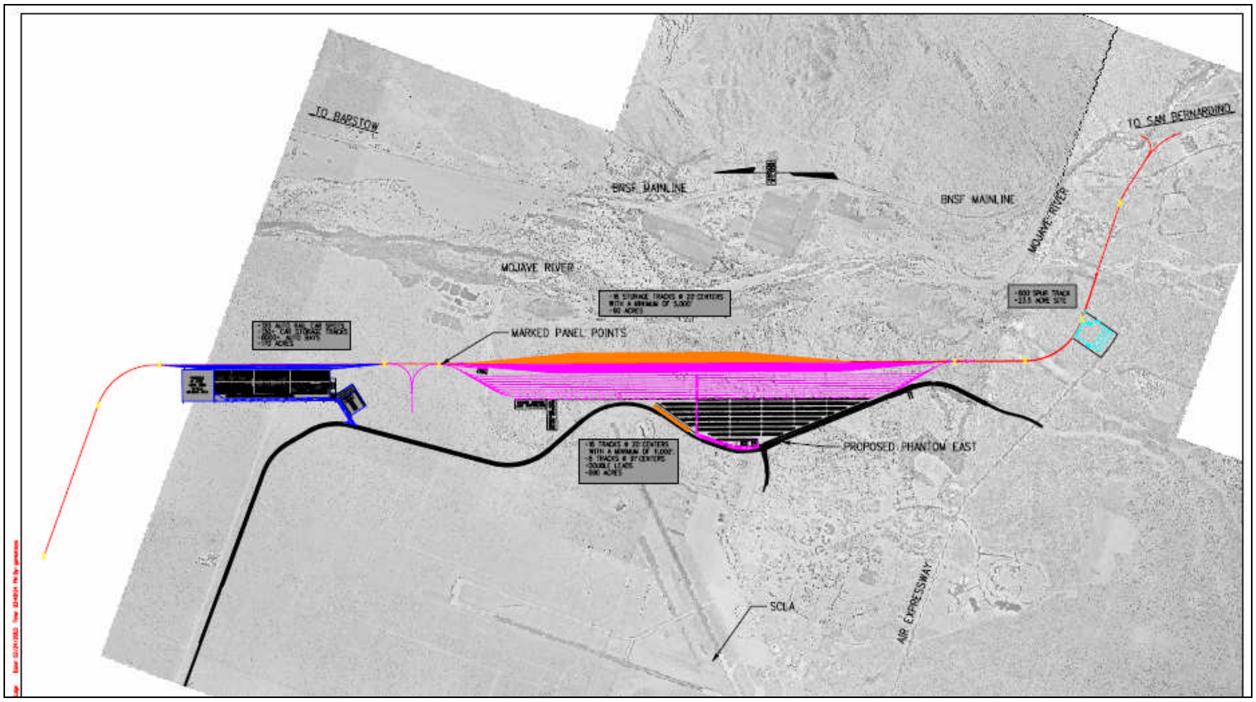
Conceptual plans for the Southern California Logistics Airport (SCLA) near Victorville (Exhibit 28) have always included the possibility of a rail intermodal terminal.

Exhibit 28: SCLA Site



BNSF has investigated the location and has worked with SCLA to suggest conceptual plans to SCLA (Exhibit 118) that differ from the original conceptual plans shown in many SCLA publications.

Exhibit 29: Preliminary Intermodal Terminal Plans for SCLA Site



The Victorville area is a less-than-optimal choice as a rail intermodal terminal for BNSF as it is much farther from the Inland Empire intermodal customer base than the existing San Bernardino terminal.

The major issue with the SCLA site as a near-term "inland port" site is, likewise, its location. Lying north of Cajon Pass, SCLA is not an efficient hub site for trucking to and from Inland Empire port customers. The SCLA site is only 3 miles closer to the Mira Loma area than is the Port of Long Beach, so any VMT savings would be minimal, and would also be offset by the difficulty and cost of trucking up and down Cajon Pass. Any rail shuttle to and from the ports would likewise have to operate over Cajon Pass, a congested and high-cost route.

In the long term, as the Victor Valley area develops into a separate market, the SCLA site may become more attractive. As noted above, serving a *developed* area with new intermodal facilities sis inherently difficult. Serving a *developing* area such as Victorville allows the customer base to grow up around the facility.

Inland Empire Planning Cases

Tioga considered three planning cases for an inland port rail intermodal terminal based on volumes of thirty, sixty, and one hundred twenty thousand annual lifts. The planning factors above drive the following very preliminary requirements. (Exhibit 81)

Exhibit 30: Sample Intermodal Terminal Planning Cases

Planning Factor	Small	Medium	Large
Annual Lifts	30,000	60,000	120,000
Minimum Acreage	15	30	60
Loading Track Length	2,000	4,000	8,000
Storage Track Length	5,000	10,000	20,000
Parking Slots	300	600	1200
Annual Gate Volume	45000	90000	180000
Estimated Cost	$3.0-$ 7.5 Million	$6.0-$15 Million	$12-$30 Million

In addition to the facilities required, terminal equipment would be required. The number of machines is dependant upon the number of primary and secondary lifts to be provided as well as the schedule of both trains and the gates.

Exhibit 81 also has implications for site selection, as the minimal size shown for a large facility is 60 acres. The track length of 8000 feet implies the need for a long, narrow site.

Roles and Responsibilities

The following roles and responsibilities are crucial for the successful development of an inland port via rail intermodal service. These functions are all required to provide the necessary railway, highway, vehicle, and terminal assets necessary to establish intermodal freight transportation services.

- **Real estate.** The entity that owns the land on which the intermodal terminal is developed.
- **Terminal improvements.** The entities that make the capital investment in the highway and rail infrastructure improvements necessary to provide efficient access to the site, and on-site improvements that provide the necessary terminal infrastructure.
- **Financing.** The entities that will finance the various elements of the project.
- **Provide the terminal equipment.** The entity that provides the equipment necessary to operate the terminal. This may include lift machines, yard tractors, boilers, or any kind of specialized terminal equipment.
- **Line haul rail equipment.** The entity that provides the line haul equipment (railcars, trailers, etc.) to support the proposed services. Establishment of these new services may necessitate equipment owners to either invest in new equipment or redeploy existing equipment from less lucrative services or locations.
- **Operating systems.** The entity, usually the terminal contractor, that provides the information and operating systems required to ensure an efficient flow of data between the parties.

- **Terminal operations.** The entity that performs the day-to-day operation of the facility, usually a specialized contractor.

- **Railroad operations.** The entity that provides and operates the rail service. Ordinarily a major railroad but exceptions are possible and should be considered.

- **Marketing.** The entities that market the rail intermodal services.

As these and other responsibilities are assigned, the interrelationship between governance, operational control, and financing can be anticipated to become quite complex. For example the use of public money tends to increase development expenses, particularly those associated with the public process, and gives the public a greater say in the governance of the facility. This is a point resisted by most railroads, which typically desire full operational control, can be expected to be more efficient operators, and do not want to pay (or repay) for the public process. There are several similar issues to be resolved in the development of an effective public-private partnership in the development of an intermodal facility.

Rail Intermodal Terminal Services

Besides the basics of modal transfer, a rail intermodal terminal may provide additional services, either as a stand-alone facility or as part of an inland port. Some of the menu choices are shown in Exhibit 31 along with an estimate of their commonality. Obviously, the more services provided the greater the land requirement, capital cost, and operating cost.

Exhibit 32 lists additional services that might be provided within the terminal.

Exhibit 31: Menu of Rail Intermodal Terminal Services

Function	All	Most	Some
Modal Transfer (Lift)	✓		
Control Point—Trucks Check In/Out	✓		
Immediate storage for containers in loading process	✓		
Lift Equipment Servicing	✓		
Administrative Support	✓		
Rail Car Storage		✓	
Lift Equipment Maintenance		✓	
Running Repairs for Containers & Chassis		✓	
Rail Car Maintenance		✓	

Exhibit 32: Menu of Additional On-Terminal Services

Function	All	Most	Some
Loaded Container Storage		✓	
Locomotive Storage and Servicing		✓	
Long Term Container Storage			✓
Customs Inspection Facility			✓
Heavy Repair for Trailers, Containers, & Chassis			✓
Cross Dock Facility			✓
Warehouse Facility			✓
Motor Carrier Terminal on Site			✓

VIII. Agile Port Concepts

Background

The term "agile port" has taken on many shades of meaning from a precise definition tied to military deployment to a generalized notion of increased port efficiency linked to inland transport. For the proposes of this project the study team endeavored to identify those elements of the broader agile port concept that would promote greater port throughput consistent with reduced VMT and emissions. In this connection:

- The objective of agile port operations is to reduce container dwell time at port terminals and increase their throughput capacity.
- The core of the concept is rail transfer of unsorted inland containers from vessel to an inland point where sorting takes place.
- The agile port concept trades off additional cost (handling) and inland space for increased port throughput.

Port of Hong Kong West Rail Concept

Exhibit 33 shows one of the original concepts later incorporated in the broader agile port idea. The West Rail plan was developed by TranSystems and Mercer Management Consulting in 1995-1997 for the Kowloon-Canton Railway Corporation (KCRC) to provide efficient intermodal rail service between the Port of Hong Kong at Kwai Chung and inland China. The design challenge was to maximize throughput at the only available near-port rail terminal site, a 37-acre parcel shown in Exhibit 33 as the Port Rail Terminal (PRT). To eventually handle up to 4 million annual TEU though this very small facility it would be necessary to transfer every container from the drayage trucks to the first available train slot with no sorting at all at the PRT. All trains would leave the PRT with a random assortment of containers. At the Northern Freight Yard (NFY) 30-35 miles north near the Chinese border, the containers would be transferred directly from PRT trains to one of several China-bound trains whenever possible, and stacked in a buffer area as needed.

The Northern Freight Yard was envisioned as the core of what could be come an "inland port", a concept that was then embodied only in the Virginia Inland Port.

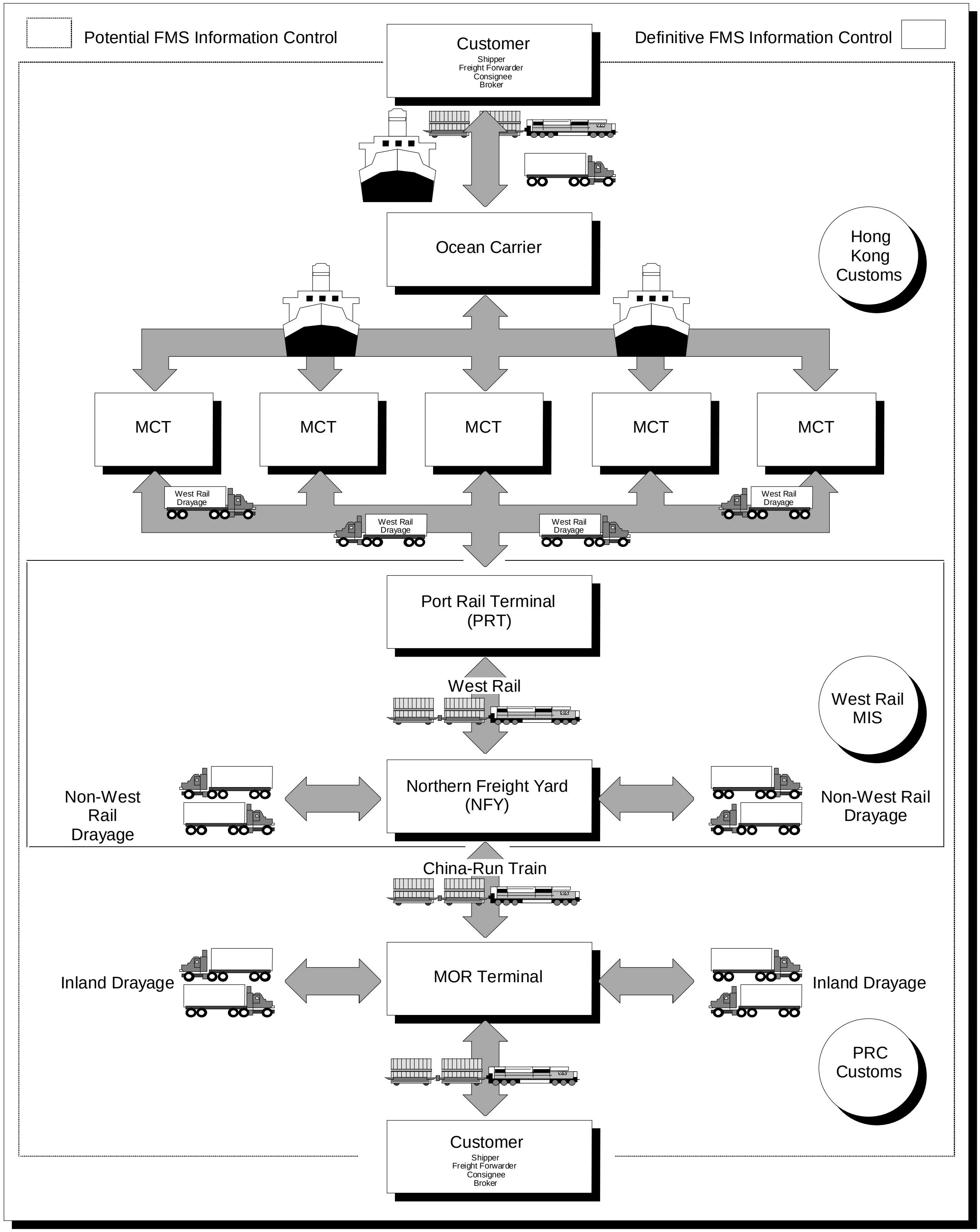
"The NFY could become the nucleus of an "inland port" complex.

- *Development of Container Freight Stations (CFS) and container depots surrounding the NFY would generate additional volume and revenue for KCRC.*
- *Encourage rail movement of full containers from Guangdong Province and the Shenzhen Special Economic Zone to and from Kwai Chung instead of piecemeal truck moves.*
- *Container depots that distribute empties to Guangdong Province would be a source of northbound fill-in traffic for KCRC*

- *By adding CFS and depot capacity, and staging containers for movement to and from Kwai Chung, the activity surrounding the NFY would effectively add capacity to the Kwai Chung terminals and extend their reach inland.*
- *The NFY could likewise become a marshaling point for rail traffic to and from Shekou and Yantian."*

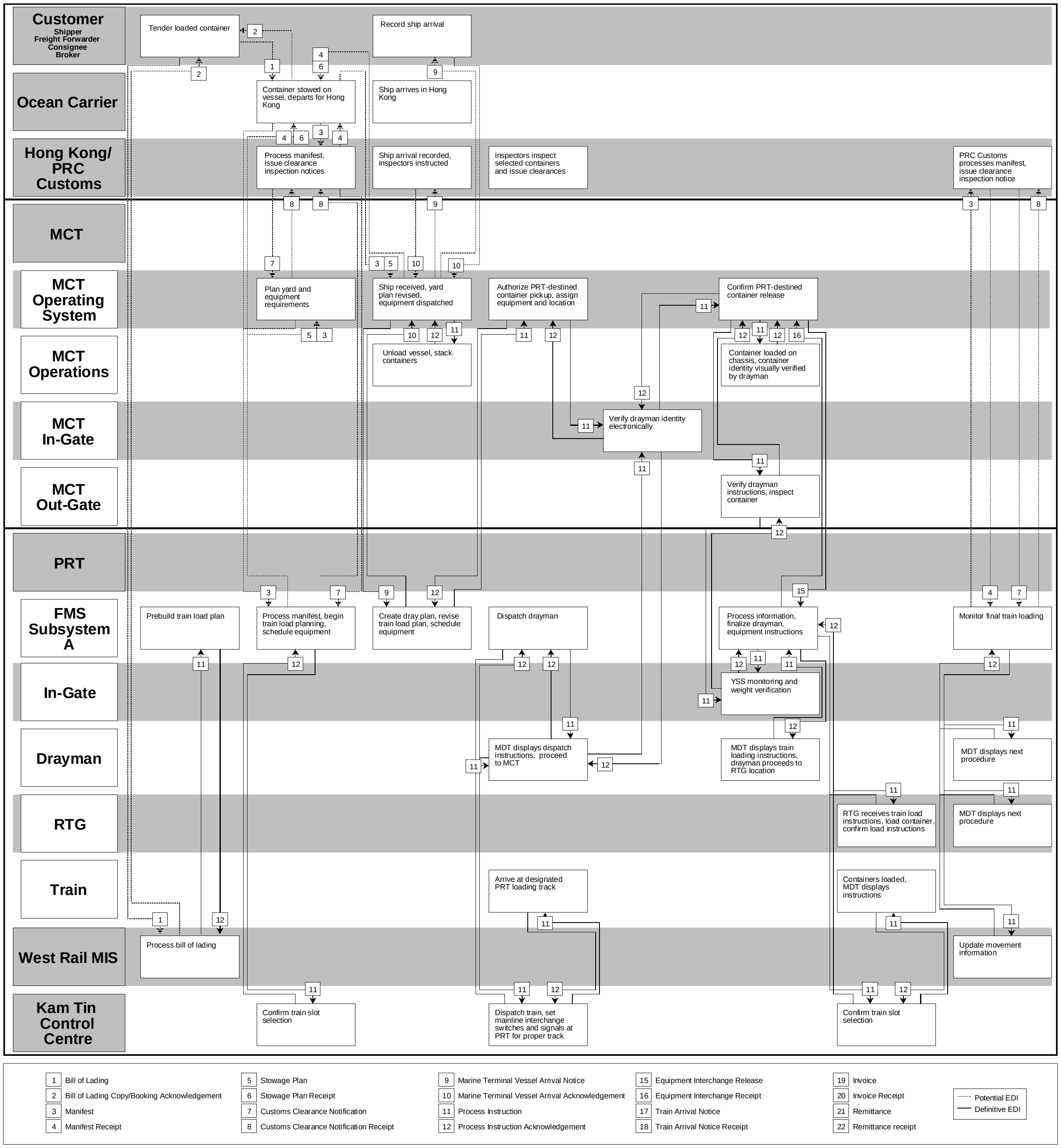
This proposed system was advanced through feasibility assessments and preliminary planning studies before being set aside with the transfer of Hong Kong to mainland Chinese governance. Its major operating philosophy, however, was incorporated in the agile port idea.

Exhibit 33: Port of Hong Kong West Rail Concept



A critical part of the West Rail proposal was the Freight Management System (FMS) alluded to in Exhibit 33. Exhibit 34 shows the flow of information through the proposed Freight Management System. Although the diagram may be most impressive for its complexity, the critical functions are applicable to agile port applications in Southern California.

Exhibit 34: West Rail Freight Management System



- Pre-arrival use of bill of lading and stowage plan information to create trip plans for import containers.

- Dispatch of drayage vehicles triggered by container availability information in the marine terminal operating system.

- Communication between the management information system (FMS) and drayage vehicles via Mobile Data Terminals, including direction to specific train slots for loading.

- Development of Northern Freight Yard transfer plans based on actual real-time container loadings at the PRT.

The West Rail plan and the FMS were designed to *"substitute superior information and operation control for scarce land area and capital equipment"*. In short, the ability of the system to move 4 million TEU through a 37-acre terminal was contingent on maximizing the availability and use of information at every step of the process.

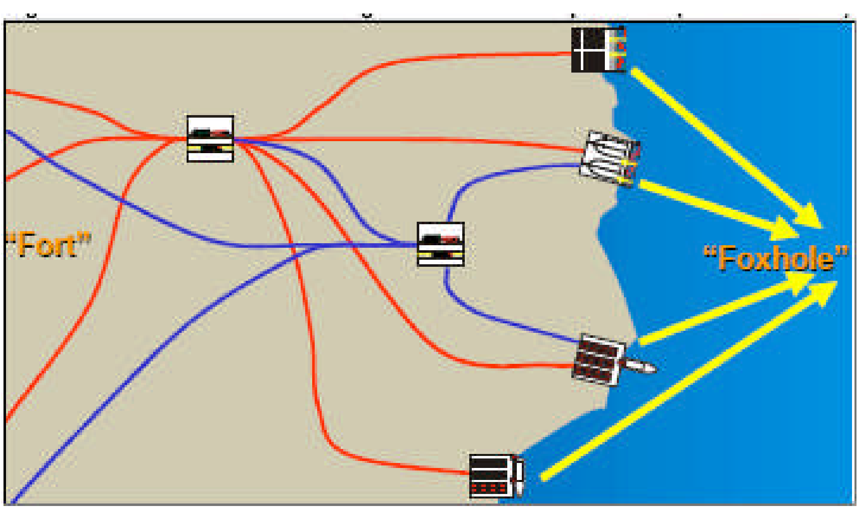
Military Deployment Definition

Within the realm of rapid military deployment, port agility is defined as *the ability of a marine terminal to accommodate military load out operations while minimizing disruption to commercial operations.* (CCDoTT) This implies that an Agile Port either has unused capacity or can change its operations to accommodate military surge cargo without significantly impacting commercial operations. To the extent that this latent capacity is the result of changed/improved operations it may have commercial impact.

As defined this way, an Agile Port System (APS) has all the elements of any transportation system; terminals, ways, conveyance equipment (ships or vehicles), systems, and management.

Exhibit 35 illustrates a Agile Port System and its major components in a "fort to foxhole" system for rapid deployment of military materials. (Note that the agile port system in this manifestation is focused on outbound or export movements.)

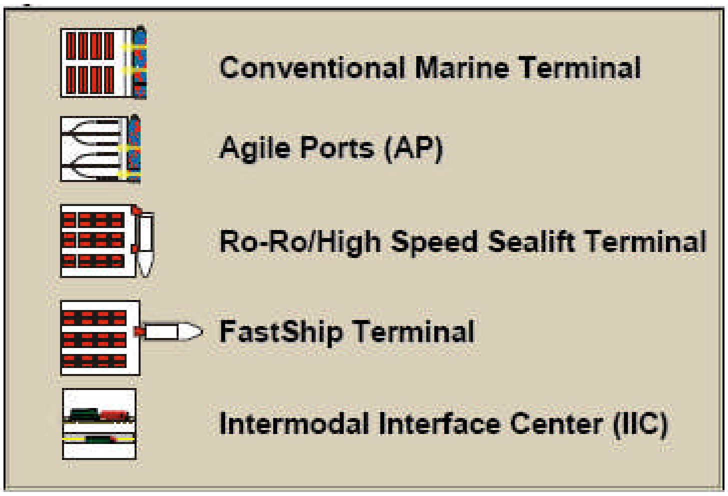
Exhibit 35: Agile Ports in Military Deployment



Source: TransSystems, Inc. Presentation

The system as envisioned for military application defines five different kinds of terminals (Exhibit 36).

Exhibit 36: Agile Port Terminal Types



- Conventional marine container terminals are the terminals that are in place today.

- Ro-Ro (Roll-on Roll-off) marine terminals are also in place today for maritime auto carriers and barges, although they do not have the High Speed Sealift characteristics (which are not relevant for this study).

- Agile Port terminals, also called Efficient Marine Terminals, are optimized for on-dock rail transfer. The concept was demonstrated successfully in Tacoma, but no terminals have been built or operated on this basis.

- Fast Ship Terminal is a concept that uses a Container Platform Train (CPT) optimized for the proposed Fast Ship technology. These terminals have been designed in concept, but not built.

- The Intermodal Interface Center (IIC) is an inland port that serves as the "front door" of the port, providing as large a menu of required marine intermodal terminal services as possible.

These functions involve both an information warehouse linked to the marine container terminals as well as rail, marine and motor carriers and integration of various optimization systems to produce highly automated and optimized land side access solutions. This use of information to maximize system performance is the same idea embedded in the West Rail Freight Management System proposal (Exhibit 34).

In the conventional system that we have today both rail and highway corridors are used to bring cargo to/from the marine facility. The notional elements of the APS system involving the IIC and the EMT are conceived as being connected by a dedicated freight corridor. The Alameda Corridor is given as the first (and only) example of this kind of facility.

One goal is to take work out of the marine terminal where land and labor are expensive and move it inland where land and labor are less costly by moving as many conventional marine terminal functions to an inland port where land is less expensive, and objective consistent with rationalization of port-area land uses.

Applying the Agile Port Concept in Southern California

How might elements of the Agile Port concept be used to accomplish two goals?

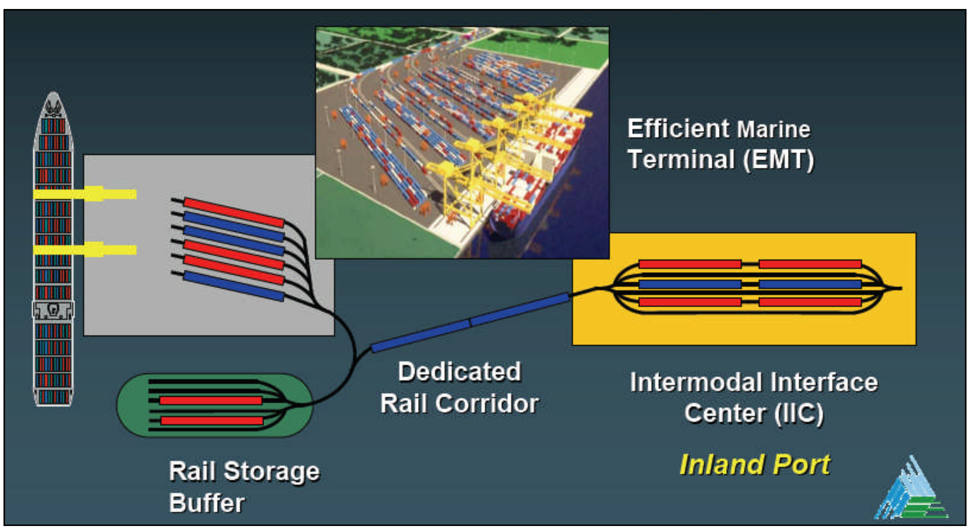
- Move truck traffic off congested Southern California highways.
- Increase the throughput of existing marine terminals.

These questions are relevant to public decision makers to the extent that they seek both growth in the port operations and employment while conserving capacity on the highway system. Also, in spite of the fact that a significant portion of the Agile Port system is designed to support military surge *export* operations without disrupting commercial (primarily import) operations, there are elements that can be helpful in accomplishing Southern California's goals.

To take trucks off Southern California highways an agile port operation would have to substitute rail moves for drayage to off-dock rail yards, for drayage to the Inland Empire, or for drayage to markets west of the Rockies (since markets east of the Rockies are already served predominantly by rail).

Exhibit 37 shows the key elements of the agile port concept as potentially applied within Southern California.

Exhibit 37: Agile Port System Elements



In principle:

- Existing marine container terminals would implement as much of the EMT concept as possible, chiefly the use of information and operational refinements to load import containers to rail as quickly and efficiently as possible.
- Adequate storage and support trackage would be available in the port area to facilitate building and blocking trains as required.

- While the rail corridor would not be dedicated, dedicated rail shuttles would connect the ports with one or more inland ports.

- At the inland port, additional sorting and blocking of rail cars and containers would yield outbound trains that could proceed intact to inland destinations.

- Westbound, the process would be reversed, with the inland port splitting, blocking, and sorting railcars and containers as needed to create trains to move intact to individual marine terminals.

As Exhibit 38 suggests, marine container terminals now do a significant amount of sorting to build trains that can move intact to inland points.

Exhibit 38: Conventional On-Dock Rail Operation

The disadvantages of this system are that:

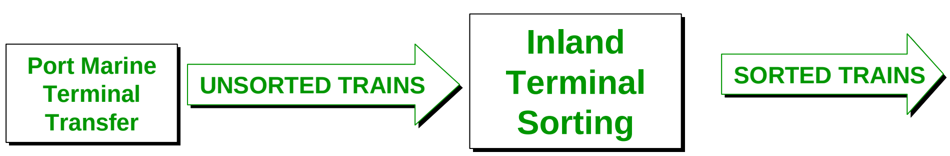
- Inland-bound rail containers that are not put on the first trains often have longer dwell times.

- Where rail volume is insufficient to make up an train or a block to a specific inland destination, those containers will usually be trucked to a near-dock intermodal yard.

At present, less than 20% of the rail volume is handled on-dock, the rest being trucked to intermodal terminals north of the ports.

In the kind of agile port operations commonly envisioned for inland ports (**Error! Reference source not found.**), the marine terminals would load trains on a first-come, first served basis, regardless of destination. It is commonly supposed that this operating strategy would free up scarce marine terminal space by reducing dwell times and eliminate the need to dray containers to rail terminals.

Exhibit 39: Agile Port Operations



As implied in **Error! Reference source not found.**, this concept would require additional handling at the inland port. It is implicitly assumed that this task could be done efficiently at an inland port that was designed for the purpose. This concept does, however, entail additional handling, cost, and delay as the price for improved marine terminal fluidity.

Terminals

Southern California marine terminals become more like Efficient Marine Terminals (EMTs) to the degree that they:

- move as many conventional marine terminal functions (particularly functions which require boxes to be held for a time) to an inland port; and
- maximize uninterrupted movement between ship and train based on improving real time data management capabilities.

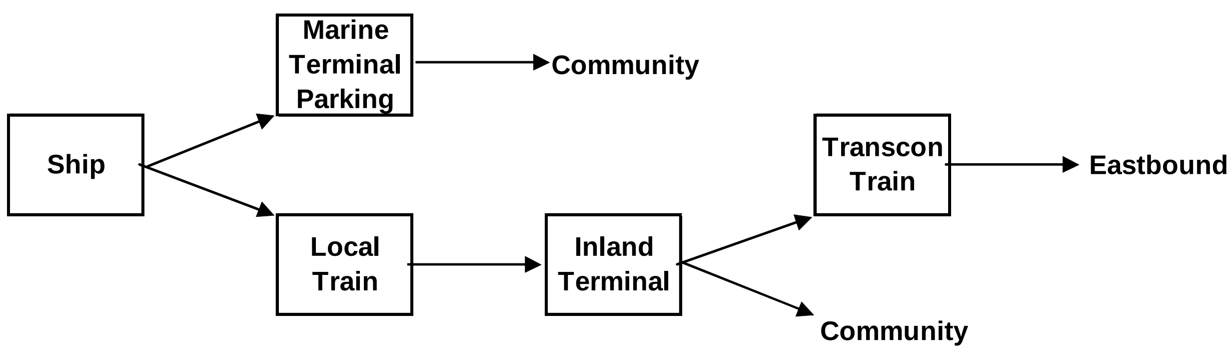
The first objective requires an inland port terminal. Both tasks require systems and management which has been demonstrated and described in the Tacoma EMT project.

Basic Operational Concept

In the most basic operational concept (**Error! Reference source not found.**) imported cargo that is unloaded from the ship would be segregated into two categories at the time of unloading:

- Local cargo would be parked in the marine terminal to await release to customers.
- Inland Empire and long-haul intermodal cargo would be immediately loaded onto rail cars and moved to the inland port. There it would be resorted into Inland Empire cargo (for local drayage) and into various blocks for eastbound movement (for onward rail movement). The local containers would move in bond and wait at the inland location for the various releases necessary prior to dispatch to the community.

Exhibit 40: Basic Agile Port Operational Concept



Conceptually, the simplest operation would be to unload every container from the shuttle train and reload those headed further inland by rail. This practice would permit optimum slot utilization of rail equipment. To the extent that intelligent blocking decisions can be make quickly in the marine terminal it may be possible avoid double handling some of the containers at the inland terminal, thereby permitting more sophisticated management of cost trade offs.

Actual operational complexity is increased because there are multiple origins in the port area. The simple solution and the one that optimizes the use of the marine facilities is to operate trains from each facility to the inland terminal as they become available for movement. That solution, however, does not optimize rail efficiency or make good use of rail track capacity. In practice some scheduling and block combination efficiencies are likely to be available to local management.

Further complexity is added because there are several railroads involved in the movement

- **Switching railroad –** Pacific Harbor Lines serving the port area
- **Passenger railroad –** sharing the railway with the Class I railroads
- **Class I railroads –** Union Pacific and BNSF each have individual commercial and operational considerations.

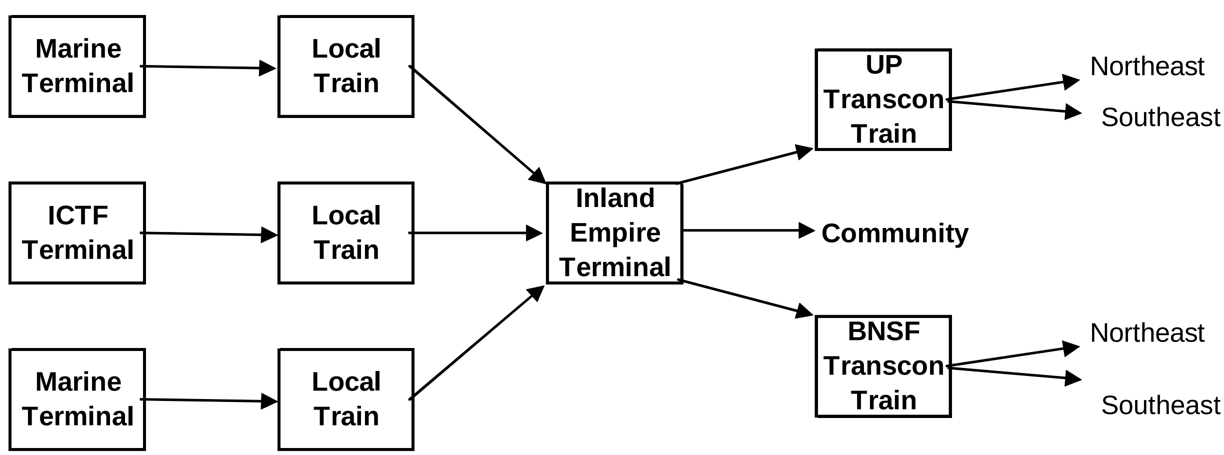
The complexity raises at least two important questions:

- Do the Class I rail carriers have sufficient common interests to agree with a single common user inland port terminal as a practical solution, or are separate terminals required for each rail carrier?
- Is additional capacity required on the lines that serve the Inland Empire and points east to handle the increased rail traffic associated with the improvement in marine terminal productivity and support of Inland Empire business,? Increased passenger demand may also require increased capacity.

Multiple Marine Terminal Scenario

Exhibit 41 illustrates the situation in which multiple marine and near-dock ICTFs generate local trains to a single inland terminal in the Inland Empire area. The main advantages of this option is that it only requires one common user facility and maximizes the traffic eligible for this new service benefiting both ports and both Class I railroads. The disadvantages include the complexity of joint operations and the number of trains required.

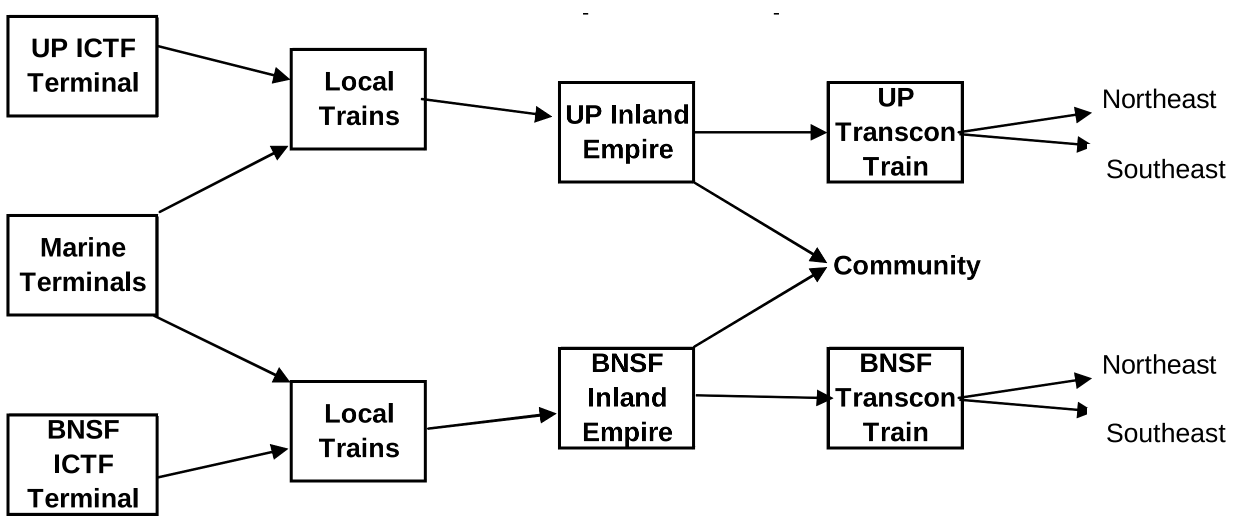
Exhibit 41: Multiple Marine Terminal Scenario



Multiple Inland Ports Scenario

Exhibit 42 illustrates the option in which multiple marine and near dock ICTFs generate local trains to a separate Inland Empire terminal for each Class I rail carrier. The advantages of this option are that it maximizes the traffic eligible for this new service benefiting both ports and both Class I railroads. As each railroad has its own facility it can structure the operation to meet its own needs. In addition this option allows the flexibility for one railroad to pick this concept and the other to pick a different concept. Presumably the railroads would be willing to contribute a bigger share of the up front capital to achieve this kind of flexibility. The disadvantages are the land cost and the need for two separate facilities.

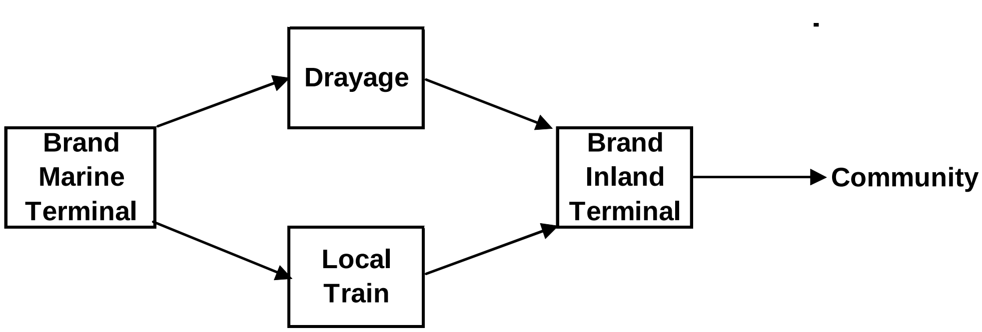
Exhibit 42: Multiple Inland Ports Scenario



Satellite Terminal Scenario

Exhibit 43 illustrates the option in which a particular marine carrier or terminal establishes an inland satellite terminal to relieve port congestion, akin to the Virginia Inland Port or the Metro-Port terminal cited in the case studies. This facility may or may not be rail served. This type of facility could be served by alternate rail technologies, such as RailRunner over less congested rail routes. The disadvantage is that this kind of operation is that absent significant public investment/subsidies it might only be initiated after the marine carrier rerouted all possible discretionary cargo to other ports, and would only serve one carrier or marine terminal rather than all the terminals at both ports.

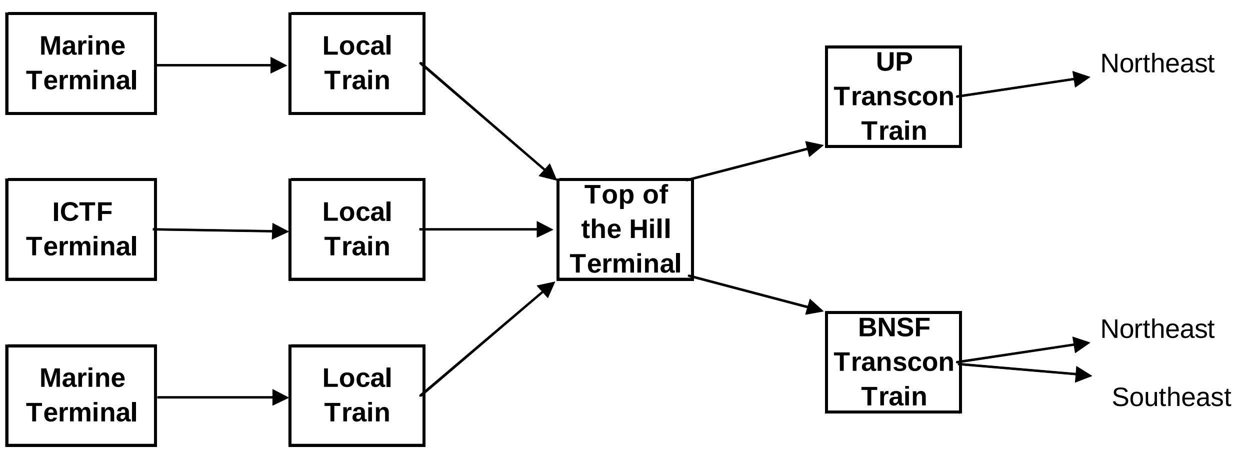
Exhibit 43: Satellite Terminal Scenario



"Top of the Hill" Scenario

Exhibit 44 illustrates a common user facility located at the east end of Cajon Pass, in the vicinity of Victorville. This facility would likely be cheaper to build than an Inland Empire facility and could increase the efficiency of not only the marine facilities but also rail use of the Cajon Pass. This facility could function as an agile port sorting point, but would not be an efficient inland port to serve the Inland Empire. The main disadvantage of the option is that there is no LA Basin traffic congestion improvement and Union Pacific's southeastern traffic does not move over Cajon Pass. This concept is likely to be perceived more favorably by BNSF than UP and might be developed as a BNSF terminal in conjunction with a UP inland empire terminal.

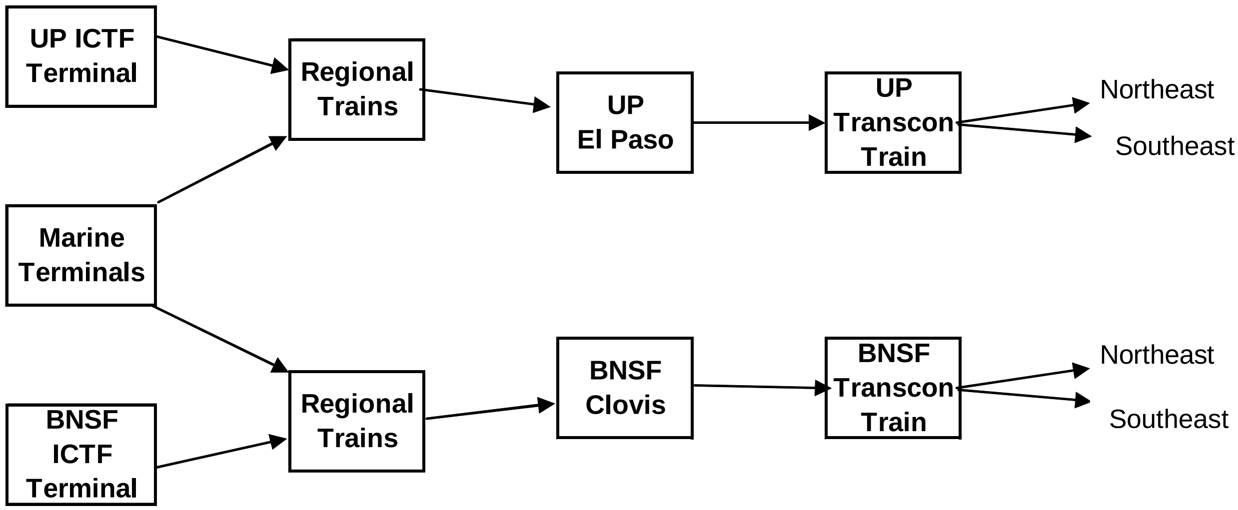
Exhibit 44: "Top of the Hill" Scenario



Far Inland Port Scenario

Exhibit 45 illustrates a scenario in which BNSF and UP move the intermodal "front door" of the port far inland, as far east as Clovis, NM or El Paso, TX. In the case of BNSF this is occurring today to a degree at Clovis, NM, where BNSF traffic to the southeast and northeast splits. BNSF is working to simplify and manage certain aspects of the movement between Clovis and Los Angeles. The matter is much more complex for Union Pacific. The closest UP equivalent point to BNSF's Clovis NM is El Paso TX. In order for this concept to have any validity for UP they would need to take the unlikely step of re-routing northeast-bound trains away from their preferred route through Salt Lake City for the purpose of optimizing marine terminal operations in Los Angeles.

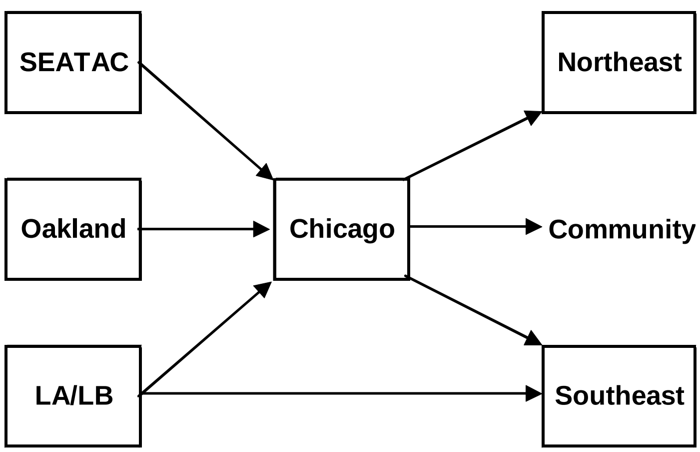
Exhibit 45: Far Inland Port Scenario



West Chicago Hub Scenario

Exhibit 46 illustrates the fact that Chicago is the next major sorting hub along the way east for most of the intermodal cargo leaving not only the LA basin, but all the major west coast ports. It should also be noted that there are far more destinations east of Chicago than west and the population/consumption is both large and dispersed.

Exhibit 46: West Chicago Hub Scenario



To the extent that terminals in Chicago are able to efficiently sort cargo bound for points east of Chicago, that function does not need to be performed in Southern California and LA/LB marine terminals can gain more throughput per acre. To the extent that a Southern California inland terminal can make blocks for locations east of Chicago, then the work required in Chicago is reduced. No analysis has been done to optimize this obvious tradeoff.

Exports

The movement of export, westbound cargo through this system is largely the mirror image of the preceding import discussion except in at least three respects.

- In order to optimize the marine terminal the inland port is expected to hold export cargo and deliver it "just in time" for the ship departure.
- There are a large number of empty containers moving in the system and the inland port may be required to hold these boxes for an extended length of time. It is likely to be the location that serves as the storage buffer for business cycles.
- Empty rail cars move into Southern California from points north, mainly via Cajon Pass. A likely function for the inland port is to be the buffer storage location for these cars and to the extent that inland locations east of Cajon are selected additional car storage is required. With an inland facility this storage does not need to take either potential marine terminal property or space at other congested city rail locations.

Reducing Truck Traffic to Off-dock Terminals

Marine container terminals now do a significant amount of sorting to build trains that can move intact to inland points such as Chicago or Atlanta. The disadvantages of this system are that:

- Inland-bound rail containers that are not put on the first trains often have longer dwell times.
- Where rail volume is insufficient to make up an train or a block to a specific inland destination, those containers will usually be trucked to a near-dock intermodal yard.

At present, less than half of the rail volume is handled on-dock, the rest being trucked to intermodal terminals north of the ports.

A completely successful agile port operation would, in theory, bypass the off-dock rail intermodal terminals (e.g. the ICTF and Hobart) by moving directly from on-dock terminals to a sorting point outside the LA basin. In principle:

- Existing marine container terminals would use information and operational refinements to load import containers to rail as quickly and efficiently as possible.
- Adequate storage and support trackage would be available in the port area to facilitate building and blocking trains as required.
- While the rail corridor itself (e.g. the Alameda Corridor) would not be dedicated, dedicated rail shuttles would connect the ports with one or more inland sorting points.
- At the inland sorting point, additional sorting and blocking of rail cars and containers would yield outbound trains that could proceed intact to inland destinations.

- Westbound, the process would be reversed, with the inland sorting point splitting, blocking, and sorting railcars and containers as needed to create trains to move intact to individual marine terminals.

Inland Empire Potential

Were an agile port system to be implemented there may be advantages to combining it with inland port operations to build scale economies. For example, until the local markets have grown substantially it would be difficult to justify shuttle service to inland ports at Victorville or Barstow. If such points became agile port sorting centers, however, it may be possible to serve local customers with the same trains.

In this respect the concept inland sorting concept could be merged with inland port functions, but the combination may not be practical. If the inland sorting point were located at an inland port serving regional customers, the same trains that took unsorted containers to be resorted into inland trains would also take containers to be delivered locally. In the near term, however, locating enough rail-served land to build a large terminal for both sorting and loading/unloading is not likely in an area already populated with potential customers – witness the difficulty of locating such a terminal in the Inland Empire. A combined facility would be more feasible in a developing market area such as Barstow or Victorville, but it would be longer before the local market developed.

An Agile Port sorting terminal would require both the ability to sort loaded and empty rail cars, and the ability to transfer containers between cars.

- The ability to efficiently sort cars requires a classification yard with many more tracks than the proposed intermodal terminal.
- Sorting containers between cars would best be accomplished with very large wide-span rail-mounted gantry cranes.

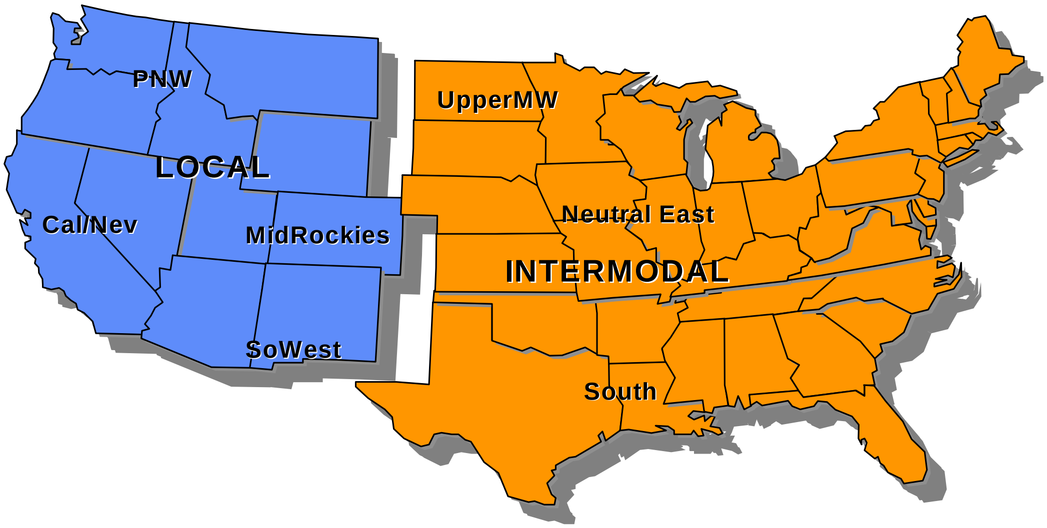
Barstow may be a suitable location for an Agile Port sorting facility, if one were to be built in California. Barstow has lots of room outside of town along the BNSF line, giving BNSF the flexibility to develop a purpose-built Agile Port sorting yard. The railroad would not want to commingle the functions of Agile Port sorting with terminal loading/unloading.

Short-Haul Potential

Agile port concepts would not be conducive to short-haul rail service west of the Rockies. The basic stumbling block of short-haul intermodal service is the cost and delay inherent in intermodal terminal operations that motor carriers avoid.

In a conventional intermodal operation the cost and time penalties of terminal operations must be spread over at least 600–800 miles of economical linehaul operations to be price and time competitive with trucks. Intermodal has very little presence in lanes of less than 750 miles, and almost none under 500 miles. The busiest intermodal lane in between Los Angeles and Chicago, about 2000 miles. From Southern California, intermodal is typically competitive for traffic moving to or from points East of the Rockies (Exhibit 47

Exhibit 47: Local versus Intermodal Markets



With additional terminal handling steps, agile port operations would face even greater handicaps in trying to compete in short-haul markets. As Exhibit 48 and Exhibit 49 suggest, the major California, Nevada, and Arizona markets are less than 500 miles from Los Angeles, and there are only a few smaller markets in the 500- to 1,000-mile range.

Exhibit 48: Rail Market Geography

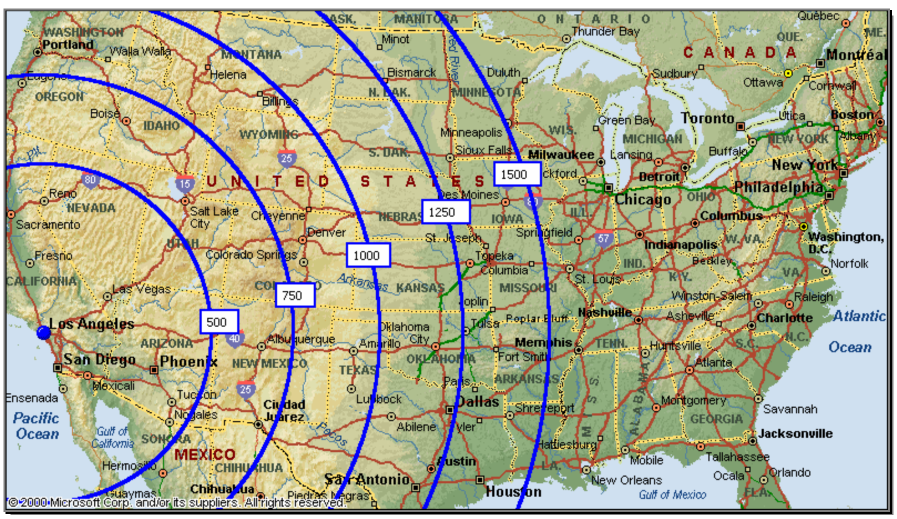
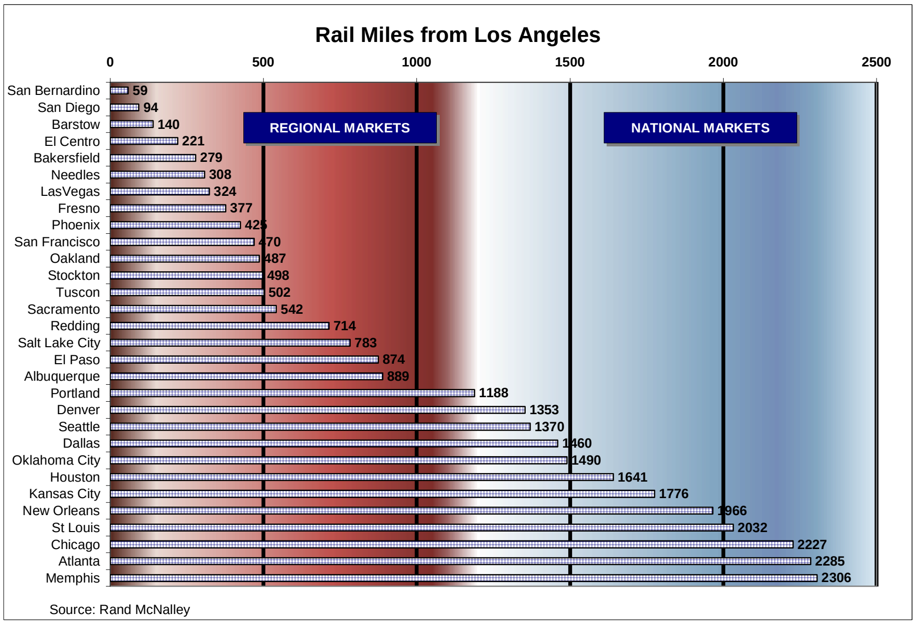


Exhibit 49: Distances to Rail Markets



An agile port system would not be effective in serving such markets and does not have the potential to take trucks to those markets off the highway.

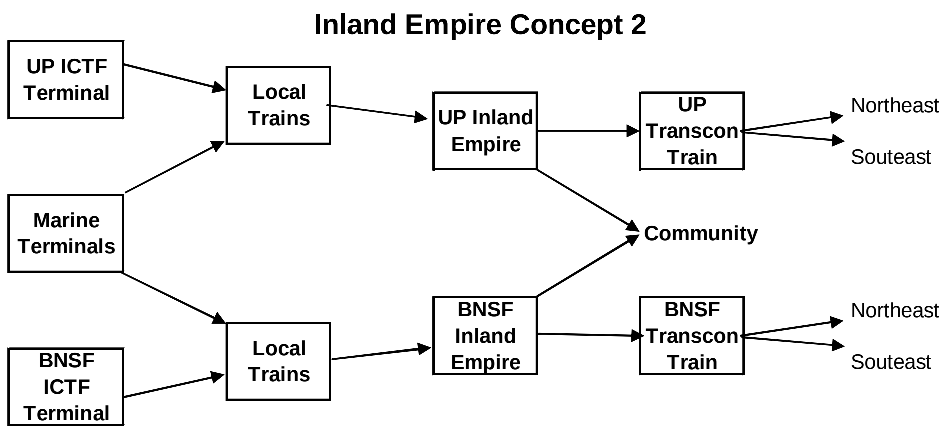
Complexity

Implicit in **Error! Reference source not found.** are some key simplifying assumptions: one marine terminal, one railroad, and one inland sorting point. Actual operational complexity is increased because there are multiple origins in the port area – twelve marine terminals with several on-dock facilities – and multiple railroads involved in the movement.

- **Switching railroad –** Pacific Harbor Lines serving the port area
- **Class I railroads –** Union Pacific and BNSF each have individual commercial and operational considerations.

As Exhibit 50 suggests, under these circumstances the simple agile port concept quickly becomes a complex network. Moreover, as the port container flows are split into multiple segments the economies of scale can evaporate.

Exhibit 50: Complex Agile Port Network



Agile Port vs. EMT

The agile port concept is closely related to the "efficient marine terminal" (EMT) concept, which also uses information to speed the flow of containers and reduce dwell time. The two concepts are complementary, but EMT operations can reduce the need for agile port functions. The key factor in the ability to reduce dwell time in an EMT is vessel storage. If an arriving vessel has been stowed in the correct order for quick transfer to rail, the need for sorting anywhere is greatly reduced. Ideally, rail-bonded containers should come off the vessel grouped by inland destination, enabling the on-dock terminal to create entire trains for specific inland points without time-consuming sorting at the port. Such trains could bypass any inland sorting point.

Cooperation between ocean carriers and railroads has led to pioneering EMT operations at San Pedro Bay. BNSF reports, for example, that OOCL vessels now arrive pre-blocked for rail transfer and that the resulting trains can move intact to Midwest points. Such strategies obviate the need for agile port operations.

Both railroads serving the ports are attempting to run longer trains with greater utilization and less intermediate handling – in direct contrast to the agile port concepts. BNSF, in particular, has been increasingly insistent that trains from the port reach the maximum desired length and have an absolute minimum of empty container slots. Besides making for more efficient line hauls, this strategy makes maximum use of scarce track and line capacity. BNSF's objective is to load eastbound trains on-dock or off-dock so that they require no additional handling before Clovis, NM. UP's parallel strategy is to avoid handling before El Paso, TX.

Implementation Barriers

Conventional on-dock operations, future shuttle trains, and agile port operations all come up against the same barrier: port rail infrastructure. At present, containers bound for lower-volume inland destinations are usually drayed to off-dock rail terminals because there is no way for PHL or the marine terminals to build efficiently sized trains for such traffic. The on-dock rail facilities may generate solid trains of containers for Chicago, but containers for Kansas City might be drayed. To build a Kansas City train, PHL would have to combine cars from multiple on-dock terminals. The port rail infrastructure, however, lacks the capacity and flexibility to do so efficiently.

As noted in the Inland Port Study reports, rail shuttle trains to the Inland Empire – or rail shuttle trains to an agile port terminal – face the same obstacles. Contacts with PHL suggest that neither Port's rail system is set up to combine cars from multiple terminals. Proposed rail capacity improvements would add some flexibility. Delays in implementing those improvements, however, mean that the new capacity will be filled almost immediately with growing long-haul rail traffic.

Conversely, the same port-area rail improvements required to facilitate agile port or rail shuttle operations would also facilitate expanded EMT operations. If PHL had the ability to combine small blocks of BNSF or UP cars from multiple terminals efficiently, those cars could then be sorted as needed at existing inland terminals before their final destination.

Agile Port Findings

Agile port operations appear to have limited applicability to Southern California's issues. The agile port approach is not necessarily an easier solution to off-dock drayage than conventional intermodal strategies. Agile port operations will not help penetrate short-haul intermodal markets. The encouraging observation, however, is that Efficient Marine Terminal operations are providing some of the same benefits and reducing the need to implement agile port concepts.

Southern California's ports are a complex system of terminals and rail carriers, making detailed agile port operations difficult to imagine or implement. The port-area rail system at Los Angeles and Long Beach is heavily burdened with existing and anticipated intermodal traffic already, and planned improvements have been delayed. Agile port operations would require the same capacity and flexibility improvements needed to handle port growth in a conventional rail system. Agile port operations would perhaps be best suited to new or reconstructed marine terminals whose rail infrastructure could be designed to suit.

IX. Additional Inland Port Functions

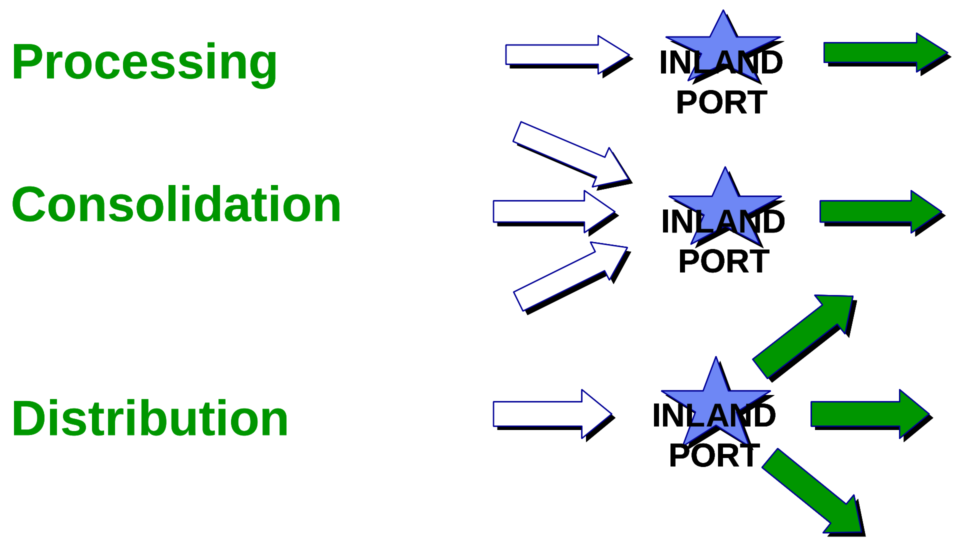
Overview

University of Texas studies have defined an inland port as a facility "located away from traditional coastal borders with the vision to facilitate and process international trade through strategic investments in multi-modal transportation assets and by promoting value-added services as goods move through the supply chain." As the case studies demonstrate, inland ports can take many forms and offer a varying range of services. This chapter describes functions that have been incorporated in inland ports and related projects.

Value-Added Functions

For an inland port or logistics park to prosper its facilities and tenants must be able to create value for their customers. To create value, either the facility itself or the tenants must ordinarily do one or more of three basic things shown in Exhibit 51.

Exhibit 51: Value-added Basics



Process the goods to increase their value. "Processing" in the broadest sense could include refining, sorting, packaging, testing, assembling, or any other operation that increases the value of the goods to the customer. Classic examples include milling grain into flour or packaging bulk goods for retail sale. Completion of regulatory requirements such as Customs clearance or agricultural inspection can, in some sense, be regarded as increasing the value of the goods by making them legal to sell, but the importers, carriers, and customers do not willingly pay for those types of "processing."

Consolidation. Consolidation is a second means of adding value. Consolidation can include:

- consolidation of multiple small shipments into a single, more efficient large shipment; or
- consolidation of multiple items into a single delivered product.

The first type of consolidation is typical of LTL trucking, air freight forwarding, export containers, freight stations, or outbound truck/rail transloading. The second type, also called "kitting" is typical of computer retailers (e.g. Dell) or retail packages of seasonal promotions (e.g. end-of-aisle Christmas card displays).

Distribution. Distribution in its simplest sense is the act of splitting large shipments into smaller shipments for local delivery. This simple sort of distribution is also called "deconsolidation". Typical examples include:

- wholesale-to-retail distribution centers (DCs);
- inbound rail/truck transloading for local delivery;
- inbound air freight forwarding;
- inbound LTL trucking; and
- import container freight stations.

Combinations. Most facilities host a combination of these basic value-added steps. For example:

- LTL truck terminals receive inbound consolidated loads from other hubs, deconsolidate them, resort them, and send them out as consolidated loads to be distributed along a local route. The process is reversed for outbound shipments.
- Retail chain distribution centers receive truckload lots from multiple vendors and create consolidated loads for individual stores. They also receive returned merchandise and shipping containers from individual stores and consolidate them for return to vendors.
- Import distribution centers receive consolidated container loads of merchandise. They sort the merchandise into new consolidated loads for regional DCs or stores, and often "process" imports by packaging and pricing.
- Air freight forwarders may function like LTL truck terminals but may also offer export crating or Customs brokerage services.

Adding value at inland ports. With these basic types of value creation as building blocks, it is possible to ask how different types of inland ports propose to add value. Most inland ports combine modal transfer (including consolidation/deconsolidation of trainload or planeloads) with providing facilities for processing/consolidation/deconsolidation by tenants. The modal transfer and consolidation/deconsolidation of shipments is analogous to a seaport handling vessels with multiple shipments, hence the "inland port" nomenclature. The business of providing land or facilities for processing/consolidation/deconsolidation by tenants is basically the same as industrial park development, with an emphasis on logistics rather than manufacturing.

The balance of this chapter considers a number of different possible ways in which value could be created in an inland port.

Cargo Handling Functions

Cargo-handling functions for containerized freight include consolidation, deconsolidation, and transloading. Historically, these functions were provided at a Container Freight Station (CFS) as part of a marine container terminal. These facilities were operated by longshore labor to serve less-than-containerload customers and as a transition between traditional break-bulk cargo handling and containerization. Container Freight Stations were relocated off-terminal for the same reasons as other ancillary functions: cost and capacity.

Consolidation, deconsolidation, and transloading facilities are now almost exclusively located off-terminal. There are several generic reasons why international cargo would pass through one of these facilities instead of moving as a single container shipment from door to door.

- **Less-than-containerload shipments.** Multiple small shipments with common origin and destination ports can be combined as a single containerload. This type of service is increasingly provided by NVOCCs, ocean freight forwarders, or 3PLs rather than by the container shipping line itself.

- **Specialized handling**. Some commodities require specialized handling that is not available at the point of origin. One example is cotton, which has typically been mechanically compressed at near-port facilities before being loaded into containers for export. Some cargo handling facilities have specialized in the complex blocking and bracing requirements for shipping machinery. Others are equipped to handle "super bags" of plastic pellets.

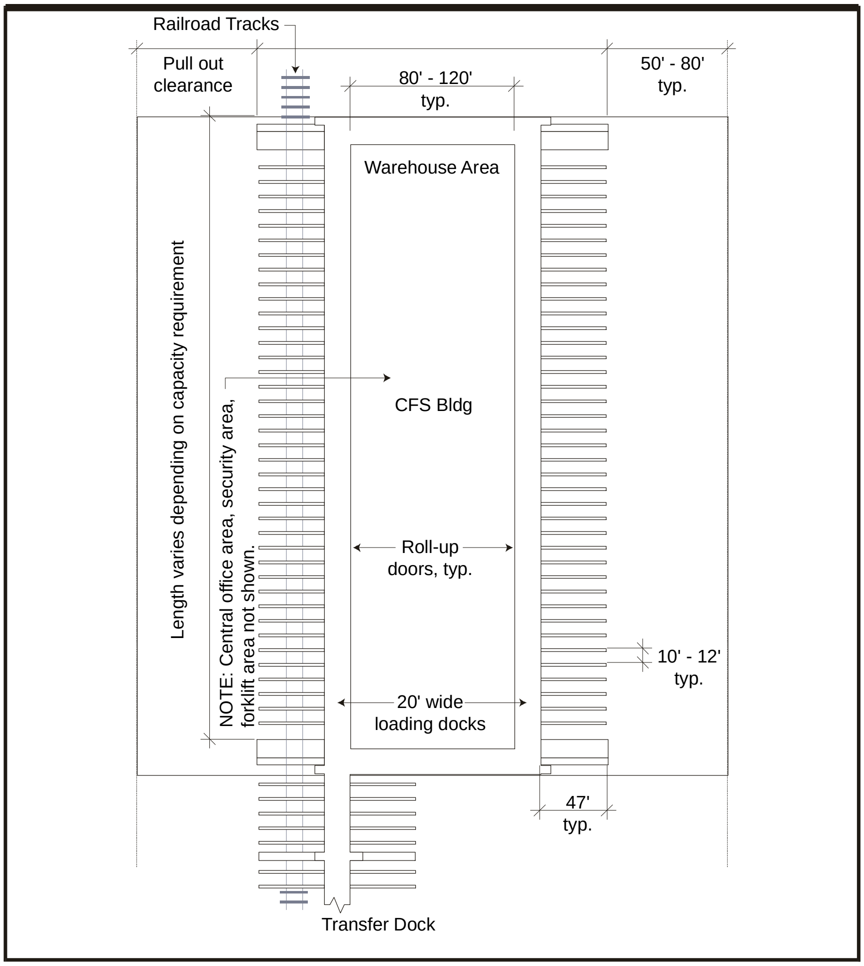
- **Refrigerated commodities.** Refrigerated ("reefer") containers are 10 – 20 times more expensive than dry containers, have significant maintenance requirements, and move empty back to origin more often than dry containers. Some ocean carriers avoid sending refrigerated containers inland, preferring to transload the cargo to domestic refrigerated equipment.

In practice, consolidation, deconsolidation, and transloading are so co-mingled with each other and with other handling functions as to make clear distinctions impossible. Current logistics practices integrate deconsolidation, transloading, sorting, and packaging functions in the same facilities as part of a carefully managed distribution network. The location and function of each node in the network is a company-by-company decision and tends to evolve over time to accommodate shifting company needs.

Transloading

"Transloading" is the practice of transferring cargo between international and domestic transportation equipment, typically to take advantage of the large cubic capacity of U.S. trucks. Until marine containers began moving inland efficiently by rail and truck, transloading was the norm. As a practice, transloading dwindled in favor of full-container shipments until the 1990s. A typical transloading facility configuration is shown in Exhibit 52. The floor space typically ranges from 40,000 to 200,000 square feet. There are several other varieties of cargo-handling services, and few of the operators have single-purpose facilities.

Exhibit 52: Typical Transloading Facility



International transloading facilities are the most numerous in Southern California due to the dominance of import trade. The reasons for such activities can include the following.

- For light and bulky articles, the goods can be transferred from an international 40-foot container to a 53-foot over-the-road domestic trailer or domestic container.

- The portion of the cargo for Los Angeles and west coast consumption can be unloaded, and locally produced goods can be mixed with those arriving from the Asia and/or Central and South America to create an eastbound domestic load.

- Final destinations, quantities and mixes of goods can be changed from the original intent and/or customized for a specific destination based on fresher, better market knowledge.

- Unsold goods can be held at the first port of arrival until their ultimate destination is determined.

Originally such facilities were located close to the ports in the Carson and Compton areas. However, today they are increasingly being located in the Inland Empire or even further into Southern California to mix import cargoes with Southern California domestic distribution.

Commercial Customs Functions

Customs Inspections. As has been widely documented only a small percentage of all import containers are opened or otherwise inspected by Customs and Border Protection (CBP). Containers are inspected for contraband (e.g. drugs), undeclared or mis-declared cargo (e.g. commodities banned, governed by quotas, or subject to higher duties than the declared contents), or stowaways. CBP relies primarily on the Automated Targeting System (ATS), which identifies shipments to be physically inspected based on origin, destination, commodity, shipper/consignee, and other factors. Containers declared to contain handicrafts from Columbia, for example, are much more likely targeted than auto parts from Japan.

Containerized cargo may be inspected via remote sensors, x-rays, cursory examination, or complete unloading for an item-by-item examination. Cargo is cleared for delivery or transport inland only after any necessary CBP inspections are complete.

In-bond transport. Imported goods must be “cleared” by Customs before the consignee can take possession. To be “cleared”, the consignee or his agent (a Customs Broker) must complete electronic or paper forms, pay any applicable duties, and make the cargo available for inspection if required. If the only issue involving the cargo is payment of applicable duties, cargo owners or their agents (e.g. a Customs House Broker) may post a bond and transport the container “in bond” to an inland location pending Customs clearance. A large portion of the minilandbridge container traffic moves in bond, with Customs clearance completed before the container is released from the inland rail terminal. In this case, the cargo “enters” the U.S. in the inland Customs District where it was released. The “processing” function is minimal, and is frequently completed without CBP personnel on site.

Customs bonded warehouse. Once “bonded” a shipment can also be moved to a Customs Bonded Warehouse to await final clearance.

Security Functions

Security-related functions *cannot* be relocated inland from the seaports. Containers suspected of containing contraband, weapons, or stowaways cannot be transported inland for any reason without unacceptable security and safety risks. Thus, the increased port activity and investment related to cargo security will not directly benefit inland ports. There may, however, be an indirect benefit if security functions and capital investments squeeze out other functions that could be performed inland.

Foreign Trade Zones

A Foreign Trade Zone (FTZ), also known as a Free Trade Zone, is a federally sanctioned site where foreign and domestic goods are considered to be outside of the U.S. customs territory. Foreign Trade Zones operate at the intersection of regulatory and commercial interests. Cargo received into a Free Trade Zone has not technically entered the U.S. in a regulatory sense and is therefore not yet subject to duties, quotas, or other regulations. Importers can leave inventory in an FTZ (at some cost) until it is advantageous to actually receive it. Under carefully prescribed conditions, cargo can be packaged, combined or otherwise processed in an FTZ and re-exported without U.S. duties or limits. Merchandise can be brought into an FTZ to be stored, exhibited, repackaged, assembled, or used for manufacturing free of customs duty, quota and other import restrictions until the decision is made to enter the goods into the U.S. market. Foreign Trade Zones are used for a variety of purposes and commodities within complex global supply chains. For example:

- **Cash Flow**. Customs duties are paid only when imported merchandise is shipped into the U.S. Customs territory. Merchandise may be held in inventory in the FTZ without Customs duty payment. Merchandise Processing Fees are owed only when and if merchandise is transferred out of the FYTZ.

- **Exports**. No customs duties are paid on merchandise exported from a FTZ.

- **Spare Parts**. To service many products, spare parts must be on hand in the United States for prompt shipment. Spare parts may be held in the FTZ without Customs duty payment.

- **Quota Management.** Merchandise may be held in a FTZ even if it is subject to U.S. quota restriction. When the quota opens, the merchandise may be immediately shipped into U.S. Customs territory.

- **Quality Control.** The FTZ may be used for quality control inspections to insure that only merchandise that meets specifications is imported and duty paid. All other materials may be repaired, returned to the foreign vendor, or destroyed under Customs supervision.

- **Inventory Control.** The FTZ is subject to U.S. Customs Service supervision and security requirements. Operations in a FTZ require careful accounting of receipt, processing, and shipment of merchandise. Firms have found that the increased accountability cuts down on inaccurate inventory, receiving and shipping concerns, and waste and scrap. Merchandise consumed in processing in a FTZ generally is not subject to U.S. Customs duties.

- **Exhibition.** Merchandise may be held for exhibition without Customs duty payment.

- **Reduced Insurance Costs**. The insurable value of merchandise held in a FTZ need not include the Customs duty payable on the merchandise. Some users of FTZs have negotiated a reduction in cargo insurance rates because imported merchandise is shipped directly to a FTZ without the opportunity for potential pilferage at deepwater ports or major international airports.

The advantages of a Foreign Trade Zone are, of course, highly specific to the import flows and company circumstances involved. Most of all, and FTZ offers flexibility and potential savings to creative shippers and receivers who can take advantage of these opportunities.

Southern California has several FTZs, including:

- FTZ 50 – Long Beach
- FTZ 202 – Los Angeles

- FTZ 205 – Port Hueneme
- FTZ 236 – Palm Springs
- FTZ 243 – Victorville
- FTZ 244 – Riverside County
- FTZ 257 – Imperial County

The hierarchy of FTZs is complex. These regional FTZs are managed and authorized by the federal government. Each FTZ can have many Sub Zones, of which there are 439 in the U.S. also administered by the federal government. Each Sub Zone can have many operators, and each operator can have many locations. For instance, Alps Manufacturing is an FTZ operator at a location in Garden Grove and at another in Compton. Operators frequently change, and the locations each operator sets up as an FTZ change depending on need. There is a constant stream of applications to set up new Sub Zones and another stream of applications to become FTZ operators. Most of the facilities discussed it the case studies offer Foreign Trade Zones.

Container Depots

Containers are stored, maintained, and interchanged at two principal locations: the marine terminal container yards (CYs), and the off-dock container depots. The marine terminal CYs are part of the port terminal complex and operated by the marine terminal operators on behalf of the ocean carriers. Container depots are usually owned and operated by separate, specialized firms.

Existing off-dock container depots already handle large numbers of empty containers. Many empty containers are already stored off-dock in container depots operated by Container-Care, Global Intermodal Services, Shippers' Transport, FastLane, and other firms. These depots handle both carrier-owned containers and leasing company containers, and have the capability of accepting containers from one trucker and releasing them to another.

Container depots have three major functions: storing containers that are currently surplus, acting as a supply point for empty containers, and servicing/repairing containers under contract.

Refrigerated container depots service, maintain, and store refrigerated ("reefer") containers. Reefer containers are heavily insulated ocean-going boxes with refrigeration equipment. The power supply for refrigeration is either a portable diesel-powered generator ("genset") that can travel with the container or electrical power from a fixed outlet in a container yard. Reefer containers are used for produce, meat, dairy products, frozen foods, and other import or export commodities requiring refrigeration or temperature control. These commodities are sensitive, so the containers must be clean, in good operating condition, and often chilled before loading. Collectively, the activities required before loading are called "pre-tripping." After the container is loaded, the container may be returned to the depot to adjust the operation, make repairs, add controlled-atmosphere gasses (often nitrogen), or maintain the generator set that supplies mobile electrical power. In the past, all these functions were typically performed in the marine terminal. Off-terminal reefer container depots emerged to perform these functions more efficiently, conserve terminal space, and give truckers more flexible access to reefer services.

Reefer depots also typically store containers for longer periods (e.g. more than a week and up to several months) between peak season demands, or while awaiting repair or disposition. Longer-term storage does not have the same need for port proximity, and more closely resembles the storage of dry containers without routine servicing or frequent truck trips. The bulk of the longer-term storage functions could be relocated inland.

There are some potential advantages to locating a container depot inland.

- Container depots need inexpensive space away from sensitive residential and commercial development, where inland points have an advantage.

- The availability of a container depot could be a step in encouraging reuse of empty containers.

- Were the container depot to become a source of "pre-tripped" refrigerated containers as well as dry vans, truckers could reduce the need to dray pre-tripped reefers from other sources.

Depot capacity is a function of size (acreage) and stacking height.

- Depot operators have reported difficulty in expanding at existing locations or securing new sites in the same general area. The alternative to site expansion is higher stacking.

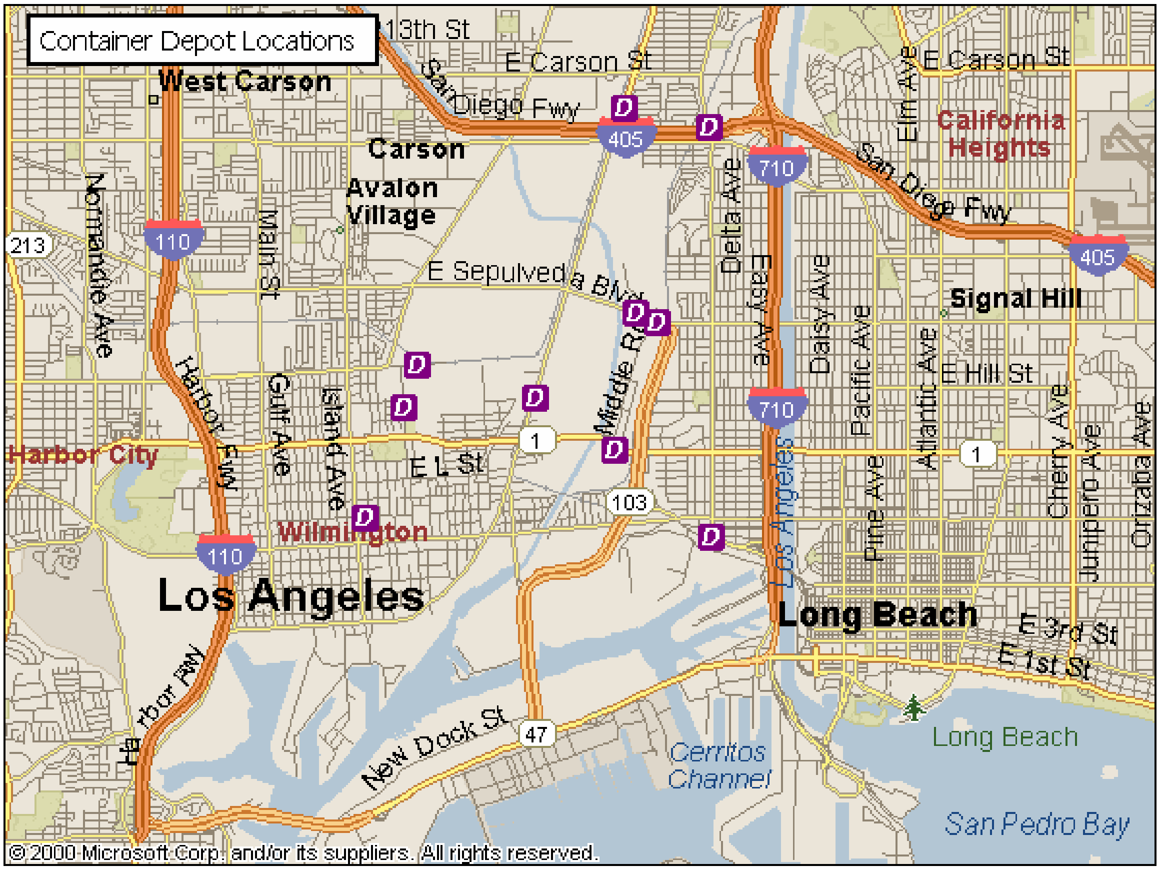
- Where permitted, North American depot operators prefer to stack containers six-high (seven-high stacking is used overseas), although the average is lower. A stack of six containers is 48-57 feet high, the rough equivalent of a six-story building. Many communities object to such large container stacks, and there has been community pressure in Southern California and elsewhere to limit the height of container stacks.

The aerial photo in Exhibit 53 shows a container depot on East Opp Street in a mixed commercial/industrial area of Wilmington. The prominence of the depot is obvious (note the shadows of the container stacks), as is the tightly constrained site. The expansion ability of this heavily used depot, like other depots in similar circumstances, depends on the willingness of local planning authorities to allow such land uses on adjacent parcels.

Exhibit 53: Container Depot

Exhibit 54 shows the approximate locations of container depots in the port area (actual locations may have changed since the data were gathered). Most are clustered in the area north of the ports bounded by I-110, I-405, and I-710. This area has historically been home to numerous light and heavy industrial uses.

Exhibit 54: Container Depot Locations



The ability of container depots to offer adequate capacity near the ports is critical to any increase in depot-direct off-hiring or any long-term potential development of off-dock empty return depots. As noted in the section that follows, the economics of depot-direct off-hiring are not so compelling as to justify significant detours by draymen, and the longer the detour the more the drayman must be compensated. In addition, the VMT and emissions savings associated with depot strategies depend on the detour length: the farther the drayman must go out of his way, the less the VMT and emissions savings.

Most existing depot capacity is about 4 miles from the ports, and 1-2 miles from the nearest I710 exit. This defines a fairly narrow area in which to locate more depot capacity to accommodate cargo growth and changes in empty container logistics. Communities in this area, like communities elsewhere, are becoming increasingly sensitive to industrial development and truck traffic. Container depots have become the focal points of public land-use planning and zoning controversies in San Pedro, Oakland, Chicago, and elsewhere.

Heavy Commodities and "Overweights"

A major reason for transloading or consolidation is the opportunity to load an international container with more net weight than can be legally handled over the highway. Since ocean rates are typically based on the containerload rather than the cargo weight, customers have an incentive to maximize the amount of heavy cargo they can pack into each container.

As Exhibit 55 shows, the state highway gross weight limit of 80,000 lbs. limits the load capacity of a typical 40' ISO container to around 47,300 lbs. An intermodal rail option would allow the container to be loaded to its full maximum load of 59,000 lbs., a 25% advantage. Exhibit 55 also shows that there is no real advantage for 20' containers since the highway limit permits loading them to their full capacity.

Exhibit 55: Highway and Rail Weight Limits

Category	40' ISO Box Typical	20' ISO Box Typical
Tractor Weight	18,000	18,000
Chassis Weight	6,500	6,600
Container Weight	8,200	4,890
Total Tare	**32,700**	**29,490**
Highway Max	80,000	80,000
Highway Load Max	**47,300**	**50,510**
Container Load Limit	**59,000**	**48,020**
Rail Weight Advantage	11,700	-
% Rail Advantage	**25%**	**0%**

Exhibit 56 shows the resulting 5:4 ratio for highway versus rail shipment and the implied consolidation opportunity.

Exhibit 56: Consolidation Ratios

40' ISO Container	By Highway	By Rail
Load Limit	47,300	59,000
Containers to Ship 236,000 lbs	5	4
Shipment capacity	236,500	236,000

A concrete, real-world example of the potential economic leverage of overweight commodities and consolidation can be found in wine or other beverage exports. Information from one shipper indicates that existing containers can be loaded to an average of about 45,000 lbs. to be consistently within highway weight limit due to variations in tractor and chassis weight. If the customer could load the same container to 55,000 lbs. in an intermodal service there would be substantial savings in both drayage and ocean carriage.

One such shipper currently exports about 560 annual loads through Oakland from a single Northern California location. Round trip port drayage is about $625 per container for an annual cost of $350,000. At 55,000 lbs. each the shipper would move only 457 containers for the same export volume. If the shipper paid a total intermodal rate equal to the drayage cost ($625), the company would save $64,205 annually, some of which would have to cover the cost of consolidation near one of the intermodal terminals. There would also be savings on the ocean freight. Each container load costs roughly $4,000 to ship to its European destination. The 560 containers shipped at present cost about $2.24 million. Shipping 457 loads at 55,000 lbs. each instead would save the company $410,909 annually.

Regulatory agencies can designate highway and surface street routes with higher weight capacities, so-called "overweight" routes. In the vicinity of the some ports, a network of such routes connects transloading and consolidation facilities to the marine terminals allowing legal movement of "overweight" containers.

Options for inland ports include developing such routes or developing suitable transloading facilities adjacent to the intermodal terminals. As the role of international trade in the Southern Arizona grows, it will become increasingly advantageous to handle overweight containers in a safe and controlled manner within the region. Creating overweight corridors linking other areas to an inland port would extend this capability to more of the region.

Empty Container Supply

Most export loads require draying in an empty container, and each import load generates an empty to be returned to a port. If the need for empty movements can be reduced or rationalized, total cost can be reduced.

There are at least three possibilities for rationalizing empty container flows.

- **Using rail shuttle service to position empties at inland port depots.** Ocean carriers may be able to use their negotiating position with the railroads to obtain favorable rates for moving empties to inland supply points.

- **Reusing import empties for export loads.** As the import traffic to Southern California distribution centers grows, an increasing number of international empties will be generated in the SCAG Region. Some truckers hold on to a handful of containers for potential reuse, but the effort is piecemeal and impact is small. If these empties could be turned in to an inland depot and accumulated in significant numbers, truckers would reduce the need for empty returns and gain a local source of supply.

Each of these possibilities is an opportunity to reduce the total costs of moving containers by rail between an inland port and the seaports, and an opportunity to improve regional container supply.

The latter consideration is particularly important for some potential businesses. Empty container supply is a key factor in encouraging "urban ore" export businesses such as waste paper, recycled plastic, and scrap metal. In the course of interviews with businesses of these kinds in other studies, it became apparent to the Tioga team that the ready availability of suitable ISO boxes is a major consideration in locating these businesses and in turning a local supply of waste products into containerized exports. To the extent that depots or other arrangements in Southern California can insure a supply of empty containers, such businesses would be more inclined to locate there.

LTL Terminals

Terminals for less-than-truckload (LTL) motor carriers are sometimes considered as candidates for inclusion in an inland port/logistics park development. LTL terminal location choices reflect market demand, operational needs, and labor rules.

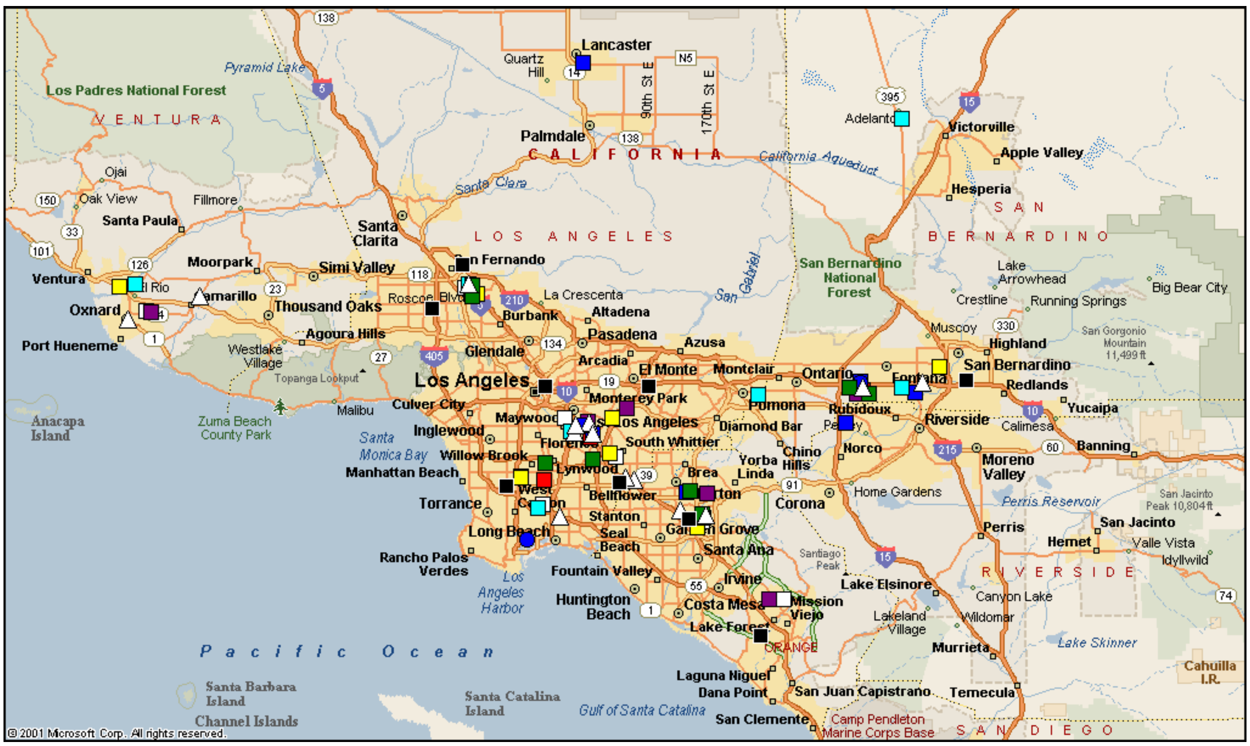
Market demand. LTL terminals exhibit scale economies. The decision on if and where to locate a terminal is a function of both total demand and density. In the absence of natural barriers, LTL motor carriers typically operate pickup and delivery service over a 20–50 mile radius from a terminal. A locality with sufficient potential business in such a service area could be a candidate for a terminal. If the potential demand is denser, the target market may be served by a larger terminal or multiple small terminals. If the available freight is not enough to justify a terminal the region might be served through an agent relationship with a local operator.

Operations Requirements. Within a given market region, LTL terminal location choices are driven by:

- Availability of low-cost land
- Freeway access and route configuration.
- Driving distance and time to serve the market

While it might initially seem that LTL terminals should be centrally located in the urban area, , central urban locations are less likely to have large tracts of available low-cost land or easy access to interstate highways. Exhibit 57 shows reported LTL terminals in the SCAG region.

Exhibit 57: LTL Terminal Locations



As Exhibit 57 shows, the LTL terminals tend to concentrate near major freeways in a handful of regional market areas.

- Central Los Angeles
- Long Beach/Gateway Cities
- Orange County
- The Inland Empire

- Ventura County
- San Fernando Valley

Regional LTL terminals reported in directories and websites are listed in Exhibit 58. Note that this list is probably not completely accurate, as terminal closures and relations can happen quickly.

Exhibit 58: Reported LTL Terminals

Company Name	Address	City	State	ZIP
ABF	8001 Telegraph Road	Pico Rivera	CA	90660
ABF	405 E Alondra Blvd	Compton	CA	90220
ABF	12200 Montague St.	Pacoima	CA	91331
ABF	1601 North Batavia	Orange	CA	92867
ABF	10744 Almond Ave.	Fontana	CA	92337
ConWay	1955 E Washington Blvd	Los Angeles	CA	90023
ConWay	12903 Lakeland Road	Santa Fe Springs	CA	90670
ConWay	20805 S. Fordyce Avenue	Long Beach	CA	90812
ConWay	12466 Montague Street	Pacoima	CA	91331
ConWay	2102 North Batavia Avenue	Orange	CA	92867
ConWay	20697 Prism Place	Lake Forest	CA	92632
ConWay	2900 Camino Del Sol	Oxnard	CA	93030
Di Salvo Trucking	6121 Randolph St.	City of Commerce	CA	90040
FedEx Freight	853 S Maple	Montebello	CA	90640
FedEx Freight	3200 Workman Mill Rd	Whittier	CA	90061
FedEx Freight	15200 S Main St	Gardena	CA	90248
FedEx Freight	11911 Branford St	Sun Valley	CA	91352
FedEx Freight	1379 N. Miller St	Anaheim	CA	92806
FedEx Freight	56 Fairbanks Rd	Irvine	CA	92618
FedEx Freight	11153 Mulberry Ave	Fontana	CA	92337
FedEx Freight	3501 Sturgis Rd	Oxnard	CA	93030
GI Trucking	14727 Alondra Blvd.	La Mirada	CA	90638
GI Trucking	1849 W. Valley Blvd.	Colton	CA	92324
GI Trucking	1555 Flynn Rd.	Camarillo	CA	93012
GI Trucking	45 W. 5th St.	Calexico	CA	92231
Motor Cargo	7754 Paramount Blvd.	Pico Riviera	CA	90660
Motor Cargo	1260 Saviers Rd.	Oxnard	CA	93033
Old Dominion Freight Line	1225 Washington Blvd.	Montebello	CA	90640
Overnite	2747 Vail Ave	Commerce	CA	90040
Overnite	7754 Paramount Blvd	Pico Rivera	CA	90660
Overnite	650 S Acacia Ave	Fullerton	CA	92831
Overnite	12455 Harvest Dr	Mira Loma	CA	91752
Overnite	9880 Banana Ave	Fontana	CA	92335
Overnite	2650 S Willow Ave	Bloomington	CA	92316
Overnite	43857 Sierra Highway	Lancaster	CA	93534
Roadway	4700 South Eastern Avenue	Los Angeles	CA	90040
Roadway	21300 Wilmington Ave.	Carson	CA	90810
Roadway	12200 Montague St.	Pacoima	CA	91331
Roadway	640 West Taft	Orange	CA	92865
Roadway	1130 S. Reservoir St.	Pomona	CA	91766
Roadway	18298 Slover Ave.	Bloomington	CA	92316
Roadway	237 Lambert St.	Oxnard	CA	93030
Roadway	17401 Adelanto Rd.	Adelanto	CA	92301
Roadway	1392 Engineer St.	Vista	CA	92083
Silver Eagle Freight	3363 Linden Ave.	Long Beach	CA	90807
Swift	221 E. D St	Wilmington	CA	90744
Swift	9951 Banana Ave	Fontana	CA	92335
UPS	1800 N Main St	Los Angeles	CA	90031
UPS	13233 Moore St	Cerritos	CA	90703
UPS	1100 Baldwin Park Blvd	Baldwin Park	CA	91706
UPS	17111 S Western	Gardena	CA	90247
UPS	1331 S Vernon St	Anaheim	CA	92085
UPS	16000 Arminta St	Van Nuys	CA	91406
UPS	12745 Arroyo	Sylmar	CA	91342
UPS	22 Brookline Dr	Aliso Viejo	CA	92656
UPS	1457 E Victoria Ave	San Bernardino	CA	92408
USF Bestway	575 East Weber Ave	Compton	CA	90222
USF Bestway	12100 Montague St	Pacoima	CA	91331
USF Bestway	2200 North Batavia St	Orange	CA	92865
USF Bestway	10661 Etiwanda Ave	Fontana	CA	92337
USF Reddaway	11937 Regentview Ave	Downey	CA	90241
USF Reddaway	9120 San Fernando Rd	Sun Valley	CA	91352
USF Reddaway	300 S State College	Fullerton	CA	92831
USF Reddaway	10646 Almond Ave	Fontana	CA	92337
Watkins Motor Lines	4500Bandini Blvd.	Los Angeles	CA	90040
Watkins Motor Lines	12200 Montague St.	Pacoima	CA	91331
Watkins Motor Lines	310 W. Grove Ave.	Orange	CA	92865
Watkins Motor Lines	14251 Slover Ave.	Fontana	CA	92337
West Ex	13901 Mica St.	Santa Fe Springs	CA	90670
Yellow	9933 East Beverly Blvd	Pico Rivera	CA	90660
Yellow	12250 Clark St	Santa Fe Springs	CA	90670
Yellow	15400 South Main St	Gardena	CA	90248
Yellow	11300 Peoria St	Sun Valley	CA	95407
Yellow	700 N Eckhoff St	Orange	CA	92868
Yellow	1500 West Rialto Ave	San Bernardino	CA	92410
Yellow	2685 Sherwin Ave	Ventura	CA	95963
Yellow	4313 Atlas Ct	Bakersfield	CA	93308

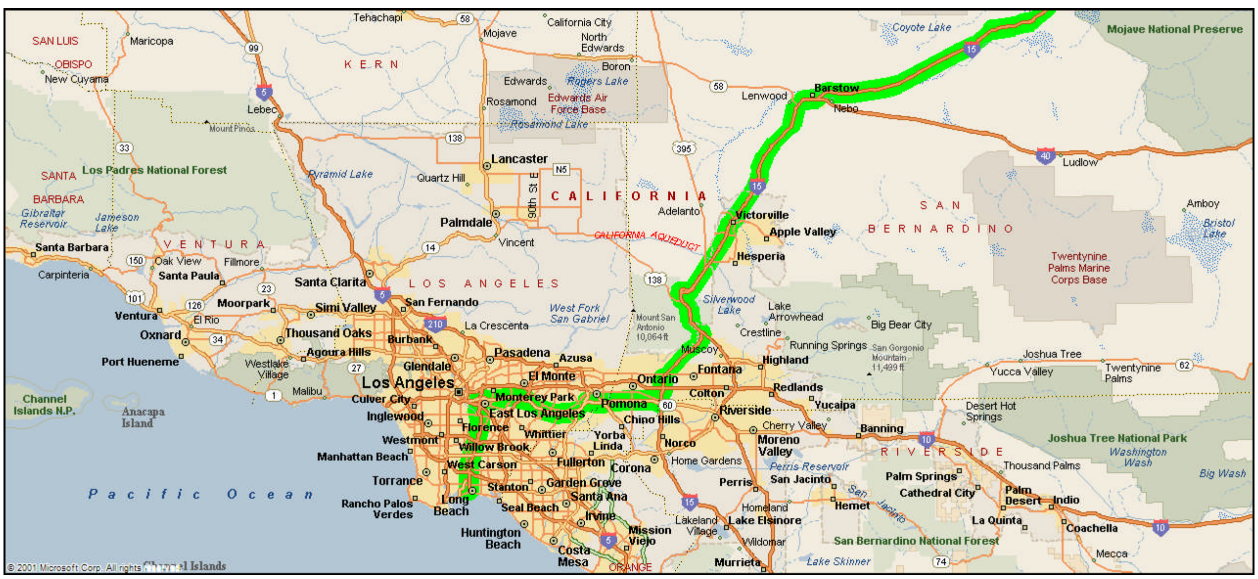
Labor rules. The largest LTL carriers are unionized. The way in which large markets are divided into terminal service territories is dictated in part by union rules. Changes in terminal location or territory definition entail union negotiations. Tioga verified through the in-depth interviews that LTL carriers typically have precisely defined market territories for each terminal.

Inland port potential. Co-location of LTL terminals with inland ports would be most advantageous when a large portion of the long-haul LTL trailers moved via rail intermodal. The location of the Yellow Freight terminal in San Bernardino adjacent to the BNSF intermodal terminal is a case in point. The share of OTR trips that can be shifted to rail, however, is limited by the Master Freight Agreement between the major LTLs and the driver's union. Any LTL terminal must therefore be located to best serve the majority of the OTR and pick up and delivery truck trips. Location near an intermodal terminal can be decisive in a choice between two good markets, but cannot override a market–based decision.

LCV Trucking

Regional infrastructure proposals include a system of "truckways" between the Ports of Long Beach and Los Angeles and Barstow. The route under discussion is a combination of I710, SR60, and I15 as depicted in Exhibit 59.

Exhibit 59: LCV Truckway Route (Approximate)

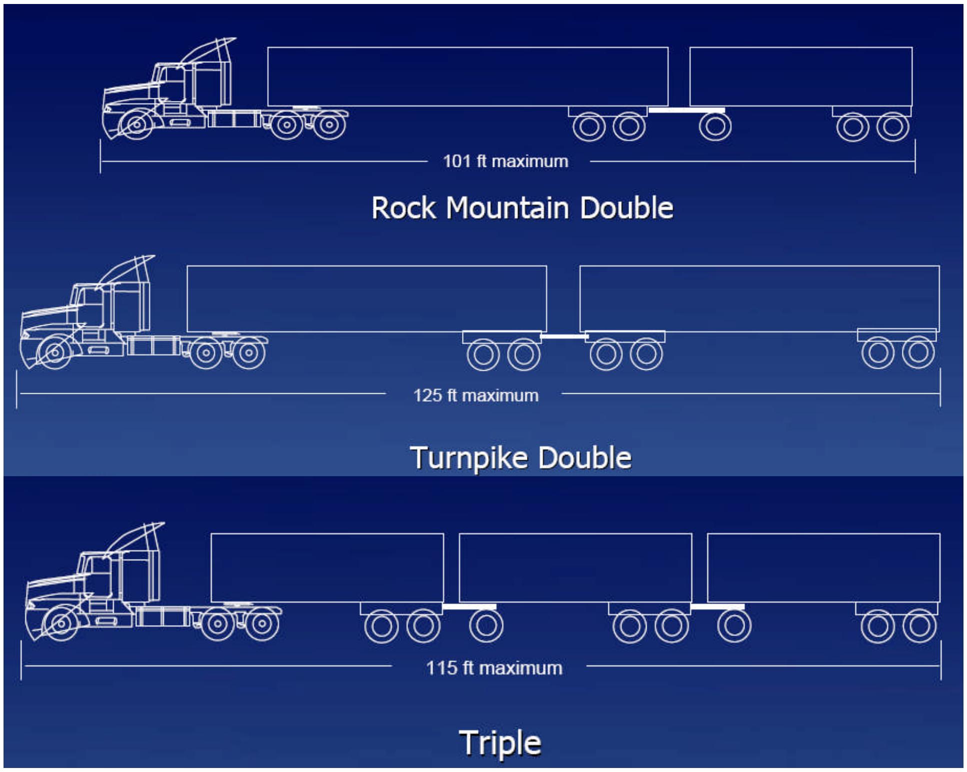


One option for funding truckways is to allow the truckers to operate longer combination vehicles (LCVs). Longer combination vehicles, are tractor-trailer combinations with two or more trailers that may exceed 80,000 pounds gross vehicle weight (GVW). The ability to operate LCVs increases the productivity of the tractor and driver. It is thought that truckers would be willing to incur the incremental cost of tolls to obtain the productivity benefits.[iv]

[iv] An analysis of LCV economics is beyond the scope of this project. The study team has therefore assumed that development of LCV tollways themselves would lead to a demand for LCV staging areas.

LCVs typically include three vehicle types. (Exhibit 60)

Exhibit 60: Longer Combination Vehicles



As pictured, LCVs equipment involved usually include one or more *converter gear units* (also known as *dollies*) used to connect multiple trailers. The possibilities are:

- Rocky Mountain doubles – formed by adding a 28' trailer to a long single semi trailer.
- Turnpike doubles – formed by adding a second long semi trailer behind the first long semi trailer.
- Triples – formed by adding a third 28' trailer to a set of two.

Operation of LCVs is prohibited in California, but operations are relatively common in certain other circumstances in other states contiguous to California, including Nevada and Oregon (but not Arizona) .

LCVs need space available at the start of the trip to hook up the "extra" converter gear and trailer in the combination and again at the end of the trip to detach the extra converter gear and trailer. Traditionally that has been done in a "break-up area" furnished by the state highway department or toll road authority immediately before entering a toll booth.

The driver requires sufficient space to uncouple his existing combination and reposition the trailers and converter gears into the correct sequence. There is also a space requirement for dropped trailers and dropped converter gears to be temporarily stored awaiting their next use. The number of dropped trailers and converters is related to level of activity and business cycles. Each company has its own converter gears, they are not a common user pool.

The entrance to the lot has to be positioned such that it is prior to toll collection when making up a LCV and after toll collection when breaking up a LCV. Perimeter lighting of the area is mandatory, and depending on the local situation, a certain level of security may be required. Ultimately, the level of LCV patronage on the truckway determines the size of the breakup lot.

Getting the LCV equipment to/from the truckway is the single most important consideration. There are three possible scenarios:

- Normal – the LCV operates on the truckway only. The vehicles that assemble into the LCV are separately shuttled between the breakup lot and the truckers nearest facility.
- Operate to/from an adjacent common user freight terminal or drop lot.
- Operate over local streets – the LCV does not make up or break up at the break up lot, instead it drives over local streets to a nearby private facility at which it is assembled or disassembled.

Originally, all LCV operations on toll roads were required to use the break up areas at the entrance to the toll road to assemble/disassemble the LCV combination so that operations over roadways off the toll road were "highway legal" – meaning that they were as allowed by state regulations. That practice resulted in lower toll road patronage than if the LCVs could operate between the entrance/exit to the toll road and a nearby facility. It is significantly more efficient if the "extra" box does not have to be separated and then separately shuttled by another truck and driver to/from the toll road breakup area. LCVs can be allowed to operate only on city and country roads that are not a part of the federal National Highway System (basically all Interstate and State designated routes).

It is now common for LCVs to enter/exit from the toll road at interchanges that are situated at city streets or county roads and to operate over such local streets for a short distance, generally only one to two miles, to the carrier's private facility. Often they can access the toll road on either a private road or over a short distance on city streets that permit LCVs.

The idea of being located in closer proximity to the entrance/exit to the toll road is critical. The more efficient the shuttle to/from the breakup area, the more probable it is that truckers will use the toll road either with LCVs or with normal truck configurations. If, for other reasons, it is not advantageous for the trucker to locate at or near the entrance/exit to the toll road, it is less probable that the trucker will use the toll road. The lesser probability is more common with private trucking than with commercial trucking. That is because usually the private trucking is appended to the shipper's manufacturing or distribution facility and it is not probable that it is advantageous to relocate the entire manufacturing or distribution facility.

LCV staging lots could be beneficially co-located with LTL terminals. It is likely, in fact, that at least some LTL carriers would locate terminals at staging lots or at approved LCV access routes once an LCV system was developed.

Feasibility of an LCV breakup lot as part of an inland port or logistics park depends, of course, on the existence of an LCV highway or tollway system.

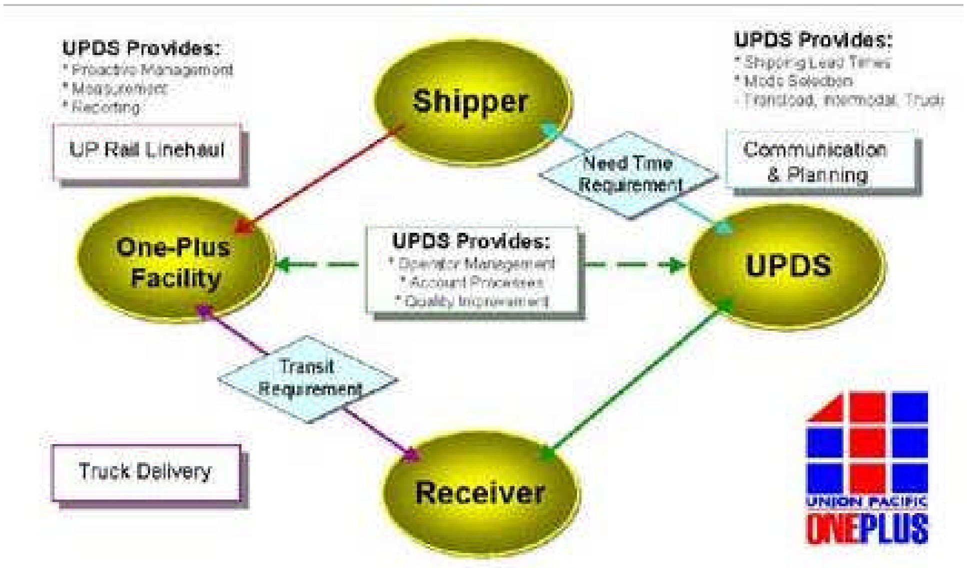
Experience to date suggests that LTL carriers would be the primary users of an LCV system. Most LTL carriers have fleets of 28' trailers and converter units that already operate as triples where possible (e.g. Oregon and Nevada). To take advantage of LCV routes, LTL carriers will need to either establish operations at staging lots, establish approved LCV routes to existing terminals, or establish new terminals on LCV surface routes.

Co-locating an LCV staging area with LTL terminals or various inland port functions would require a large site at an LCV highway exit. The availability of such sites will depend on the final location and configuration of the LCV highways or tollways.

Rail-Truck Bulk Transfer Facilities

Rail-truck bulk transfer facilities typically receive bulk commodities in carload lots by rail, store them in the railcars, and transfer them from the railcar to a truck for final delivery**.** Exhibit 61 illustrates a generic transload process.

Exhibit 61: Sample Rail Transload Process



Source: Union Pacific Distribution Services

For most commodities, there are 3 to 4 truckload equivalents in a single rail car carrying 70 to 125 tons. These facilities tend to be located close to railroad freight yards to enable local rail switching crews to move railcars in and out of the site. These facilities handle bulk commodities for consignees who either lack a rail siding or who place orders for less than a full carload. Often, multiple producers of the same commodity with have rail carloads of competitive products on site at the same facility. The goods are either liquids such as asphalt, alcohol, ethanol, specialty chemicals, or acids, dry bulk such as flour, plastic pellets, catalysts, or fertilizers, or gases such as propane, anhydrous ammonia, or nitrogen. Exhibit 62 below shows a transfer facility moving liquid bulk commodities between rail tank cars and tank trailers.

Exhibit 62: Liquid Bulk Transloading

When transloading lumber (and other building materials such as wallboard, decorative stone, and roofing), transload facilities typically mix shipments that arrive in full carloads to create outbound truck shipments to construction sites. Where these facilities are part of a major wholesale operation, the railcar is not used for storage (Exhibit 63 below).

Exhibit 63: Lumber Transloading

Local steel and other metal fabricators and wholesalers draw their supply of coils, bars and other shapes from manufacturers, often by rail. Depending on the economics of the supply chain and the demand for a given product, the manufacturer will use a rail/truck transfer facility to supply a given clientele. Steel transfer facilities often have an enclosed site and an overhead crane bay (Exhibit 64 below) to lift heavy shipments out of coil cars and low-sided gondola rail cars.

Exhibit 64: Coil Steel Transloading

Auto Ramps

Autos and light trucks (finished vehicles) are usually moved from assembly plants to destination regions via special bi-level and tri-level railcars. At destination, no auto dealer or group of dealers is set up to receive an entire railcar. Instead, the manufacturers use rail distribution centers, often called “auto ramps”.

There are three types of auto ramps in Southern California.

- Most auto ramps in the Los Angeles region are destination preparation and delivery centers that transload the vehicles to trucks equipped with auto racks for dealer delivery. There are two on the UP, one at Mira Loma (Exhibit 65). There are two on the BNSF in the Los Angeles area, including one in San Bernardino (Exhibit 66), and BNSF is looking for space for more.

- Imports through Port Hueneme and Long Beach are transferred to trucks and also to railcars at both ports. The import facility can have a large amount of outbound trucking, and some or a lot of rail. UP has two such facilities; BNSF has one.

- Exports are transferred from railcar to ocean vessels at Long Beach. The export facility usually has very little inbound trucking.

Exhibit 65: UP Auto Distribution Facility at Mira Loma

Exhibit 66: BNSF Auto Facility, San Bernardino

Given the existence of several auto ramps in the region, including the major facilities at Mira Loma and San Bernardino, the need for additional auto facilities in the Inland Empire appears minimal. The SCLA site at Adelanto has been considered for an auto distribution facility to serve the expanding Victor Valley region.

Air Cargo Handling

There are three basic types of air cargo service.

- "Integrated" carriers such as UPS, FedEx, and DHL provide pickup and delivery and cover the full spectrum of services, from envelopes and parcels through large freight shipments.

- Passenger airlines such as United, American, and Southwest carry freight as "belly cargo" in the baggage area of passenger planes. Some airlines also operate all-cargo planes. These carriers market their cargo service directly to customers who provide their own pickup and delivery, and also market to air freight forwarders.

- All-cargo carriers, such as Panalpina or BAX, concentrate on freight rather than parcels or letters and usually rely on customers and air freight forwarders for pickup and delivery service.

These three types of carriers operate planes and require on-airport sites with runway access. The integrated carriers also have a network of "retail" counter locations linked to the airport by regular truck trips.

Air freight forwarders are a critical group of intermediaries that purchase service wholesale from the three types of carriers and sell service retail to customers. Air freight forwarders, such as Excel may also offer other services or operate as 3PLs. They are located either on-airport or near the airport, and truck freight to and from the carriers as individual items or loaded "igloo" containers.

An inland port with air cargo capabilities (e.g. a logistics or all-cargo airport) might therefore have both air carriers and air freight forwarders on-site. An inland port that is not also an airport may have air freight forwarders and "counter" offices of air cargo carriers on-site.

Major airports such as LAX or Ontario are typically surrounded by air cargo handing facilities. These facilities include some operated by major airlines to handle "belly cargo' on passenger flights, some operated by all-cargo carriers, some operated by FedEx, UPS, and other parcel and express companies, and some operated by air cargo forwarders and others who do not have their own aircraft. The basic function of these facilities is to transfer air cargo between the aircraft and trucks. An important distinction can be made between air cargo handled loose or on pallets, and air cargo handled in specialized containers (sometimes called "igloos") for specific aircraft.

Air cargo facilities tend to be either single-user terminals for large carriers such as FedEx or UPS, or smaller multi-user facilities used by carriers with less air cargo (e.g. airlines handling only belly cargo) and air freight forwarders.

As the case studies point out, logistics or all-cargo airports also attract aviation businesses that require runway access but that do not handle cargo for others. These businesses typically include flight schools, business aircraft leasing or maintenance, and suppliers to the aircraft industry. These business types fall outside the purview of this study as their location or operation does not appreciably affect the movement of freight at issue. Moreover, they are almost always located at an airport, so there is no overriding economic development purpose in influencing their location decisions.

Many of the all-cargo/logistics airports discussed in case studies have been largely unsuccessful at attracting large-scale economic development on the basis of air cargo services (although some have attracted DCs on the basis of economical land and advantageous location). The reason is simple: very few shippers or consignees of any size move enough of their freight by air to make an airport location attractive. Most DCs, for example, move the bulk of their business by truck, making locations with freeway access more desirable.

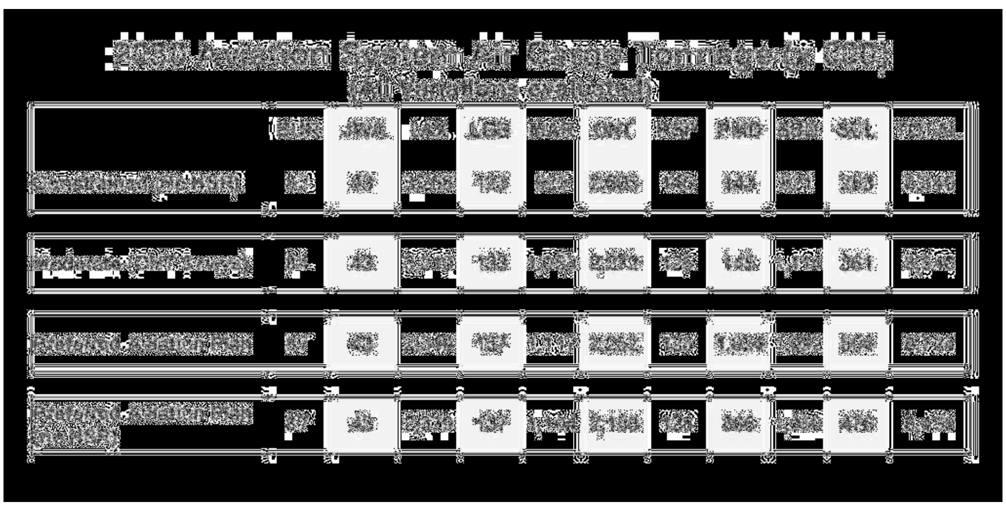
The case studies point out that relatively few shippers or consignees rely so heavily on air freight that they prefer to locate near or at an airport. For most businesses, shipping by air is an adjunct to trucking, and air freight is typically minimized due to its high cost. The three Inland Empire logistics airports already compete for those few shippers or consignees looking for an airport location, so there would be little benefit to creating yet another competitor in this limited market.

Most air cargo moving to or from the Inland Empire is handled at LAX or Ontario, both of which face long-term capacity issues. The Inland Empire has three logistics airports: San Bernardino International, March GlobalPort, and the Southern California Logistics Airport at Victorville. (Exhibit 67)

Exhibit 67: Inland Empire Cargo Airports

The air cargo element of the Regional Transportation Plan anticipates substantial air cargo growth, but concludes that the existing airport system as a whole provides adequate capacity through 2030. (Exhibit 68)

Exhibit 68: SCAG 2004 RTP Air Cargo Element



There appears, therefore, to be no need for additional air cargo capacity at another inland port location. Should there eventually emerge a need, the first choice would ordinarily be to expand capacity at one of the existing airports rather than to establish yet another in the crowded Southern California airspace. The three regional logistics airports likewise appear to have sufficient development space for air freight forwarders, and would be the preferred locations for future development of this kind.

All these considerations suggest that an additional inland port development in the Inland Empire area would not benefit from an air cargo component. Likewise, adding air cargo capabilities would not further SCAG's objectives for the study or SCAG's regional goals.

X. Container Flows and Market Segments

Market Estimates

This section lays out the total flow of port containers and estimates the portions moving to and from the Inland Empire in the study context.

Exhibit 69 displays the total LA/LB container traffic for 2006 in TEU and estimated containers (at 1.85 TEU/container). The trade is roughly balanced in terms of container movements, with 4.4 million inbound loaded boxes and a mix of 4.1 million loaded and empty boxes outbound. The other boxes are considered "leakage" – units that come in through LA/LB and ultimately leave via some other port.

Exhibit 69: 2006 Los Angeles/Long Beach Container Trade

Container Trade in TEU

	Loaded Inbound	Loaded Outbound	Total Loaded	Empties	Total TEU
LB	3,719,680	1,290,843	5,010,523	2,279,842	7,290,365
LA	4,408,185	1,423,620	5,831,805	2,638,048	8,469,853
LA/LB	**8,127,865**	**2,714,463**	**10,842,328**	**4,917,890**	**15,760,218**

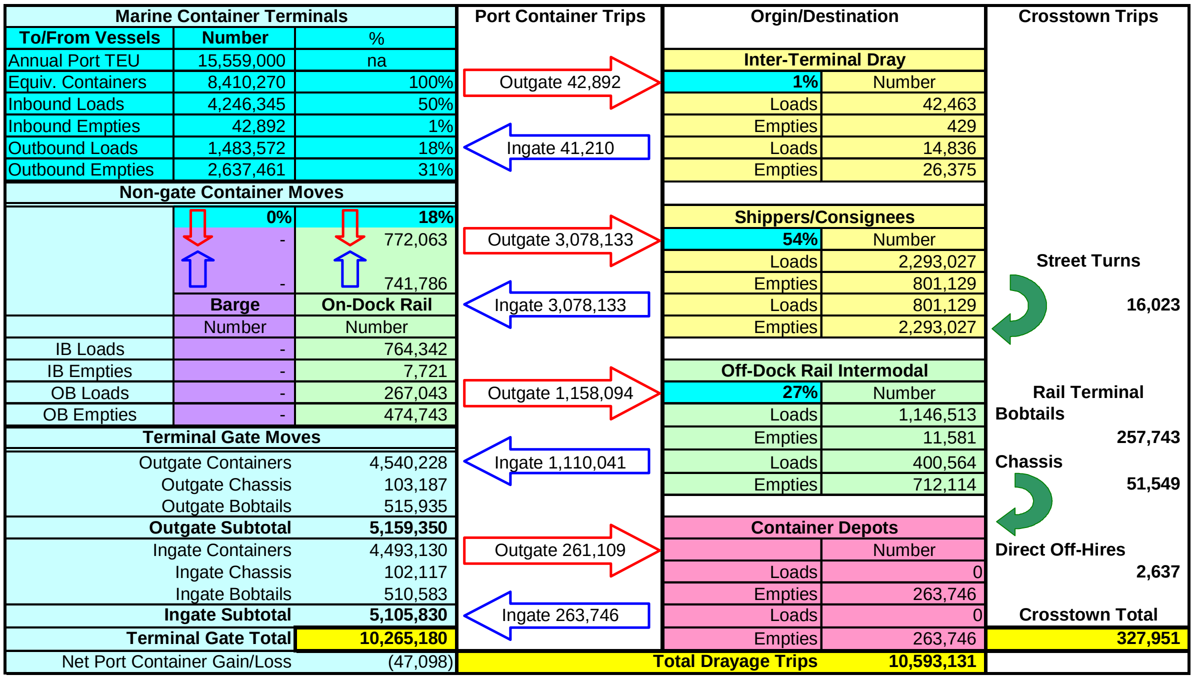
Container Trade in Containers*

	Loaded Inbound	Loaded Outbound	Total Loaded	Empties	Total Containers
LB	2,010,638	697,753	2,708,391	1,232,347	3,940,738
LA	2,382,803	769,524	3,152,327	1,425,972	4,578,299
LA/LB	**4,393,441**	**1,467,277**	**5,860,718**	**2,658,319**	**8,519,037**

Souce: Port websites * at 1.85 TEU/container

Exhibit 70, prepared in draft for a current EPA drayage activity modeling effort, shows what happens to those containers. (Note that the numbers are slightly different, due to different sources.) The pattern is obviously complex, and most of the numbers shown are estimated through various means since there exist no definitive. Of the flows shown under "Origin/Destination" three are contained in the immediate vicinity of the port: inter-terminal drays, off-dock rail terminal drays, and container depot moves. Only the shipper/consignee movements would extend to the Inland Empire or beyond.

Exhibit 70: LA/LB Container Flow Chart



Another perspective is given in Exhibit 71, derived from the TTX Trade Flow Study. That study contains the most recent estimates of rail and transload volumes. The 2005 total for truck movements (including local truck customer plus transloaders who eventually reship by rail) is estimated at 54.3%, almost exactly the same as the 54% shown for actual shippers and consignees in Exhibit 70.

Exhibit 71: Southern California Port Container Market Segments – Percent

Segment	2000	2001	2002	2003	2004	2005es*t
Local/Highway	25.8	23	26.6	25.8	30.0	31.6
Transload/Rail	26.6	27	25.9	26.6	24.3	22.7
Truck Total**	**52.4**	**50**	**52.5**	**52.4**	**54.3**	**54.3**
Intact Rail**	47.6	50	47.5	47.6	45.7	45.7

Source: TTX Trade Flow Study, 2006 * based on data through 3Q05

** Excludes rail terminal trips

The "transload" estimate used in the TTX study is narrower than that used in the Leachman Port Elasticity study. The TTX definition yields a combined rail and transload-to-rail estimate of 67.7%, smaller than the roughly 75% attributed to the Leachman study. Note, however, that the transload share shown in Exhibit 71 has been declining, which explains part of the difference. The Inland Empire share would be drawn from the 54.3% trucked, since none of the intact rail goes to Inland Empire facilities. (The BNSF San Bernardino terminal handles only domestic freight, although some westbound movements arrive in international containers that are moved to the ports when empty.)

Using the TTX estimates and the 2006 container data, Exhibit 72 estimates the loaded container volume sin each segment.

Exhibit 72: Port Segment Estimates

Segment	2006 estimated port container loads		2006 estimated port container truck trips*	
	Import	**Export**	**Import**	**Export**
Local/Highway	1,388,969	463,874	2,777,938	927,748
Transload/Rail	995,577	332,493	1,991,153	664,985
Truck Total	**2,384,546**	**796,367**	**4,769,091**	**1,592,733**
Intact Rail	2,008,895	670,911	Excludes rail terminal trips	

* Assume no container reuse; does not include bobtail or chassis moves

All figures for port truck trips to inland points are estimates from various sources, leading to a range of values depending on the underlying data and the estimation method. Previous port trucking studies have divided the flows by county, with the area immediately north of the ports separated out from the rest of Los Angeles County. The data for daily loaded container truck trips are summarized accordingly in Exhibit 73.

Exhibit 73: Regional Loaded Port Truck Shares

2005 Loaded Trucks	Port Area	Other LA Co.	Inland Empire	Ventura & Orange Cos.	Total
Import Loads (Departures)	66%	17%	7%	10%	100%
Export Loads (Arrivals)	58%	20%	8%	14%	100%
Total Loads	**64%**	**18%**	**7%**	**11%**	**100%**

A manual compilation of the port driver survey data is given in Exhibit 74. For this estimate an effort was made to assign and correct city names based on addresses and other descriptors. Exhibit 74 also includes the east Los Angeles County cities of Pomona and San Dimas in a functional definition of the Inland Empire (Exhibit 75).

Exhibit 74: Alternate Estimate of Inland Empire Share

City	State	Count	Share
BLOOMINGTON	CA	2	0.1%
CHINO	CA	18	1.1%
COLTON	CA	3	0.2%
CORONA	CA	5	0.3%
FONTANA	CA	32	2.0%
MIRA LOMA	CA	38	2.4%
MONTCLAIR	CA	2	0.1%
ONTARIO	CA	63	4.0%
POMONA	CA	13	0.8%
RANCHO CUCAMONGA	CA	4	0.3%
REDLANDS	CA	3	0.2%
RIALTO	CA	2	0.1%
RIVERSIDE	CA	8	0.5%
SAN BERNARDINO	CA	4	0.3%
SAN DIMAS	CA	1	0.1%
Inland Empire Total		**198**	**12.6%**
ADELANTO	CA	1	0.1%
BORON	CA	8	0.5%
LUCERNE VALLEY	CA	1	0.1%
VICTORVILLE	CA	1	0.1%
Victor Valley Total		**11**	**0.7%**
Other Total		**1364**	**86.7%**
Grand Total		**1573**	**100.0%**

Exhibit 75: Inland Empire Cities with Relative Port Truck Volumes

This approach yields an upper bound estimate of 12.6%, versus 7%. Exhibit 76 applies these shares to the data in Exhibit 72 to estimate Inland Empire loads.

Exhibit 76: Estimates of Inland Empire Port Container Trips

Loaded Containers

Segment	Estimated Inland Empire at 7%			Estimated Inland Empire at 12.6%		
	Import	**Export**	**Total**	**Import**	**Export**	**Total**
Local/Highway	194,456	64,942	259,398	349,671	116,779	466,450
Transload/Rail	139,381	46,549	185,930	250,635	83,704	334,339
Truck Total	**333,836**	**111,491**	**445,328**	**600,305**	**200,484**	**800,789**
Intact Rail	Excludes rail terminal trips			Excludes rail terminal trips		

Loaded and Empty Containers

Segment	Estimated Inland Empire at 7%			Estimated Inland Empire at 12.6%		
	Import	**Export**	**Total**	**Import**	**Export**	**Total**
Local/Highway	388,911	129,885	518,796	699,341	233,559	932,900
Transload/Rail	278,761	93,098	371,859	501,269	167,409	668,678
Truck Total	**667,673**	**222,983**	**890,655**	**1,200,610**	**400,968**	**1,601,578**
Intact Rail	Excludes rail terminal trips			Excludes rail terminal trips		

The estimate of the Inland Empire market made by Moffat & Nichol for the ACTA rail shuttle study in 2002 used data on *domestic* shipments from the BNSF San Bernardino intermodal terminal to infer the number of international shipments that must have come from the Ports. That method yielded an estimate of about 700,000 containers each direction, or 1.4 million total trips, exclusive of empties, bobtails, and chassis moves. This estimate lies roughly in the same range.

To provide context to this issue, at SR-71 trucks account for five percent of traffic on I-210, seven percent of traffic on I-10, twelve percent of traffic on SR-60 and seven percent of traffic on SR-91. On an average day 70,000 trucks use these four freeways to travel between the Los Angeles basin and the Inland Empire.[v] The annual weekday total would be roughly 17.5 million. The port container share would be 5-9% of the total.

The port truck share is much smaller than is often imagined. There are at least three reasons why the public might imagine that port traffic accounts for more than 5-9% of the trucks.

- Port traffic is widely publicized, estimated, and discussed, unlike the thousands of relatively anonymous trips that comprise the bulk of the truck traffic.
- International containers are readily identified by their uniform appearance, distinctive colors, and often their steamship line logos. Other types of truck traffic are harder to identify or categorize.
- The public does not readily differentiate between international containers moving to and from the ports and domestic containers moving to and from rail intermodal terminals. The additional domestic container traffic may be attributed to the ports.

[v] 2005 Caltrans Data

Potential Rail Diversions

Exhibit 77 provides a perspective on potential rail diversions in an Inland Port scenario. Assuming two round trips per day (one form each Port) with each train carrying 200 containers, the rail shuttle would divert 12-22% of the estimated port truck traffic in loaded and empty containers.

Exhibit 77: Rail Diversion Perspective

Segment	Estimated Inland Empire at 7%			Estimated Inland Empire at 12.6%		
	Import	Export	Total	Import	Export	Total
Total	667,673	222,983	890,655	1,200,610	400,968	1,601,578
Rail Diversions at 800/day (two round trip trains of 200 containers each)						
Total	15%	45%	22%	8%	25%	12%

The diversions of 800 daily trips would be 1.1% of the 70,000 daily total trucks.

XI. Inland Port/Rail Shuttle Strategy

Original Concept

The original concept for the rail shuttle/inland port combination entailed a conventional railroad intermodal train connecting the Ports with a conventional intermodal terminal in the Inland Empire. Were this combination feasible it would be attractive for its familiarity to the organizations involved and its relatively simple implementation. As the study progressed, however, it became apparent to the study team that many of the implicit assumptions in the conventional model were not true in Southern California, and that a conventional solution was not feasible.

Railroads maximize the length and utilization of conventional double-stack container trains to exploit their economies of scale and make maximum use of crew, locomotive, rail car, and track capacities. Conventional double-stack trains routinely have 30 five-platform cars with a combined capacity of 300 forty-foot containers. Such trains are nearly a mile long and require extensive terminal trackage for efficient loading and unloading at both ends of the trip.

Most such trains are assembled at individual on-dock rail terminals from either a single ocean carrier's import containers or from the combined containers of a consortium or vessel sharing agreement. Where individual terminals do not have enough containers with a common inland destination to create an efficient train, the containers are drayed to an off-dock terminal and combined there with containers from other terminals. For the foreseeable future it appears doubtful that individual terminals could generate frequent, efficient conventional trains to the Inland Empire. To avoid draying containers to a common location and reducing the VMT savings, it would probably be necessary to accept smaller, less efficient shuttle trains that can be assembled at one or a very few on-dock terminals. Inland port rail shuttles are therefore likely to be much smaller than conventional intermodal trains.

It is very unlikely that a large conventional intermodal terminal can be built in the central part of the Inland Empire. BNSF has tried without success for several years to either expand its San Bernardino intermodal terminal or locate a new site. Conventional intermodal terminals typically approach 300 acres, and require both main line access and an appropriate site configuration (essentially a long rectangle).

BNSF previously examined sites at SBIA, Devore, and other locations but found those sites unsuitable or inaccessible. This frustration accounts in part for BNSF's interest in an intermodal terminal at SCLA.

The study team's findings echoed BNSF's results: there are no near-term sites available for a large conventional intermodal facility in the Inland Empire.

- Sites easily accessible from UP and BNSF are heavily developed, with no available parcels large enough for a conventional intermodal terminal.
- Large sites are either inaccessible from the railroads, inappropriately zoned, or physically unsuitable as intermodal terminals.

With obvious difficulties in port rail operations and no feasible terminal sites, conventional rail intermodal operations to a conventional inland Empire intermodal terminal appear infeasible. These roadblocks to a conventional approach led the study team to consider alternative approaches.

The "Commuter" Shuttle Concept

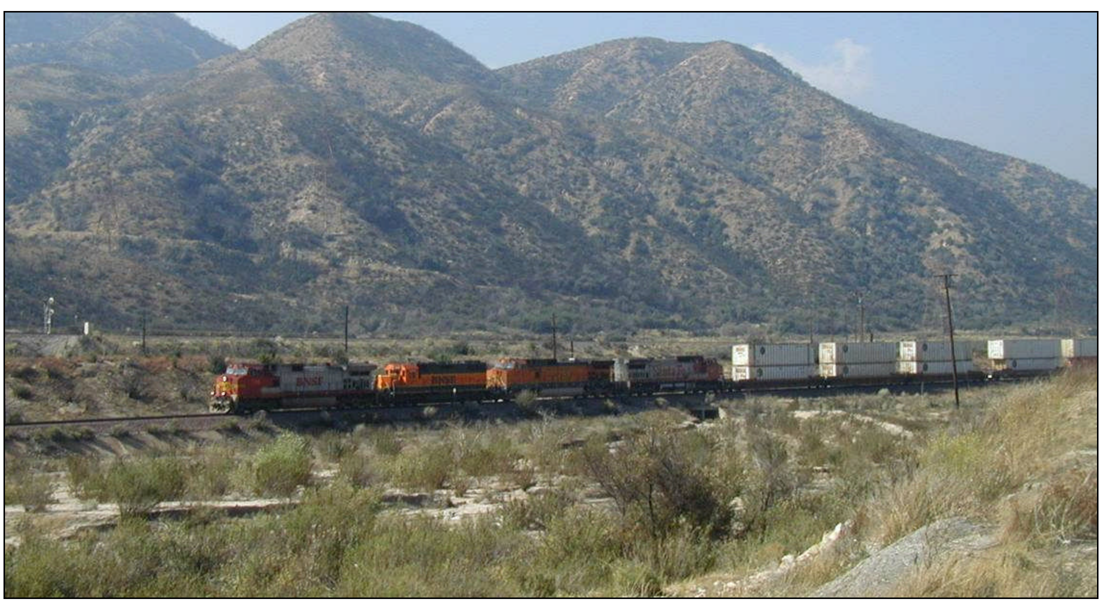
The problems with a conventional approach led the study team to reformulate the concept. The team found the regional passenger and commuter systems offered a familiar template that could be adapted for container shuttles.

In regional or commuter rail systems such as Metrolink, relatively short trains (Exhibit 78) are operated between small terminals or stations. The smaller commuter trains can accelerate and brake faster than longer, heavier conventional freight trains (freight trains made up of either intermodal cars or ordinary freight cars, Exhibit 79).

Exhibit 78: Metrolink Commuter Train

Source: Metrolink Photo Archive, Los Angeles Metrolink Historical Society

Exhibit 79: Double-Stack Freight Train



Source: The Tioga Group

This ability allows shorter trains to stick closer to schedule, reduce interference with other trains, and recover better from delays. Smaller trains can also use short station or terminal sidings to clear the main line for other trains.

Commuter and regional trains are often operated by regional transportation authorities (such as LAMTA) or contractors (often Amtrak) over trackage owned by private railroads (e.g. BNSF or UP). The passenger train operator pays to use the mainline trackage ("trackage rights") and may separately share in capital or maintenance costs.

In discussions with the railroads, introducing the commuter train paradigm was a significant breakthrough. Both BNSF and UP have experience working with commuter and regional passenger agencies, such as Metrolink, Amtrak, and the Capital Corridor. Thinking of a rail shuttle as a "commuter train for containers" facilitated comparisons with known operations rather than a hypothetical "publicly controlled freight train".

The commuter train paradigm opens the door to public-private partnership options. Where commuter trains are operated by public agencies (either directly or by contractors), the railroad is essentially charging rental for track space. This arrangement insulates the private railroad from the finances of the train operation. The operating subsidy would be going to the sponsoring agency, not to the private railroad – a significant political distinction. The commuter concept also facilitates shared capital investment for capacity improvements (trackage, signaling, control system, etc.). The California State Rail Plan is, in fact, heavily focused on improvements needed to facilitate more and better passenger service.

It must be noted, however, that railroads have rarely "rented out" their trackage to outside *freight* operators. Trackage rights agreements between railroads are common and familiar, although they can take years to negotiate and can cause day-to-day friction between host and operator. One option in Southern California may be to contract with Pacific Harbor Lines (PHL) as the shuttle operator. PHL will, in any case, perform the port-area switching for the rail shuttle. PHL already has trackage rights agreements with both railroads in the Port area. It is usually easier to extent existing relationships than to start anew.

There would likely be some resistance from the railroads and rail unions While passenger train jobs have long since shifted to Amtrak or regional transportation agencies, freight operating jobs are jealously guarded.

As Exhibit 80 suggests, the conventional and commuter paradigms have some elements in common: PHL switching at the Ports, third-party terminal operations inland, and subsidized shuttle operation by BNSF or UP.

Exhibit 80: Changing Gears: The "Commuter" Shuttle Concept

Original Concept

- PHL switching at ports
- Large, conventional inland terminal
- Third-party terminal operations
- UP or BNSF operation
- Operating subsidy

Problems

- No place for large inland terminal
- Institutional and economic barriers to UP or BNSF commitments
- Rail capacity shortfall

"Commuter" Concept

- PHL switching at ports
- Small commuter-style inland terminal – or terminals
- Third-party terminal operations
- UP or BNSF operation with subsidy
- UP or BNSF establish operating windows
- Public capital investment to maintain required capacity with shared use and benefits

The keys to success are the working relationship, the provision of scheduling "windows," public agency station development and operation, and joint investment in the required line capacity with shared benefits.

Basing a rail intermodal shuttle on the commuter model may be the best way to serve an inland port.

- Public agencies are comfortable with commuter/regional rail operations and economics.
- Both Class 1 railroads cooperate with commuter and regional rail operations in multiple locations.
- Railroads make a fixed number of operating "windows" available
- Sponsor agencies develop stations and administer subsidies
- Sponsor agencies invest in line capacity, and benefits are shared

There are several interrelated elements to a successful rail shuttle strategy.

- Improvements in port-area rail network to facilitate PHL train assembly.
- Selected public-private capital investments to increase network capacity, e.g. additional trackage, longer sidings, signaling, etc.
- Terminal location to minimize mainline conflicts.
- Joint planning to schedule shuttles in available operating windows.
- Negotiated limits on number and length of daily trains.

- Negotiated operating subsidy.

Finally, there would need to be an agreed implementation timeline and criteria for a successful service. The railroads are understandably concerned about open-ended commitments if the service does not attract enough traffic to yield the expected benefits.

With daily trips, the assembly time required at the ports, the wait for an operating window on the main line, and the time required to unload the train at the inland port terminal indicate that the service will be effectively "next morning" (e.g. containers ready to leave the marine terminal on Monday would be delivered in the Inland Empire on Tuesday morning.) "Next morning" service is not a fatal flaw. The heavy influx of import containers unloaded at vessel arrival – particularly with growing vessel sizes and multiple daily arrivals – often exceeds the aggregate port drayage capacity. In busy periods it is common for customers to designate "hot boxes" that must be delivered the same day as vessel arrival, and then allow the chosen drayage firm to stretch out delivery of the remaining boxes as needed. Thus, "next morning" delivery is already common. Daily train service would have to establish a high degree of reliability but would not be at a transit time disadvantage.

An alternative is for major ocean carriers (or consortia using the same on-dock terminals) to assemble one or two weekly rail shuttle trains corresponding to major vessel arrivals. If, for example, Ocean Carrier A has vessels arriving Monday and Thursday, its rail shuttle trains would depart the port Monday night and Thursday night for inland port delivery Tuesday and Friday mornings. On Wednesday it is unlikely that Ocean Carrier A would have sufficient Inland Empire container volume to warrant another departure. A similar system on a much larger scale is already in place for long-haul double-stack trains with departures keyed to vessel arrivals.

Empty containers could be returned to the ports on an entirely different schedule – again in parallel with long-haul train practices. By accumulating empties in an inland depot or buffer, the system could send full cars of empties, or conceivably full trains of empties, to each on-dock terminal.

Commuter-Sized Terminal Operations

In Tasks 1 and 2 Tioga considered three planning cases for an inland port rail intermodal terminal based on volumes of 30,000, 60,000, and 120,000 annual lifts. The planning factors above drive the following conceptual requirements. (Exhibit 81)

Exhibit 81: Sample Intermodal Terminal Planning Cases

Planning Factor	Small	Medium	Large
Annual Lifts	30,000	60,000	120,000
Minimum Acreage	15	30	60
Loading Track Length	2,000	4,000	8,000
Storage Track Length	5,000	10,000	20,000
Parking Slots	300	600	1200
Annual Gate Volume	45,000	90,000	180,000
Estimated Cost	$3.0-$ 7.5 Million	$6.0-$15 Million	$12-$30 Million

Terminal lift equipment would also be required. The number of machines is dependant upon the number of primary and secondary lifts to be provided as well as the schedule of both trains and the gates.

Exhibit 81 also has implications for site selection, as the minimal size shown for a large facility is 60 acres. The track length of 8000 feet implies the need for a long, narrow site.

In a conventional intermodal terminal most of the space is used for parking trailers, containers on chassis, and empty chassis. The parking space requirement is determined by traffic volume (the number of units inbound and outbound) and dwell time (the average time a unit remains parked). Multi-day dwell times create the need for large parking lots. Units arriving by train are parked until picked up by the customer or the customer's drayage carrier, and many units may wait in the yard for 3-5 days. Units arriving by truck for outbound movement by rail may also wait 1–2 days. Loaded units have the shortest dwell times, but it is still common for inbound units to be parked for 1-3 days. A small portion of the loads can be parked longer, at which time they begin accumulating storage charges. Empty units can remain parked much longer, especially when the terminal is being used as a source of empty equipment for local outbound loads.

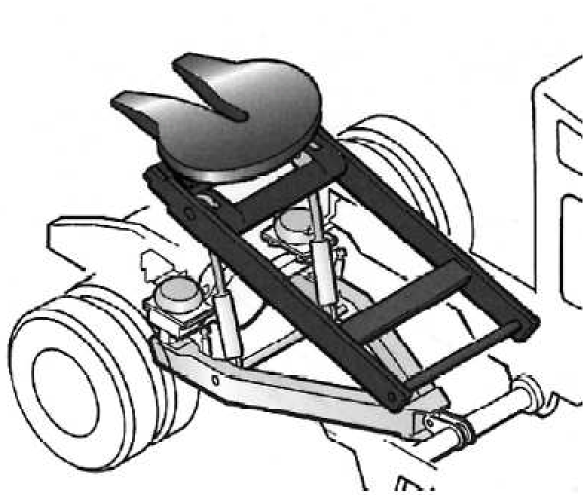
To maximize the throughput of small commuter-sized inland port terminals, the study team recommends implementation of one or more strategies to move bare chassis storage off-site and minimize on-site parking of all kinds. Bare container chassis can be particularly troublesome. At terminals without neutral chassis pools each ocean carrier must maintain its own pool of chassis, and utilization of chassis and terminal space suffers. There is a strong industry trend toward neutral chassis pools in which the bare chassis are used by multiple member carriers. Neutral chassis pools have been established by Maher Terminals, Trac-Lease, and OCEMA (the Ocean Container Equipment Management Association). Neutral chassis pools typically reduce on-terminal chassis fleet size by about 25%, but they still store chassis on-site.

Remote parking lots are one option. Congestion at SCAG region intermodal terminals has led the railroads to establish remote parking lots. BNSF has remote parking lots for different purpose and customers at both Hobart and San Bernardino. At an inland port, one or more remote parking lots could be used for bare chassis supply or storage of empty containers. Without valuable merchandise inside, these units do not require the level of security demanded for loaded units.

The key to efficient operation of a remote lot is access for terminal yard tractors so that units can be moved between sites without time-consuming equipment inspection and interchange procedures. Yard tractors (Exhibit 82 and Exhibit 83) have powered "fifth wheel" hitches to raise trailers and chassis without retracting the landing gear.

Exhibit 82: Yard Tractor

Exhibit 83: Powered Yard Tractor "Fifth Wheel"



Yard tractors usually move trailers and chassis without connecting the trailer air brakes. These two practices dramatically reduce the time and cost of moving units around the terminal. Ideally, these movements should take place on a private, dedicated road between the sites with no access for public vehicles.

There are two alternatives where private access roads are not feasible.

- Permitted operation on designated public streets, perhaps in designated lanes. This alternative may encounter local opposition on safety grounds.

- Inter-site movement by licensed highway tractors with trailer landing gear raised and brakes connected. This alternative would increase the time and cost.

A key attraction of a remote lot strategy is its flexibility. Remote parking lots can use smaller, odd-shaped parcels unsuitable for the intermodal terminal itself. Sites under electric power lines or elevated freeways would be ideal. Remote lots could also be established as interim land uses, since all that would be required is a level gravel surface and a chain link fence.

Ideally, the small inland port terminal should be a "live lift" operation. In live lift operations inbound containers are transferred from the train to waiting chassis already attached to the drayage tractor for delivery and are never parked in the terminal. Outbound containers would be drayed directly to trackside and transferred from the road chassis to the train, again without parking in the terminal.

At conventional terminals live lifts are usually performed only for high priority inbound loads and occasional outbound loads. The dominant practice is to unload the inbound containers to bare chassis that are parked for later drayage. This method disconnects the drayage and train operations and allows the railcars to be moved out of the way so the loading tracks are free for another train.

The proposed shuttle operation would change that paradigm. All inbound containers would be coming from the ports on either the same day or the previous day, making it possible to plan the delivery drayage and set customer appointments for many of the inbound loads. With a neutral chassis pool it should be possible to stage bare chassis at trackside for the inbound train.

Drayage drivers would pick up inbound loads from trackside, avoiding the cost of moving them to a parking lot whenever possible. There will inevitably be exceptions for which a small parking area will be needed.

Outbound units being returned to the ports – predominantly or exclusively empty containers – will need to be loaded according to the on-dock terminal of destination. To utilize train capacity efficiently each rail car headed back to the port should be full. Depending on the rail cars used, meeting this goal would require that outbound 40' units be accumulated and loaded in groups of two (for single-platform double-stack cars), five (for five-platform sets of single-level cars), or ten (for five-platform double-stack cars). In all likelihood this need would be met by using a remote lot to stage the empty units.

An alternative approach would be to establish empty container depots near the inland port terminal. Empties would be returned to the depots, and the depots would manage the flow of empties back to port terminals. This approach could have multiple benefits.

- Container depot capacity in the port area is becoming tight. Locations in the Inland Empire or beyond would add needed capacity.

- By holding more empties outside the port marine terminals, this strategy would increase the port capacity for loads and reduce empty dwell time. Currently, empties typically accumulate and take up terminal space until they are either loaded on an outbound vessel or drayed to a depot.

Off-terminal "buffer" sites have been proposed as a means of increasing port capacity and shifting some of the container traffic volume to off-peak hours. PierPass has addressed the off-peak issue, but off-terminal "buffers" in the form of Inland Empire depots linked by a rail shuttle might still contribute to net port capacity.

XII. Port Area Rail Operations

Overview

The logistics of a rail shuttle/inland port combination are seriously complicated by the fact that Southern California has two ports and multiple container terminals served by two railroads. It is perhaps too easy to refer to "the Port" and sketch movement diagrams as if the Ports of Los Angeles and Long Beach were a single location. In fact, as Exhibit 84 shows, the port complex includes fourteen terminals which are served by several on-dock rail terminals.

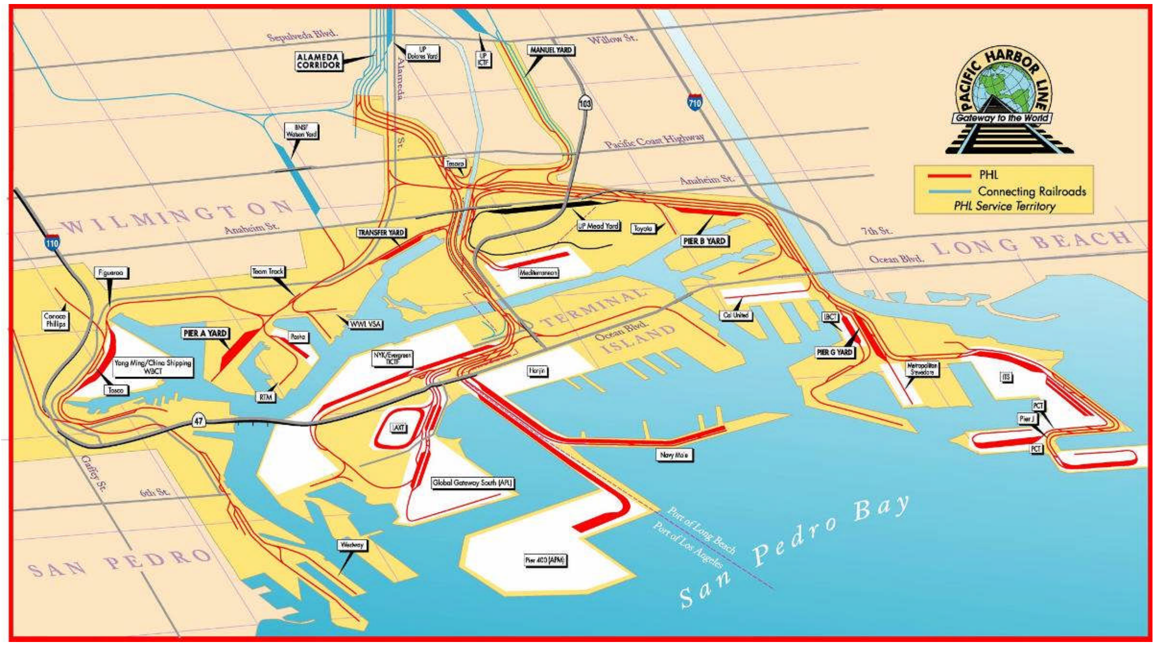
Exhibit 84: LA/LB Container Terminals

The multiple on-dock terminals at the two ports significantly increase the time and cost required to assemble rail shuttle trains and would force a tradeoff. If individual on-dock terminals cannot generate efficiently sized daily rail shuttle trains, then either PHL will experience greater time and cost of assembly or the system will not be able to offer daily service.

Pacific Harbor Line

Pacific Harbor Line (Exhibit 85) serves the on-dock terminals and connects them to UP and BNSF. Discussions with PHL have revealed serious infrastructure barriers to efficient port-area assembly of rail shuttle trains.

Exhibit 85: PHL Service to Ports



Ordinarily, entire intermodal trains are loaded and unloaded within individual on-dock terminals. Rarely does PHL attempt to make up an outbound train by assembling cars from multiple terminals, or breakup an incoming train between multiple export terminals. To do so PHL would need substantially more off-dock yard trackage in strategic locations. Newer purpose-built intermodal facilities such as TICTF at Los Angeles have more yard trackage than older, legacy facilities such as LBCT at Long Beach. Basically, the legacy port rail network was not designed to assemble intermodal trains from multiple terminals and does not work well for that purpose.

The Port's rail infrastructure development plans would add substantially to the switching capacity of PHL. Implementation of those plans, however, is not imminent. By the time the new capacity is built it will be largely full with higher priority long-haul intermodal traffic.

Each on-dock terminal operator who participates in the shuttle train operation may need to set aside space within their operation to load a block of one, two, or three double-stack cars. The cars could be pulled by a PHL switch crew to assemble a train within the port area. This alternative would work in the LA portion on Terminal Island, and at the Hanjin Terminal at the Port of Long Beach. The remainder of the terminals in the Port of Long Beach accessed by rail beyond 9th Street in Long Beach are presently too congested and lack run-around tracks to allow access without disrupting on-dock loading operations. There are several capital improvement projects in the Port infrastructure plan that would, when completed, change the operation to allow for an inland terminal shuttle train operation within the Port of Long Beach. However, until these changes are made it is not feasible to consider a shuttle train service that builds the train by pulling loaded cars from individual terminals within the Port of Long Beach.

In addition to not being able to access the on-dock facilities in the Port of Long Beach, pulling cars from the Yang Ming facility by the same switch crew that assembles the train by switching the Terminal Island on-dock facilities may not be possible given the location and the volume of long haul intermodal trains on the Alameda Corridor. The terminals that could be readily accessed as part of a container shuttle train service are Pier 400, Global Gateway South, NYK/Evergreen, and Hanjin.

The operation of the shuttle train described above could be accomplished by a new PHL crew that would come on duty based on the time the finished shuttle train would depart on the Alameda Corridor. They would start from Pier A Yard by pulling an inbound group of double stack cars loaded with empty containers returned from the inland terminal. These cars would need to be held in PHL's Pier A Yard from the time of arrival of the inland shuttle train until it is pulled by the PHL switch crew. Depending on the timing of the arrival of this train, PHL may have some difficulty holding the train given the need to pull loaded cars from the on-dock facilities before placing the returning cars with the empty containers. Once the outbound shuttle train is assembled it will need to depart for the inland terminal.

The crew that operates the shuttle to the inland terminal would probably not be able to make a return trip within the hours of service requirements. A second crew would then be necessary to operate the train from the inland terminal to the port area. This crew will need to be timed to allow it to pull the cars of empty containers prior to the arrival of the shuttle from the port. While a second crew would add to the operating cost, the necessity of constructing inland terminals that can hold two sets of cars – the inbound loads as well as the outbound empties – will be eliminated. This will allow for either a smaller footprint for the terminal or more throughput capacity because more loaded cars can be spotted with once-a-day service.

The staging of the empty container train in Pier A Yard would not be not as disruptive to current PHL operations as would be the case if the loaded outbound train needed to be staged in the yard. The PHL classification operation starts at 4:00 PM and, given that more track space is required during carload classification operations, making one or two tracks unavailable in the evening could interfere with carload operations. Also, the carload jobs that service non-intermodal customers pull cars from Pier A Yard early in the day, freeing up space in the yard.

The observation that two "line haul" crews would likely be required for the inland terminal shuttle is based on experience. There is a daily non-container shuttle train operation between the Port and the Inland Empire that has existed for years. BNSF and PHL operate a Slab Train Shuttle between Pasha Yard on PHL and California Steel in Fontana on BNSF. This operation consists of a daylight operation loading of imported steel slabs onto railcars for a 7:00 PM shuttle train departure for Fontana. At the same time, a train of empty cars departs Fontana with a scheduled arrival at PHL no later than 6:00 AM. This service operates seven days a week, as needed, depending on import steel delivery at the port.

BNSF local operating personal agree with the PHL observation that a single crew cannot make the turn-around, and that two crews would be necessary. They confirm that the Slab Train is a two-crew operation and that on occasion the inbound crew returning the empty cars cannot complete the move within the 12 hours of service allowed, due to congestion in the area. They also confirm the PHL observation that a shuttle operation at on-dock facilities in the Port of Long Beach are not feasible at present, but could be once infrastructure changes in the Port plan are funded and made.

Assembly of rail shuttle trains at the Ports is thus less feasible and more costly than assumed at the outset of the study. For the near term PHL and the Ports are hamstrung by lack of capacity. There is likely to be a perpetual capacity limit, with that capacity (justifiably) taken up with long-haul traffic.

The long-term limitations on port-area rail capacity is a serious barrier to implementation of a rail shuttle. Cost aside, it appears unlikely that the port-area rail network will ever be able to support assembly and breakup of multi-terminal rail shuttles without disruption to higher-priority movements.

XIII. Main Line Rail Operations

Mainline Rail Capacity

The emerging shortage of mainline rail capacity between the Ports and the Inland Empire is a second major implementation barrier to a rail shuttle. The BNSF and UP lines are faced with mounting demands from multiple sources of traffic growth, most of which have higher private and public priority than a rail shuttle. While an aggressive regional rail expansion plan might create sufficient capacity to meet these multiple needs, it is not clear that the benefits of a rail shuttle would justify the incremental cost.

Through the early 1990s railroads typically had reserve capacity and sought to rationalize their physical plant by retiring the unproductive excess. Since then, however, rising rail freight levels and increased demand for publicly sponsored passenger service has exhausted the reserve rail capacity in many places. Railroads facing capacity constraints understandably prefer to use that capacity for the most attractive long-haul business.

There are three sources of escalating demand for rail capacity between the Ports and the Inland Empire.

- **Trade growth.** Continued growth in intermodal container traffic through the Ports is probably the single most important factor.

- **Domestic freight growth.** The expanding population, production, and consumption of the SCAG region is resulting in domestic intermodal and carload freight growth.

- **Passenger Rail.** Portions of the same rail routes traveled by freight are used for regional and interstate passenger service. Passenger service growth in the form of new routes and more trains on existing routes increases the pressure on mainline capacity.

Public policy is closely aligned with the railroads' preferences in this regard. Rail transportation is more efficient on longer trips. It would not be in the public interest for short-haul rail shuttles to displace long-haul container trains. Long-haul trains eliminate thousands of truck miles regionally and nationally. The congestion and emissions relief benefits of moving a container 2000 miles to Chicago clearly outweigh the benefits of moving one to the Inland Empire. The public and the railroads have a common need to maintain capacity for existing and expected long-haul trains, while providing sufficient capacity for the rail shuttles.

UP Operations Perspective

The UP operates two main lines between Colton and Los Angeles in the area of interest for this study. The Los Angeles Subdivision operates from East Redondo to Colton via Riverside and the Alhambra Sub operates from Yuma Jct. to Colton. The LA Subdivision connects with the Alameda Corridor at East Redondo.

UP is working toward increasing capacity in this corridor by double tracking the Alhambra Subdivision, scheduled to be completed in 2009 and is working with the Ontario Airport Authority to locate what will be a mile long connection between the LA and Alhambra Subdivision just west of the expanded airport. The combination of these two UP capital investment projects will increase operating flexibility and thus capacity for trains in and out of the LA Basin. A third capital investment project (Colton Crossing) involves improving efficiency for UP and BNSF operations in Colton where currently the two railroads cross each other at grade. The growth in traffic on both railroads has resulted in delays while one train is held short of the crossing diamond waiting for a train of the other railroad to clear the crossing. The project involves building a railroad fly-over to grade separate the two railroad thus eliminating the need to hold trains on account of the other railroad. The final design of the fly-over is still being negotiated, and more than likely will not be operational until 2010 at earliest.

The UP local operating staff agreed that there is not a large plot of land upon which a intermodal terminal, as typically configured, can be located west of Colton. They also understand the need to focus on congestion mitigation and air quality improvement in the entire LA Basin, not just to move the problems out of the ports to another point further inland. As a result they understand the project focus on VMT as the measure of improvement.

The idea of basing a container shuttle operation on commuter operations has appeal for to the local UP operating officers interviewed; however they quickly point out that UP headquarters in Omaha has the final authority. The local officers even express a possible interest in operating the shuttle trains with UP crews, although they would entertain the idea of PHL operations or other qualified train operation. They are concerned about the impact any new operation would have on long haul train operations and capacity. They point out that the expansion projects that are planned or ongoing are to meet anticipated growth in current volume, not new operations such as the container shuttle. They are also concerned that public officials do not have an adequate understanding on how new operations, no matter how modest they may seem, can have on the entire rail network.

BNSF Local Operations Comments on the Inland Shuttle Train Concept

The local BNSF officers have the same concerns about capacity as has been raised by UP. They also state, as have others, that short haul container moves of this nature do not break even for the railroads and that spending line capacity for these short moves at the expense of long haul is not a sound business decision for the railroads. Thus they make the same observation as others have, in order to operate the shuttle train service capacity must be increased and, given the growth projection for the region, it must be beyond what is planned to meet the long haul growth demand.

Alternative Line Haul Systems

One obvious conceptual alternative is use of a different line haul technology to move containers between the seaports and one or more inland terminals. There are conceptual proposals for maglev and linear induction motor (LIM) systems currently under study by the ports for their feasibility between port terminals and near-dock rail facilities (ICTF and the proposed SCIG). A brief discussion of these systems and the challenges they face is presented in Appendix A.

The port study now in progress should help answer these questions.

1. **How are containers moved from vessel to system loading point (and vice versa)?** At present, every container in North America is moved on chassis between the apron under the crane and the container yard or on-dock rail terminal.

2. **How are containers loaded and unloaded to/from system vehicles?** At present, marine terminals in North America use gantry cranes, side loaders, reach stackers, or straddle carriers to handle containers or chassis, on rail cars, or on the ground.

3. **How does the system get into, through, and out of the marine (and inland) terminal?** Conventional rail tracks embedded in pavement allow trucks to pass over. No terminals have rail loading at ship side.

4. **How does the system link multiple marine and/or inland terminals?** As noted elsewhere, the Los Angeles and Long Beach terminals are scattered over 20 square miles of waterfront and separated by water, highway, rail, and development barriers.

5. **What right-of-way does the system use to link terminals?** Absent a feasible right-of-way other system features are irrelevant.

6. **How are system movements planned and controlled?** The system must correctly identify each container, move it to the correct terminal, position it for loading/unloading, and hand-off control to terminal gate (inland) or vessel (marine) systems.

7. **How does the system recover from disruptions?** The full range of potential disruptions might include vehicle failure or malfunction; central system failure or error; guideway failure or damage; power shortage or loss; and accidental or malicious damage.

8. **Where will import containers be sorted and forwarded to final destination by truck or rail?** The agile port concept on which all the systems implicitly rely shifts the sorting function to the inland terminal. The inland terminal must be sized, planned, equipped, and operated accordingly.

9. **What are the full capital costs of the system?** The capital costs must encompass the right-of-way, the guideway, the vehicles, the control system, the terminals, and any ancillary facilities or systems.

10. **What are the full vessel-to-destination operating costs?** The operating cost estimates would have to include every step: unloading the vessel, operating the terminals, loading and unloading, sorting, linehaul, transfer to another mode, overhead, etc.

11. **What is the system throughput capability?** The system will be limited by its slowest link, which is likely to be in the terminals rather than on the line-haul. The system will need to cope with volume peaks and valleys, and comparisons should be based on reliable, day-in/day-out throughput rather than optimized conditions.

12. **What impact will the system have on communities, highways, and other urban features?** The existing proposals point out the potential emissions advantages but do not discuss the potential neighborhood division and diminished property values associated with elevated systems, displacement of truck drivers, or exposure to hazardous/objectionable cargo.

As most of the proposed systems are highly conceptual, there is a long way to go before these systems can be evaluated with any confidence.

XIV. Rail Shuttle Economics

Overview of Cost Estimates

This analysis draws on standard railroad costing techniques and rules-of-thumb to estimate the operating cost per container for a rail shuttle service linking the ports with a terminal in the Inland Empire. These estimates should not be regarded as precise or definitive, as there are many potential variations in actual operations that would affect costs. Moreover, there are virtually no precedents for short-haul intermodal operations of this type. The estimates developed below should be regarded as guidelines for relative rail and truck costs, as indications of how cost might vary with volume, and as indications of potential subsidy requirements.

All estimates assume 5-day service, 260 working days per year, 2 roundtrips per 24 hours from both LA and LB to Mira Loma, Ontario and Fontana.

Terminal Lift Costs

The rail shuttle operation will incur costs for lifting container on and off the rail cars at the port, and at the inland terminal.

The rates charged by terminal operating companies for loading and unloading at on-dock rail facilities vary widely, and most are contained in confidential contracts. Since some of the largest terminal operating companies are owned by their ocean carrier "customers" (e.g. Eagle Marine, owned by APL, and APM Terminals, owned by Maersk), information on the actual rate charged is closely held. The study team used estimates published in previous studies of $90 per lift.

Exhibit 86 provides estimates of inland rail terminal operating costs, based on a 70-acre terminal and three different annual lift volumes.

Exhibit 86: Inland Rail Terminal Cost Estimates

Cost Category	Case 1	Case 2	Case 3	Comments and Cost Factors
Volume	26,000	52,000	135,200	
Mangement	1	2	4	
Lift Labor	4	6	10	$ 20/Hour
Clerical Labor	3	5	8	$ 15/Hour
Mechanical Labor	1	2	4	$ 25/Hour
Lift Machines	1	2	4	Side loaders, Mixed new/used
Yard Tractors	2	4	9	Mixed new/used
Switch Engine	1	1	1	Owner function (could be contractor)
Crews	1	2	2	Shifts per day
Acres	70	70	70	Purchase total acrage at start
Land	$ 17,500,000	$ 17,500,000	$ 17,500,000	$250,000 per acre
Construction	$ 6,500,000	$ 13,000,000	$ 33,800,000	$500K per acre and 2000 lifts per acre
Estimates				
Contractor's Lift Rate	$ 23.77	$ 22.70	$ 19.71	
Gate Cost per Lift	$ 9.24	$ 6.16	$ 7.37	
Owner Operating Cost	$ 15.47	$ 14.35	$ 5.98	Mainly the switch engine
Annual Facility Cost	$ 26.37	$ 26.37	$ 26.37	Construction
Annual Land Cost	$ 67.31	$ 33.65	$ 12.94	Return on land
Total Annual Cost per Lift	$ 142.16	$ 103.23	$ 72.37	
Average Operating Cost per Lift	**$ 48.49**	**$ 43.21**	**$ 33.06**	

The three different average costs per lift correspond to the volume scenarios and are used in the overall cost estimates below. Note that each round trip requires two lifts: a loaded lift off on arrival inland, and a lift on for return to the ports.

Rail Line Haul and Switching Costs

Exhibit 87 shows the rail line distances from the Ports to various Inland Empire points used for analysis.

Exhibit 87: Rail Distances

	Los Angeles	Long Beach
To Mira Loma	128	128
To Ontario	112	112
To Fontana	185	182

Exhibit 88 and Exhibit 89 show the requirements and costs for double-stack rail cars at various train capacities. TTX is a car pooling organization owned by the major railroads, and supplies most cars used in U.S. intermodal service. TTX charges by the day and by the mile, allowing the shuttle operation to vary car supply as needed.

Exhibit 88: Rail Car Requirements

	Assuming all double stack, 5 platforms per car:	
Containers Per Train	**# of Cars Per set**	**Total # of Cars**
50	5	15
100	10	30
200	20	60

Exhibit 89: TTX Rail Car Costs

TTX Double-Stack Car Costs	
Per Car Per Day	Per Mile
$ 48.00	$ 0.075

Exhibit 90 shows locomotive requirements. Locomotive costs included the following assumptions.

- Locomotive cost was assumed to be $2,500,000 per unit
- Ownership cost was based on the replacement cost at 7% interest rate and 15-year depreciation life.
- Locomotive maintenance cost was assumed at $50,000 per locomotive per year.
- Fuel Cost was calculated based 8 operating hours per locomotive per day, 14 gallons consumption per locomotive per operating, hour, $2.50 per gallon.

Exhibit 90: Locomotive Requirements

Containers Per Train	Locomotives for 3 Train Sets
50	4
100	6
200	8

A total of four 2-person crews were required for two roundtrips every 24 hours (Exhibit 91).

Exhibit 91: Annual Rail Crew Costs

Crew	Annual Salary and Benefits	
Engineer	$	120,000
Conductor	$	100,000
Crew Total	**$**	**220,000**

Maintenance of Way (track) cost was estimated $1,000 per track mile, an industry standard, and pro-rated across the container volume. Other costs, including overhead, loss and damage, etc., were estimated at 6% of the total container cost.

Exhibit 92 gives the overall rail line-haul estimates at three mark-up levels: a low revenue/cost ratio of 1.5, a high ratio of 2.0, and a mid-range average. The average of the mid-range 100-unit estimates in Exhibit 92 is $168.10.

Exhibit 92: Rail Line-Haul Cost Estimates

Los Angeles				
Units Per Roundtrip (All Double Stack, 5 Platforms Per Car.)				
UP - Mira Loma		**Low (R/C:1.5)**	**Mid-Range**	**High: (R/C:2.0)**
	50	**$205.44**	**$239.68**	**$273.92**
	100	**$146.81**	**$171.28**	**$195.75**
	200	**$106.24**	**$123.95**	**$141.66**
UP - Ontario				
	50	**$204.37**	**$238.43**	**$272.49**
	100	**$146.27**	**$170.65**	**$195.03**
	200	**$105.98**	**$123.64**	**$141.31**
BNSF - Fontana				
	50	**$209.24**	**$244.11**	**$278.99**
	100	**$148.72**	**$173.50**	**$198.29**
	200	**$107.20**	**$125.06**	**$142.93**
Long Beach				
Units Per Roundtrip (All Double Stack, 5 Platforms Per Car.)				
UP - Mira Loma		**Low (R/C:1.5)**	**Mid-Range**	**High: (R/C:2.0)**
	50	**$205.39**	**$229.35**	**$253.31**
	100	**$146.78**	**$163.90**	**$181.02**
	200	**$106.24**	**$118.64**	**$131.03**
UP - Ontario				
	50	**$204.32**	**$228.15**	**$251.99**
	100	**$146.25**	**$163.32**	**$180.38**
	200	**$105.96**	**$118.33**	**$130.69**
BNSF - Fontana				
	50	**$209.00**	**$233.38**	**$257.76**
	100	**$148.60**	**$165.93**	**$183.27**
	200	**$107.14**	**$119.64**	**$132.14**

Exhibit 93 provides a comparable estimate for port-area switching costs.

Exhibit 93: Port-Area Switching Costs

Units per Train	Cost per Unit
50	$ 26.68
100	$ 13.34
200	$ 6.67

Total Rail Shuttle Operating Costs

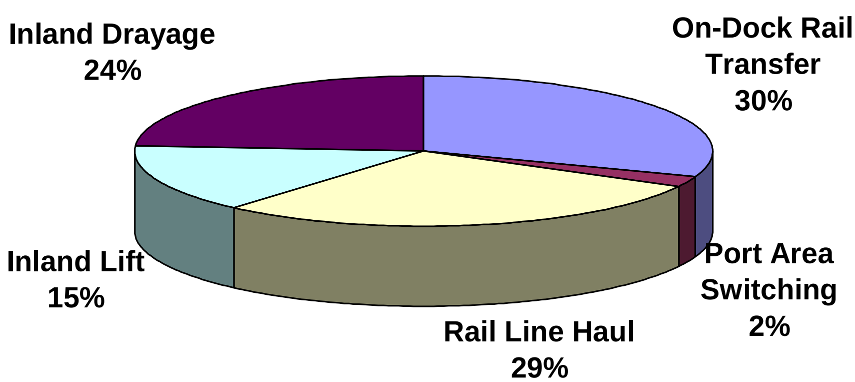
Exhibit 94 summarizes the cost categories discussed above for 100-container trains. Comparable results were obtained for 50-container and 200-container trains.

Exhibit 94: Total Inland Empire Rail Shuttle Cost per Container – 100-Container Trains

Item	Inbound	Outbound	Total
On-Dock Rail Transfer	$ 90.00	$ 90.00	$ 180.00
Port Area Switching	$13.34		$ 13.34
Rail Line Haul	$168.10		$ 168.10
Inland Lift	$ 43.21	$ 43.21	$ 86.41
Inland Drayage	$140.00		$ 140.00
Round-Trip Total			**$ 587.85**

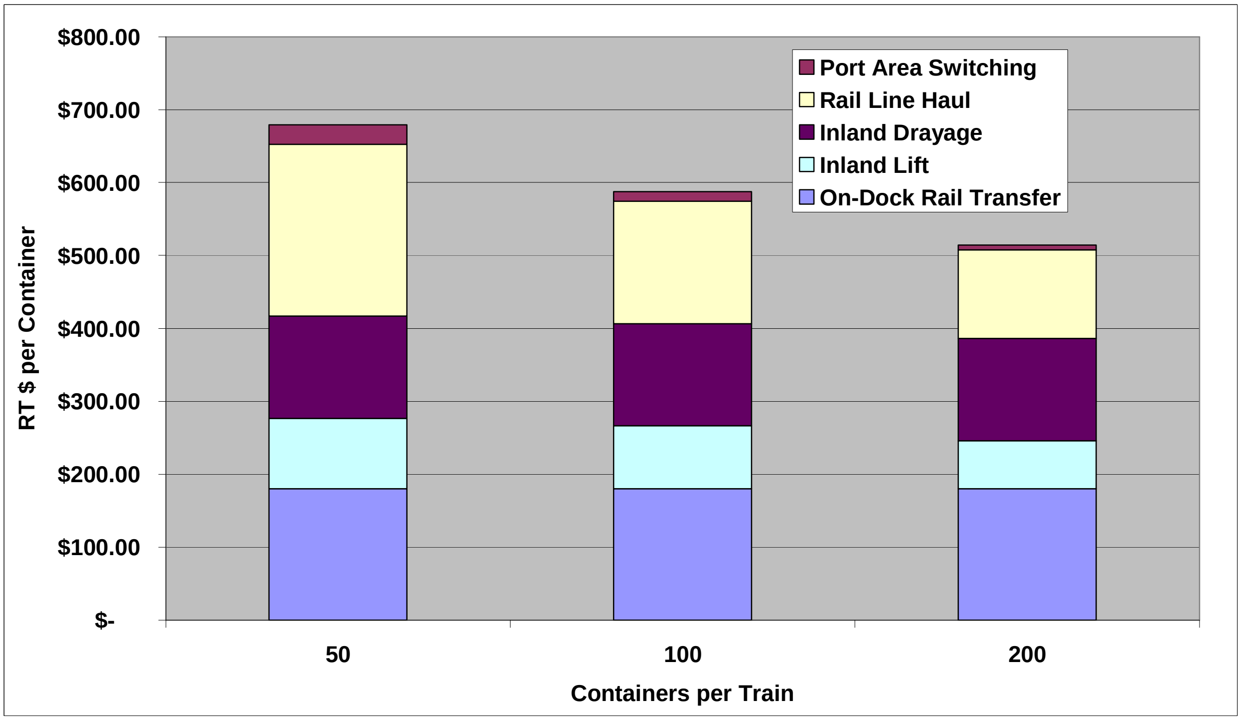
As Exhibit 95 illustrates, the rail line haul cost is less than 30% of the total operating cost. Over 70% of the cost is in lift-on/lift-off at marine or inland terminal, ports area switching, and inland drayage. When these costs – totaling over $400 – are spread out over a 2,000 cross-country line haul, rail intermodal service is not only competitive but less costly than truck. Over the 60-mile trip to the Inland Empire, however, it is impossible to be directly cost-competitive with truck.

Exhibit 95: Rail Shuttle Cost Shares – 100-Container Trains



The on-dock and drayage costs exhibit no economies of scale (Exhibit 96), so the composite cost does not decline appreciably with volume.

Exhibit 96: Total Rail Shuttle Cost Comparison – RT $ per Unit



Rail-Truck Comparisons and Operating Subsidies

Exhibit 97 compares rail costs for three train sizes with estimated truck drayage costs.[vi] Note that drayage cost estimates vary considerable depending on the customer's volume commitment, current operating conditions, fuel surcharges, etc. As the comparison indicates, however, the gap between truck and rail shuttle costs is large – $200 to $300 for larger train sizes, and even more at start-up levels. Small variations in either cost estimate would have little impact on the overall comparison.

Exhibit 97: Rail Shuttle and Truck Costs for Inland Empire Round Trips

	RT Cost
50-container train	$ 679.18
100-container train	$ 587.85
200-container train	$ 514.33
Truck	$ 300.00

The operating subsidy required to divert truck trips to the rail shuttle would be determined by the cost gap in Exhibit 97. The estimates suggest that the required subsidy would be at least $200 per container at current cost levels. The 100-container train scenario would move 50,000 round trips per year (2 round trip trains per day, 250 days per year), and would require a nominal annual subsidy of $14.4 million at a unit cost difference of $287.85 per unit.

[vi] From San Pedro Bay Ports Clean Air Action Plan, Economic Analysis; Husing, Brightbell, and Crosby, September 2007

Increasing truck costs due to the Port's Clean Truck Plans (CTP) could narrow the cost differential and thus reduce the subsidy requirements. Analysis of likely trucking cost impacts yields the comparisons in Exhibit 98.

Exhibit 98: Truck Cost Scenarios and Subsidies

Impact Source	*Inland Empire Truck Cost*[vii]	*Nominal Subsidy per Unit*	*Annual Subsidy for 50,000 Units*
Current	$300	$287.85	$14.4 million
TWIC	$373	$214.85	$10.7 million
TWIC + LMC/IOO CTP	$446	$141.85	$7.1 million
TWIC + Employee CTP	$540	$47.85	$2.4 million

The Transportation Worker's Identification Card (TWIC) requirement is expected to increase labor costs. The Clean Truck Plan (CTP) with Licensed Motor carrier/Independent Owner-Operator (LMC/IOO) or Employee driver options would increase both labor and capital costs further. At the extreme, the annual subsidy for 50,000 units on a rail shuttle might be reduced from $14.4 million at current price levels to $2.4 million. These comparisons must be approached with caution, however, as the estimated impacts of drayage industry changes are highly uncertain and the same changes may also increase the cost of inland drayage for the rail shuttle operation.

[vii] Ibid.

XV. Inland Empire Terminal Analysis

Barriers to Conventional Terminals

There appear to be no opportunity to create a conventional large-scale rail intermodal terminal in the central part of the Inland Empire. BNSF, as noted earlier, spent several years searching for sites without success. The study team reviewed BNSF's findings, examined maps and aerial photos, and consulted regional planning agencies with the same result; there are no suitable rail-served parcels for a conventional rail intermodal terminal in the central part of the Inland Empire. Most rail-accessible property along UP or BNSF lines has already been developed, although most adjacent land uses are not rail-related.

Large parcels somewhat removed from the rail lines would be attractive and suitable, but would need rail connections built through developed areas. The need to build rail connections, and the resulting community opposition, are formidable obstacles to terminal development. The difficulty of connecting a new site to the existing network was the major stumbling block for BNSF's effort to establish a new terminal near SBIA.

Public agency stakeholders in this project have enquired if there would be a value in efforts to assemble a large parcel as an economic development or redevelopment initiative. The answer may be "yes," but not solely for an inland port. Large intermodal terminals are built to accommodate multiple intermodal origins and destinations, and often for a mix of domestic and international business. There would likely be a significant benefit to an additional large intermodal terminal in the Inland Empire, which explains the ongoing interest of BNSF and UP. The most apparent benefits would be in a reduction of truck VMT currently incurred between UP intermodal terminals in Los Angeles (City of Commerce, LATC) and the Inland Empire. A BNSF facility would reduce the need for drayage to and from Hobart or, in the future, Victorville. If such a facility were developed, part of its capacity could be used for a port rail shuttle.

Rail intermodal terminals are low-value land uses, however, creating an economic obstacle to redevelopment efforts. Industry experience and Tioga Group analysis in other projects indicates that rail intermodal terminals return little or no revenue on the land itself. Railroads supply or purchase the land, but earn the revenue on the line-haul service. Rail intermodal terminals are operated by specialized contractors who are paid by the lift but who do not own or lease the land. Efforts to develop rail intermodal terminals as private money-making ventures have been generally unsuccessful, as is documented in the Case Studies Appendix. The few successful private terminals serve as the core of logistics parks, not as standalone businesses.

This consideration implies that a large intermodal terminal initiative would have a difficult time justifying assembly of large parcels, or competing to use such large parcels as become available. In the rising Inland Empire real estate market, a 100–300 acre commercially zoned parcel could cost $100 million to $300 million.

While there are no near-term candidates, there may be some long-term possibilities.

- Union Pacific (and its predecessor Southern Pacific) has periodically investigated the possibility of using or reconfiguring its land and facilities around the West

Colton yard to develop an intermodal terminal. The proposed demonstration shuttle train project in cooperation with ACTA would have used a small intermodal terminal at Colton built for the purpose. The study team incorporated this small-terminal concept as a possibility in Inland Empire site selection. The possibility of a large intermodal terminal at Colton is more remote, however, and could be further diminished by the Colton Crossing line separation project.

- The quarry currently operating west of Colton will likely be depleted and close within the next decade. Closure of this operation could conceivably make a large parcel available as an intermodal terminal site. Suitability of this site would depend on its post-closure condition, size, and configuration. Intermodal terminals are good uses for "brown field" sites with environmental remediation issues since terminals are almost entirely paved or covered with gravel and tracks. Intermodal terminals must be level, however, and rolling terrain suitable for housing would not facilitate intermodal development. A large issue is whether the entire site remains intact until closure and sale or is sold off and developed in stages.

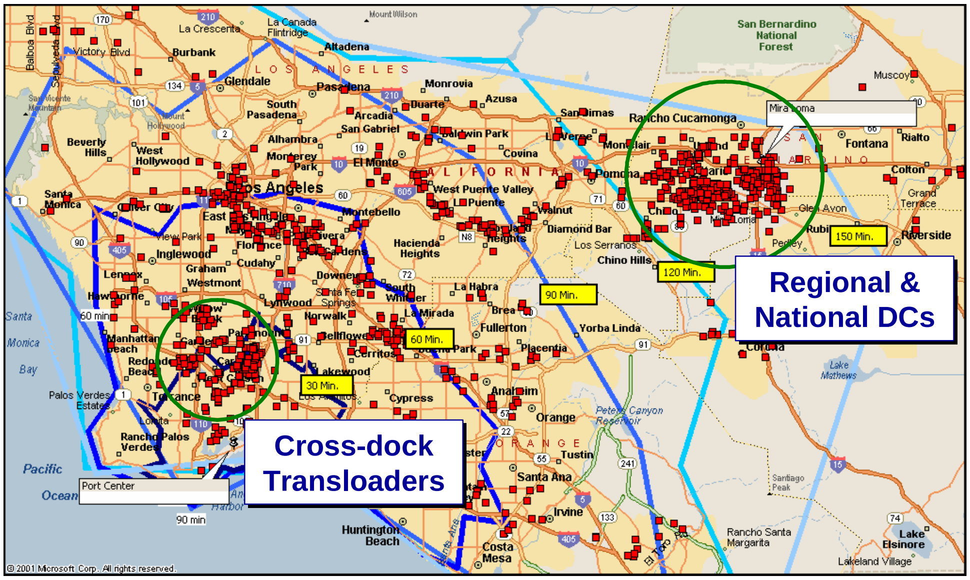
Commuter-Style Terminal Approach

Rather than looking for large, multi-purpose terminal sites that do not exist, the study team began looking for commuter-style inland terminal sites that could accommodate just the rail shuttle trains. The major issues to be addressed are:

- Rail and terminal capacity
- Commercial acceptance
- Public investment and subsidy
- Site selection close to existing customers

The Mira Loma concentration of distribution centers and other customers is the key near-term target market to reduce VMT. That is where the Inland Empire distribution centers are clustered (Exhibit 99), and the closer the terminal is to the center of that cluster the more truck VMT can be saved.

Exhibit 99: Mira Loma Concentration of Regional and National DCs



As the port survey data show, Mira Loma is really the major concentration of existing customers outside of the immediate port area (Exhibit 100).

Exhibit 100: Current Markets: Daily 2005 Trips

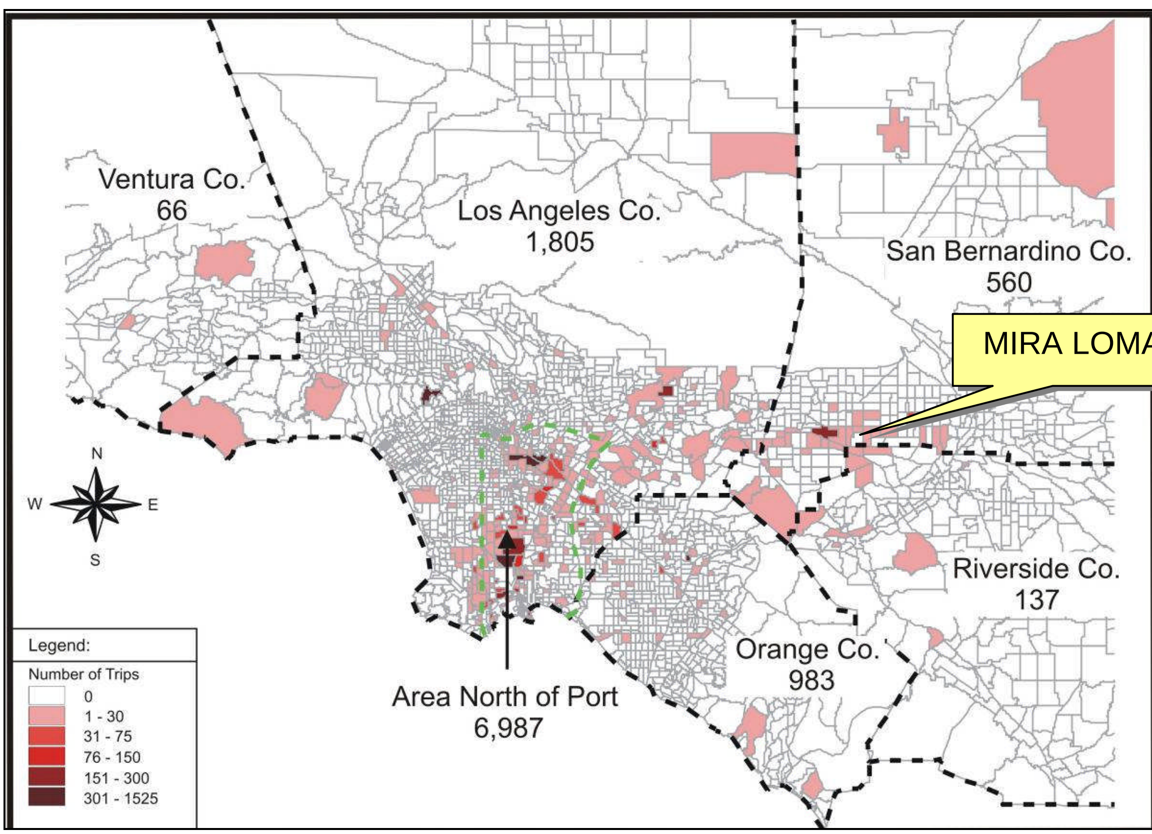


Exhibit 101: Large Inland Empire Sites: Colton, SBIA, SCLA

Model runs confirm that net VMT can be reduced using sample sites, and that the closer Mira Loma the better the results. The MMA model demonstrates substantial VMT reductions for the Colton and SBIA locations, and modest reductions for the SCLA location (Exhibit 101 and Exhibit 102).

Exhibit 102: Truck Model Findings for Large Inland Empire Sites

Year 2005

Year 2005	VMT Estimates				Difference			Percent Difference		
	Without Inland Port	Colton	SBIA	SCLA	Colton	SBIA	SCLA	Colton	SBIA	SCLA
AM Peak Hour	126,465	120,302	121,236	125,993	(6,163)	(5,229)	(472)	-4.87%	-4.13%	-0.37%
MD Peak Hour	190,198	180,811	182,178	189,268	(9,387)	(8,020)	(930)	-4.94%	-4.22%	-0.49%
PM Peak Hour	119,825	114,180	115,103	119,434	(5,645)	(4,722)	(391)	-4.71%	-3.94%	-0.33%
AADT*	1,865,333	1,774,756	1,788,534	1,857,671	(90,577)	(76,799)	(7,662)	-4.86%	-4.12%	-0.41%

** AM, MD, and PM Peak Hours are 23.4 percent of daily port trips in 2005*

Year 2010

Year 2010	VMT Estimates				Difference			Percent Difference		
	Without Inland Port	Colton	SBIA	SCLA	Colton	SBIA	SCLA	Colton	SBIA	SCLA
AM Peak Hour	162,263	155,130	156,103	161,183	(7,133)	(6,160)	(1,080)	-4.40%	-3.80%	-0.67%
MD Peak Hour	222,142	211,746	213,348	221,154	(10,396)	(8,794)	(988)	-4.68%	-3.96%	-0.44%
PM Peak Hour	134,115	128,039	128,943	133,418	(6,076)	(5,172)	(697)	-4.53%	-3.86%	-0.52%
AADT	2,541,765	2,426,054	2,443,108	2,528,211	(115,711)	(98,657)	(13,554)	-4.55%	-3.88%	-0.53%

** AM, MD, and PM Peak Hours are projected to be 20.4 percent of daily port trips in 2010*

Terminal Site Selection

Search criteria for a commuter-sized terminal include the following:

- Minimum size of 35 acres. Provides minimum capacity for a terminal of at least 100,000 lifts, approximately 8% of 2005 port market share for Riverside and San Bernardino Counties.

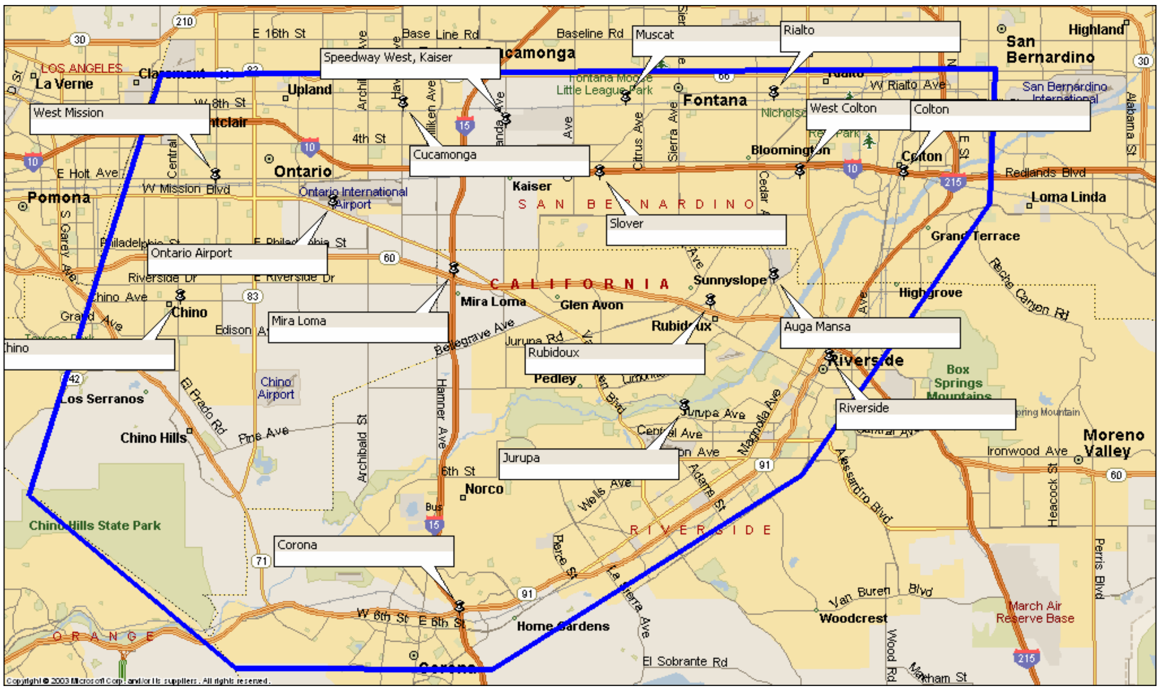
- Properly zoned. Zoning and land use generally conform to the potential market for the prospective service.

- Clear rail access.

- Able to be efficiently developed or re-developed

"Commuter-sized" terminal sites do exist. The team checked 16 industrial areas surrounding Mira Loma and found a number of candidate sites (Exhibit 103).

Exhibit 103: Sites with Rail Access in 16 Industrial Areas



The sites are listed in Exhibit 104 from nearest to farthest from Mira Loma.

Exhibit 104: Industrial Area Characteristics

Area	Line	Interchange	Miles and Minutes to Mira Loma	
Mira Loma	LA Sub-Eastbound	I-15, CA-60	0	0
Ontario Airport	LA Sub-Eastbound	I-15, CA-60	4.4	8
Kaiser	BNSF North	I-10, Etiwanda	6.6	12
Cucamonga	BNSF North	I-10, Haven	5.9	13
Slover	Alhambra Sub-Westbound	I-10, Cherry	8.1	16
Chino	Chino Branch	CA-60, Central	9.7	17
W. Mission	Alhambra Sub-Westbound	CA-60, Mountain	9.2	18
Rubidoux	Crestmore Branch	CA-60, Valley Way	9.3	20
Jurupa	LA Sub-Eastbound	CA-91, Central	9.0	21
W. Colton	Alhambra Sub-Westbound	I-10, Riverside	14.6	22
Muscat	BNSF North	I-10, Cherry	11.6	23
Corona	BNSF Main	I-15, CA-91	15.8	24
Auga Mansa	Crestmore Branch	CA-60, Rubidoux	16.4	25
Colton	Alhambra Sub-Westbound	I-10, Mt. Vernon	17.3	25
Riverside	BNSF South	CA-60, CA-91	13.5	26

The study team used maps, zoning diagrams, and aerial photos from Google Earth. Most of the sites were also field checked. The team also conducted an internet search for commercial and zoning information. Where possible, the project team contacted the appropriate planning agencies to verify the availability and suitability of these sites. The one message that comes through consistently is that the public sector has a limited window of time before these sites are taken for potential uses.

The three highest-ranked sites from Exhibit 104 are discussed below.

Mira Loma Site and Zoning

There is one potential site on the UP in the middle of the Mira Loma area in the 3.5 miles along UP between Philadelphia Street and Belgrave Ave. The site consists of 53 acres at Etiwanda and Iberia. Nearby major UP facilities include:

- Mira Loma auto distribution center
- Mira Loma Yard – support yard for rail-served warehouses

The quote below is an excerpt from the applicable land use regulations.

Require that in the Business Park, Light Industrial, and Heavy Industrial land use designations within the Jurupa Area Plan, warehousing and distribution uses, and other goods storage facilities, shall be permitted only in the following area: the area in Mira Loma defined and enclosed by these boundaries: San Sevaine Channel from Philadelphia Street southerly to Galena Street on the east, Galena Street from the San Sevaine Channel westerly to Wineville Road on the south, Wineville Road northerly to Riverside Drive, then Riverside Drive westerly to Milliken Avenue, then Milliken Avenue north to Philadelphia Street on the west, and Philadelphia Street easterly to the San Sevaine Channel on the north….No warehouses, distribution centers, inter-

modal transfer facilities (railroad to truck), trucking terminals or cross dock facilities shall be allowed outside of the aforementioned area.

This provision clearly prohibits intermodal terminals outside the area shown in Exhibit 105 in yellow.

Exhibit 105: Mira Loma Site

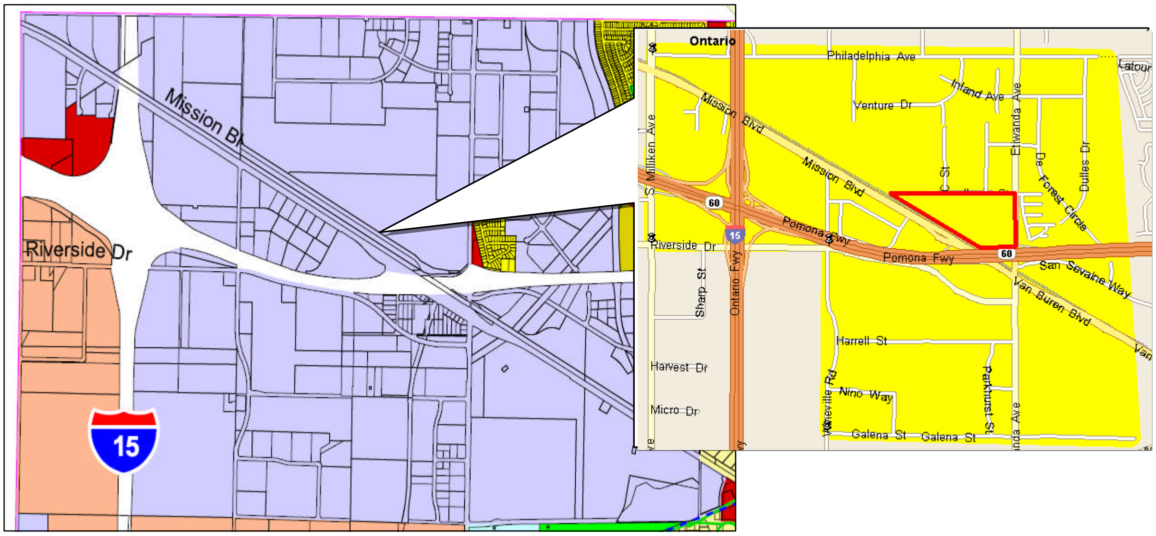
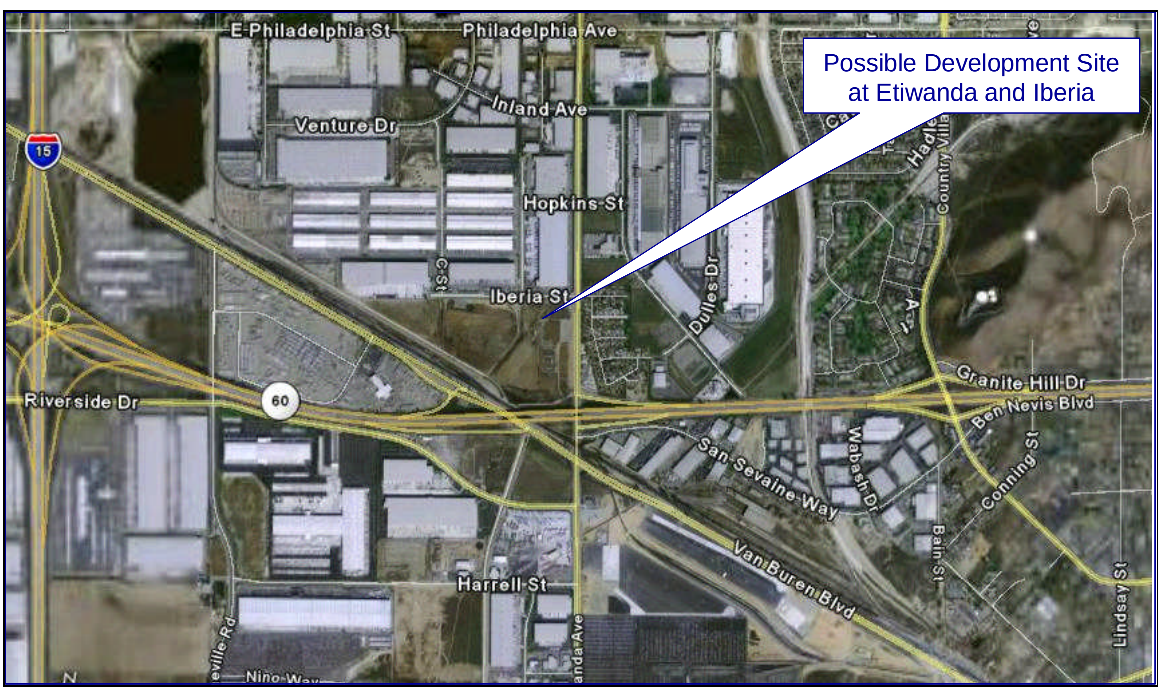


Exhibit 106 provides an aerial view of the site.

Exhibit 106: Space Center Mira Loma Site – Aerial Photo



The site is adjacent to the UP and owned by the Space Center of Mira Loma. The Space Center has no current tenants on that parcel but expects to develop it in the next 3 to 5 years. This and other sites are going fast.

Exhibit 107 and Exhibit 108 provide additional aerial and ground-level views of the site.

Exhibit 107: Mira Loma Site in Context

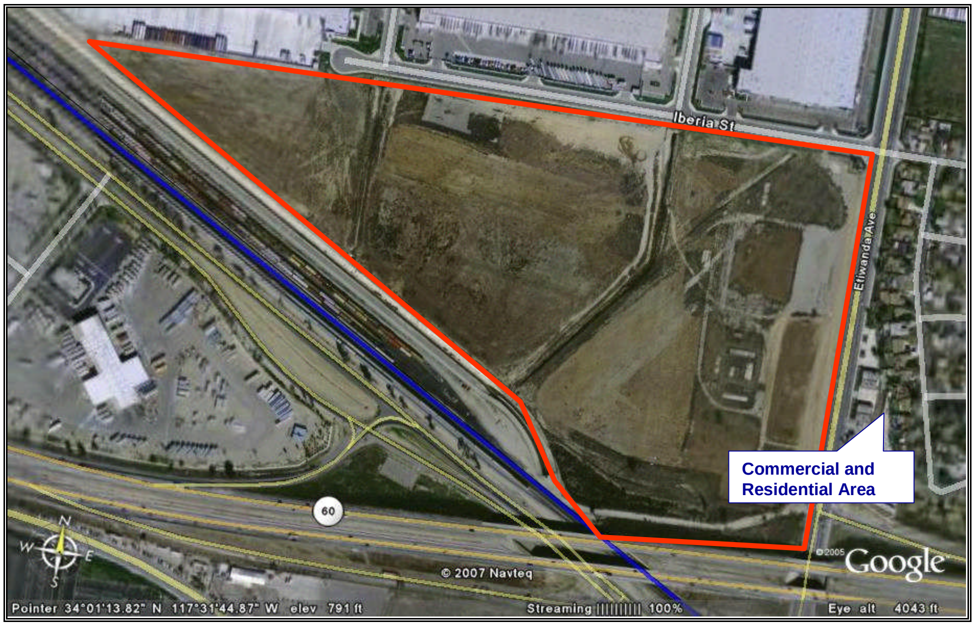


Exhibit 108: Mira Loma Space Center Site - Ground Level View

Although ideally located near the center of the Mira Loma distribution industry cluster this site illustrates many of the problems faced in existing development areas. The site is very close to the freeways, but entrance and exit ramps are legacy structures and not well suited to heavy truck traffic to and from the site. The site is zoned commercial and (apparently) suitable for an intermodal rail terminal, but is directly across Etiwanda Ave. from a small residential area. Adjacency to residences would be a major problem for night and early morning operations, as well as frequent truck movements.

This is the best site that the team could locate in the Mira Loma area. The location would maximize VMT savings but obviously raises significant community acceptance issues. Moreover, as noted above, it will likely be developed for distribution facilities in the next 3 to 5 years, leaving a very brief time span for potential public sector development as an inland port terminal.

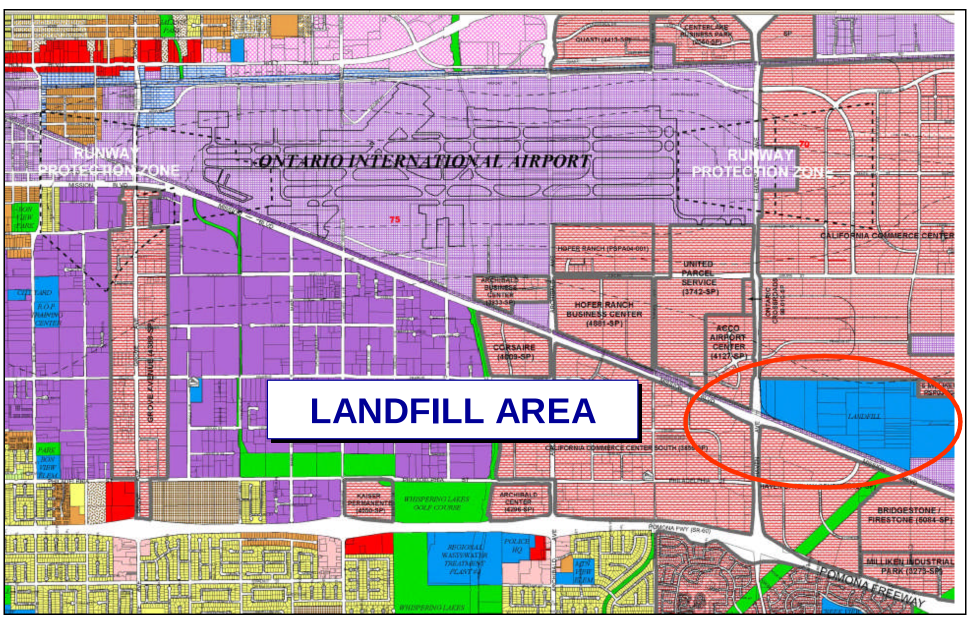
Ontario Airport Site and Zoning

The Ontario Airport is near the center of the target market. As Exhibit 109 shows, there is a former landfill area southeast of the airport, along Mission Blvd. This site is of sufficient size and has the required rail and highway access to serve as an inland port terminal. The site is adjacent to the Union Pacific Line and is located between the SR60, I10, and I15 with access from Haven Ave.

The site is a mile south of the Runway Protection Zone on the east and of the Ontario Airport, in an area already subject to late night and early morning flight activity. The nearest residential areas are on the other side of the Pomona Freeway (SR91) and would not be directly affected. The East Ontario Metrolink station is just west of the site.

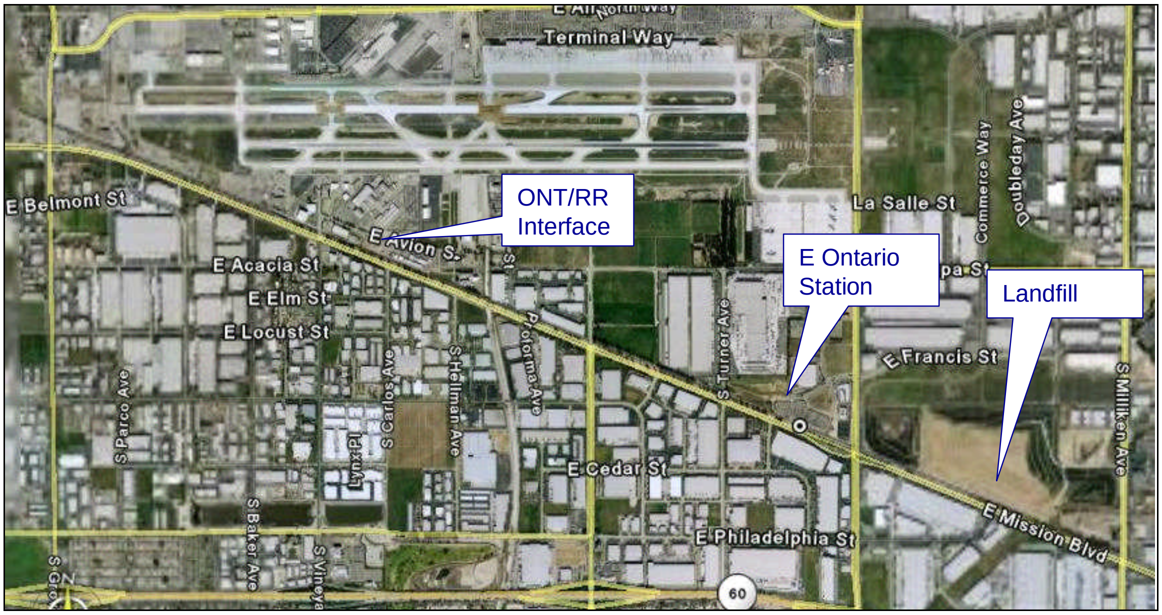
Exhibit 110 shows several vacant parcels near the site, suggesting the potential for new logistics-related customers that could benefit from inland port operations.

Exhibit 109: Ontario Airport Site Zoning



The land use pattern south of the airport suggests developing an inland port and associated DCs in the area.

Exhibit 110: Ontario Airport Site - Aerial View



The landfill site is reportedly zoned PF – Public Facility, which would be favorable for development of an inland port terminal. The site, however, is not level, being a landfill. Leveling the site for use as an inland port terminal may involve moving the landfill, an impractical proposition.

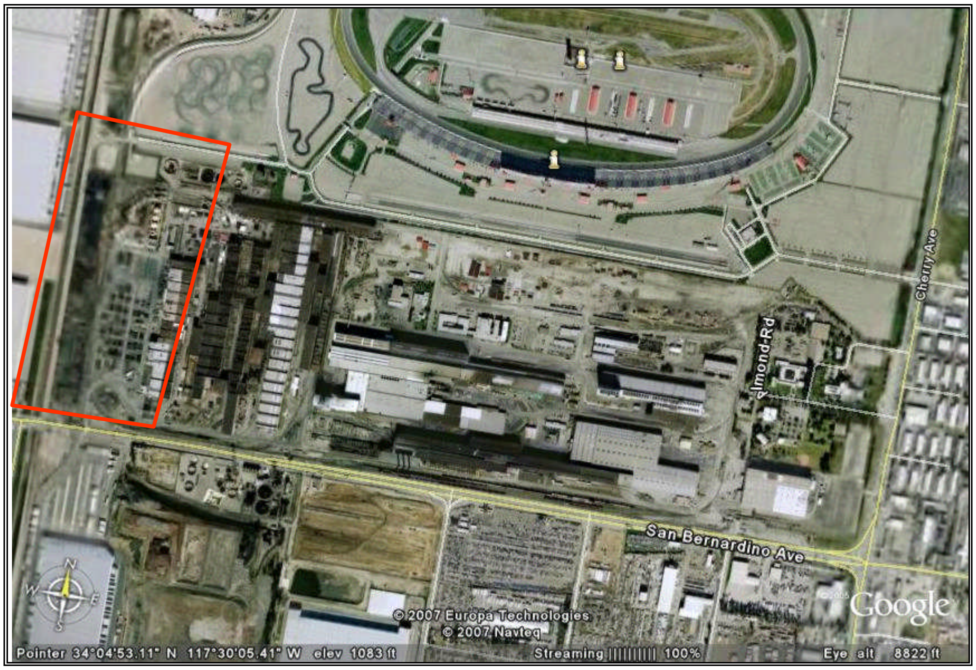
Kaiser/California Steel Site

The third example is the former Kaiser Steel site, which is now California Steel Industries (Exhibit 111). Key features of the overall site include:

- About 6 square miles of mixed zoned property (mainly industrial) in Ontario, Fontana, and Rancho Cucamonga.
- Accessible from the UP Alhambra and the BNSF north lines.
- Former Kaiser Mill now California Steel Industries is a major land owner.

Approximately 50 acres adjacent to the California Steel Plant are suitable as an inland port terminal.

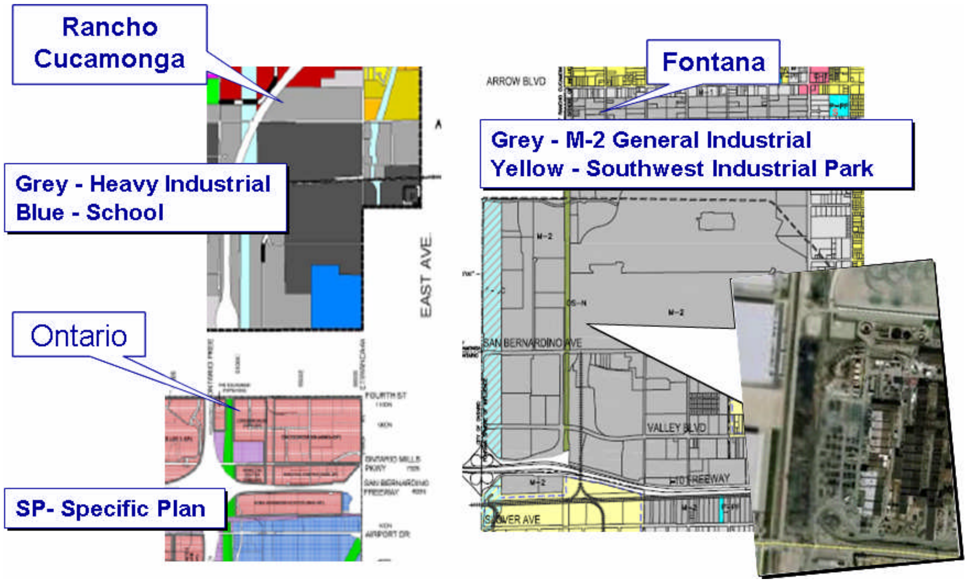
Exhibit 111: California Steel Site



This site overlaps city boundaries. The candidate location within the site is in Fontana in an area zoned M-2 General Industrial, as shown in Exhibit 112.

- Ontario Zoning: SP Specific Plan
- Fontana Zoning: Grey Area, M-2 General Industrial; Yellow Area, Specific Plan, Southwest Industrial Park
- Rancho Cucamonga zoning: Grey Area-Heavy Industrial, Blue Area-School

Exhibit 112: California Steel Area Zoning



The location is served by a rail line that connects with BNSF on the north and UP on the south. The site consists of approximately 50 acres adjacent to California Steel Plant and is currently used for open storage of steel products. Another nearby site that was considered earlier in the project, shown here as the West Speedway site, is no longer available.

Exhibit 113: California Steel Site - Aerial Photo

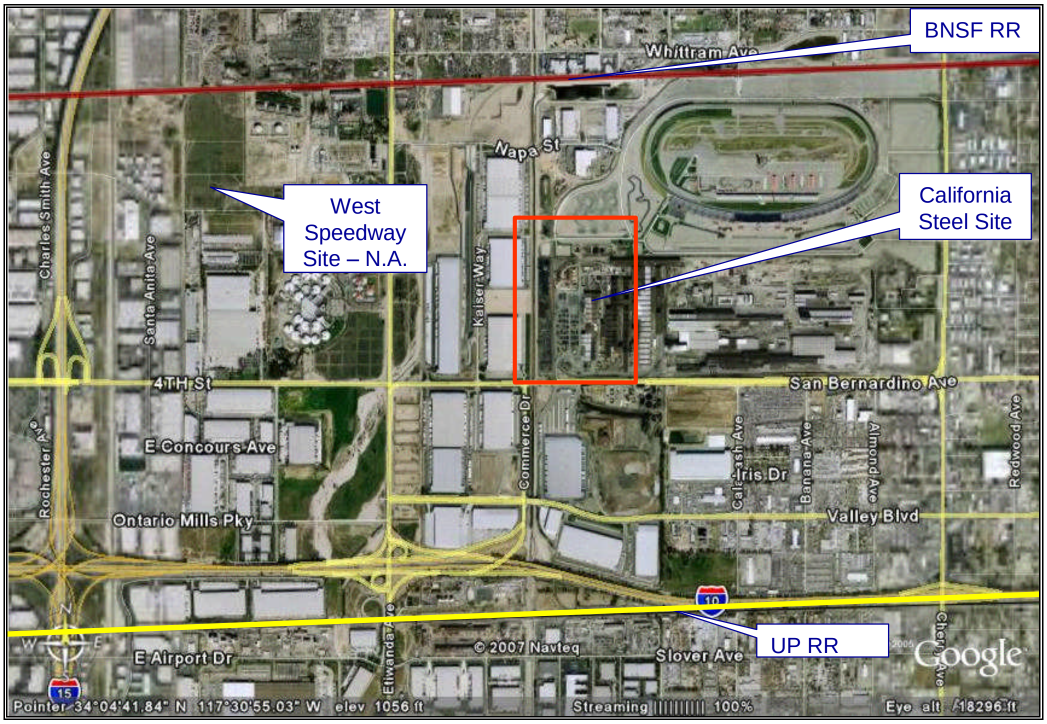


Exhibit 114 shows the rail access to the California Steel site.

Exhibit 114: Rail Access to California Steel Site

Community Acceptance/Opposition

The sites discussed in this chapter all face serious issues of community acceptance.

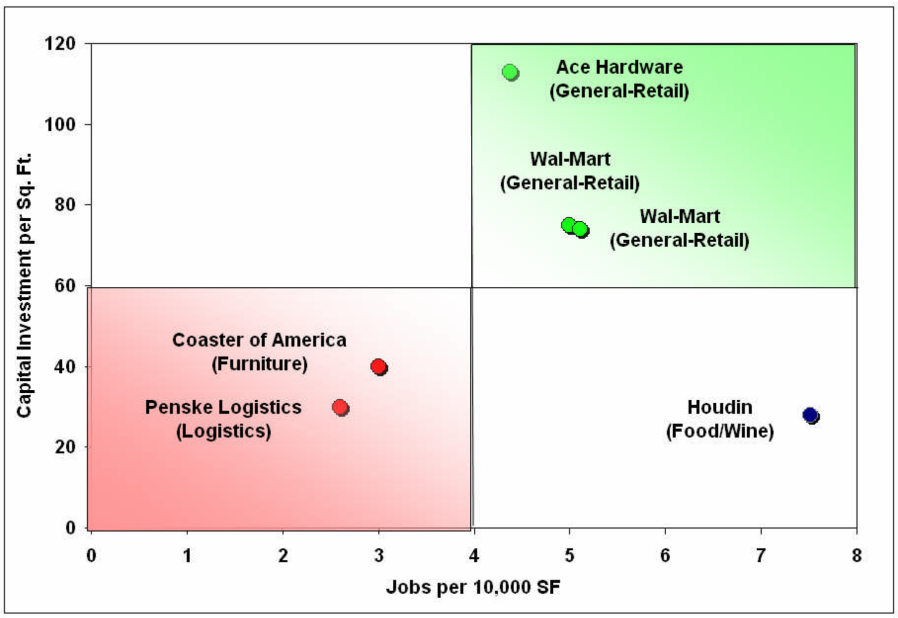
Much of the central Inland Empire has a legacy mix of residential, commercial, and industrial land uses. In unincorporated areas, which include much of Mira Loma, proximity of new distribution facilities and older residential neighborhoods has created acute sensitivity to truck and rail traffic.

Meetings with representatives of County Supervisors, RCTC, and SANBAG confirmed the extreme social and political sensitivity to additional truck traffic in the Mira Loma area in specific.

As observed in the site selection discussion there are relatively few open industrial sites left in the central portion of the Inland Empire. Communities and regional planning agencies are placing a high priority on the number and quality of jobs to be generated by development of the remaining sites.

As Exhibit 115 below suggests, new distribution facilities typically generate 2-6 jobs per 10,000 square feet.

Exhibit 115: Job Density of Logistics Developments



Source: Economic Planning Systems – Sacramento Area Data

Distribution facilities may have floor area ratios of about 0.5, meaning roughly that half the site is covered by a single-story building. A typical value of 4 employees per 10,000 square feet from Exhibit 115 would therefore become the equivalent of about 9 employees per acre.

In contrast, a 35-acre rail intermodal facility is likely to employ no more than 10-12 people, giving a ratio of about 0.33 per acre. (The drayage drivers would not be counted, since they are not employed at the terminal and would actually have more work without an inland port.)

Developing an inland port facility on one of the few empty sites in the Mira Loma area would therefore run counter to the highest priorities of regional and local planning agencies.

The inland port concept has already met with strong community opposition. The Center for Community Action and Environmental Justice (CCAEJ) based in Riverside, has convened community meetings to oppose the idea of an inland port and prepared media articles opposing the idea – even though there is no current inland port proposal. While the actions or opinion of a specific community group may not be decisive, or perhaps even representative, the existence of organized opposition in advance of any actual proposal is indicative of high community sensitivity.

Based on potential opposition from county and regional planning agencies, and active opposition from at least one permanent community group, there appears little chance for community acceptance of an inland port terminal in the central Inland Empire.

XVI. Additional Terminal Sites

Logistics Parks as Inland Ports

Extending the inland port concept beyond the central Inland Empire requires a change of strategy or model. The central Inland Empire (e.g. Mira Loma) is an existing market with a base of potential customers already moving containers to and from the ports. The advantages of existing development are the certainty of the market, even though that market may be hard to penetrate, and the potential for near-term project benefits. The disadvantages are the lack of space for a terminal and the inertia faced in attempting to shift modes. Moving beyond the central Inland Empire leaves existing markets behind, and relies instead on new market development.

The "Logistics Park" model would encourage and locate future logistics industry development. Choosing a logistics park site comes down to "location, location, location." The site must have potential for distribution center development, and good rail access. Use of the land as a logistics park has to mesh with other public plans and private initiatives.

The key to success in the Logistics Park model is attracting customers that will use the inland port and rail shuttle from the beginning, rather than attempting to divert established traffic from trucks. The major issues to be addressed are:

- Market potential
- Public vs. private development priorities
- Rail capacity and traffic volume
- Competition with other public and private initiatives
- Site selection and development timeline

The development timeline is critical. Not unlike a passenger transit station, it is preferable to be near the beginning of the development cycle so there is some customer base at the outset, but still in the position to influence future development patterns. Long-term development plans and trends for the SCAG region anticipate growth extending out the I-15 Corridor. Riverside and San Bernardino Counties are the fastest growing sub-regions according to the SCAG Regional Economic Forecast. In 2004, sub-regional employment in Transportation, Warehousing, and Utilities grew 10.7%.

As development progresses beyond Cajon Pass there are two highway junction areas that will become candidates for logistics park developments: Victorville and Barstow.

Victor Valley

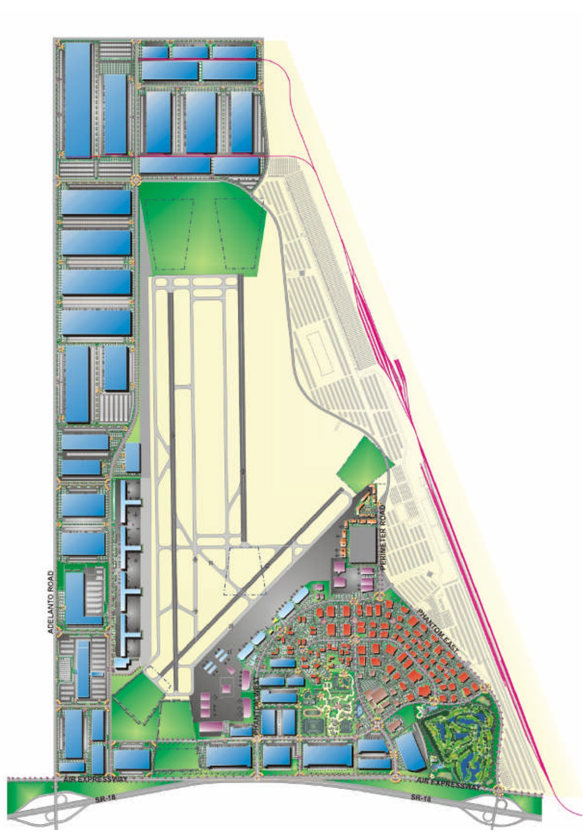
The Victorville area – broadly including the communities of Victorville, Apple Valley, Hesperia, and Adelanto – has for some time been considered the next logical focus for distribution activity after the Inland Empire. As Exhibit 116 indicates, the area is roughly defined by the junctions of

Interstate 15, US 395, and State Route 18. The Victorville area is the first substantial metropolitan area north and east of Cajon Pass for both the highway and the railroads.

Exhibit 116: Victor Valley and SCLA Site

The Southern California Logistics Airport (SCLA) at Victorville is an obvious candidate. The SCLA is the former George Air Force Base, being developed by Stirling International into a 4,000-acre master-planned business and industrial airport complex (Exhibit 117).

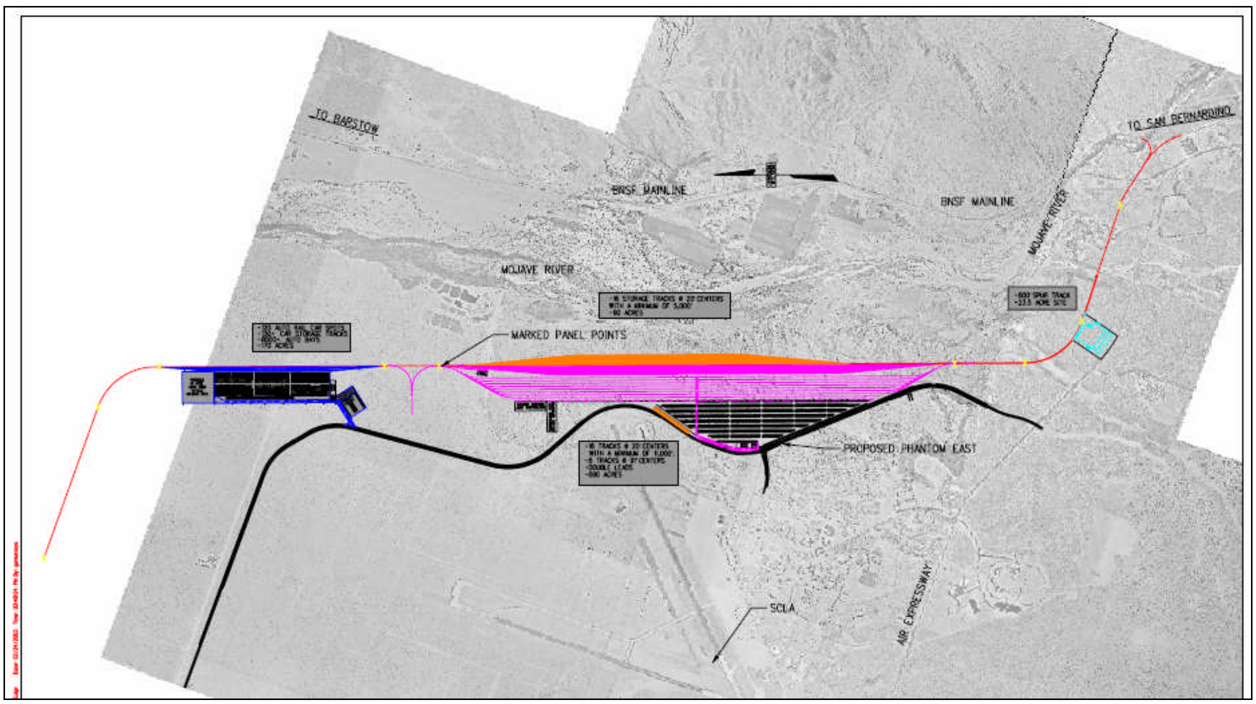
Exhibit 117: Conceptual SCLA Development Plan



Developers of SCLA have envisioned an intermodal rail terminal as part of the development from an early stage. In 2007, BNSF began discussions with SCLA about actually developing such a facility. As noted earlier BNSF has been seeking additional Inland Empire intermodal capacity without success for several years. BNSF has investigated the location and has worked with SCLA to suggest conceptual plans to SCLA that differ from the original conceptual plans shown in many SCLA publications.

The 2003 BNSF preliminary concept is not an inland port terminal designed to handle rail shuttles to and from the San Pedro Bay ports. The concept in Exhibit 118 is a 690-acre conventional intermodal terminal capable of handling multiple trains and traffic flows. As with the existing San Bernardino terminal, an SCLA terminal would likely handle domestic long-haul intermodal traffic to and from points to the north and east. The concept in Exhibit 118 also includes a 170-acre auto loading/unloading facility and a large storage yard serving both terminals. The facility would be accessed on a long spur track from the BNSF mainline. Until such time as it filled up with other business in the distant future, a terminal of this scale could easily accommodate a port rail shuttle. Serving the Victorville area would therefore not require a separate inland port facility.

Exhibit 118: Preliminary Intermodal Terminal Plans for SCLA Site



The Victorville area is a less-than-optimal choice as a rail intermodal terminal for BNSF as it is much farther from the Inland Empire intermodal customer base than the existing San Bernardino terminal.

The major issue with the SCLA site as a near-term “inland port” site is, likewise, its location. Lying north of Cajon Pass, SCLA is not an efficient hub site for trucking to and from Inland Empire port customers. The SCLA site is only 3 miles closer to the Mira Loma area than is the Port of Long Beach, so any VMT savings would be minimal, and would also be offset by the difficulty and cost of trucking up and down Cajon Pass. Any rail shuttle to and from the ports would likewise have to operate over Cajon Pass, a congested and high-cost route.

In the long term, as the Victor Valley area develops into a separate market, the SCLA site may become more attractive. As noted above, serving a *developed* area with new intermodal facilities is inherently difficult. Serving a *developing* area such as Victorville allows the customer base to grow up around the facility.

Extension of a rail shuttle service to Victorville would obviously be simplified if and when a BNSF intermodal facility is established there. The key issues facing such an extension are the emergence of demand and rail capacity on Cajon Pass.

Establishment of an intermodal facility at SCLA should encourage development of distribution and manufacturing facilities that utilize intermodal service, but not necessarily those that have large volumes of port container traffic. SCLA is 40 miles farther from the ports than the edge of the existing Inland Empire distribution center cluster (measured from SR 210 at Fontana), adding 80 truck miles or $80-100 to each round trip drayage move and a comparable incremental cost to each rail move. It may be a long time before enough port-oriented distribution facilities locate in or near Victorville to justify a frequent rail shuttle service.

Exhibit 119, which comes from the SCLA website, emphasizes the outward orientation. There might still be some truck trips back into the Inland Empire and the LA Basin, but most of the DCs in the Victorville area would be primarily serving markets beyond Southern California.

Exhibit 119: Outward Orientation of SCLA Site

Barstow

Moving farther out the I-15 corridor, Barstow offers potential as a future logistics park site. A Barstow site would be positioned as a developing logistics park and/or an agile port terminal.

Exhibit 120: Barstow Location

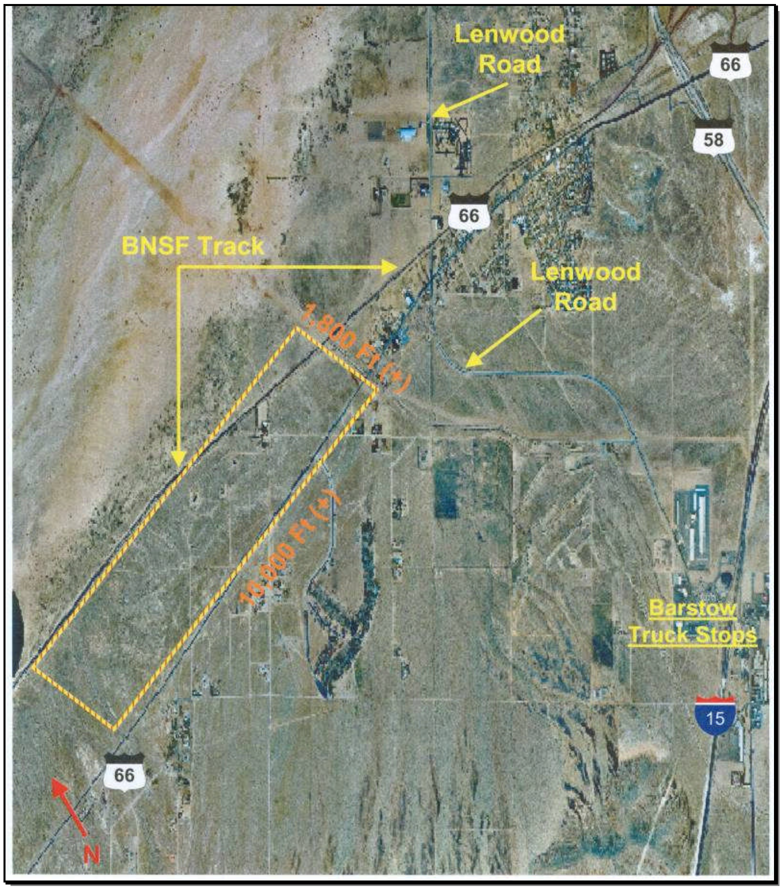
The City of Barstow has identified at least one appropriate site for a rail intermodal facility that could become the nucleus of logistics-related development (Exhibit 120). A potential Barstow site is adjacent to the BNSF mainline with UP trackage rights.

Barstow is experiencing strong economic development trends across a range of commercial and industrial categories. As of June 2007, the economic development office listed over 300,000 square feet of new commercial buildings in progress. The study team is aware of two significant distribution industry initiatives.

- There are advanced plans to develop a Wal-Mart distribution center for food products, including perishables. The Wal-Mart facility would consist of roughly 900,000 square feet on a 143-acre site west of Lenwood Road Exhibit 121, and is expected to open by early 2009. This facility could be expected to receive at least some of its goods from the ports, notably imported produce, foods, and beverages (beer and wine).

- A smaller nearby produce distribution center (85,000 square feet) could also be a potential customer.

Exhibit 121: Proposed Barstow Inland Port Site



A proposed industrial park adjacent to the potential inland port site would cover roughly 1200 acres with buildout between 2007 and 2016. Preliminary plans indicate about 15 buildings, most with rail sidings to accommodate conventional freight cars (rather than intermodal cars). This proposed development would focus on customers and commodities using conventional rail cars but would likely ship and receive intermodal freight as well.

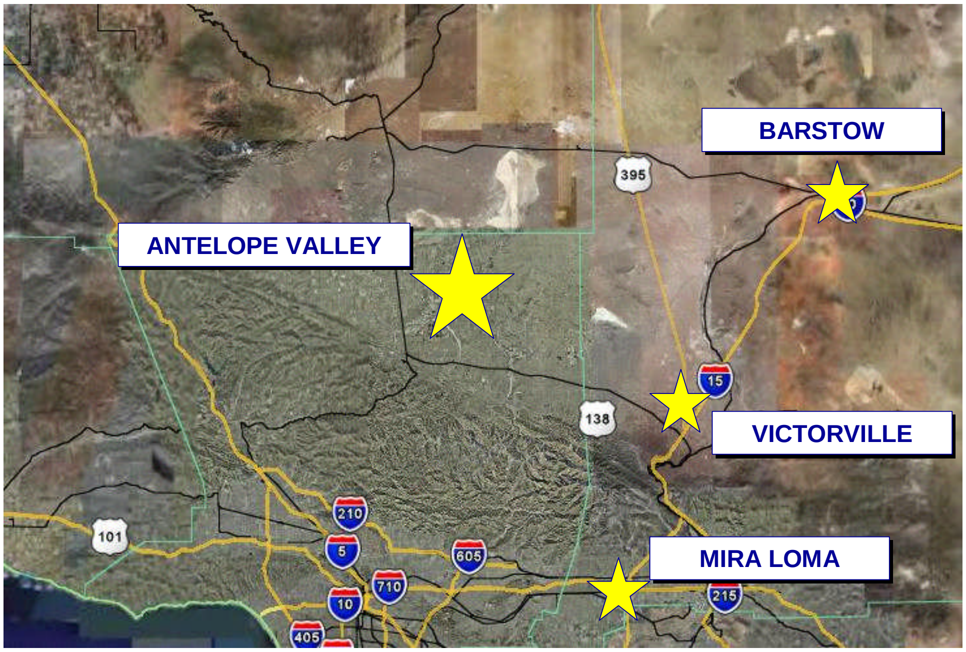
This area is at an earlier point in the development time line. Barstow is established as a rail and truck crossroads, as evidenced by the rail facilities and truck stops. As it emerges as a distribution center location in the future, regional planning agencies may want to link that development with an inland port where possible.

Barstow would also be a logical site to pursue an agile port strategy. The agile port concept calls for port terminals to load as much as possible on rail with a minimum of port-area sorting, and would require a site with abundant space for inland sorting.

Antelope Valley

The Antelope Valley offers two of the things needed for an inland port – rail service and developable land – but is handicapped by geography. Unlike Mira Loma, Barstow, or Victorville which are at major highway junctions, the Antelope Valley is off the major regional truck routes and not well located for near-term distribution functions (Exhibit 122).

Exhibit 122: Antelope Valley Location



The rail line between the Antelope Valley and Los Angeles is a secondary route. The UP line from Palmdale to West Colton (the "Palmdale Cutoff") was actually built in the early 1970s to bypass this older route into Los Angeles.

Development of the Antelope Valley as a distribution hub would be a very long-term proposition, as it would likely depend on significant shifts in regional population and economic development patterns. For the foreseeable future, the Antelope Valley is not in a favorable geographic location to serve either the Southern California population centers or more distant regional markets.

XVII. Institutional Issues

Ocean Carrier Perspective

A significant portion of the containers moving to Inland Empire customers do so under ocean carrier control. Under "store door" rates, the ocean carriers are responsible for delivering the container to final destination, usually by hiring a local drayage firm. The other options are "local" rates, in which the customer is responsible for movement from the port, and "inland point intermodal" (IPI) rates that incorporate a rail move on longer trips.

It is possible that ocean carriers could use a rail shuttle to deliver "store door" containers to customers in and beyond the Inland Empire. The ocean carriers could do so to save money, assuming the rail shuttle and subsequent short delivery drayage were priced below a pure truck move. Ocean carriers might also do so to obtain additional capacity when the fleet of drayage tractors and drivers was insufficient to deliver the full volume of import containers on a timely basis, such as in peak shipping season.

While the ocean carriers may theoretically have control over the "store door" movements, in practical terms the delivery arrangements must be acceptable to the import customer. For the largest, most influential customers the ocean carrier will tender the container to the customer's choice of drayman and pay the drayman's bill. Under those circumstances the customer would have to acquiesce in the shift from all-truck to rail shuttle. In all circumstances the rail shuttle/local delivery option must meet customer expectations for transit time, reliability, and damage control as well as cost.

The study team's discussions with ocean carriers were somewhat hampered by the conceptual state of the rail shuttle/inland port concept. Ocean carriers are generally interested in any opportunity to reduce cost and add capacity. They were, however, skeptical on several points.

- Some ocean carriers expressed doubts regarding railroad willingness to operate such a shuttle or allow others to operate it over railroad lines. These doubts must be acknowledged as realistic.

- Ocean carriers also expressed doubts about the timeliness and reliability of such a shuttle. On-time performance of rail intermodal service has varied over time depending on the railroad and the time period involved.

- Among all the parties contacted in the course of the study, ocean carriers were the most concerned that the International Longshore and Warehouse union (ILWU) might claim jurisdiction over an inland port. If that happened, the ocean carriers felt that costs would escalate due to ILWU wage rates and work rules.

Ocean carriers would be particularly unwilling to pursue the development of an inland port/rail shuttle combination before a new ILWU contract is negotiated. The current ILWU contract will expire in July 2008. Before then, the ocean carriers would be unwilling to do anything that might complicate or jeopardize the negotiations. This timing factor may have little practical impact since it is unlikely that a fully developed inland port/rail shuttle proposal would be ready during the negotiation period.

Study team contacts did reveal ocean carrier interest in a rail shuttle option, but the issue did not have high priority. Ocean carriers face numerous issues in serving Southern California, including container fees, cold-ironing, terminal capacity, and long-haul rail capacity – all of which are considered more pressing than the rail shuttle concept. One major ocean carrier had previously investigated the shuttle concept in detail, but chose not to pursue it.

Beyond the fear of ILWU jurisdiction there was no ocean carrier opposition to the concept. Ocean carriers are willing to use a shuttle if it can perform to their cost, timeliness, and reliability standards.

Drayage Industry Outlook

The ability of the ocean carriers and their customers to rely on conventional highway drayage to the Inland Empire is predicated on continued capacity and reasonable cost. At present, capacity is sufficient in all but peak season conditions. Drayage costs have risen in recent years with driver shortages, higher insurance costs, and rising fuel prices (the latter often covered by a surcharge). The increases, however, have been relatively minor and are not a cause for serious customer concern.

Under existing drayage industry conditions rates will continue to rise slowly for the foreseeable future and capacity will continue to tighten during seasonal peaks. PierPass implementation has allowed for a modest increase in the number of driver trips per day, and will continue to soften the impact of cargo growth. Under those circumstances drayage will remain a concern but is unlikely to experience a near-term crisis.

Those conditions, however, are going to change. Regional and community concerns over emissions have led the Ports to develop the Clean Air Action Plan (CAAP). A cornerstone of this broad, ambitious plan to reduce port-area emissions is the Clean Truck Program, a controversial effort to replace the oldest and most polluting drayage tractors with newer or retrofitted units.

The current plan is embodied in changes to the Port tariffs approved by the commissions of both Ports in early 2008. Those plans call for a progressive ban on older or non-retrofitted trucks. The cost of industry compliance with this plan will be substantial. The Ports are developing a plan to subsidize a large portion of the cost of new or retrofitted tractors. To do so, however, the ports will draw on the same funding sources that might otherwise support a rail shuttle – state infrastructure bonds, congestion and air quality mitigation funds, and container fees. The more successful the Ports are in assembling funds for new drayage tractors, the less the chances of funding an inland port/rail shuttle project.

The remaining financial burden of the CTP will fall on the drayage industry and its customers. Some drayage tractors will be withdrawn from service and not replaced, possibly reducing net fleet capacity.

A second event affecting Inland Empire drayage costs and capacities is implementation of the Homeland Security Transportation Workers Identification Card (TWIC) program. This program, due to be implemented in Southern California beginning in December 2007, requires port drayage drivers (among many others) to pay a fee and submit documentation to obtain the TWIC. While the TWIC requirements cover criminal corrections and other issues ,the biggest impact on the drayage industry will be elimination of many illegal aliens from the driver pool. Immigrants of all kinds account for a very large percentage of all port drayage drivers and it is estimated that up to 20% will either fail to obtain a TWIC or choose to leave the field rather than apply (likelier for illegal aliens).

Reduced capacity and higher drayage rates would lead to greater interest in an inland port/rail shuttle alternative. The costs of local drayage within the Inland Empire would likely rise as well, but neither the CTP or the TWIC program would have a direct impact on them.

A loss of 20% of the driver pool would cut regional drayage capacity by the same amount (assuming that the loss was uniform across the range of full-time, part-time, and occasional port drivers). The loss would not be critical in the slack import months of December 2007 through February 2008, but would begin to hamper port operations as imports rose in the spring of 2008. If the industry does indeed lose 20% of its drivers and cannot replace those drivers by July 2008 when the peak shipping season begins, there will be an acute shortfall.

A study commissioned by the Ports[viii] found that the combined impact of TWIC and the most aggressive proposals in the Clean Truck Program could increase the cost of drayage to the Inland Empire from $300 to as much as $540 per trip, as discussed early in the cost comparisons. Such a large increase could materially change the rail/truck cost comparisons and materially reduce the need for an operating subsidy.

These drayage outlook considerations pose a dilemma for the inland port/rail shuttle concept. By any criteria, large-scale emissions reduction in the immediate port area is a higher regional priority than the rail shuttle. Public support for such emissions reduction strategies will drain resources that might otherwise have supported a rail shuttle. To the extent that drayage costs and rates rise as a result of these programs the truck/shuttle cost gap will narrow and subsidy needs will decline.

A drayage capacity shortfall would increase demand for a rail shuttle, yet that increased demand would likely be restricted to peak season and the rail shuttle could offset only part of the shortfall. An inland port/rail shuttle cannot, therefore, be considered more than a partial remedy for CTP impacts.

The prospect of substantial drayage cost increases and capacity shortfalls does suggest that future distribution center developments cannot rely on cheap abundant trucking to and from the ports. This observation suggests in turn that it would be prudent to consider a rail shuttle alternative in planning for concentrations of distribution activity beyond the central Inland Empire.

[viii] San Pedro Bay Ports Clean Air Action Plan, Economic Analysis; Husing, Brightbell, and Crosby, September 2007

Appendix A: Inland Port Case Studies

Purpose and Scope

This Appendix presents 29 case studies of inland ports and related developments. Although the projects differ widely they have one key element in common: the goal of developing economic activity around transportation infrastructure at inland points.

These case studies were chosen on the basis of their analytic and instructive value. No claim is made that this list is exhaustive.

The information presented here was drawn from a variety of sources, including industry publications, project websites, staff and consultant reports, presentations, and personal contacts. The availability of information is inevitably uneven.

The case studies have been organized into groups.

Satellite Marine Terminals

- Virginia Inland Port
- Metroport, New Zealand

Satellite marine terminals are the only type of inland ports that act as extensions of specific seaports. Both Virginia Inland Port and Metroport in New Zealand are owned and operated by the Ports of Virginia (Norfolk) and Tauranga. Both are connected to their parent ports by rail intermodal shuttles.

Multimodal Logistics Parks

- Alliance, Texas
- Port of Huntsville, Alabama
- Rickenbacker/Columbus Inland Ports
- Logport, Duisburg Germany

These developments have used multi-modal infrastructure (air-rail-truck, or sea-rail-truck) as the core of business/industrial parks. Whereas conventional business or industrial parks seek office buildings or manufacturers as "anchor tenants", these "logistics parks" use the transportation infrastructure as a selling point. These developments have much in common with the shippers, consignees, and ancillary businesses that surround seaports. They are "inland ports" without being extensions of seaports.

Rail Intermodal Parks

- Joliet Arsenal (JADA)
- Global III, Rochelle, IL

- Port of Quincy, WA
- CILC, Shafter, CA
- Neomodal, Stark Co., Ohio
- Detroit Intermodal Freight Terminal
- Port of Montana

Almost all rail intermodal terminals are built and owned by the railroads. In a very few cases public or public/private agencies have created intermodal terminals in the hopes of encouraging development in the same manner as the multimodal logistics parks. Of the rail intermodal initiatives, only the Joliet Arsenal project has attracted significant new business development beyond the terminal itself. Some of the other projects have achieved modest progress to date, some are dormant, and some have yet to start.

Logistics Airports

- Europort Vatry (France)
- San Bernardino International
- Kelly USA/Port of San Antonio, TX
- Southern California Logistics Airport (Victorville)
- March Global Port
- Global TransPark

These "logistics airport" developments have as their core an all-cargo (or primarily cargo) airport. Europort Vatry was purpose-built, Global TransPark converted Kingston Regional Airport, and the others are former military air bases. (Rickenbacker, Huntsvile, and Alliance Texas also have cargo airports, but have rail intermodal terminals as well.) Some of these efforts have attracted significant logistics-based development, notably Europort Vatry. Others have primarily attracted aircraft industry firms with a need for runway access.

Networks and Corridors

- PANYNJ Port Inland Distribution Network
- Heartland Corridor
- North American Inland Ports Network

These projects link together inland ports, seaports, and related developments into operating networks or corridors. Some of the other case study developments, for example, are part of the Heartland Corridor or the North American Inland Port Network. These networks and corridors have been included to illustrate the potential of linking individual initiatives.

Shuttle Services

- Albany, NY Barge Service
- Worcester-Keary Rail Shuttle

Since rail or barge shuttles are an integral part of many inland port concepts, these two case studies of the shuttles themselves (rather than of the facilities they serve) have been included in this Appendix. The Albany Barge Shuttle has been discontinued; the Worcester-Keary rail shuttle continues to operate.

Trade Processing Centers

- Richards-Gebaur
- Port of Battle Creek
- Kingman, AZ ITPC
- Greater Yuma Port Authority

U.S. Customs and Border Protection has encouraged the concept of International Trade Processing Centers (ITPCs) to shift some of the trade-related activity away from congested ports and border crossings. The case studies presented here involve proposed ITPCs; non have been built or are in operation. These proposals differ from the others in that the development attraction is presumed to be a regulatory function, "trade processing" that requires a physical location rather than a transportation or logistics function.

Economic Development Initiatives

- KC SmartPort

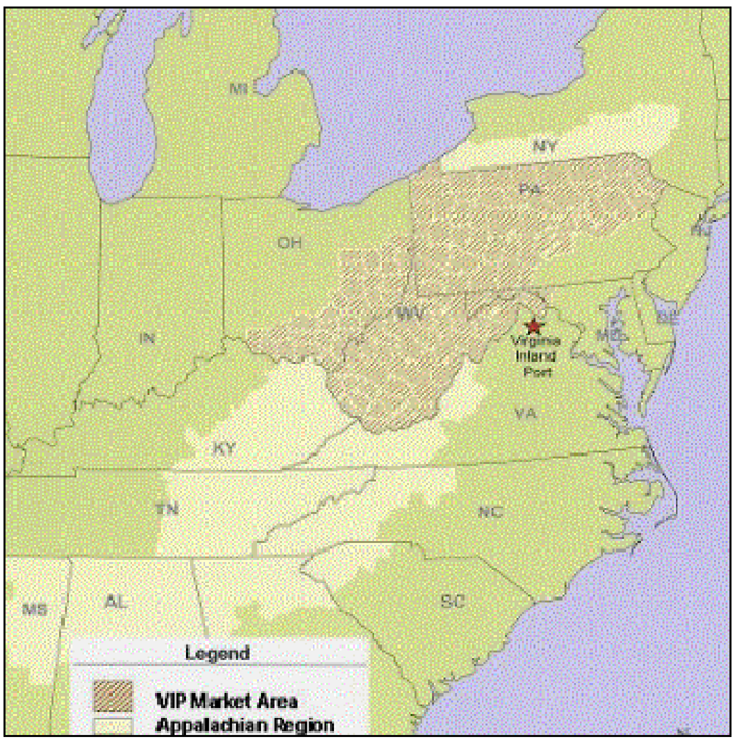
KC SmartPort is unique among the case studies as not involving a specific facility or site. KC SmartPort is an economic development initiative designed to bring business to Kansas City by virtue of the area's transportation and logistics capabilities.

Virginia Inland Port

Overview

The Virginia Inland Port (VIP) concept was first explored in the early to mid 1980s with the project's main purpose being to capture a larger market share for the Port of Virginia (Norfolk). At that time, cargo from the Ohio Valley was primarily being sent through the Port of Baltimore. The market expansion was intended to be a powerful sales tool in convincing additional ship lines to add Norfolk to their schedules or to increase their business in Virginia. Initial examination of this Ohio Valley market revealed a potential for 100,000 annual containers. The Virginia Port Authority (VPA) determined that one way to attract this business was to build an intermodal facility close to these areas that could be linked by rail to the port area. Exhibit 123 illustrates the Appalachian Region market area for the VIP.

Exhibit 123: VIP Market Area



Planning for the inland port began in earnest in 1984 and involved a series of meetings among representatives of all transportation modes, shippers and brokers. VPA and Norfolk Southern (NS) reached an agreement in January of 1987 enabling the VPA to proceed with the inland port development. Several sites were examined with NS officials and local area leaders before the eventual site in Warren County, VA (Exhibit 124) was selected. This site has easy access to I-66, I-81 and ADHS Corridor H, and has 1,400 feet of common boundary with Norfolk Southern. The initial concept was to run a dedicated NS train three days per week between Hampton Roads and VIP. It was anticipated that this level of service would attract approximately 20,000 international containers annually.

One advantage was that the funding fell into place rather easily and did not require any borrowing to support VIP construction. The original funding was easier than expected due to a series of fortunate circumstances, including: the election of a new Governor committed to transportation infrastructure, a special session of the General Assembly, and a report from the citizen advisory Commission on Transportation. Legislation was passed in 1986 to create a Transportation Trust Fund. The inland port was constructed with money entirely from the Trust Fund. The original $10.75 million and subsequent $2.25 million was paid in cash, on a pay-as-you-go basis. Thus, Virginia managed to avoid incurring debt in the construction of the intermodal facility.

The Virginia Inland Port started operations in 1989 with initial annual volumes of 8,000–9,000 containers. The VIP's annual throughput volume approached the targeted level of 20,000 international containers annually in 1999 and was near that level through 2001. Logistics Today reports volume at 14,000 moves in 2003, some 28,000 in 2004, and 35,000 in 2005.

Exhibit 124: VIP Site

Services

Norfolk Southern (NS) railroad provides the intermodal service between two Virginia Port Authority (VPA) Terminals, Norfolk International Terminal (NIT), and Virginia Inland Port (VIP).

- NS provides the train service and rail cars.
- VPA owns both terminals. VPA is an independent corporation created by the commonwealth of Virginia for the purpose of operating the state's ports and able to execute contracts with labor unions.
- VPA operates both terminals through its subsidiary, Virginia International Terminals (VIT).
- The terminal in Front Royal is pictured in Exhibit 124. Its menu of services includes a warehouse facility, mechanical repairs, USDA inspections, SGS inspections, pool chassis, generator sets for refrigeration units, as well as power hook ups. The facility is a U.S. Customs-designated port of entry, and the full range of Customs functions is available.

- The marine carriers are the customers of VIT. The cargo largely remains in bond and clears customs in Front Royal. Some of the cargo may move on a through marine bill of lading with final destinations in Northern Virginia, West Virginia, Western Maryland, Pennsylvania, and Ohio.
- VIT contracts with NS to provide a second morning train service scheduled six days per week in each direction. VPA markets this service to marine carriers as a part of its terminal service package.

Norfolk Southern has a flat rate charge to VIP for box movement to VIT shown in the VIT tariff (Exhibit 125).

Exhibit 125: VIP Tariff Rates, February 2006

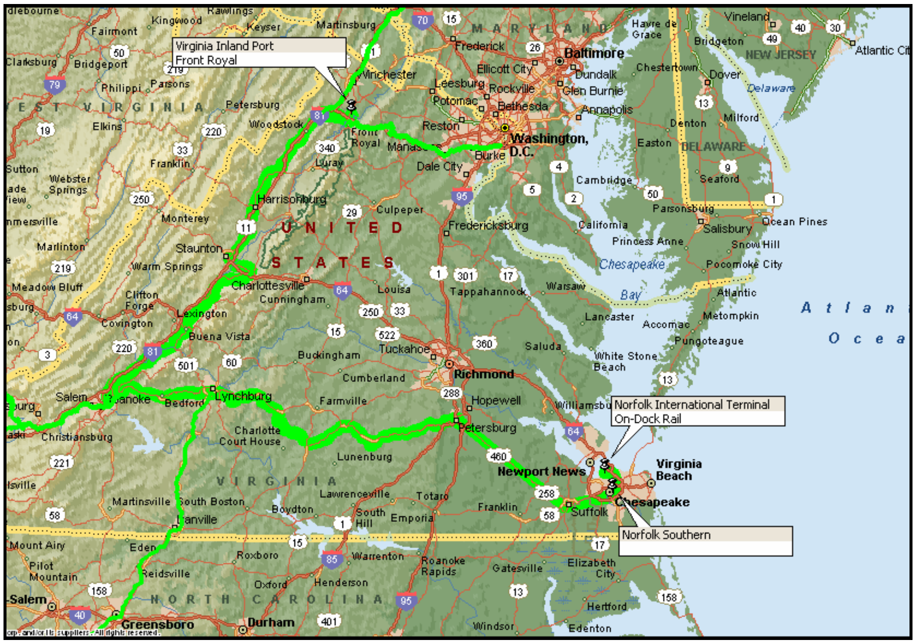
	Loaded	Empty
TOFC	$449.00	$366.00
COFC	$271.00	$188.00

The original arrangement between NS and VIP when VIT opened in 1989 was a 3-day-per-week train, take or pay. That has evolved to a flat rate between Hampton Roads and VIP. The containers can move on any NS train that runs to or through Front Royal, but there is a train each way 5 days per week that originates at VIT to VIP as well as a reverse train from VIP to VIT.

The highway distance between VIT and VIP is about 220 miles which makes the published load/empty round trip COFC rail rate less than $1.05 per mile, much less than any conceivable motor carrier drayage rate. The TOFC rate on the same basis is $1.85 per round trip mile which would indicate that VIT and NS would not really be interested in TOFC in this market. NS rail mileage is 400–450 miles one way, so NS is paying a circuitry penalty in this lane of about 100%.

In Norfolk, the cargo can originate at the on-dock rail terminal at NIT, and at NS's Chesapeake, VA facility. Shipments from Front Royal terminate at NIT. The Front Royal terminal is located less than a mile from I-66 and less than five miles from I-81. The thick green line on the map in Exhibit 126 illustrates the NS rail route between the terminals.

Exhibit 126: VIP Location



For the most part westbound containers are loaded at the on-dock rail facility at NIT. In addition, containers can be drayed between the marine terminals in Portsmouth and Newport News to the NS terminal in Chesapeake, VA. The NS route to Front Royal is via Roanoke, VA, then north on its line which runs along I-81. Cut off for receipt of cargo at Chesapeake is 10:00 p.m. Containers or trailers are available in Front Royal at 7:00 a.m. the second morning. The operation is reversed to move containers from Front Royal to Norfolk with service offered only to NIT.

Competition

The following is an excerpt from, *VIRGINIA INLAND PORT; The Case for Moving a Marine Terminal to an Inland Location*, which was prepared for the American Association of Port Authorities Professional Port Manager Program by J. Robert Bray, Executive Director, Virginia Port Authority.

> *The original marketing plan was based on aiding ship lines who had abandoned Baltimore to maintain their Ohio Valley base of business which the lines had previously carried over Baltimore. The lines at the time (1989) were carrying cargo to and from Baltimore by truck or barge. VIP rail charges were less, so in theory VIP gets the cargo. ... As is always the case, VIP truck and barge competition dramatically cut their rates. In the years following the opening of VIP, truck and barge costs plummeted by as much as $125 per container. This caused an immediate effort on our part to concentrate on Virginia business found in and around VIP. We have succeeded in this endeavor. While reacting to changed transportation costs, we continued to pursue marketing presentations to all current and potential ship line users. These meetings focused on market research, operational flexibility, closed loop on equipment, rate comparisons and cost savings over existing liner methods for handling intermodal containers. We pitched - if it reaches VIP - it is on the ship.*

Our task has been made difficult by a reluctance on the part of some custom-house brokers and international freight forwarders to assist and some have continued to insist on a Baltimore bill of lading; some ship lines are hesitant to offer a VIP bill of lading without an arbitrary charge to cover the rail movement; and the rationalization of equipment and services has enabled ship lines the option of handling cargo from more ports at a reasonable cost.

Regional Benefits

Since VIP opened, it has spurred nearly $600 million in private sector capital investments. It is estimated that 95 percent of the business generated by the VIP is new business for the Port of Virginia-Hampton Roads (i.e., this freight traffic has been captured from other ports).

The local community expected that the VIP facility would stimulate regional economic development. This local expectation caused VPA to shift from the original plan concentrated on international containers to a broader program encompassing domestic rail service and regional economic development (increasing jobs, wages and taxes), which is its core mission to the Commonwealth of Virginia. Operations at the VIP are conducted by about 17 full-time employees. The VIP has been generating operating profits. Its establishment is associated with strengthening the competitive position of Virginia's ports relative to their East Coast competitors, and has resulted in increased business investment, and employment in nearby Appalachian Region areas.

The VIP terminal has been in operation since 1989 with rail intermodal service from and to the Port of Virginia. Over that time, 24 major companies have located distribution centers near VIP with investment of $600 million and over 6.25 million square feet of buildings. These firms actively take advantage of the Port to ship a variety of products overseas, including plastics, medical supplies, apparel, auto parts, furnishings, food, paper, and four-wheel-drive vehicles. *(Virginia Port Authority, 1999)* Logistics Today (December 2005) reports that, "*Although imports flow through VIP, [export] poultry, logs and lumber represent a major part of the facility's freight.*"

Long-Term Direction

The Virginia Inland Port seeks to increase container volume by marketing the facility and its benefits to shippers. Marketing plans are carried out in conjunction with economic development efforts based on the freight mobility the VIP offers the region. In 1995, a long-term VIP Mission and Strategic Plan was created that advocated making the inland port the focal point for regional economic activity. To this end, the Virginia Port Authority created an Economic Development Center, including an administration building and warehouse facilities at the VIP.

Needs and Next Steps

Any VIP infrastructure improvements and expansion will require additional funding. However, the VIP may not need to rely solely on public financing for any expansion funds; the facility has been self-sufficient and operating profitably since 1994. As of this writing expansion is underway. Beyond targeting and increasing market-share from within the existing VIP market area, the Port of Virginia also seeks to expand the VIP market area and customer base. This plan will involve significant area and regional economic development efforts. In conjunction with Washington-Dulles International Airport, ongoing efforts have been made to develop the corridor between the two facilities as a principal freight distribution center/hub. This involves attracting warehouse and distribution facilities (and ancillary support infrastructure) to the area. Expansion of the Foreign Trade Zone to land and facilities surrounding the VIP is also seen as a positive step for the Port. Such an FTZ expansion would include land owned and operated by various economic development agencies in the region.

Success Factors

This operation has been successful because:

- There was **Capital and Commitment** to develop the terminal driven by the strong resolve of the Commonwealth to develop its ports. As Mr. Bray reports, *During this time frame, the Virginia General Assembly created a Transportation Trust Fund (TTF). The TTF is composed of a set-aside of certain taxes on gasoline, titling taxes and sales and use taxes. The VPA receives 4.2 percent of the TTF as the Commonwealth Port Fund (CPF). This CPF is used for capital development and maintenance by VPA and this certain source of funding made possible serious consideration of an inland port.*
- The **Marketing Plan** was viable and flexible enough to accommodate change. While the original target market was Baltimore-billed Ohio Valley cargo handled over the Port of Norfolk, the market that has emerged is based on improved transportation access to the region and its impact on the local economy. The regional economic development was created by the VPA's terminal infrastructure investment and the availability of necessary terminal services to support the marketing plan described above.
- Norfolk Southern is a **willing Class 1 railroad**. Norfolk Southern has a long-standing and symbiotic relationship with the Virginia Port Authority which supported the development of VIP. There was a commitment to run the train and absorb the train operating cost even during the long start up period.

Metroport, New Zealand

Overview

Established in 1999, Metroport Auckland is New Zealand's first inland port focused on landside container flow. Tranz Rail links this inland port to the Port of Tauranga. Metroport is located in South Auckland's manufacturing region approximately 140 miles away from the maritime port. (Exhibit 127)

This facility is a Customs bonded site, meaning that imports do not undergo Customs transactions at the maritime port, but are brought to the inland port where the necessary federal transactions are made. Metroport does not have Customs officials on-site, but paperwork is handled at the city office. Agricultural goods are handled in the same way at Metroport.

Tranz Rail owns the land at the Metroport site. However, the land improvements and the computer system are owned by the Port of Tauranga. The port is publicly listed and the main source of funding for Metroport comes from the fee charged per container handled.

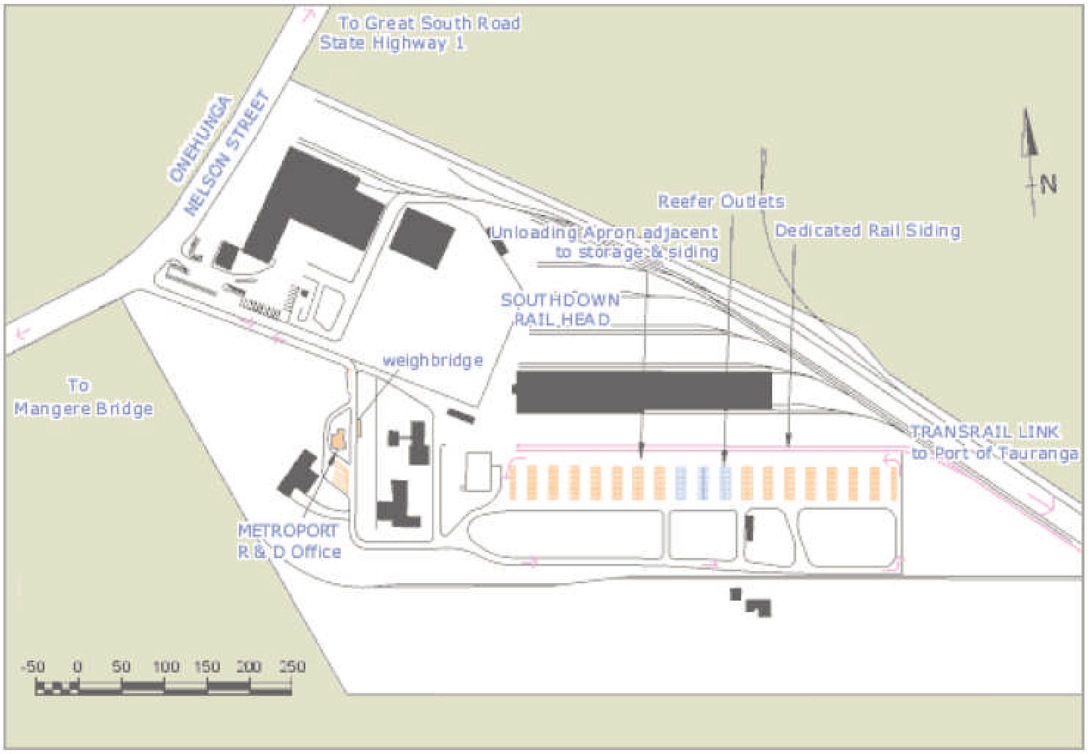
Exhibit 127: Metroport Auckland, NZ

The Port of Tauranga is New Zealand's fastest growing port. A key part of maintaining its competitive position, particularly with the Port of Auckland itself, was to provide an efficient way to deliver the containers from Tauranga to Metroport in Auckland after they were unloaded.

Services

Metroport (Exhibit 128) operates by contracting with shipping lines that call at the Port of Tauranga. When the import cargo arrives, it is off-loaded and railed to Metroport. At Metroport, containers clear customs and are trucked to their final destination. The reverse process applies to exports arriving at Metroport. The trip from Metroport to the Port of Tauranga takes approximately 4 hours on the main north-south trunk rail line in New Zealand.

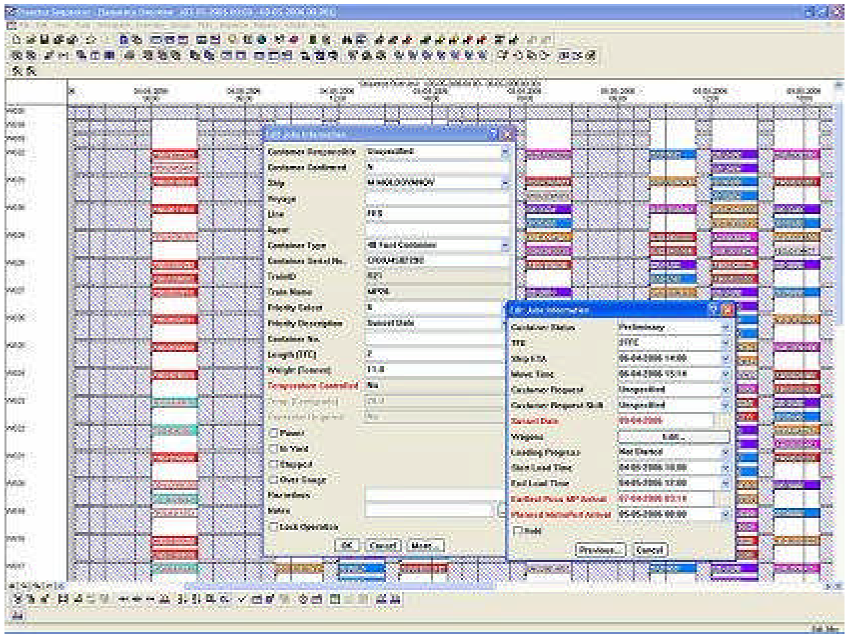
Exhibit 128: Metroport Facility Plan



The Port needed a system that could automatically allocate containers to cars within a train, taking into account the train capacity, loading rules, and service level objectives. In addition, the system would need to fully integrate with the other software systems that dealt with vessel arrival schedules, container details (Navis SPARCS), and the proposed train schedules and consists. They also wanted to provide a web portal to allow customers to manage the arrival times of their containers.

A commercial system called Preactor was customized. Each container was represented as a bar, color coded for easy identification and a train load as a set of bars arranged vertically with the last car at the top. The train schedule is read in together with container arrival times and the customer's expected delivery dates (Exhibit 129).

Exhibit 129: Preactor Scheduling System



About 48 hours before the vessel ETA the customized Preactor scheduling rule assigns the containers to each car in each train and generates a train plan which is published to a web site. The system is called ShuttleSelect and allows customers to see exactly when their cargo is due into MetroPort Auckland. In addition they can modify delivery time to a cut off point of 6 hours to vessel arrival.

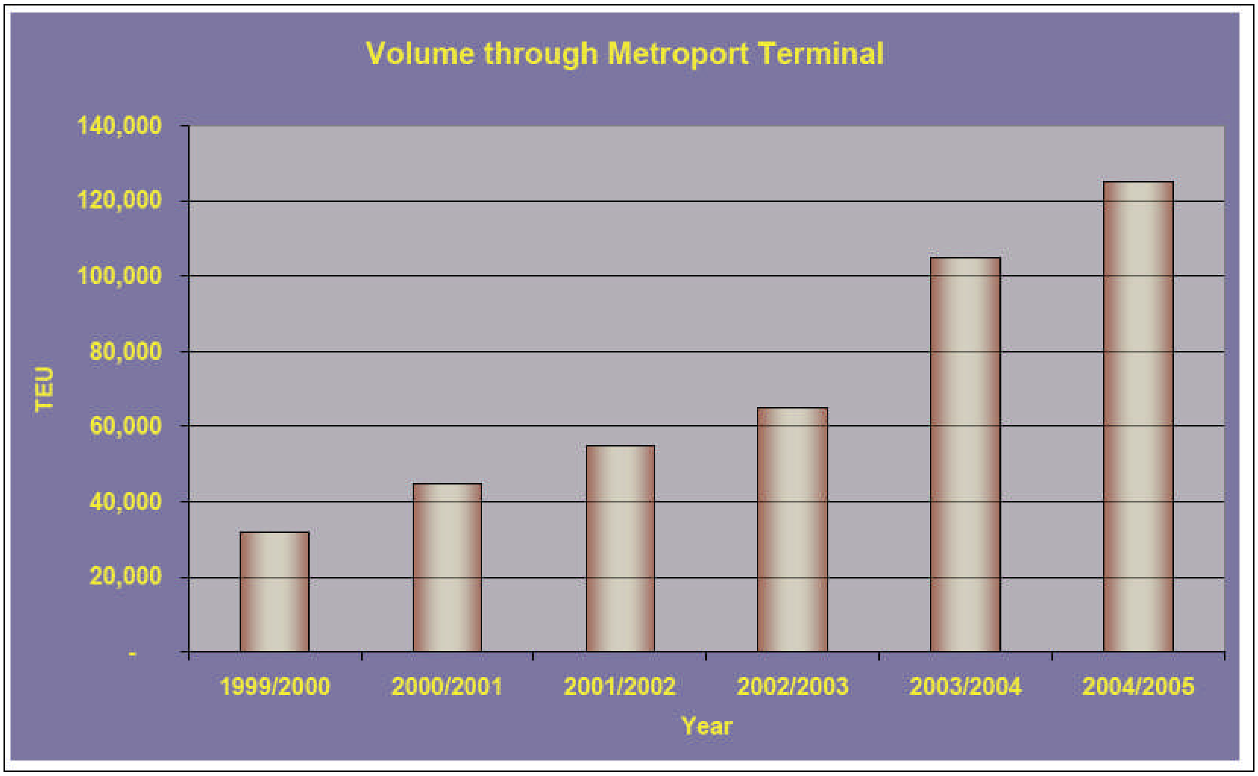
For the customer the advantages of ShuttleSelect are:

- It allows them to select a time for container deliveries from Tauranga to Auckland. Changes are possible as needed within the 'change window' of 6–48 hours prior to vessel arrival.
- By knowing container delivery times in advance, ShuttleSelect allows them to better plan their own unloading and distribution processes. Customers can prioritize urgent deliveries and stagger the rest as required, taking advantage of longer free delivery time.
- They can, by managing their own containers on-line, eliminate extra steps in the process and therefore save time and money.

Success Factors

Although not emphasized in the descriptions, Metroport is an extension of the Port of Tauranga's commercial presence in the Port of Auckland's market (much like VIP's situation relative to the Ports of Norfolk and Baltimore). Metroport is therefore a commercial initiative, not a public effort to reduce truck travel or improve system efficiency. Tauranga has traditionally been an export port, with Auckland dominating the import trade. Metroport has successfully grown the Port's cargo share in the Auckland area.

Exhibit 130: Metroport Cargo Growth



Ease of use and rail service frequency are key factors in Metroport's success. The rail shuttle operating over Tranz Rail between Tauranga and Metroport has three departures each way on most days, with two to three on Monday and four on Sunday. This is a very high level of service for any rail intermodal operation.

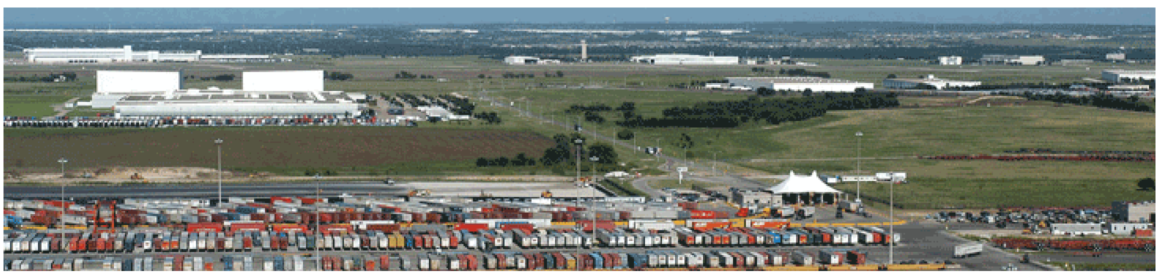
Alliance Texas Logistics Park

Overview

Alliance Texas (Exhibit 131) is located 15 miles north of downtown Fort Worth and 15 miles west of Dallas/Fort Worth International Airport. Covering some 15,000 acres, Alliance is one of the largest and most successful master planned developments in the country. Existing air, rail and highway systems have been greatly expanded and upgraded in order to connect Alliance with a full range of domestic and international markets. Business activity is further enhanced at Alliance by a foreign trade zone, an enterprise zone, a world trade center, high-tech telecommunications facilities (with state-of-the-art fiber optics), and an inventory tax exemption.

Hillwood, a Perot Company, operates the business park which now houses more than 140 companies, including 62 from the Fortune 500, Global 500 and Forbes List of Top Private Companies. These firms have invested more than $5 billion to build 24.4 million square feet and create 24,000 fulltime jobs. Many of these are also served by the BNSF intermodal facility.

Exhibit 131: Alliance Logistics Park



Alliance is divided into multiple sub-developments:

- Alliance Center, a 2,600-acre complex that encircles the airport and is geared primarily towards aviation-related enterprises.
- Alliance Commerce Center, a 300-acre business park for manufacturing and high-tech firms.
- Alliance Air trade Center, a 52-acre air cargo development with direct access to the Alliance Airport runway system, direct access to Interstate 35W, and over 250,000 square feet of space for cargo companies.
- Alliance Gateway, a 2,400-acre distribution, manufacturing, and office sector for large distribution and industrial firms.
- Alliance Advanced Technology Center, a 1,400-acre technology complex.
- Heritage Reserve at Alliance, which offers locations for research and development facilities in a natural setting.
- Westport at Alliance, a 1,500-acre industrial and distribution sector located on BNSF's main line and intermodal terminal.
- Alliance Crossing, a 170-acre retail complex.

Major ground transportation routes through Alliance include I-35W and State Highways 170 and 114. Dallas/Fort Worth International Airport is only 20 minutes travel time to the east.

A variety of economic incentives have been made available to spur business development at Alliance. These include a foreign trade zone designation, a triple Freeport tax exemption, and enterprise zones that encourage job creation and capital investment in designated areas for a period of seven years. Alliance operates its own 3PL firm, called Alliance Operating Services. AOS provides such services as foreign trade zone assistance, overseas container processing and third-party warehousing. A number of other 3PL firms also operate at Alliance, producing a wide range of possibilities for tenants seeking to outsource part of their operations.

Educational and technical training programs also are provided. The Alliance Opportunity Center offers technical training for companies located at the park.. Texas Christian University's TCUglobalcenter at Alliance offers advanced degrees and provides conferencing facilities.

Alliance also offers the services of TeraSpace Networks to build and market data centers across the country. TeraSpace has recently completed the first phase of a 1.1-million-square-foot internet data center on the eastern side of Alliance. The company also provides power and fiber optic connectivity to more than a dozen web-hosting and carrier-hotel companies that offer their services to Alliance tenants.

Companies originally chose to locate at Alliance because of its availability of relatively cheap developable land, access to a large work force, access to intermodal facilities, and economic inducements. Alliance has been labeled an "e-commerce fulfillment center" because of the prominence of companies that are engaged in filling business-to-business and business-to-consumer orders via the internet. The most prominent of these businesses include At&T Wireless, Ameritrade, W.W. Grainer, Dell Computer, and UPS Logistics Group.

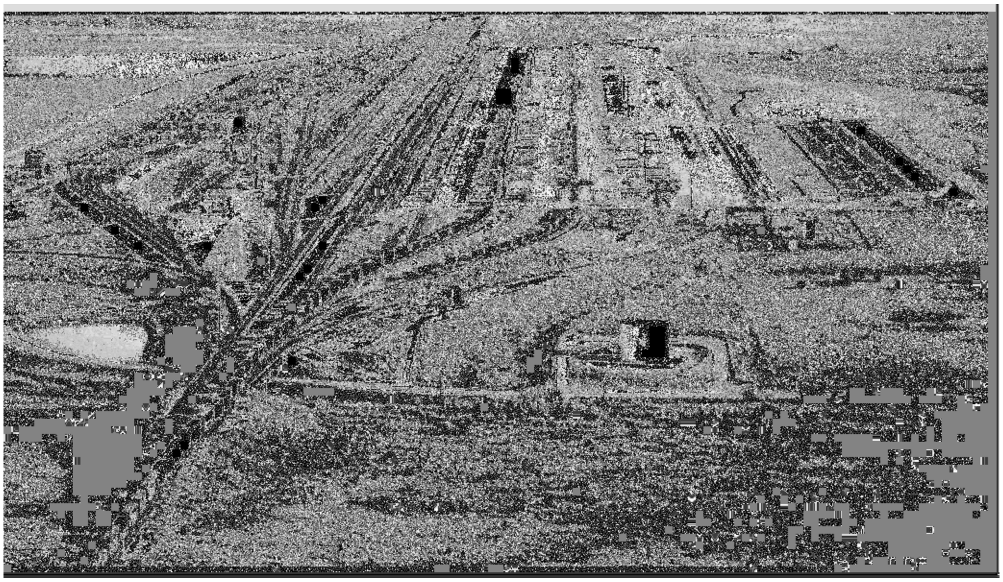
About 4.38 billion dollars have been invested so far in Alliance, 96.7% from private sources. This investment has translated to 18,167 permanent jobs created and $147 million in property taxes generated over the last ten years.

Rail Intermodal Terminal

On the western border of the park, BNSF Railroad operates a 735-acre intermodal yard. Alliance has designated 1,500 acres immediately east of the intermodal yard for rail clients to locate distribution centers. Since 1994 BNSF intermodal terminal services have been provided at a facility operated in partnership.

The BNSF Alliance intermodal facility (Exhibit 132) is located on the main line of the BNSF and is comprised of 280 acres and about 2000 parking spots. There are an additional 160 acres available for expansion. In 2005 the terminal handled 573,000 lifts.

Exhibit 132: BNSF Alliance

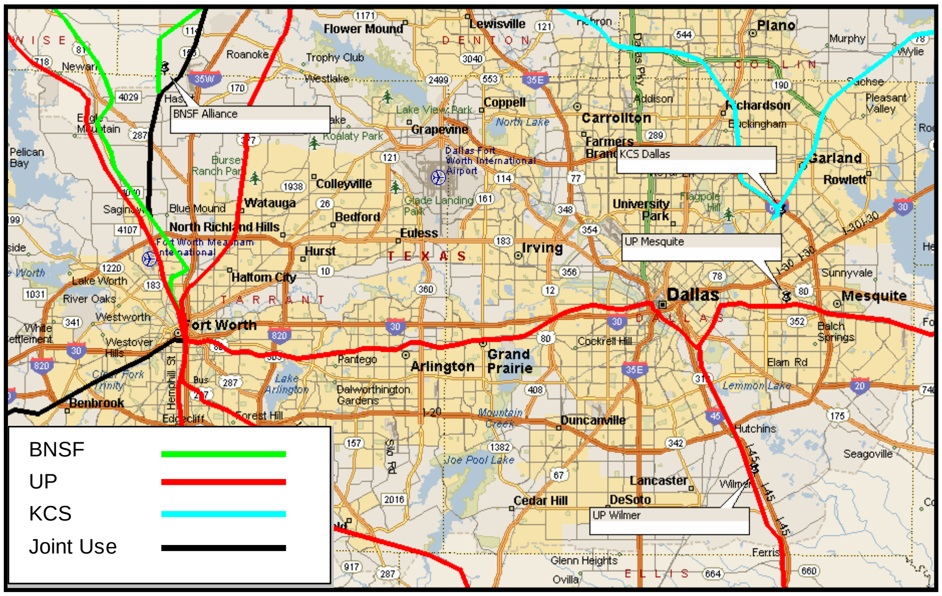


In the late 1980's, during the planning process for the then new Dallas Area Rapid Transit System (DART), planning authorities determined that the Santa Fe's rail intermodal facility in Dallas was required for use as a support facility for the system. As a result the Santa Fe conducted a series of studies to determine the best location for a new intermodal terminal in the region with the result that a decision was made to construct the new facility at the Alliance Industrial Park. In the process, surplus property and rail lines were sold. The proceeds were combined with those from the sale of the Dallas facility to fund the new Alliance terminal.

This facility, which was designed and constructed by Hillwood, was funded by BNSF. BNSF purchased the land from Hillwood. The initial cost of construction was in excess of $100 million. For the railroad this industrial park provides customers while for the developer the rail terminal serves to increase the commercial value of the property.

Rail Intermodal Service

Exhibit 133: Mid-Texas Intermodal Terminals



Air Cargo Services

Fort Worth Alliance Airport is the first purely industrial airport in the Western Hemisphere. Planning for the 7500-acre Alliance Airport began in 1988 with the objective of serving business and industrial uses rather than commercial passenger traffic. The airport officially opened on December 14, 1989. The facility features the full complement of flight services for general and industrial aviation.

AFW offers direct taxiway access to nearby corporate residents in Alliance Center. World-class concierge services for pilots, crew and passengers are coordinated by Alliance Aviation Services, which manages the Fixed Base Operation (FBO). The airport accommodates air cargo, corporate aviation and military operations.

In 2005 Fort Worth Alliance Airport handled 220,134 metric tons of cargo, an increase of 28% over the 172,046 metric tons that passed through the facility in 2004. 242,210 metric tons were handled in 2000. AFW has the current capability of handling freight/cargo on any sized aircraft.

In addition to serving the general aviation and cargo needs of the tenants of the industrial development and nearby areas, the Alliance facility is home to FedEx's Southwest Regional Sorting Hub, American Airlines aircraft maintenance and engineering center, the Federal Aviation Administration's Flight Standards District Office and a number of other aviation companies.

The surrounding development area currently supports a total of 29 tenants occupying about 4.92 million square feet of space. Among the tenants are FedEx, which is constructing its 230,000-sq. ft. state-of-the-art Southwest regional sorting hub, and American Airlines, which recently established a $481 million aircraft maintenance and engineering center at Alliance.

The airport received $4.5 million in Airport Improvement Program funds from the FAA to extend both runways to 11,000 feet to accommodate larger jets. Fee simple ownership of large tracts of land with direct runway access is a unique airport feature. The U.S. Customs Service has on-site facilities, allowing international flights and cargo to be cleared at the airport.

Auto Loading Services

The 55-acre auto facility is a conventional rail transfer facility and serves DaimlerChrysler, American Honda, Hyundai and a number of other manufacturers and automotive re-marketers.

Competition

Union Pacific has two intermodal terminals in the Dallas-Fort Worth area that compete directly with Alliance. A primarily domestic terminal is located in Mesquite and a primarily international terminal is located in Wilmer. This brand new UP terminal advertises being adjacent to a planned 4,500-acre industrial park. Kansas City Southern (KCS) operates an intermodal terminal located in Dallas and is often considered a business partner of BNSF in this market, particularly for east/west movements.

Success Factors

This facility started the trend toward synergistic development of business parks and intermodal terminals. There was some concern initially about the distance of the new facility from the Dallas Metro area, primarily related to drayage costs. While this may be a negative factor, Alliance has been a very successful development. Hillwood was also highly interested in having an intermodal facility as an adjunct to the industrial park and actively markets the synergistic relationship between the intermodal terminal and the industrial park. For example, J. C. Penney developed a major distribution center that was planned to receive 18,000 inbound containers annually and distribute goods to approximately 1,000 stores located east of the Rockies. All the inbound and many of the outbound loads will move via the BNSF intermodal facility.

The airport was sited to serve the greater Dallas-Ft. Worth area and points beyond. As with other cargo airports its initial tenants were aircraft and airline industry firms, not cargo shippers or consignees.

The rail intermodal terminal was relocated from Dallas to Alliance and therefore had a pre-existing clientele. The Hillwood Group has been a very effective master developer and "champion" for the project.

The Port of Huntsville, AL

Overview

The Port of Huntsville is an inland port complex located in Northern Alabama (Exhibit 134) comprised of three operating facilities under the jurisdiction of Huntsville–Madison County Airport Authority: Huntsville International Airport, the International Intermodal Center, and Jetplex Industrial Park. The mission of the Port of Huntsville is to provide quality multi-modal transportation services to a diverse regional customer base and to stimulate the economic growth and development of the Tennessee Valley Region.

The driving force of the Airport Authority created the Port of Huntsville. The Airport Authority also financed and built the intermodal terminal and convinced NS to provide service. Facilities and infrastructure significantly exceed current demand and provide long-term capacity for growth.

Exhibit 134: Port of Huntsville Market Region

International Intermodal Center (IIC)

The IIC (Exhibit 135) is divided into two distinct operations: rail cargo, which began in 1986, and air cargo which began in 1987.

Exhibit 135: Huntsville International Intermodal Center

The rail intermodal terminal is co-located with the air cargo terminal on the east side of the airport. The terminal is served by Norfolk Southern (NS) whose main line between Memphis and Chattanooga passes about 4 miles north of the terminal. The terminal is owned by the Airport Authority and operated by Authority employees. NS pays a lift charge to cover the cost of the terminal operation. The facility handled 22,000 lifts in 1999 and has grown to 35,000 lifts in 2005. With a recent expansion, terminal lift capacity is estimated at 100,000 lifts.

The terminal is served by two NS trains per day, one eastbound and one west bound. NS main line trains pick up and set off Huntsville blocks which are switched to and from the facility by NS local switch crews. Authority personnel provide terminal switching with their own locomotives. About 90% of the volume at the terminal is international containers with 60% to 70% of that moving over west coast ports. West coast volume is interchanged to NS at Memphis by Union Pacific or Burlington Northern Santa Fe. The remaining international volume moves over the ports of Savannah and Charleston or the Florida Ports of Jacksonville and Miami. NS also provides domestic service, principally in domestic containers, to Rutherford, PA, (Harrisburg) and Erail, NJ, (Elizabeth). Service frequency is five days per week for both eastbound and westbound services. Considering the volume and the size of the local market, the service frequency and port coverage is quite good.

The air cargo facility includes a 200,000 square foot terminal building for domestic and international air cargo along with 1 million square feet of cargo ramp space. Air cargo was a primary goal of Huntsville planners throughout the facility's development process. In 2004, HSV was ranked 18th among U.S. airports for international air cargo tonnage.

The IIC provides Customs services for both international air cargo and rail containers, along with services offered by a number of freight forwarders, customs brokers and ground handlers. In addition, the designation of Foreign Trade Zone 83 gives manufacturers and processors the ability to take advantage of duty deferral, duty reduction and other FTZ cost savings.

Huntsville International Airport

HSV began operations in 1967 as Carl T. Jones field when the regional airport was relocated from downtown Huntsville. At that time, the airport was built with two parallel 8,000–foot runways with one mile separation enabling simultaneous operations during instrument conditions. After expansions in 1991 and 2005, the airport runways are now 10,000 and 12,600 feet giving HSV the capability to handle any size aircraft in service today, including the new Airbus 380. Current air operations utilize less than half of current airport capacity.

Jetplex Industrial Park

The Jetplex Industrial Park has 4000 acres of industrial sites located in and around the Huntsville Port complex, with over 2,800 acres available for immediate development. JIP has excellent access to air, rail and highway transportation infrastructure along with the related services described above. This creates a competitive advantage for locating industry in the park complex. In addition, Foreign Trade Zone designation provides an added benefit for industries that can take advantage of the FTZ cost savings.

Exhibit 136: Jetplex Planned Industrial Development

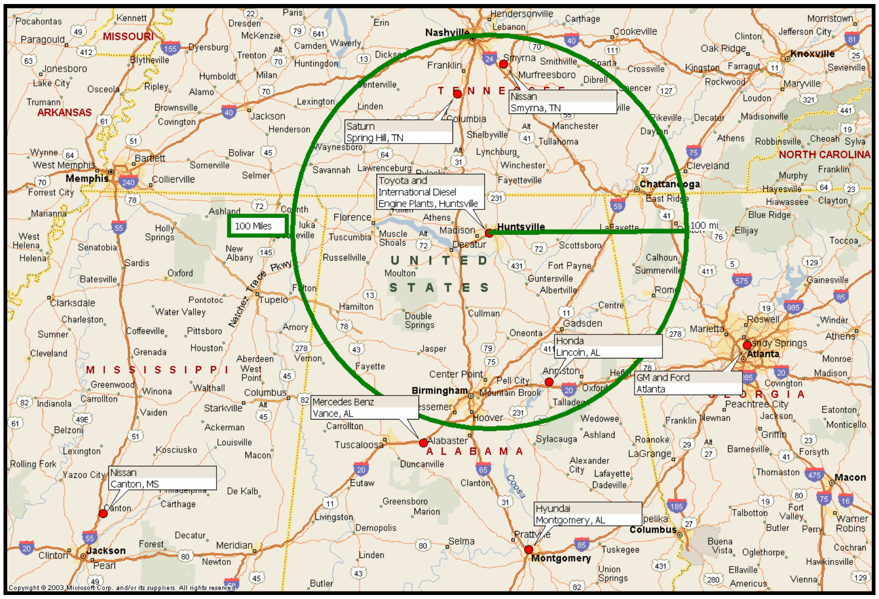
Air Cargo Service

International air cargo began in 1991 with Swiss freight forwarder Panalpina. Currently, Panalpina operates 10 scheduled B-747's per week to European markets, three scheduled weekly flights to Mexico, plus charter aircraft as needed. In 1991 Panalpina was looking for a location for a U.S. Air Cargo Hub and selected Huntsville. After Panalpina agreed to establish its operation the Airport authority extended one of the runways to 10,000 feet to enable 747 air freighters to use the airport. Panalpina's top air freight commodity markets at Huntsville include automotive, energy (i.e oil field equipment), apparel, and technology. Panalpina's US market is focused on the Southeast but it has handled freight trucked in to Huntsville from as far away as Texas and Wisconsin. Because of low congestion and high ground service levels at Huntsville, Panalpina can deliver in Atlanta as fast or even faster than Atlanta-based air cargo carriers. Panalpina operates daily service to Luxemburg for its European service. It also operates twice weekly service to Mexico. It had a weekly service to Hong Kong but this service was recently discontinued because high fuel costs made it difficult to secure enough high paying cargo. Panalpina's volumes are well balanced, which is a requirement for profitable operations. Termination of its Hong Kong service was partially due to an inability to secure backhaul cargo to Asia.

Auto Plants

A significant portion of the terminal's container business comes from import auto parts for a Toyota engine plant and new Hyundai and Mercedes auto assembly plants. Exhibit 137 shows the location of Southeast automotive plants in relation to Huntsville. The region has developed a significant base of auto assembly and parts facilities. The Huntsville rail intermodal terminal has been a beneficiary of the automotive business with record volume in 2004 and 2005.

Exhibit 137: Regional Auto Plants



Governance

The Huntsville Madison County Airport Authority is organized as an Alabama public corporation. It is governed by a five-member board made up of local citizens and business people. Two members of the board are appointed by the Huntsville City Council. Two members are appointed by the Madison County Commission, and one member is appointed jointly by the City and the County. The Port Authority is funded through its operating revenues. In 2005 it had about $24 million in operating revenue and over $11 million in cash flow. The principle sources of operating revenue were passenger operations of about $17 million, air cargo $3.6 million, rail operations $2.2 million, and the industrial park $1.2 million. The Airport Authority appears to be in excellent financial condition with over $30 million in cash at the end of 2005, $5 million more than 2004. The Airport Authority has bonding power and currently has about $50 million of outstanding revenue bonds. About 60% of its capital came from its own capital, with the remaining coming from FAA grants, Appalachian Regional Commission grants and Federal earmarks.

Success Factors

Although the Huntsville–Decatur regional population is only 500,000, the Port of Huntsville has facilities and infrastructure that significantly exceed current demand and provide long-term capacity for growth. This can be attributed to the vision and long-range planning of the Huntsville-Madison County Airport Authority which was formed in the early 1960's to relocate the region's airport. It took 20 years, from 1967 to 1987, for the Port of Huntsville to "get off the ground".

Vision

A key example of the Airport Authority's vision and planning was its early focus on development of freight facilities required to support future transport needs and industrial development, namely air cargo and rail intermodal for both domestic and international markets. Examples include:

- Creation of the IIC hub with both air cargo handling and rail intermodal facilities.

- The runway extension to 10,000 feet in 1991. This attracted Panalpina to the Port with its direct freight service to Europe.

- The runway extension to 12,500 feet in 2005. This enables fully loaded 747-400 non stop airfreight service to Asia and future operations of Airbus 380 air cargo planes.

Another example of this vision is in land acquisition. A key factor in the development of the Port of Huntsville was the availability of land. At the time the airport was relocated in 1967, the Airport Authority acquired 3000 acres of cotton fields with a plan to create an industrial park as an integral part of the airport development. Today, the Airport Authority owns 6000 acres of land for Port facilities and industrial development. In addition, the Port master plan provides for acquisition of an additional 4000 acres.

Willing rail service

Another key success factor was securing NS intermodal service. NS had no interest in investing its own capital for an intermodal terminal or in establishing intermodal service for the Huntsville Decatur market. Obviously, without NS service the inland rail port could not have been established. The Airport Authority financed and built the intermodal terminal and convinced NS to provide service from and to key markets. After some negotiation, NS agreed to serve the Huntsville terminal and pay the Airport Authority a lift charge for terminal services. At the same time, NS closed its Birmingham and Chattanooga terminals enabling the Huntsville terminal to serve as a regional terminal for Northern Alabama and Middle Tennessee. The Airport Authority development plan prepared in the 1970's included a rail intermodal terminal as part of the multi modal transportation complex. The intermodal terminal was built in 1986, well before the growth of intermodal and international container movement that is currently being experienced.

Financing

Financing of these capital investments in land and facilities was the critical element of the Port's development. Funding was accomplished by the Airport Authority through a combination of Federal Grants and Airport Authority Revenue Bonds. The Federal grants came from FAA airport construction and improvement grants, Appalachian Regional Commission Area Economic and Human Resource Program grants, and Federal earmarks. The total historical value of investments for the Port of Huntsville at the end of 2002 was $207.4 million, $160.8 million for the Airport and 46.6 million for the Intermodal Center. The Airport Authority financed about 60% of the total and the remainder came from Federal sources.

Champion

It was the driving force of the Airport Authority that created the Port of Huntsville's inland port complex. The key objective was to create economic development and jobs. The economic impact on the region has been significant. The 2003 Port of Huntsville Economic Impact Study shows direct employment within a two mile radius of the airport to be 12,505 employees with an annual payroll of $714.9 million. The multiplied impact on the region was 24,654 jobs with a payroll of $1.1 billion. There was certainly significant risk in making the necessary investments in transportation and industrial development infrastructure. However, the Port of Huntsville is now very well positioned for long term economic growth.

Rickenbacker Airport Columbus Inland Ports

Overview

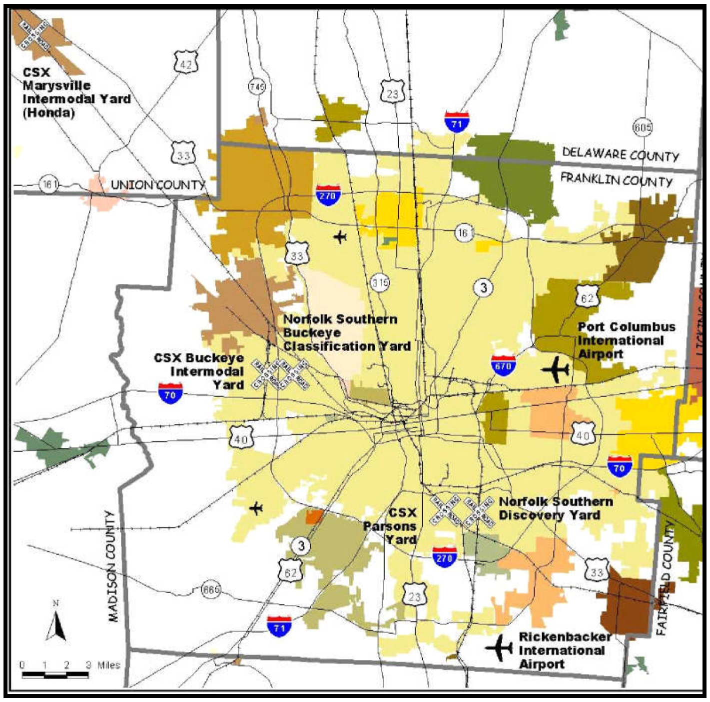
Columbus is a city of 1.6 million people located in central Ohio, 300 miles east of Chicago (Exhibit 138) and 500 miles west of New York City. The Limited, Honda of America, and Kroger are very large local, logistics-intensive employers. The city is located at the intersection of I-70 and I-71, is served by CSX and Norfolk Southern (NS) railroads, and has two major airports. Local transportation planning is centered in the Mid-Ohio Planning Commission (MORPC). MORPC/Greater Columbus Chamber of Commerce started a freight planning partnership in mid-1990s.

Exhibit 138: Columbus Location

Columbus Inland Ports

MORPC defines several “inland ports” in the Columbus metropolitan area (Exhibit 139).

Exhibit 139: Columbus "Inland Ports"



- Port Columbus International Airport primarily serves passengers, but also handles freight shipments such as small package cargo and mail. The airport is surrounded by warehouses and distribution centers including a soft drink warehousing/distribution center. This location has access to I-670 and I-270.
- Rickenbacker International Airport is a multi-modal cargo airport, a charter passenger terminal, and a U.S. Foreign-Trade Zone. This airport was built over 50 years ago by the Army Air Corps. For the past 10 years, this airport has been transformed from a military base to an airport whose primary function is to serve cargo planes. Industrial development has occurred in areas surrounding the airport. This district is home to various distributing centers such as Gap Inc.
- NS Discovery Park Intermodal Terminal is located just north of the Rickenbacker Airport with good access to I-270, I-70 and I-71. The 40-acre yard was opened in 1990 and underwent major expansion in 1994 and a second expansion in 1999. Currently service goes to Chicago, Dockside, NJ, and Norfolk, with 12 outgoing trains per week. In 2003, the intermodal facility handled approximately 140,000 lifts. The NS terminal is operating over its design capacity of 125,000 lift and a new larger facility is being developed near Rickenbacker Airport.
- CSX Buckeye Yard Intermodal Terminal and NS Buckeye Classification Yard are located northwest of the I-270 and I-70 intersection on the western side of Franklin County. The Buckeye facility was developed by Conrail and was divided between CSX and NS in 1999 as part of the Conrail acquisition. CSX received the intermodal yard and NS received the classification yard. The Buckeye intermodal yard was constructed in 1985 using both state and Conrail funds. Currently CSX

provides service from Columbus to destinations in Texas, Georgia, Massachusetts, South Carolina, Illinois, California, New Jersey, Florida, Virginia, Oregon and Washington. CSX has double-stack clearance on all routes to Columbus and services approximately 18 outbound trains/week and 25 inbound trains/week. The number of rail lifts at Buckeye Yard has increased steadily; in 2004, the intermodal facility handled approximately 150,000 lifts. Although both yards have reached capacity, the yards are landlocked and cannot be expanded.

- CSX Parsons Classification Yard is located near NS Discovery Park and is CSX's freight classification facility in the region. It is also the planned location of a new larger intermodal facility to supplement or replace CSX's Buckeye facility.
- Honda Intermodal Terminal. The Honda–Marysville terminal was constructed in 1989 as a joint venture between Conrail and Honda and is located at the Honda Marysville plant in Union County. Under the Conrail split, CSX bought the rights to operate this yard. The initial yard annual traffic volume projections were around 14,000-15,000 inbound loads, consisting principally of auto parts imported from Japan either directly to the plant or to local suppliers who did certain additional work before delivery to the plant. Volume has declined somewhat as Honda has chosen to source more parts locally.

Rickenbacker International Airport

Only Rickenbacker International Airport is an "inland port" with Customs facilities, and FTZ, etc. The others are conventional rail facilities and the existing passenger airport.

Rickenbacker is a 5,000 acre all-cargo airport. It was the first public use all-cargo airport in the United States and is currently the largest public all-cargo airfield in the world. Rickenbacker is a former Air Force base that was designed with 12,000-foot runways. The base was realigned in 1980, with the control transferred to the Ohio National Guard. The Franklin County Board of Commissioners formed the Rickenbacker Port Authority to operate and develop a civilian airport at Rickenbacker with a joint use agreement with the National Guard. Over 5,000 acres of land were transferred from the Air Force to the Port Authority between 1984 and 1994. The Port Authority now operates the facility and the military is one of many tenants.

Rickenbacker did not become an economic success until after 1990, when a new management company was hired, and a new marketing strategy developed, based on Greater Columbus Inland Port Concept. Local business and political leaders believed that a container could arrive at port in New York, be unloaded, shipped by rail to Columbus, clear Customs, be broken down into small units and driven to East Coast locations faster than if processed entirely in New York.

The airport anchors the southern end of a 15,000-acre industrial zone. It contains over 22 million square feet of class "A" distribution and logistics space that employs over 15,000 workers. The Rickenbacker Port Authority has developed ten million square feet over the last ten years in the Foreign Trade Zone industrial park. An additional 12 million square feet have been developed in 12 other industrial parks in the Rickenbacker Area over the last five years. Ample room still exists for additional growth; only 40% of the area's land suitable for industrial projects has been developed thus far.

More than 60 companies now do business at Rickenbacker, including several Fortune 500 firms. These companies employ about 5,000 civilian employees at Rickenbacker. Eagle Global Logistics and Forward Air have established national truck hubs at Rickenbacker, and regional gateways are operated by Federal Express and United Parcel Service. A number of logistics companies have also located at Rickenbacker, including Exel. Exel's 23,000 square-foot all-inclusive facility at Rickenbacker consolidates all of Exel's airfreight forwarding, Customs brokerage, truck brokerage, intermodal operations, logistics and warehousing. Logistics and e-commerce fulfillment firms are supported at Rickenbacker by telecommunications services including state-of-the-art fiber optic lines, high-speed data circuits, and video-teleconference capabilities.

In the 1990's, air cargo volumes handled at Rickenbacker increased by an average of 15% a year, double the national average. About 45% of the cargo handled by Rickenbacker is international. While the total number of flights at the airport declined in 2001 compared to the previous year, a greater number of larger cargo aircraft used the airport. This increase was due in large part to FedEx's new contract with the U.S. Postal Service.

Cargo operations at Rickenbacker are enhanced by the development of Rickenbacker's 500,000 square-foot Air Cargo Terminal Complex, which is being continually expanded. It provides direct airfield access to freight forwarders, shippers, logistics companies, and others looking to capitalize on a Foreign Trade Zone location. The Air Cargo Terminal Complex is being developed by the Franklin County Improvement Corporation, which was created in 1994 by the Rickenbacker Port Authority and the Franklin County Commissioners to develop specialized facilities backed by joint ventures and private financing. More than three million square feet of additional air cargo facilities are planned for development during the next five to ten years.

The success of Rickenbacker International was the catalyst for the 1991 creation of the Greater Columbus Inland Port Commission, which promotes trade and the development of intermodal infrastructure for freight shipping and distribution in the Columbus area. It is made up of city, county, state and federal representatives on the public side, and the Greater Columbus Chamber of Commerce, as well as individual manufacturers, shippers, carriers and other private service providers.

Funding

In the period 1981–1991, Rickenbacker drew a total of $72.8 million in public capital investment and $1.7 million in private capital investment. Public investment sources included 49% from the Rickenbacker Port Authority (mostly revenue bonds), 23% from Franklin County, !7% from the State of Ohio, and 11% from the FAA and Department of Defense. In the period 1992 – 2000, the facility drew a total of $111.7 million in public capital investment and $403.0 million in private capital investment. Public investment sources included 52% from the FAA and DOT, 21% from the State of Ohio, 12% from the Rickenbacker Port Authority, 11% from Franklin County, and 4% from other local sources.

The Rickenbacker Port Authority received a $5 million grant from the FAA's Military Airports Program for the construction of a small charter passenger terminal. A new parallel runway that is at least 5,000 feet distant from the existing primary runway is planned for construction within the next fifteen years. This will allow for simultaneous instrument flight rules (IFR) landings that are not possible with the existing runway configuration because the parallel runways are too close together.

As a cargo airport, Rickenbacker receives a variable entitlement of about $500,000 annually from the FAA, based upon cargo tonnage handled. The airport is not entitled to any federal airport funding based on passenger activity at airports. Consequently, in 2003 the Port Authority is expanded its business services to include charter passengers in order to become eligible for federal grants needed to provide for minimal maintenance of the airfield.

Benefits

To date, every dollar of public investment in Rickenbacker has produced over $3 in direct private investment, and $25 in regional economic impact. A recent economic study estimates that Rickenbacker Airport currently generates over $811 million in economic impact to the Greater Columbus Region, and supports over 7,600 jobs. Businesses located in the Foreign Trade Zone generate an additional $951 million to the regional economy and support almost 10,500 jobs. An additional $988 million is generated by Rickenbacker Area development outside the boundaries of the Rickenbacker Port Authority. The total impact of Rickenbackder and Rickenbacker Area development to the regional economy is currently about $2.8 billion. This is forecast to increase to $3.8 billion in 2006 with the development of the International Facilities Complex, which will include a passenger terminal, hotel and conference center, and corporate hangars.

Public-Private Collaboration

The following is taken from a 2004 MORPC report "*Freight Planning in Central Ohio A Companion Report to the 2030 Transportation Plan". In the mid-1990's MORPC and the Greater Columbus Chamber of Commerce started a freight planning partnership (GCIP – Greater Columbus Inland Port) to play a strong leadership role in advancing Columbus' freight transportation and distribution industries. The work that resulted from this effort won national recognition and became known as the Inland Port Reports, as described below.*

- *Inland Port Phase I (1994): MORPC concluded its first study exploring the institutional, organizational, and regulatory impediments to freight movement in the region.*
- *Inland Port Phase II (1997): This study stressed closer and more effective communication between the private and public sectors, and more extensive exchange of information and opportunity for input in the decision-making process on transportation infrastructure improvement projects.*
- *Inland Port Phase III (1998): The Freight Transportation Economic Impact Study for Central Ohio was completed. This study documented that public investment in freight transportation projects is an effective method to achieve economic growth in the region.*

The result of this state and MPO activity coupled with an aggressive Chamber of Commerce has helped the region maintain long-term job growth in the face of a significant reduction in manufacturing jobs.

Success Factors

Columbus is a successful model for any city that is seeking job creation in the transportation and logistics sectors of industry. The simple key to this process has been leadership exercised in both the public and private sector around shared economic development goals.

The biggest advantage is Rickenbacker's location as a distribution center for both domestic and international air cargo. Columbus is within a one-day truck drive or a 90-minute flight of more than half of the population, employment, retail purchasing power and manufacturing capacity of both the U.S. and Canada. Rickenbacker has convenient access to the nine state and federal freeways and highways that intersect in central Ohio and link Columbus to major markets in New York, Chicago, and Atlanta. Lastly, Rickenbacker is located within a rapidly growing metropolitan area of 1.4 million people with a workforce exceeding 700,000 workers.

Creation of a foreign trade zone at Rickenbacker in 1987 also contributed to its success. Rickenbacker enjoys an exemption from state inventory taxes, and an abatement on real estate taxes for improvements to land and buildings through 2007. The airport receives a subsidy of about $3 million per year from local government, and the State of Ohio has pledged a total of $65 million in revenue bonds for future facility improvements.

The collaboration between MORPC and the Greater Columbus Chamber of Commerce dates from the mid-1990s and has helped sustain a focus on regional freight planning issues. The region is regarded, and regards itself, as "freight friendly."

Logport, Duisburg, Germany

Overview

Duisburg is a German city in the western part of the Ruhr region in North Rhine-Westphalia. It is an independent metropolitan borough in the Düsseldorf area. With its harbor and proximity to Duesseldorf International Airport, Duisburg has become an important venue for commerce and steel production.

Logport is an offshoot of Duisport, itself an "inland port" by virtue of being on a river rather than on the coast. Logport is not a satellite terminal in the sense of being connected by a rail shuttle, but has its own berths and water access. Logport is of interest because of its emphasis on modern logistics and multimodal (water-rail-truck) transportation.

Duisburg Port

"Duisport" (Exhibit 140) is the largest inland river port in Europe. It is officially regarded as a "seaport" because sea-going river vessels go to ports in Europe, Africa, and the Middle East. Numerous docks are mostly located at the mouth of the River Ruhr.

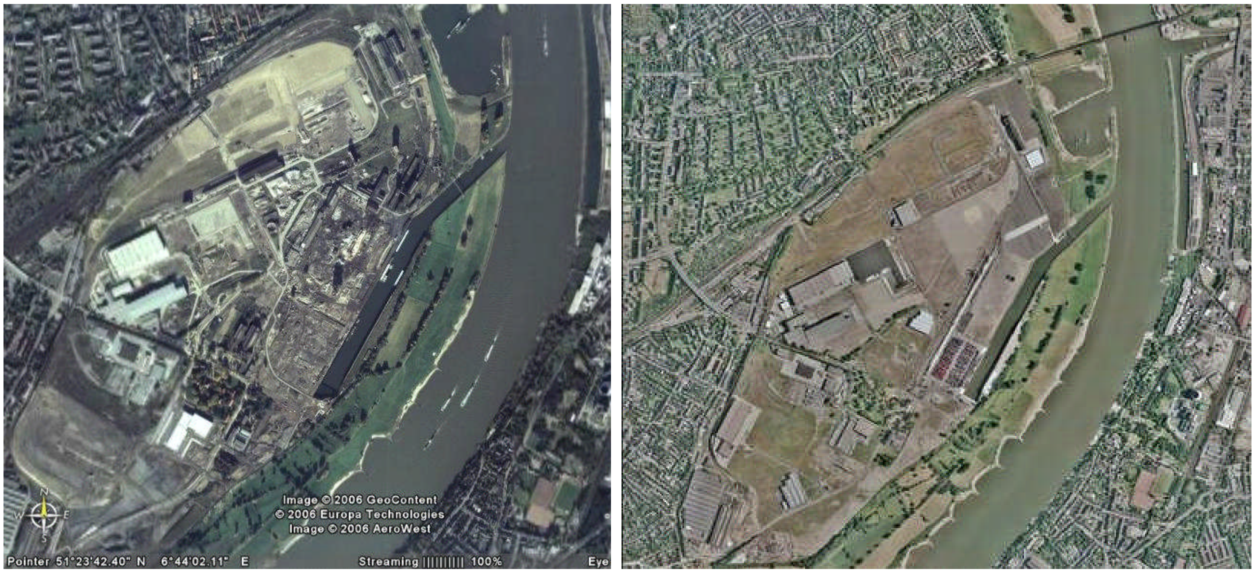
Exhibit 140: Duisport

Each year more than 40 million metric tons of various goods are handled, with more than 20,000 ships calling at the port. The public harbor facilities stretch across an area of 7.4 km². There are 21 docks covering an area of 1.8 km² and 40 km of wharf. A number of companies run their own private docks, and 70 million metric tons of goods yearly are handled in Duisburg on average. Duisburg Harbor is approximately 155 miles from the North Sea and is considered the hub of a 169-mile long system of inland waterways.

Logport

Logport is a logistics center at the former Duisburg-Rheinhausen ironworks site. The Logport project was started in 1998. Logport is situated on approximately 665 acres with access to its own river container terminal, road, rail, and nearby airports. The site is classed as "industrial space" and offers little or no land-use restrictions under German zoning laws. Exhibit 141 shows the "brownfield" ironworks site and a current aerial view of Logport

Exhibit 141: Logput Before (Left) and After



Logport is located in the heart of central Europe at the intersection of north-south and east-west traffic. Approximately 30 million consumers live within a 94-mile radius of Logport. Three east-west and two north-south roads provide an 8-hour travel time to reach 40% of the entire European Union population, approximately 150 million consumers.

Logport's container terminal began operation in February 2001. To provide rail service to the site, the Duisport Group is entering into a joint venture with an existing rail operator to link the Port of Duisburg, Duisburg-Hochfeld (coal terminal), and Logport with a shuttle service. A fourth modal connection by air is available at the Duesseldorf International Airport located 10 miles from Logport.

Direct connection to Europe's most important waterway, the River Rhine, is available to Logport. This connection is enhanced by the direct link to Duisport, Europe's largest inland port.

The three target industries for Logport are logistics and the transportation sector, logistics-based manufacturing, and logistics-oriented services.

Multimodal Connections

Duisburg and Logport are connected to the German Autobahn system. Five such roads extend through the city area or pass it.

Duisburg is served by the InterCityExpress and InterCity long-distance network of the Deutsche Bahn, the German national railway.

Success Factors

The Logport site is ideally chosen to access a very large market base. The use of a brownfield site with preexisting river and rail access minimized startup cost and time.

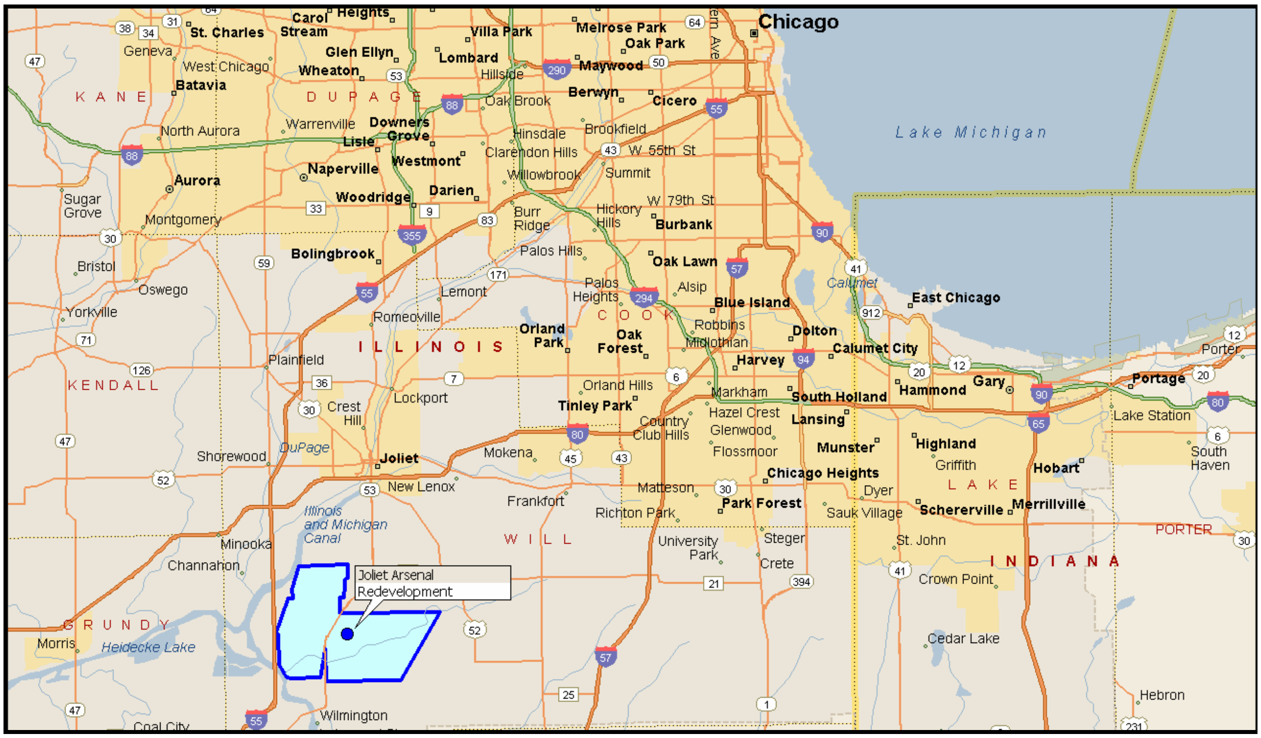
The role of Duisport management is critical, bringing extensive port facility operating and marketing experience to the project.

Joliet Arsenal Development Authority (JADA)

Overview

The Joliet Arsenal was developed by the U.S. Army in the early 1940's as a munitions plant. It was located on a 26,500 acre site near Joliet, IL, about 40 miles southwest of Chicago (Exhibit 142). In 1976 the Arsenal was decommissioned and in 1993 the U.S. Army declared the Joliet Arsenal site as excess property.

Exhibit 142: Joliet Arsenal Location



In 1995 the site was subdivided for both public and private use and the Joliet Arsenal Development Authority (JADA) was established to facilitate and promote the redevelopment of 3000 acres of Arsenal property. JADA worked with all levels of government, more than a dozen public agencies and private industry to create a development plan.

The cornerstone of this redevelopment was a complex of over 2000 acres being developed by CenterPoint Properties, one of the largest industrial real estate developers in the Chicago region. In 2000, the U.S. Army transferred ownership of nearly 1900 acres to CenterPoint. This property was combined with 375 acres of property previously acquired by CenterPoint to enable development of the CenterPoint Intermodal Center (CIC). The plan for CIC included a Burlington Northern Santa Fe (BNSF) transportation complex named Logistics Park Chicago (LPC) along with an adjacent industrial park (Exhibit 143). CIC's industrial park is currently located on 1,100 acres and when fully developed will encompass up to 12 million square feet of rail-served industrial buildings suitable for warehousing, distribution, and light manufacturing.

Exhibit 143: Logistics Park Chicago

LPC is a major multi-modal rail transportation facility operated by BNSF on over 700 acres. It includes a major intermodal container terminal, an automobile loading/unloading facility, and a carload transload facility. When completed in October 2002, the intermodal terminal was initially designed to handle 400,000 lifts, with room for expansion. In 2006, the terminal is projected to handle over 700,000 lifts. Terminal expansion in progress will increase capacity to over 1 million annual lifts.

In 2004, JADA received the final transfer of the 1,100-acre Island City Industrial Park from the U.S. Army. In 2005, JADA reached agreement with ProLogis, a major industrial real estate development firm, to develop a 770-acre warehouse and distribution park on this site. ProLogis, headquartered in Denver, is a leading provider of distribution facilities and services with facilities in 77 global markets.

Services

The BNSF intermodal terminal is the key driver of transportation services for international containers at the Joliet Arsenal redevelopment sites. The LPC intermodal terminal train service is limited to international containers originating and terminating at west coast ports. Daily train service is provided to the ports of Los Angeles and Long Beach and to Seattle and Tacoma. Service to the Port of Oakland is 4 days per week. These service levels, as well as adequate terminal capacity for container parking and container yard storage for ocean carriers, has attracted major ocean carriers such as Maersk SeaLand and Evergreen to BNSF for transporting their ocean containers from and to the Chicago and Midwest markets.

Another service is in-bond movement of ocean containers via BNSF with U.S. Customs clearance of import containers available at LPC. In addition to ocean carrier container storage, the services of California Cartage Company (Cal Cartage) are available at LPC. Cal Cartage provides drayage service, consolidation and deconsolidation, warehousing and other services for shippers and receivers of international containers. The Cal Cartage facility (Exhibit 144) is located adjacent to the LPC intermodal terminal.

Exhibit 144: Cal Cartage LPC Warehouse

CIC is also a designated Foreign Trade Zone. This gives manufacturers and processors the ability to take advantage of FTZ duty deferral, duty reduction and weekly customs entry providing cost reduction opportunity. With the BNSF service for import and export container shipments along with access to CIC development sites, the Joliet Arsenal provides an attractive location for companies involved in international trade and distribution of imports which move via west coast ports.

Governance

JADA is governed by a nine-member board. Four members are appointed by the Governor with consent of the Senate and five members are appointed by the Will County Board. All members are from Will County. JADA has the authority to borrow money and to issue revenue bonds with a maximum indebtedness of $100 million. Day to day operations are managed by an executive director who is responsible to the board. Initial funding of JADA operations came from a State grant which provided the seed money to get it started. Subsequent funding of operations and capital improvements came from land sales. Grant funding was also secured for specific projects. As a result of these sources of funding JADA has never used its bonding authority.

Success Factors

The primary objective of the redevelopment of the Joliet Arsenal by JADA was to create economic benefits and job opportunities from the reuse of the Arsenal property. However, it appears that the driving force for the logistics-based development was the developer, CenterPoint Properties. CenterPoint led the effort to assemble the land, deal with the environmental issues, secure needed financing, and work with BNSF to site and develop its transportation facilities at the Arsenal. John Gates, CenterPoint's President and CEO, gives an indication of the difficulty of the project, "*Laying the foundations for one of the world's premier multi-modal distribution complexes has been a truly extraordinary effort over many years…. A truly remarkable team of public officials and private professionals has overcome literally thousands of obstacles to make the redevelopment of the Joliet Arsenal a reality*."

CenterPoint's 1100 acre development plan for CIC is reported to be five years ahead of schedule and the ProLogis planned development of a 770 acre warehouse and distribution park is being developed on the south side of the Arsenal redevelopment complex.

The CenterPoint development has attracted several major industries including two huge Wal-Mart warehouse and distribution facilities. Exhibit 145 is a listing of the CIC customers:

Exhibit 145: CIC Customers

CenterPoint Intermodal Center Customer List

1)	BNSF Logistics Park Chicago	715 acres
2)	Maersk Sea Land	17 acres
3)	California Cartage, Inc.	213,500 square feet
4)	Georgia Pacific	1,001,200 square feet
5)	DSC Logistics	1,022,000 square feet
6)	Potlatch, Inc.	624,000 square feet
7)	Sanyo Logistics	400,000 square feet
	Partners Warehouse	200,000 square feet
8)	Wal-Mart	1,600,000 square feet
9)	Wal-Mart	1,800,000 square feet

Location

Chicago is the U.S transportation and distribution hub. This is a great location for both industrial development in general and logistics-related development in particular. Growth of U.S imports over west coast ports has created the demand for rail transportation to Midwest markets which utilize Chicago as a distribution hub. BNSF was reaching capacity limits at its Chicago terminals. These two factors created the "perfect storm" that drove the success of combined development of the BNSF logistics park, LPC, and CenterPoint's business park, CIC.

Market and Funding

This project had the necessary prerequisites that lead to success: adequate financing, a solid and well understood market opportunity, and a willing Class I railroad. In spite of this, it took nearly a decade of work from decommissioning to establishment of the inland port which opened in late 2002.

Willing Railroad

When BNSF developed Logistics Park Chicago (LPC) at the Joliet Arsenal, it changed its operations to concentrate most of its international container business at LPC. Most of the California ocean carrier business was taken out of BNSF's Corwith and Cicero terminals. The BNSF's Pacific Northwest container business is still handled at the Cicero terminal because the former BN lines from the Pacific Northwest come in to Cicero.

Because BNSF shifted large volumes of existing ocean carrier container traffic from overburdened Chicago terminals to Joliet the new facility had a ready-made traffic base. After four years of operations LPC is expected to handle about 700,000 annual lifts in 2006, making it one of the busiest terminals on the BNSF system.

Champion

Every major project of this scope and complexity needs a particular "champion" to carry it forward and CenterPoint filled that role for this project.

The CenterPoint Intermodal Center adjacent to LPC has been very successful in attracting industry and is reaching capacity with the recent development of a large Wal-Mart warehouse and distribution facility.

The Wal-Mart facility at LPC is a 3.4 million square-foot warehouse with future capacity expected to reach 5.2 million square feet. This facility is a Midwest import distribution center for Wal-Mart. Pacific import containers are brought into LPC by BNSF and delivered to the Wal-Mart facility for distribution to Wal-Mart stores and distribution centers throughout the Midwest.

Global III Intermodal Terminal, Rochelle, IL

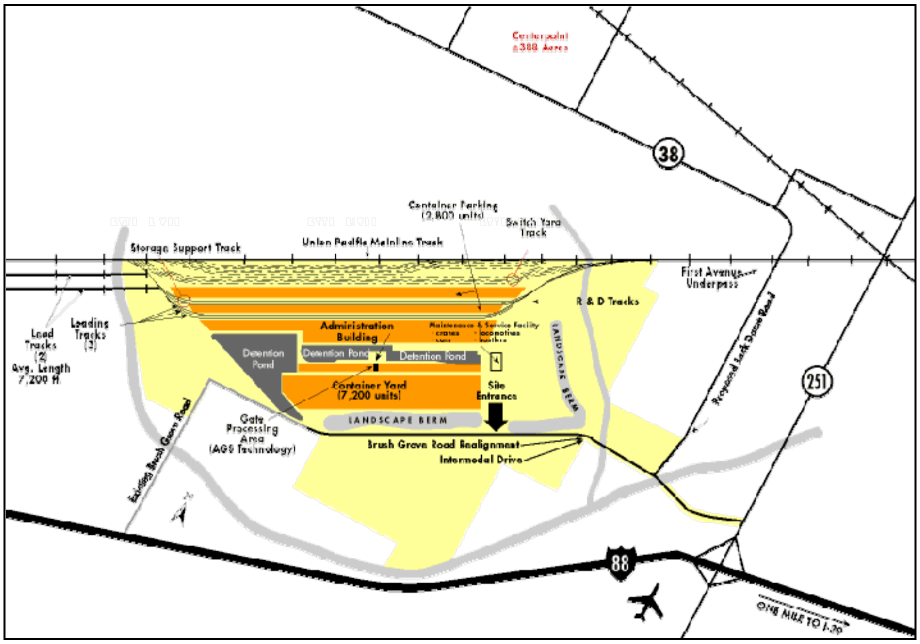
Overview

The Union Pacific Global III Intermodal Facility, located in Rochelle, IL, was built to meet the growing need for intermodal terminal capacity in the Chicago market. Unlike other intermodal terminal development projects, the driving force for this facility was the railroad and its need for capacity. It was not driven by an industrial development company or public economic development authority seeking an industrial development opportunity.

The development encompasses two facilities that cover 843 acres of 1,200 acres owned by Union Pacific (UP) (Exhibit 146).

- The first is a 13-track carload classification yard for assembling line haul trains. The yard also includes support tracks for locomotive servicing. This facility was opened in December 2002.
- The second is an intermodal terminal with four 7,000-foot loading tracks, a 10-lane automated gate system, and a 7,200-unit container storage yard. The terminal, which was opened in August 2003, has capacity to perform 720,000 lifts annually.

Exhibit 146: Rochelle Rail Development Site



The intermodal terminal and the switching yard work in tandem to load railcars and build railcar blocks of intermodal containers for movement beyond Chicago. These blocks are shuttled to intermodal facilities of eastern railroads in the Chicago area for interline movement. Blocks are also made for the UP's intermodal terminal at Yard Center on the south side of Chicago for transport to Texas, Mexico, and other Southwest UP markets. Westbound intermodal service from Rochelle is provided to major west coast ports and intermediate points. Exhibit 147 shows the other UP intermodal terminals in the Chicago area.

Exhibit 147: UP Intermodal Terminals in Greater Chicago

Global III is 80 miles west of Chicago. Rochelle, IL was not the UP's first choice for the facility location. UP selected Rochelle after a 5-year search for a municipality that was willing to accept the development of an intermodal terminal. The first two sites selected were in West Chicago, IL, and Elburn, IL, approximately 38 and 54 miles west of Chicago, respectively. Public and political opposition to these two sites forced the railroad further west to the site at Rochelle.

Parties and Roles

The local political and economic development officials from Rochelle promoted this site location to the UP when it became apparent that the two sites closer to Chicago were not going to be successfully developed. The local officials saw the terminal employment and increased potential for future economic development as a major benefit. These benefits enabled local officials to cooperate with the UP on development of the site. The construction and engineering firm Ragnar Benson built Global III for the Union Pacific at a cost of $181 million.

In addition to the rail facilities, there is an industrial park adjacent to the intermodal terminal being developed by CenterPoint Properties as a joint marketing partnership with UP. The CenterPoint Intermodal Center at Rochelle is a 289-acre site just north of the terminal. There is also a 200-acre land parcel adjacent to the CenterPoint property that is being marketed by a national commercial real estate firm Martin, Goodrich and Waddell. Both of these sites, as well as several thousand acres of farmland, will have direct access to the UP terminal after a road project is built by the City of Rochelle. Jack Dame Road, shown in Exhibit 146, connects Route 38 with the terminal entrance road, avoiding city streets in Rochelle. Once this road is constructed, development of property north of the UP main line is expected to accelerate.

Services

This facility provides UP with much needed intermodal capacity in the Chicago area albeit at a distance from the center of the city. However, industrial and warehouse expansion is moving west of the city and the UP site has good existing intrastate access both east/west and north/south.

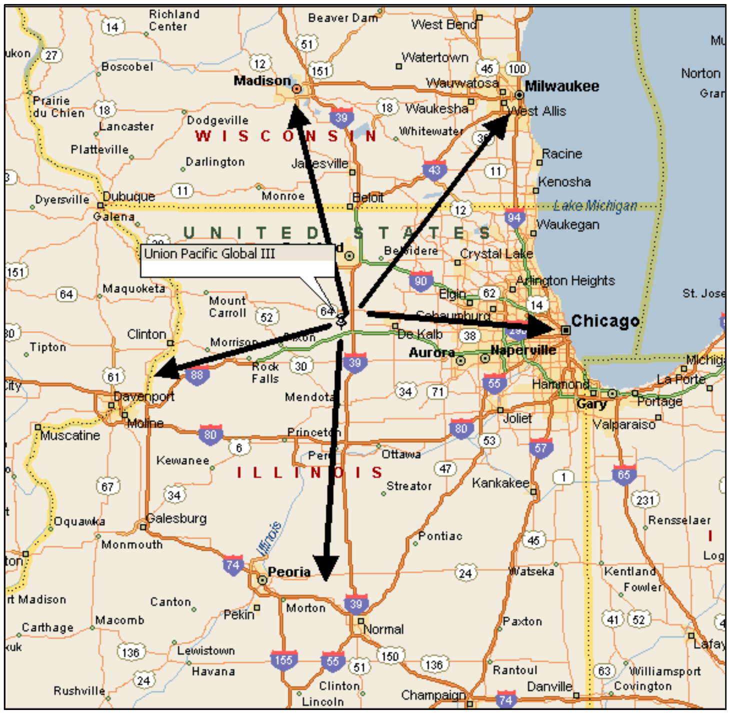
Direct rail-to-rail interchange is accomplished by building blocks of cars at Global III for direct rail movement to connecting railroads in Chicago. This operation has been developed in a relatively efficient and effective manner.

Highway drayage of intermodal freight between local Chicago markets and Global III has proved to be relatively expensive. Due to the highway distance of 80 miles each way and local freight imbalance, Global III has experienced a drayage cost premium of $250–$350 per movement when compared to the drayage of other Chicago terminals. The drayage differential depends on the relative location of the freight customer and the intermodal terminal. In addition, there is a $136 surcharge for tolls associated with drayage service on I-88 between Chicago and Rochelle.

The UP carload and unit train classification yard is not expected to generate local economic development beyond its own employment and vendor purchases. The yard primarily sorts cars and unit train consists for distant points rather than serving local customers.

Competition

Exhibit 148: Rochelle Highway Access



UP competes directly with BNSF for international container business moving over west coast ports. BNSF's Logistics Park Chicago, built on the site of the former Joliet Arsenal, currently provides very effective competition to the UP because it is located only 40 miles from Chicago. In addition, the CenterPoint Intermodal Center at Joliet has been successful in attracting several large distribution facilities. There is also regional competition for industrial development in La Salle/Peru, IL, 45 miles south of Rochelle on I-80, in Rockford, IL, 20 miles north and DeKalb, IL, 10 miles east. These communities have a larger work force and have been more aggressive in working to develop industry that has been attracted to the region by the UP intermodal terminal.

Success Factors

Global III's primary role for the UP, at present, is to provide capacity for the growing intermodal business that travels through Chicago. The terminal allows UP the opportunity to build interchange blocks for connecting railroads as well as build UP west bound trains outside the congestion of Chicago proper. Rochelle is located at the intersection of I-39 and I-88 and therefore enjoys excellent highway access both north/south and east/west. The region has potential as a major Midwest distribution center that can serve not only the Chicago market but also Milwaukee, Madison, WI. Springfield, IL, and the Quad Cities markets.

Lessons Learned

Union Pacific is making a long term investment in advance of anticipated westward development in the Chicago area. UP acted to secure needed capacity ahead of demand, while the local jurisdiction was cooperative and the price of land was relatively low.

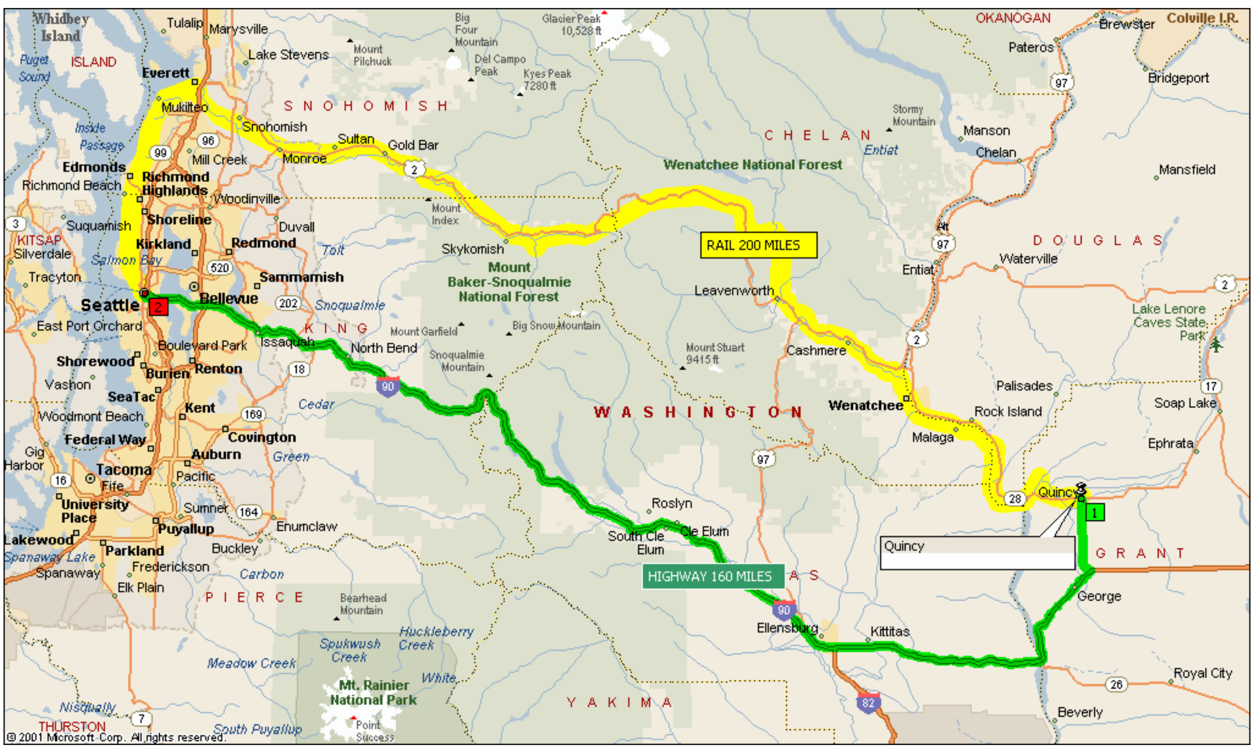
Although the UP terminal has attracted industrial development in the region, development adjacent to the terminal has been relatively slow. There are two issues that will improve future development for the city of Rochelle. One is the development of Jack Dame Road. An important lesson is to include direct access to the intermodal terminal as part of the development plan. The second issue is be competitive with other communities in the region with respect to development. Because of the nature of intermodal, the entire region can benefit from access to an intermodal terminal. Although Rochelle will be the closest community to the terminal, it is still necessary for it to be competitive with other communities in the region in attracting development.

Port of Quincy, WA

Overview

The Port of Quincy is a series of industrial parks east of Seattle and Tacoma (Exhibit 149). A rail intermodal facility was built to encourage industrial development, although success was slow in coming. The economic analysis and market planning appear to have been optimistic.

Exhibit 149: Port of Quincy Location



Governance

The Port of Quincy is governed by a three-member Board of Commissioners. Each Commissioner is elected by the citizens of the port district and serves a six-year term. The port district is divided into three commissioner districts following voting precinct boundaries. The Port of Quincy's mission is to stimulate economic growth and prosperity for the region. The Port Commission is primarily responsible for:

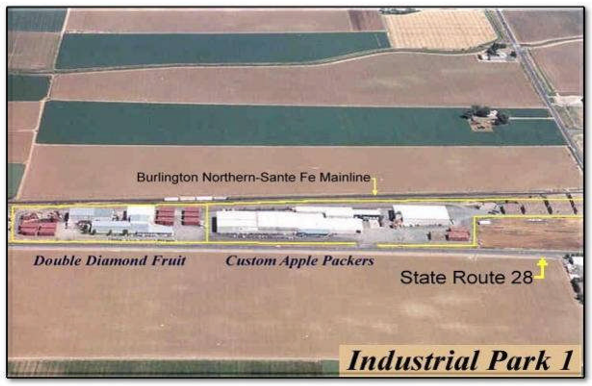
- Planning the Port's future and guiding the Port's activities in that direction

- Developing and adopting port district policies and governing operations
- Preparing and adopting an annual budget and authorizing the tax levy amount
- Hiring the staff to oversee the Port's activities

Services

Quincy's short-haul rail initiative was coupled with a competitive pricing policy from NorthWest Container Services, the exclusive container operator. The Port of Quincy can handle dry or refrigerated containers, and offers a dedicated steamship container depot with full maintenance and repair capability. As shown in Exhibit 149, however, Quincy is 200 miles from Seattle by rail versus 160 miles by highway, making it difficult for intermodal rail to compete head-on with trucking.

Exhibit 150: Quincy Industrial Park 1

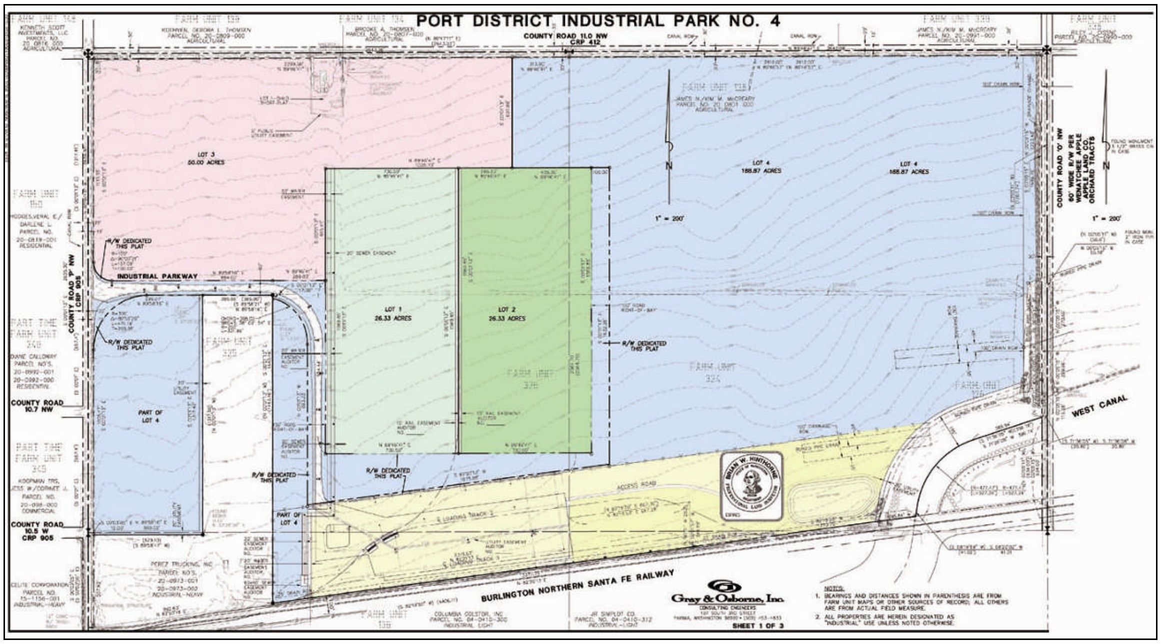


Industrial Park 2 (Exhibit 151) has been divided into individual parcels. The smallest is less than 7 acres, and the largest over 12, but parcels can be combined to accommodate larger developments. Industrial Park 3 comprises a 50-acre parcel. Both Parks have access to all utilities, such as power, municipal water, sewer and natural gas. And, with rail bordering the site, these properties have excellent loading or shipping options.

Exhibit 151: Quincy Industrial Park 2

Industrial Park 1 (Exhibit 150) is fully leased to two apple packing industries -- Double Diamond Fruit Company and Custom Apple Packers. Vocational training and support is available from community colleges in Wenatchee and Moses Lake as well as Washington Manufacturing Services out of Spokane.

Exhibit 152: Port of Quincy Industrial Park



The Port of Moses Lake, which operates the Grant County International Airport, is the Federal Grantee of Foreign Trade Zone #203.

Non-Freight Developments

Recently, the Port of Quincy has had notable success in non-freight businesses.

- In January 2006, Microsoft purchased 75 acres for a new data storage center. Groundbreaking occurred on May 31, 2006
- In June 2006, Yahoo! signed an agreement to purchase about 40 acres for an undisclosed operation at Industrial Park #4.

Funding

The Port of Quincy has been very successful in obtaining state and federal funding.

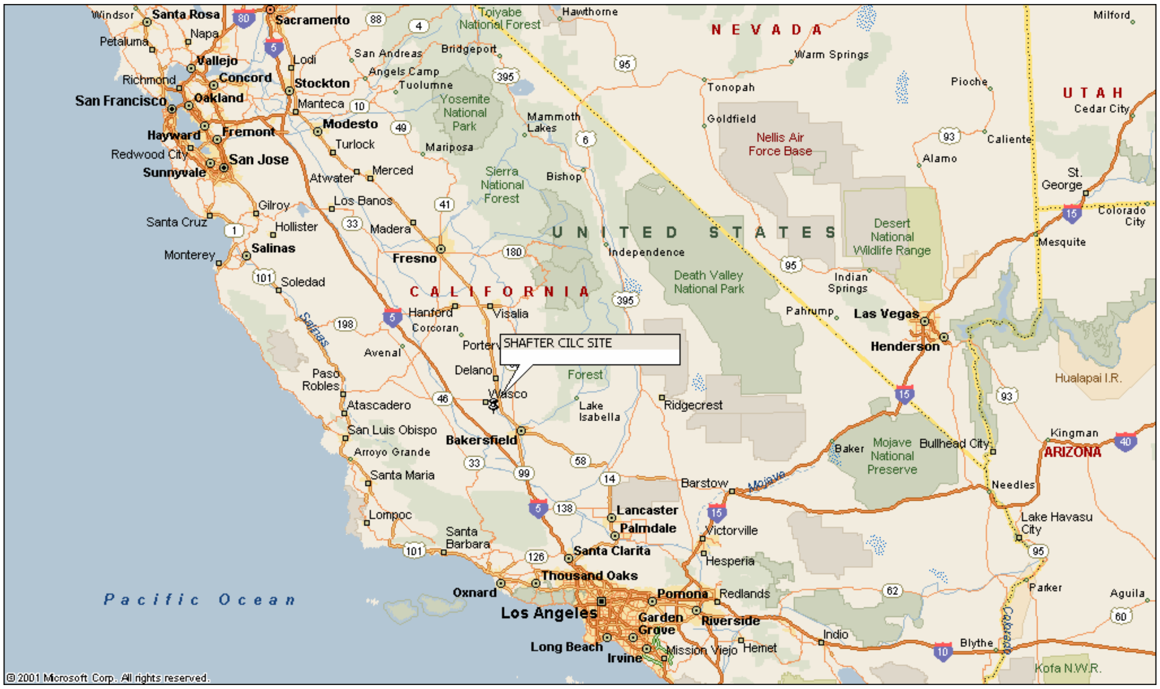
- In August 2003, Quincy obtained a $3.5 million USDA low-interest loan to fund rail infrastructure. Senator Patty Murray was instrumental in obtaining the loan.
- In October 2005, the Port of Quincy obtained a $992,000 federal grant to complete the construction of a carload transload facility and upgrade the intermodal facility, including the purchase of lift equipment.
- In March 2006, the Port of Quincy received $400,000 from the State of Washington to fund infrastructure improvements ranging from rail to fiber optics.
- In June 2006, the Port of Quincy received an Economic Development Administration grant of $840,000 to upgrade water mains and supply.

California Integrated Logistics Center, Shafter, CA

Overview

There is a well-publicized effort to develop an "inland port" near the City of Shafter, north of Bakersfield (Exhibit 153), connected to the Port of Oakland by a rail shuttle. The City of Shafter is the sponsor, but the effort also involves local industrial park developers. The industrial park development is the "International Trade & Transportation Center" and the Shafter intermodal initiative is the "California Integrated Logistics Center".

Exhibit 153: Shafter CILC Site



According to the sponsors, the facility would serve both domestic and international needs, provide container depot and Container Freight Station (CFS) services, and offer a Foreign Trade Zone opportunity. The claimed advantages of the Shafter location include:

- Proximity to exports including hay, cotton, citrus, almonds, and pistachios
- Proximity to major import distribution centers, including Sears, IKEA, Target, and Wal-Mart (although only Target is adjacent).

The Bakersfield area is typically considered an extension of the Southern California market and most marine cargo originating or terminating in the Bakersfield area is assumed to move via the ports of Los Angeles and Long Beach. By highway, Shafter is about 256 miles from Oakland but just 150 miles from Long Beach, which is why the Bakersfield market is ordinarily tied to the Southern California ports. Shafter is roughly equidistant by rail from Oakland and Long Beach, 270-290 miles to either port depending on the route.

Exhibit 154: Shafter Project Site

Legislation

The Shafter project sponsors have taken the unusual step of introducing legislation to give Shafter precedence over other inland port projects. The current version of SB 1010 would establish the Shafter site as a unique circumstance.

Economics

At an early point in the development of the Shafter project, sponsors envisioned using revenue bonds to finance the construction of an intermodal facility. The revenue bonds would be repaid from the intermodal terminal operating profits.

The difficulty with this plan is that intermodal terminals themselves do not ordinarily yield operating profits, so there would be no net revenue to cover the bonds. Railroads profit from intermodal line haul operations between terminals, not from owning the terminals themselves. Terminal contractors profit from providing lift services and ancillary services under contract and do not own, lease, or build terminals. In other words, no one pays rent on intermodal terminals. The few privately owned intermodal terminals in North America (such as Stackbridge in Massachusetts or Port of Tucson in Arizona) generate their revenue from lift fees, not rent.

Status

A review of the available reports and presentations on the Shafter initiative suggests that the proposal faces some significant near-term obstacles. There is no intermodal terminal at Shafter yet. The sponsors obtained $5 million in funds from the State of California, which are being used to install a track connection between the industrial park/terminal site and the BNSF mainline. Although the sponsors state that funding will be forthcoming for terminal construction, it is not clear that sufficient funding will be available. The sponsors note the difficulty of placing debt unless there is a service and volume commitment. The study team was unable to locate any market analyses beyond the conceptual level, or any financial or economic analyses of costs, rates, etc. Railroad interest in serving Shafter has been minimal, and the project lacks service commitments from either railroad.

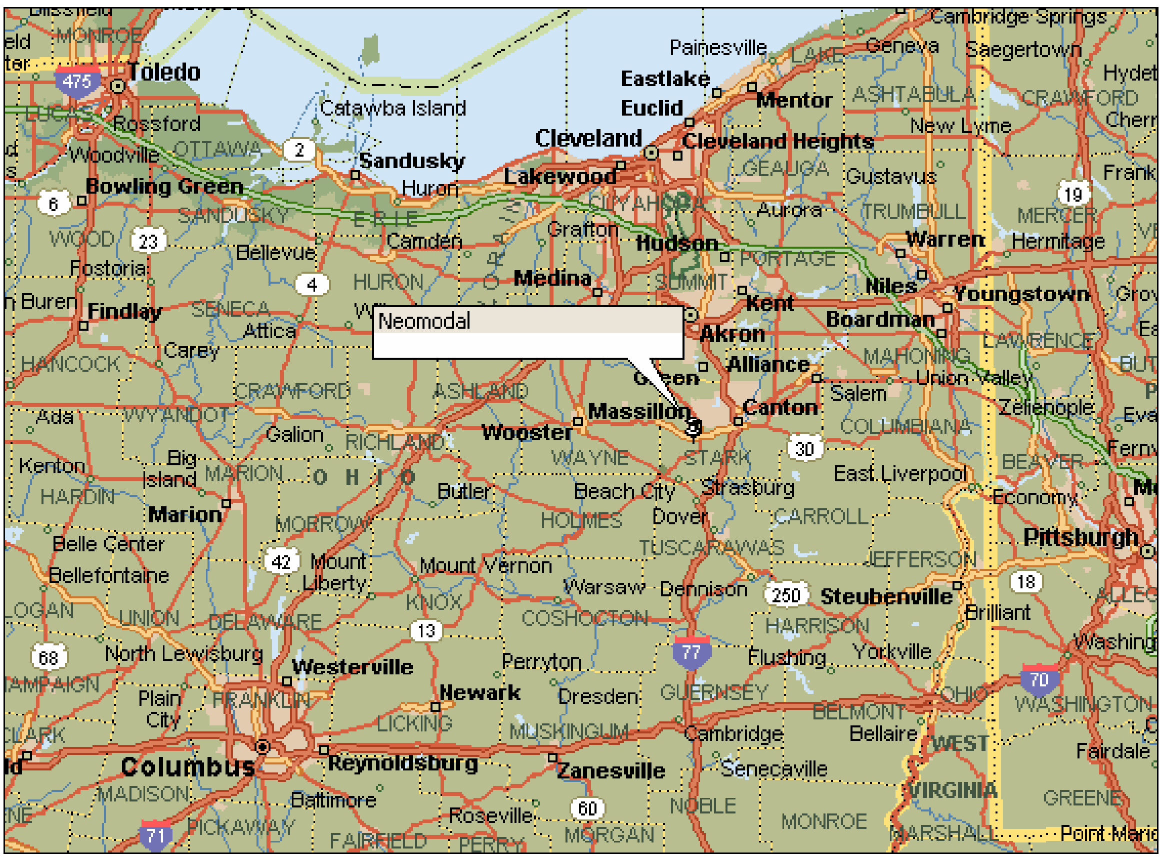
An interim facility was opened along the UP line on the east side of the Shafter area but there has been no significant business. A track connection is being built to an industrial park adjacent to the BNSF line (Exhibit 154).

Neomodal, Stark County, Ohio

Overview

The Stark County intermodal terminal (Neomodal) was opened in 1996 under the auspices of the Stark County (Ohio) Development Board. (Exhibit 155) It is a good example of a new terminal built with government funding, without benefit of a comprehensive marketing plan, and without private sector financial commitment. Perhaps this could be best characterized as a "build it and maybe they will come" approach. The result has been a terminal with little business.

Exhibit 155: Neomodal Location



Terminal

The 28-acre terminal (Exhibit 156) is a technologically advanced design using overhead cranes that can be operated from the ground. The gate facility was developed using the best technology available at the time.

Exhibit 156: Neomodal Terminal

The terminal is located on the Wheeling and Lake Railroad (WLE). The location on the regional line was chosen to provide competitive access to three Classes I railroads. The trade off with this feature was the introduction of another railroad into the routing. The specific location was chosen because the Development Board already owned a large parcel of property in the area, which was also being developed as an industrial park.

Marketing

The terminal was justified on the basis of a perceived economic need in the area, but no formal market study was performed. Apparently Neomodal was expected to draw business from Cleveland, as well as new business off the highway. For a variety of reasons the traffic has not materialized.

Relationships with the connecting Class I railroads were never good, and traffic volumes were not high. A short haul movement was required to reach either CSX or NS, and the usual rate division problems exacerbated the problem. At one point terminal volume reached 500 lifts a month, but recent experience has been much lower. CSX cancelled rates to Neomodal at the end of 1999, with the opening of their expanded Cleveland terminal. The sale of Conrail to NS and CSX made the facility much less viable.

In 2000, Canadian National announced it would begin service to Neomodal. This prospect resulted from trackage rights granted by the Surface Transportation Board to the WLE as part of the split-up of Conrail. To date this opportunity has not produced significant results and Neomodal CN is not actively advertising its relationship with Neomodal.

Funding

A line of credit from Congestion Management and Air Quality (CMAQ) was used to fund the project. The County donated the land. The $8 million CMAQ loan was to be paid by operating profits; however, there was a provision in the agreement between the Ohio DOT and the Stark Development Board (SDB) releasing SDB from financial payment responsibility in the event of operating deficits. Loan repayments were to be remitted equally to three parties: Ohio DOT CMAQ revolving fund; Ohio's Erie Canal Heritage Account (established under the National Heritage Corridor program); and Stark County Area Transportation Study (the MPO). Instead of a 20 percent direct local match, OH DOT used toll revenue credits from tolls generated by the Ohio Turnpike Authority under provisions of Section 1044 of ISTEA. (From FHWA)

The project was overseen by a management committee of five people, including representation from ODOT. Construction of the terminal was completed in a period of one year; 16 separate permits were required. Construction costs included only 10% engineering overhead versus the “usual” ODOT’s 30-35%. As a result the terminal came in under the $11.2 million budget.

Lessons Learned

In order to be successful a project of this type needs to have the following:

- A substantial market to serve and an effective plan for marketing the service.
- Willing and committed Class I rail carriers.
- Sufficient funding to develop the project.

This project enjoyed only one of the three necessary prerequisites.

Competing facilities are located in Cleveland (55 mi.), Columbus and Pittsburgh (90 mi.), and Toledo (120 mi.), all of which are much larger population centers with more significant concentrations of business. The Neomodal planners may not have thought clearly about the market and potential competition in the market. Even before the Conrail split that further jeopardized their market, they did not properly consider the relative ability of competing rail systems to serve these population centers.

Detroit Intermodal Freight Terminal (DIFT)

Overview

Based on a consultant study completed in 1994, Michigan DOT (MDOT), with the support of GM, Chrysler and Ford, embarked on a project to consolidate the intermodal terminals of the four Class 1 rail carriers serving Detroit. At that time Conrail, Norfolk Southern (NS), Canadian National (CN), and Canadian Pacific (CP) operated intermodal terminals in Detroit. The concept was the creation of a consolidated common user terminal located at Conrail’s Livernois Yard in Southwest Detroit. Livernois Yard, also referred to as Junction Yard, was selected as the site for the consolidated terminal because of its central location and rail connection to all Detroit carriers. In addition, at nearly 350 acres, this site was the only rail-served site large enough to accommodate a consolidated terminal. The project was named Detroit Intermodal Freight Terminal and referred to as DIFT.

The purpose of the DIFT project was to support the economic competitiveness of southeastern Michigan and of the State by improving intermodal freight transportation and ensuring sufficient terminal capacity to meet future intermodal demand. Specific objectives included:

- improving highway infrastructure to the common location
- reducing the distance and related cost for trucking between the terminals, and
- assisting the rail carriers in providing the terminal capacity needed for future demand.

This project was extremely ambitious because of the number of operational, commercial and engineering issues that needed to be resolved. At that time, Conrail had no interest in giving up its Livernois Yard property for use by other rail carriers and the project never advanced until Conrail was acquired by CSX and NS. The acquisition of Conrail by CSX and NS, in June 1997, provided an opportunity for Michigan DOT to revive the terminal consolidation project. As a condition of the Conrail merger, NS and CSX agreed to cooperate with MDOT on DIFT.

High-level political support for the project by Governor John Engler, Congresswoman Carolyn Cheeks Kilpatrick, and Congressman John Dingell enabled an $18 million earmark for the project within TEA-21 in 1998. Section 1602, High Priority Project 1221, describes the project as, "Construct intermodal freight terminal in Wayne County, Michigan". This funding enabled the DIFT project to be reactivated.

Detroit Intermodal Terminals

Following the integration of Conrail operations into NS and CSX in June 1999, Conrail's Livernois Avenue intermodal terminal was shared by NS and CSX. The freight-car switching operations at Livernois yard continued to be operated by Conrail on behalf of both NS and CSX who had equal access to Conrail's Detroit customers. In addition, NS was operating two other terminals in Detroit: a Triple Crown Roadrailer terminal at its Melvindale Yard, and a small intermodal terminal at Delray. CP operated two intermodal terminals in Detroit. The first was CP Expressway, a specialized terminal for CP's Expressway branded service to Toronto and Montreal. The second CP terminal, CP Oak, was an international container terminal located at CSX's Oak Yard. The Oak terminal was leased from CSX. CN operated the former Grand Trunk Terminal, Moterm, located just north of the Detroit city line in Ferndale, MI. Exhibit 157 shows the location of these terminals along with Conrail's Livernois Yard.

Exhibit 157: Detroit Intermodal Terminals

DIFT Progress

Utilizing the TEA-21 funding, MDOT completed the Detroit Intermodal Freight Feasibility Study in December 2001. The conclusion of the feasibility study was to advance the planning for DIFT by preparing an environmental impact study (EIS).

As a part of the EIS, MDOT identified four DIFT alternatives:

- **Alternative 1. No Action:** Railroads will develop their existing intermodal terminals with no government funding assistance or oversight.
- **Alternative 2. Improve/Expand:** Proposes improvements will be made to existing rail terminals with federal and state government funding assistance.
- **Alternative 3. Consolidate:** Proposes the intermodal operations of all four railroads will be consolidated at the Livernois Yard area with federal and state government funding assistance.
- **Alternative 4. The Composite Option:** Proposes that the intermodal operations of CSX, NS and CP will be consolidated at the Livernois Yard area, while CN Moterm terminal will be improved at its existing location. Projects will be funded with federal and state government funding assistance.

MDOT continues to advance the EIS and conduct public hearings to obtain community and stakeholder responses to the various alternatives. The EIS schedule, revised in December 2005, shows determination of the preferred/recommended alternative and finalization of the EIS in October 2006 with a Record of Decision (ROD) by FHWA in December 2006. Although funding of preliminary engineering and EIS development have come from the $18 million TEA-21 earmark, actual project funding requires completion of the EIS and FHWA ROD. Once the ROD is issued, the remaining funds from the original $18 million earmark can be utilized for the DIFT project. In addition, any future federal funding authorizations for the project can be utilized.

CSX and NS Intermodal TerminalExpansion

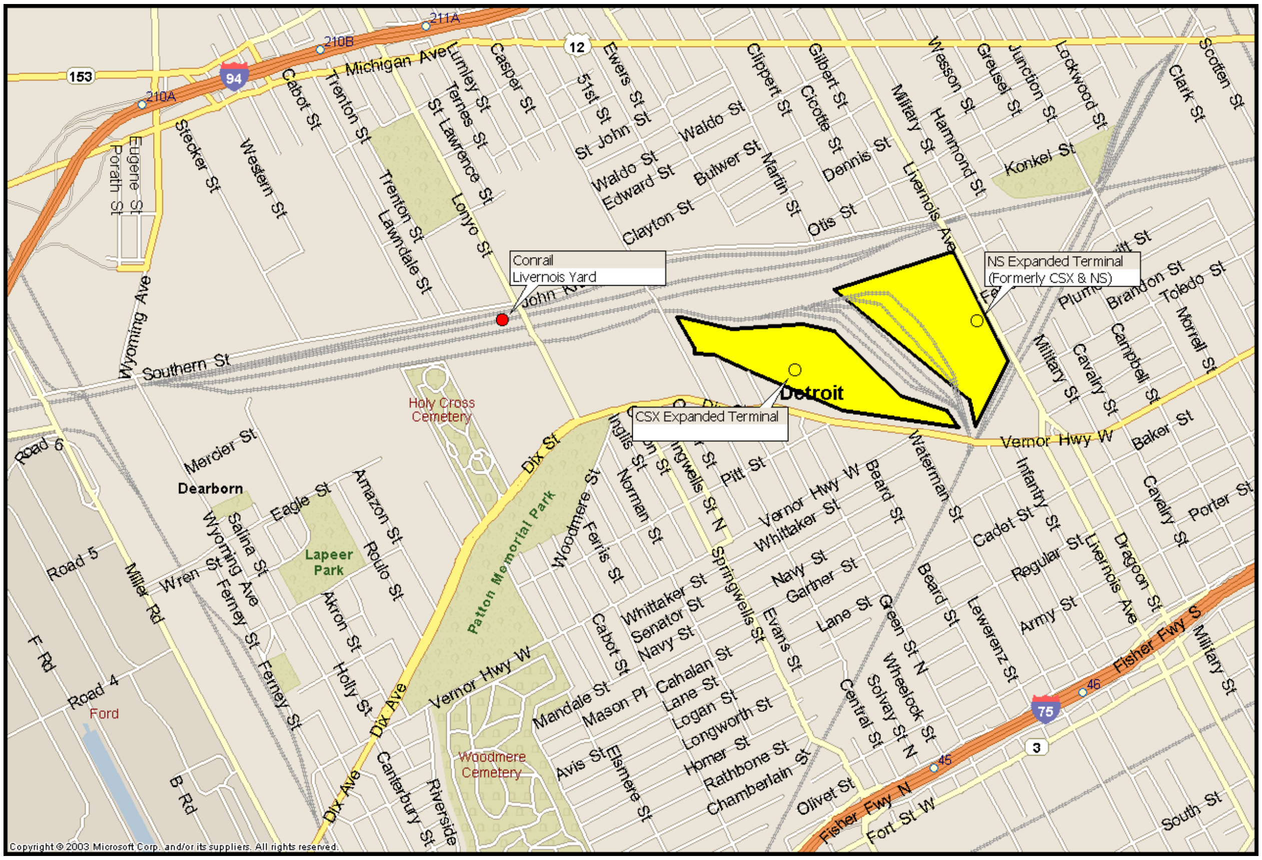
In 2002 the shared CSX and NS intermodal terminal at Livernois Yard was well beyond its design capacity. The terminal occupied about 35 acres on the east side of Livernois Yard and had a nominal capacity of about 60,000 lifts. Current operations of both carriers are estimated at 90,000 to 100,000 lifts. In addition, since NS and CSX are direct competitors, sharing a common facility created operational and commercial conflicts. As a result, CSX and NS agreed that they would work together to expand their terminal capacity in Detroit. This was done by creating a new facility on about 65 acres of adjacent Livernois Yard property for CSX and expanding and improving the existing facility to provide NS with a comparable 65-acre terminal.

Since this project was consistent with the DIFT, MDOT agreed to consider a loan/grant application for the project under its current capital program for funding of transportation improvements. The MDOT program provided matching-grant funding under a five-year loan which converted to a grant over the five-year loan term. The MDOT loan agreement contractually obligates the carrier to make five loan payments to pay off the loan. However, in each year that the borrower achieves certain agreed operating performance, the loan payment is converted to a grant and waived.

Since the CSX and NS terminal expansions were located on Livernois Yard property owned by Conrail, the application for the MDOT grant and the final loan agreement were completed by Conrail on behalf of CSX and NS. The overall cost of the expansion of both terminals was between $10 and $11 million. $4.5 million of this amount was funded through the MDOT program. The MDOT loan agreement provided an operating performance requirement in terms of combined CSX and NS lifts, which were agreed to by Conrail on behalf of CSX and NS. All agreements necessary to advance the project were completed by the end of 2003. The CSX terminal was completed in 2004 and the NS expansion was completed in 2005. Exhibit 158 shows the location of the two terminals within the Livernois Yard complex.

Although the CSX and NS expansions at Livernois Yard were not a part of the DIFT project, they did make a significant contribution to the DIFT objectives. The combined capacity of the two terminals more than doubled the capacity of the former Conrail terminal. The project also provided land for future CSX and NS expansion and separated the terminal operations of the two competitors. This separation will facilitate future expansion and investment as each carrier can advance projects based on its own needs.

Exhibit 158: Livernois Yard Expanded Terminals



Lessons Learned

This project has extended for more than a decade. The auto industry was always the key to this effort and over this extended period the auto manufacturers have lost the interest and commercial clout necessary to bring the railroads and the public sector together to accomplish this project.

Initially, the negotiation over the acquisition of Conrail by CSX and Norfolk Southern added delay, and the failure of these railroads to provide the auto industry with competent service during the integration of Conrail led the auto industry to reduce its support for railroads in general and DIFT in particular. In addition, the auto industry has substantially changed the way it buys transportation service, relying increasingly on specialized logistics firms and loosing touch with the strategic opportunity that might be available if the DIFT were constructed.

Although the DIFT project was initially well supported politically and had a significant amount of funding, the project seems to be stalled because of its complexity. MDOT appears to be having difficulty in getting and maintaining a consensus regarding the need for the project that is satisfactory to all four rail carriers, the auto industry, and the public stakeholders.

A further complication is that over the development period there have been multiple governors, mayors, and public officials involved in the public process. Because there have been community concerns regarding the development, DIFT has become a political issue.

The inherent difficulty of getting large competing companies to reach long-term agreements on complex operating and commercial issues can be a major constraint to the project. Each company's driving self-interest makes it very difficult to create a consolidated operation without in some way disturbing the existing competitive balance. This is particularly true when dealing with CSX and NS who are owners of the property and are being asked to make trade-offs that may improve a competitor's position. CSX and NS must agree or the project cannot go forward.

On the other hand, when private sector companies develop a plan that satisfies their own self-interest, they can move very quickly. This was the case with CSX and NS on their own terminal expansions at Livernois Yard. With MDOT funding as a key driver, along with the need for terminal capacity, CSX and NS found a way to work together for their mutual self-interest. If the grant funding incentive is offered, the private sector companies can find a way to overcome complexity and other issues to take advantage of it.

Port of Montana

Overview

Montana is served by two Class I railroads, Union Pacific and BNSF. There are three intermodal terminals in the state, all located at major highway junctions (Exhibit 159). BNSF operates an active facility in Billings (I-90/25 and I-94). The Port of Montana operates a general-purpose rail terminal in Butte (I-15 and I-90), which presently does not have any intermodal rail service. Finally there was a BNSF intermodal terminal in Shelby (I-90 and US-2), which was active as late as 2002.

Exhibit 159: Montana Project Sites

The Port of Montana

The Port of Montana (Exhibit 160), located just outside of Butte, is also located at the only rail junction of the BNSF and UP railroads in Montana; and at the intersection of two major interstates, I-15 and I-90. The facility has been in existence for 32 years and has served as the Union Pacific connection in Montana.

Exhibit 160: Port of Montana

There is currently no intermodal service, the railroads having cancelled rates for the terminal. Until a couple of years ago, the terminal was handling about 1200 intermodal loads annually, primarily outbound agricultural products. They do have two lift machines.

The Port is a multiple-use facility and was built using funds obtained by the Port from an unrelated legal settlement. As a quasi-government facility, it is currently partially funded by a tax from Silver Bow County.

Traffic currently handled is:

- Forest products. A separate 85,000 sq-ft. building with five railcar capacity, plus paved outside storage.
- Bulk handling. Fertilizer and various mining by-products (Butte is located on what was once known as "the richest hill on earth" (copper).
- Intermodal transloading. Basically moribund except for occasional specialty loads.
- Auto transloading. Site is a major auto distribution center for Montana.
- Other. The facility handles a variety of other products such a paper rolls, scrap paper, etc.

BNSF Billings

BNSF Billings is on the BNSF railway and near the intersection of I-90 and I-94. In that location I-90 is the northern extension of I-25. BNSF Billings is a typical rail-owned facility whose operation is contracted to Dick Irvin Trucking. BNSF Billings is a marginal intermodal facility because of its small size. It remains because United Parcel Service, the rail industry's largest intermodal customer, is the anchor user of the terminal.

BNSF Shelby

BNSF Shelby is on the BNSF railway near the Canadian border at the intersection of I-15 and US2. The facility is now closed. BNSF Shelby was also a rail-owned facility whose operation was contracted to Dick Irvin Trucking.

The concept was that Canadian longer-combination vehicles could be operated across the border to Shelby, then loaded on the train for distribution to points south and east. The facility was successful in penetrating this market, but the volume was small and unbalanced. There was some concept toward also moving international exports through Shelby, but again the business was heavily balanced outbound and only a very small number of international containers were available for loading in the market. An additional small, unbalanced inbound movement of parcel and less-than-truckload shipments in private trailers apparently developed over time, but was not sufficient to make the facility viable in the long term.

Lessons Learned

Size

In order for a Class I railroad to be interested in a particular new market for intermodal service the potential volume needs to be at least 20,000 loads per year.

Balance and Equipment

Many small terminal projects fail for lack of balanced equipment movements. This is complicated because of the many different types of domestic and international highway equipment. Balance is typically worse in small markets.

Europort Vatry, France

Overview

Europort Vatry is an all-cargo airport and associated logistics park located in France approximately 100 miles east of Paris (Exhibit 161). Europort Vatry was planned and built on a former NATO base site to accommodate air cargo shippers.

Exhibit 161: Europort Vatry, France

Vatry includes a 24-hour all-cargo airport, road and rail connections, and a logistics center. Direct links to major highways provide for efficient trucking. The airport has no night-flight restrictions, a 12,635-foot runway, and all-weather landing capability. Flight operations can occur during the night because Vatry is centered in a low-population area.

Vatry is under contract management by the Montreal Airport Authority under an agreement lasting through mid 2008.

The cargo terminal has 45,200 square feet, including refrigerated space. The construction of a second freight terminal began in April 2006.

Logistics Developments

The associated logistics center is 1,040 acres with a potential to add 2,220 acres in the future. Two large business parks have been constructed: one 265 hectares in area in Zone 1, the other 157 hectares in area in Zone 2. Some 70 hectares in total have been set aside for larger-scale operations. Incentive funding is available from local, regional and European authorities in addition to on-site tax incentives.

Recent cargo growth has been very rapid. Vatry International Airport handled 10,830 metric tons of freight in the first quarter of 2006, up more than 72.6% on the same period last year. Vatry handled 37,670 metric tons of freight in 2005 compared with 19,128 tons in 2004 and 8,730 tons in 2003.

2004 saw Vatry succeed in attracting a number of cargo carriers and becoming, in some cases, a traffic hub for operators. For example, Coyne Airways operates several weekly services to the Caspian Sea region while Avient uses Vatry as a European base for flights to and from Africa.

The main business sector locating at Vatry is distribution. Starting in 1998, the initial tenants included:

- Air Liquide Welding, which distributes welding equipment throughout Europe;
- JCH Associates, which warehouses and distributes toys and textiles;
- Vatinel, a Customs broker;
- Transports Vertusiens, a parcel transport company specializing in foods; and
- Varty Poids Lourds, a forklift repair company.

Major new tenants include Prologis, a leading world logistics real estate investor, and TNT, which operates a European distribution center for Fiat.

Success Factors

The location of Europort Vatry appears to be the single greatest success factor. Vatry is centrally located within Europe, with 75% of all freight traffic in the European Community concentrated within an 800-km radius of the airport complex.

Another major growth factor has been the marked development in perishable freight (fruit, vegetables and fish). Vatry's perishable goods center is one of the largest facilities in Europe and includes multiple cold-storage rooms designed specifically for fresh vegetables, fruits and flowers, as well as fish, meat and prepared foods. European regulations require the separate handling of various types of food products. Vatry International Airport's perishable goods center is certified by European authorities and is a recognized European cargo Border Inspection Point, both of which constitute major competitive advantages for the airport. As a result, products transiting through Vatry can be distributed throughout the European Community with no additional customs approval.

San Bernardino International Airport

Overview

The Inland Valley Development Agency (IVDA) and the San Bernardino International Airport Authority (SBIAA) oversee the redevelopment and reuse of the former Norton Air Force Base to civilian and commercial use. The objectives of both agencies are to replace the jobs lost when the base closed, improve the infrastructure, landscape, and aesthetics of the local and surrounding areas, and promote economic and aviation-related activities. Alliance California is a project of the Hillwood Group, who are also the developers at Alliance, TX. Rail intermodal service uses the BNSF San Bernardino terminal. The project has attracted aircraft-related business centers and commercial distribution centers.

Exhibit 162: SBIA and Alliance California

Inland Valley Development Agency (IVDA)

The Inland Valley Development Agency (IVDA) is a joint powers authority comprised of the County of San Bernardino and the Cities of San Bernardino, Colton, and Loma Linda. Formed in 1990, the IVDA is responsible for the redevelopment of the non-aviation portion of the former Norton Air Force Base. In addition to the approximately 600 acres on the former base, the IVDA also has a redevelopment project area of approximately 13,000 acres of surrounding properties. The land use designations within the project area include: light and heavy industrial, office, commercial and residential. In 2002, the IVDA entered into a Master Disposition and Development Agreement (DDA) with Hillwood/San Bernardino LLC, a Texas-based development company, which serves as the master developer of the project commonly known as Alliance California.

San Bernardino Int'l Airport Authority

The San Bernardino International Airport (SBD) is located 60 miles east of the Los Angeles International Airport (LAX). SBD is surrounded by major interstate freeways (I-10, I-215 and I-30/I-210), and is within two miles of the BNSF intermodal facility. SBD offers Customs clearance, aircraft ramp space, room for new development opportunities and expansion potential, including Foreign Trade Zone and LAMBRA tax incentives.

- Businesses at SBD itself are primarily aircraft-related.
- BSA International, an FAA-certified repair station for aircraft components.

- Blue's Aviation, a Fixed Base Operator (FBO). An FBO provides numerous services for local and transient aircraft. Services include fuel, light aircraft maintenance, general aviation aircraft tiedown and storage, and numerous accommodations for the flying public.
- Aircraft Rescue & Fire Fighting (ARFF) Training Center.
- Aero Pro, a private company specializing in aircraft painting.
- US Forest Service air tanker base.

Negotiations are currently underway with a company to function as an FAA-certified repair station performing inspection, overhaul, and maintenance services for large commercial aircraft. These services can be beneficial to tenants who base their aircraft operations at SBD.

Alliance California

Alliance California is a 2,000-acre “trade and logistics center” adjacent to SBD. It incorporates a Foreign Trade Zone and an on-site CBP office.

The FTZ is operated by Alliance Operating Services, the same firm that operates the FTZ at Alliance Texas.

There are multiple buildings in existence or under development at the site totaling roughly 64 million square feet. Tenants include MedLine, Pep Boys, Kohl’s, Mattel, and Stater Bros. Grocers. Hillwood estimates that over 29,000 jobs have been created there since 2000.

Kelly USA/Port San Antonio

Overview

In 1995 the Base Realignment and Closure Commission (BRAC) decided to close Kelly Air Force Base. At that time the City of San Antonio created the Greater Kelly Development Corporation (GKDC) as a public development corporation under Texas law to manage the transition of Kelly Air Force Base from a government facility to private ownership. In 1999 GKDC was dissolved and Greater Kelly Development Authority (GKDA) was created as its successor. GKDA is governed by an eleven member board that is appointed by the Mayor and City Council. GKDA is managed by an executive director responsible to the Board. GKDA can own property, enter into contracts and has bonding authority.

In 2001 the Kelly Air Force Base (Exhibit 163) was officially closed and control of approximately 1,900 acres of Base property, with 11.8 million square feet of buildings, was transferred to GKDA. At that time the development was branded KellyUSA. The primary mission of GKDA under Phase I of its redevelopment plan was the privatization of Base property. By the end of 2004 about 96 % of the existing commercial/industrial property had been leased to 73 tenants and GKDA was essentially sold out.

Exhibit 163: Kelly Air Force Base

Phase II of the development plan, beginning in 2004, calls for the infrastructure projects necessary to attract new development to KellyUSA. These include a number of road and drainage projects needed to make properties suitable for Class A development. It was estimated that these improvements along with new construction will require about $364 million of capital. About 67%, or $245 million, of funding is expected to come from private sources, with the remainder coming from city, state, federal and GKDA sources.

Port San Antonio

Phase III of the development plan turns KellyUSA into an international cargo port. This is consistent with the city-wide strategy named Inland Port San Antonio. This strategy promotes the growth of all of the transportation, distribution, and logistics facilities which make up the city's capacity to serve international trade. The primary focus of this initiative is on the trade corridor with Mexico, particularly those industries located in Monterrey, Mexico. In response to this strategy the GKDA board, in early 2006, approved a name change to Port Authority of San Antonio (PASA) and changed the industrial park brand name from KellyUSA to Port San Antonio. PASA is currently developing a master plan for development of 700 acres of industrial and commercial property at Port San Antonio. The plan calls for three types of development, aerospace and aeronautical at Kelly Airport, commercial and mixed use at Kelly Town Center, and rail-served industrial at East Kelly Railport.

PASA is just beginning the implementation of its Phase III plan. One of the key drivers is San Antonio's location as a South Texas hub. San Antonio is located at the juncture of I-10, I-35 and I-37. Exhibit 164 provides an area map showing San Antonio's interstate highway network and the access to Port San Antonio. The largest US / Mexico gateway crossing is located in Laredo about 150 miles to the south via I-35. Seventy five percent of all goods moving between the U.S. and Mexico flow through San Antonio.

Exhibit 164: Port San Antonio

Port San Antonio has an 11,500-foot runway which can handle 747-400 air freighters. An 80,000 square foot air cargo terminal is under construction as part of the Phase I air cargo development plan. This facility will be completed in 2007, enabling start up of commercial air freight service.

On the east side of Port San Antonio, PASA is developing the East Kelly Railport. This area is adjacent to the Union Pacific rail yard and is served by Union Pacific. PASA is developing the rail infrastructure and necessary rail operating capability to provide its own local switching service for rail carload tenants. PASA has recently located a railcar transload operator who is building a 360,000 square foot rail-served warehouse and transload facility.

Port San Antonio tenants will be able to utilize Foreign Trade Zone 10. In addition, a federal inspection facility is being established that will include offices of U.S. Customs, U.S. Department of Agriculture, Food and Drug Administration and other federal agencies involved in clearing and inspecting international cargo. This facility will be located at the air cargo center but will also be available for use by rail customers as well as Foreign Trade Zone customers.

San Antonio Rail Intermodal

The Union Pacific has two small intermodal terminals in San Antonio. The Quintana Road terminal is located at the Union Pacific yard adjacent to Port San Antonio. The Quintana Road facility handles north-south business from and to Mexico. The Sherman Road terminal is in northeast San Antonio and serves east-west business. The current intermodal terminals are small and relatively inefficient and Union Pacific is considering the feasibility of consolidating these terminals into a new facility. The project is in its early stages and a site location has not been identified.

PASA has no plans for development of a rail intermodal terminal at Port San Antonio. There is not enough land available for a large-scale terminal or the associated distribution warehouses at existing industrial sites. PASA is not relying on large-scale rail intermodal service to handle import and export containers as part of its development plan.

Port Authority of San Antonio Funding

In its early years GKDA received City grants as seed money to begin operations. Once GKDA took control of the Kelly Air Force Base Property it was able to fund its operations from lease revenues. Today PASA generates about $29 million in gross revenue, with net income of about $3.2 million. About 70% of PASA revenue comes from aerospace or aeronautical industries.

PASA has authority to issue revenue bonds and has issued $6 million of bonds to finance a hanger for Boeing's aircraft repair facility. These bonds were secured by lease revenues. PASA is currently considering issuing bonds for about $30 million in capital projects. These bonds would be secured by its operating income and proceeds from tenant infrastructure charges. PASA property is not subject to property tax. However, in lieu of property tax it assesses an infrastructure charge based on 75% of assessed property value. These charges generate between $3 and $4 million annually and are used for infrastructure projects. This revenue stream can also be used to secure bond funding.

Lessons Learned

The primary driver for the Greater Kelly Development Authority since it took control of Base property in 2001 was industrial development and replacement of the lost Air Force jobs. Although there are a few logistics services companies, logistics and inland port operations have not been a key driver of development. The Inland Port San Antonio city-wide strategy appears to have been adopted by PASA in early 2006. The inland port concept of ocean containers moving in to Port San Antonio by rail from west coast ports and being distributed to south Texas markets is not a part of the PASA plan. The inland port vision of Port San Antonio involves Mexican imports and exports coming to San Antonio by highway, international air cargo arriving at Kelly Airport, and domestic or Mexican rail carload business moving to Kelly Railport for processing and distribution. It is too early to tell how successful Port San Antonio will be in attracting logistics-related industrial development.

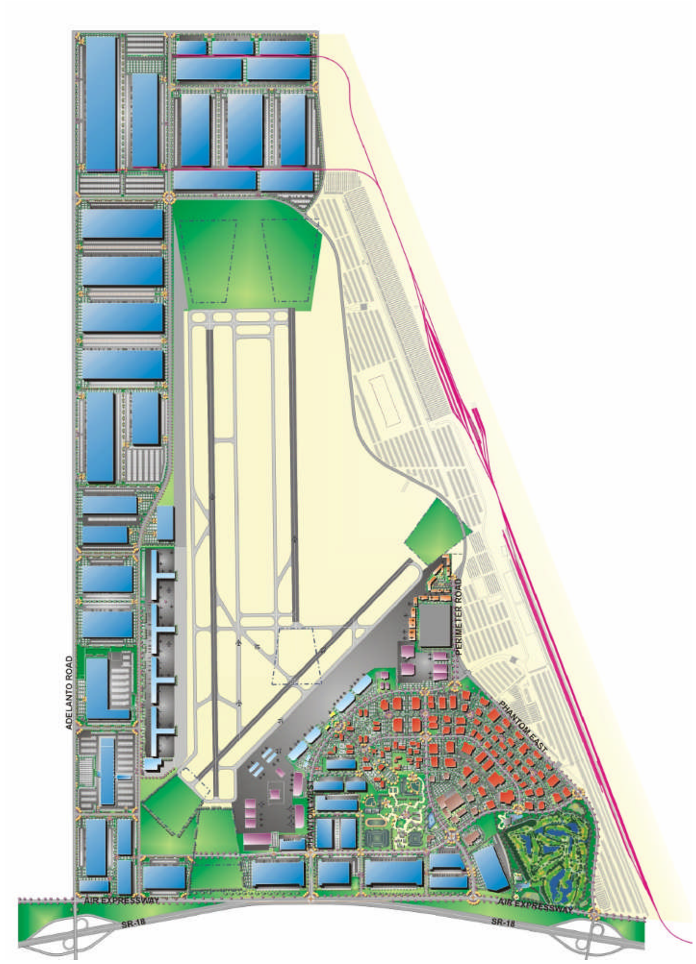
Southern California Logistics Airport

Overview

The SCLA is the former George Air Force Base, being developed by Stirling International into a 4,000-acre master-planned business and industrial airport complex. (Exhibit 165).

To date, the project has attracted primarily aircraft industry plants and retail distribution centers served by over-the-highway trucks.

Exhibit 165: SCLA Plan



As shown in Exhibit 166, SCLA is actually at Adelanto, although it is commonly referred to as being at Victorville. Adelanto is part of the Victor Valley, a developing region north of Cajon Pass and separated by Cajon Pass from the Inland Empire market. In may respects, the future for SCLA is in this developing market rather than in competing with San Bernardino, March GlobalPort, and Ontario for the Inland Empire market.

Exhibit 166: SCLA Location

SCLA is a 500-acre complex with a number of target business segments, many of which are not directly related to air cargo or freight transportation.

- Air Cargo
- Aviation Maintenance
- Rail Complex
- Real Estate Development
- Military Defense Programs
- Flight Testing
- Advanced Flight Training
- Charter Passenger Service
- Business & Executive Jet Travel Center

In this respect SCLA has much in common with the other logistics airports.

Business tenants with a direct cargo focus include:

- ConAgra Foods
- Nutro Products, Inc.
- M & M / Mars
- Nestle Waters North America
- GTE (Verizon)

- Wal-Mart

Commercial air cargo carriers have included Cargolux, FedEx Express, ASB Air, Atlas Air, and MK International.

Incentives

Acting as the Airport and Rail Complex Authority for SCLA, the Victorville City Council is focused on developing economic activity and job creation within the region. As well as strong city support, companies located at SCLA benefit from county, state and federal incentives.

- 60,000-acre redevelopment district
- LAMBRA Zone credits and incentives
- 2,500-acre Foreign Trade Zone no. 243
- Tax assistance from the State of California for employee training and equipment purchases
- San Bernardino County Incentives, including tax-exempt bonds
- FAA program support
- Local tax-exempt bond financing
- City tax credits for hiring and equipment purchases

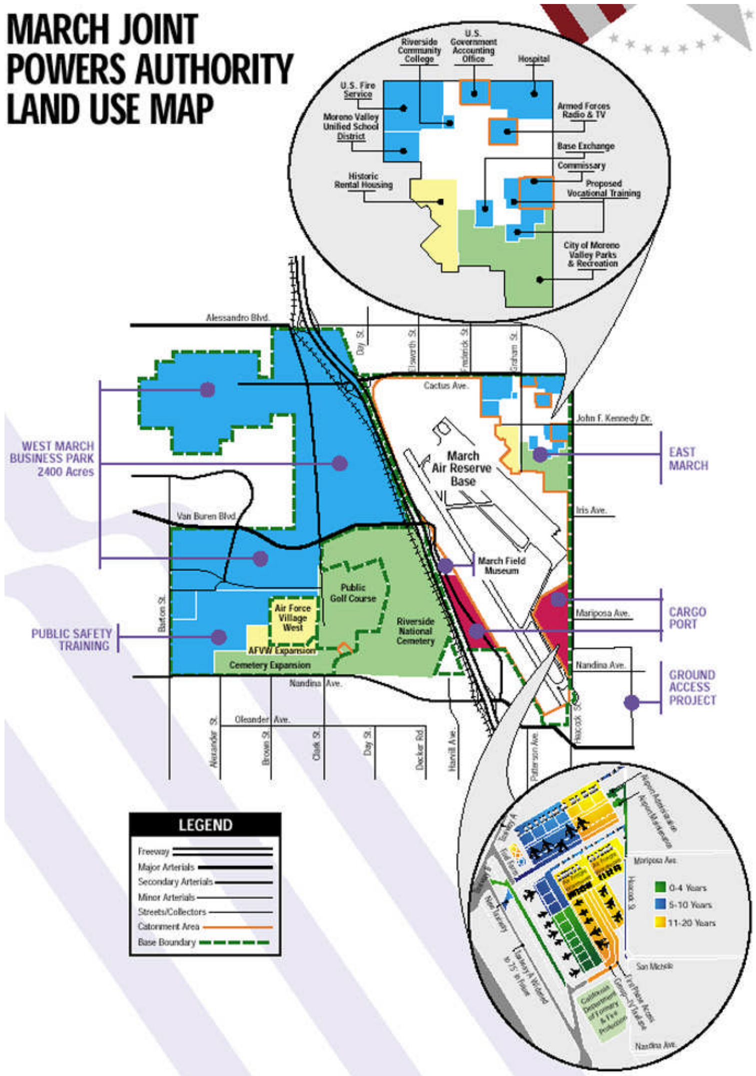
March GlobalPort

Overview

March is a 350-acre "joint-use airport" governed by the Air Force and the March Joint Powers Authority. March Inland Port Airport Authority (MIPAA) was formed by the March JPA in 1996 to develop the civilian airport and related business. The Authority's marketing partner is the Lynxs Group. Lynxs was chosen in 1996 and formed March Inland CargoPort Development, LLC to convert and market the base. March also formed a California Redevelopment Agency and project area to assist with development.

The marketing focus is on airfreight and air industry support businesses. The Base Reuse Plan (Exhibit 167) designates approximately 350 acres of land for civilian aviation facilities at the southern end of the airfield at March. An additional 200 acres west of the I-215 freeway. This acreage is intended to be used for commercial aviation through a military/civilian joint-use arrangement. March does not have any distinct "inland port" functions beyond those of a logistics airport, although it does have a rail connection.

Exhibit 167: March GlobalPort



Competition

As Exhibit 168 shows, the SCLA, March, and San Bernardino logistics airports are all in the same general market and share that market with Ontario International, an established airport with extensive service.

Exhibit 168: Inland Empire Cargo Airports

Global TransPark

Overview

In 1991 the North Carolina General Assembly created the North Carolina Cargo Airport Authority (now the North Carolina Global TransPark Authority) to develop an air cargo industrial complex. This concept was based on an expectation that the next future wave of industrial development will be driven by just-in-time manufacturing and distribution. Flexibility and speed are expected to become the critical competitive factors driving industrial development. As a result, an integrated air cargo airport/industrial complex was believed to offer a competitive advantage in attracting new industry; and generating jobs and economic benefits for the region it serves.

In 1992 the Global TransPark Authority (GTPA) selected Kinston, NC, as the site for the Global TransPark (GTP). Kinston is located about 70 miles southeast of Raleigh, with reasonable access to interstate highways I-95 and I-40 as well as the North Carolina ports of Wilmington and Morehead City (Exhibit 169).

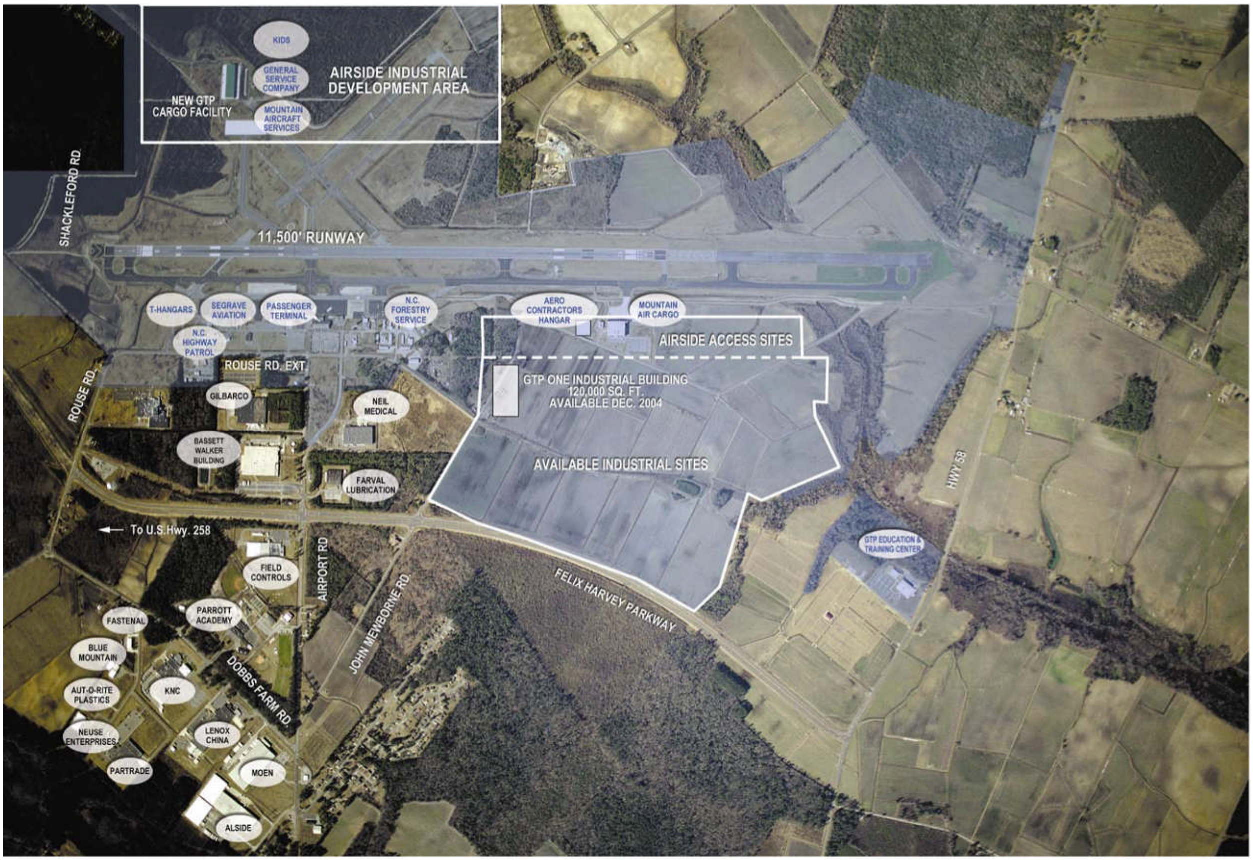
Exhibit 169: Global TransPark and Southeastern NC

The current master plan provides for a 15,300-acre development. Improved highway access to I-95 and I-40 was to be built. The plan also included a rail intermodal terminal with connections to CSX and Norfolk Southern which would enable rail intermodal service to the ports of Wilmington and Morehead City. Industrial areas were planned to locate industries with high air transport demand close to the runway and those with a higher reliance on surface transport on the periphery. The Master Plan projected about 23,000 cargo flights carrying 696,000 tons of cargo by 2014.

Global TransPark Development

GTPA has advanced the development of Global TransPark at the former Kinston Regional Airport over the last 13 years. Over that time about $150 million in State, Federal, and private sector funds have been received for development. Exhibit 170 shows the current site plan for GTP development. The areas in blue denote GTP property.

Exhibit 170: Current Global TransPark Site Plan



Following are a number of major development events at TransPark:

- May 1996 – TransPark approved as Foreign Trade Zone
- August 1996 – Mountain Air Cargo opens new facility as TransPark's first tenant
- March 2000 - Construction of 32,000 sq. ft. education and training center completed
- December 2002 – Runway extension to 11,500 feet opened enabling Boeing 747-400 air freighters to utilize TransPark
- May 2002 – 58,200 sq. ft. air cargo facility opened with three tenants
- April 2003 – Duke Realty selected as developer for industrial component of TransPark
- June 2005 – New Breed, Inc. leases 120,000 sq. ft. distribution warehouse. This is the largest transaction completed by GTPA.

Currently GTP supports 27 employers in its initial development area and has over 5,700 acres fully permitted and available for development. These companies are providing 2,600 jobs with over $65 million of payroll and benefits.

Global TransPark Financial Issues

Although GTP has modest success, it has fallen far short of its original forecasts and expectations with respect to its ability to attract air cargo operations. Even with the progress that has been made, GTPA is not self-sufficient and requires ongoing subsidy to fund its current operations. In its fiscal year ending June 30, 2005, GTPA received only $690,000 in operating revenue and experienced an operating loss of $3.2 million. Even with a State funding subsidy of $1.6 million GTPA experienced negative cash flow of over $300,000. As a result, public support for continued funding is eroding as evidenced by the reduction of State subsidy from $3.4 million to $1.6 million in 2003. In addition, the State legislature has ordered studies to determine ways to improve operations and/or restructure the organization.

It does not appear feasible to discontinue operations of GTPA. There is outstanding debt of $32 million, most of which is held by the State. Another concern is that if GTPA discontinues operations the FAA may require payback of $20.1 million in grants. Now that the funds have been invested it appears that the only option available to the State is to continue supporting the operation and increase efforts to turn it around.

Tenants

Existing GTP tenants are primarily aircraft-related businesses (e.g. flight training, aircraft charter) or state agencies (e.g. Highway Patrol, Forestry, Economic Development). There are few firms engaged in moving, shipping, or receiving air cargo.

Global TransPark tenants include:

- ASA Delta Connection - Commercial jet service
- Aero Contractors - Aircraft charter
- Henley Aviation - Flight Training Center
- Longistics - Foreign-Trade Zone Operator
- MJE Telestructure - Plant infrastructure
- Mountain Air Cargo - Full A&P contract air service
- N.C. Emergency Management - Eastern Branch
- N.C. Forestry Service - Eastern Branch
- N.C. Highway Patrol - Eastern Aviation Unit
- New Breed, Inc. - Logistics and supply chain management
- North Carolina's Eastern Region - Economic development
- Segrave Aviation - FBO, Charter service, trucking
- Workhorse Aviation Manufacturing - Military support plant

Funding

The act creating the North Carolina Global TransPark Authority authorizes the financing of projects that may be available for use by private parties by the issuance of bonds and notes by the

Authority. Under federal tax laws, the general rule is that interest on bonds issued to finance facilities used by private parties will not be tax-exempt. However, there are exceptions to this general tax rule for facilities that qualify as "exempt facilities," such as certain airport facilities, and for manufacturing facilities, if the facilities and their user meet the requirements for "small issue" industrial revenue bonds. The Authority can also issue bonds on a federal taxable interest basis, the interest on which bonds, however, would be exempt from North Carolina income tax.

The Authority may issue bonds and notes ("obligations") (1) to provide airport projects and (2) special user projects. The obligations will constitute special limited obligations of the Authority, payable solely from Authority revenues; income on assets specifically assigned or pledged for the payment thereof; or from the funds, collateral and undertakings of a private party that are assigned or pledged by that party for the payment thereof.

The Global TransPark statute's definition of "airport projects" authorizes the financing by the Authority of land, building and structures at the TransPark, including facilities to be leased to one or more private parties.

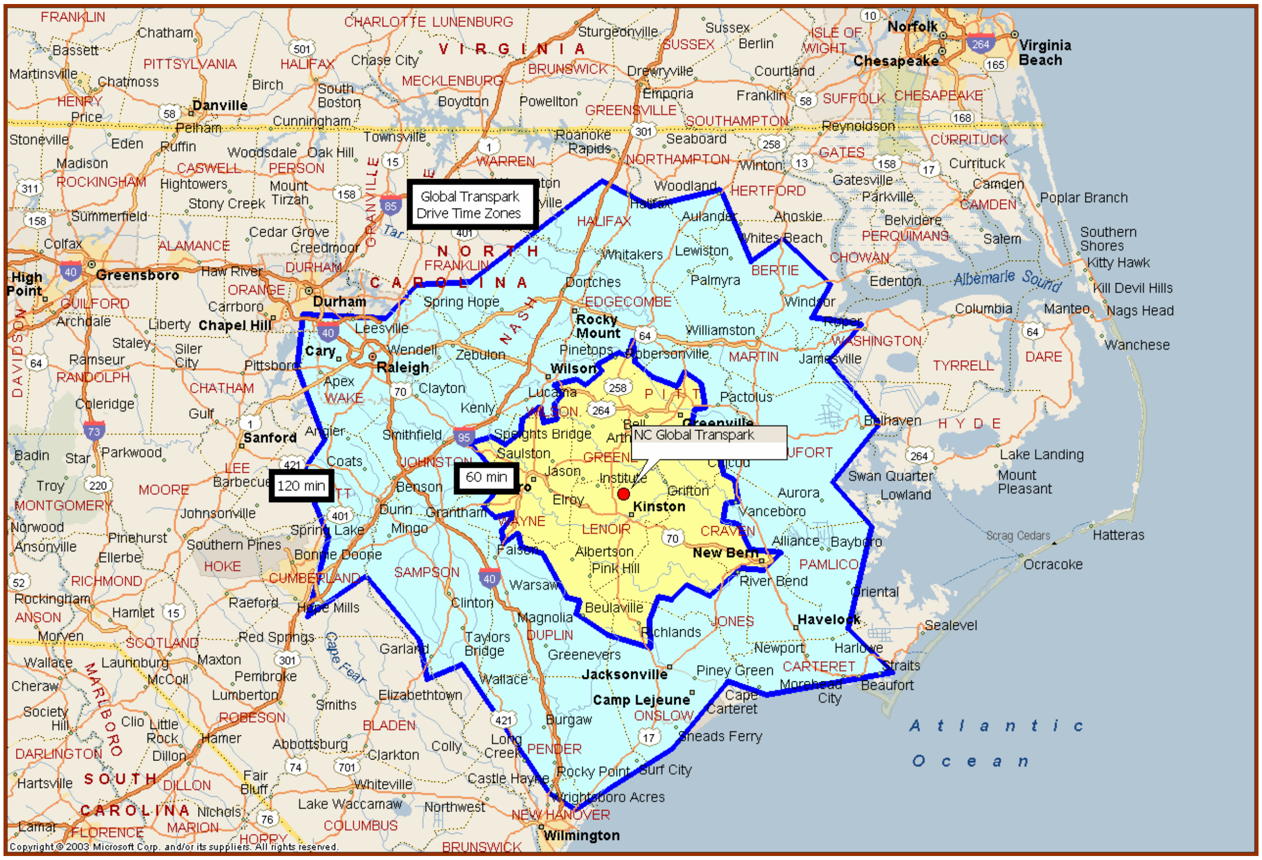
The Act defines special user projects to mean any land, equipment, buildings or other structures located at the TransPark and the addition to or rehabilitation, improvement, renovation or enlargement of an existing structure. The special user project must be used as, or in connection with,:

- (a) an undertaking for industry, including an industrial or manufacturing factory, mill, assembly plant or fabricating plant, a freight terminal, an industrial research, development or laboratory facility, or an industrial processing or distribution facility for industrial or manufactured products; or
- (b) a commercial, processing, mining, transportation, distribution, storage, marine, aviation, or environmental facility or improvement; or
- (c) any combination of the above items.

Lessons Learned

The Global TransPark experience is an excellent example of the importance of location and markets in development of new airport facilities and industrial parks. The region surrounding Kinston does not appear to have enough economic growth to absorb the projected industrial development. There are no major population centers to support the market for a major cargo airport or passenger operations. As a result, the available market served by GTP cannot sustain the size of the facility investment. Exhibit 171 shows the market region through drive-time zones surrounding GTP. Access to markets and interstate highways is not particularly good and does not appear to provide competitive advantage to the Kinston location.

Exhibit 171: Global TransPark Market Reach



GTP is almost totally dependent on the air cargo operation to attract development. Although GTP advertises close proximity to the deep-water ports of Wilmington and Morehead City, these ports are very small niche ports and do not have the import-export container business needed to drive container-oriented distribution. The ports of Norfolk, Charleston and Savannah are the east coast ports that are handling most of the Southeast Atlantic container business. As a result, GTP has no competitive advantage to these ports in attracting Atlantic container cargo.

GTP also makes reference to rail access to CSX and Norfolk Southern. Kinston is not on the main lines of either of these two rail carriers and is very doubtful that GTP will be able to justify development of an intermodal terminal. With no rail intermodal service, the Kinston location suffers another competitive disability for attracting logistics-oriented development.

Although the concept of a global air cargo industrial complex was certainly a creative and forward thinking idea in 1991, it does not appear that the site location selected for GTP had sufficient market and location advantage to support the investment made. This makes it necessary for GTP to rely entirely on its air cargo capability and regional market to provide the needed industrial development. It may only be a matter of time and increased marketing effort to bring GTP to a position of financial self-sufficiency.

NY/NJ Port Inland Distribution Network

Overview

The Comprehensive Port Improvement Plan (CPIP) is a strategic plan for the future development of the Port of New York and New Jersey (PANYNJ). The CPIP evolved from a U.S. Army Corps of Engineers Harbor Navigation Study, completed in December of 1999.

As logistics and distribution activities are a major economic driver of the New York Metropolitan regional economy, the PANYNJ seeks to maintain and expand Port market share in the very competitive Atlantic port marketplace.[ix] Over the past five years for which data is available (2000-2004) the PANYNJ's container business has grown much faster than its major port competitors, Montreal and Norfolk. The ports of Baltimore and Halifax have smaller container operations and are not strong competitors to the Port of New York and New Jersey. The ports in Boston, Wilmington and Philadelphia are considered niche ports with very specialized container operations.

The Port has five major marine container terminals at Newark, Elizabeth, Global Marine (not a PANYNJ terminal), Howland Hook, and Red Hook. Land-side access is critical for future port development. ExpressRail on-dock volume is climbing rapidly from 50,000 annual container lifts 10 years ago to 227,000 lifts last year. About 75% to 80% of all rail business is ExpressRail and rail has steadily gained at the expense of truck. Projected rail growth is 1 million rail lifts by 2020 and 2 million by 2040. The basic reasons for rail growth are increasing demand for rail transport, the PIDN program, overall growth in the port business and rail's increasing role in port growth.

While there are major environmental aspects of CPIP, the major logistics-infrastructure components of the current plan include:

- deepening major shipping channels
- expanding and modernizing cargo handling equipment
- developing inland distribution centers (Inland Ports-PIDN)
- expanding rail infrastructure

The latter two aspects are the subject of this report.

Port Inland Distribution Network (PIDN)

In the study which justified the dredging of New York Harbor to commercially relevant depths, it was recognized that the existing highway infrastructure would not be able to meet the increased demand associated with dredging. Without a shift away from the highway mode, the PANYNJ would not be able to maintain its Atlantic port market share in general and specifically, its share of cargo unloaded at the Port of New York and New Jersey destined to inland markets.

[ix] A January 2006 PA pamphlet reports, "The port directly and indirectly supports 230,000 diverse and highly skilled jobs within the two states of New York and New Jersey and generates $9.4 billion a year in personal income."

PIDN is a program to maximize the productive capacity of the terminals in an environmentally sustainable manner. The PANYNJ developed the PIDN concept two to three years ago. As it considered the flow of container traffic, it saw clusters of inland origins and destinations. A number of clusters were centered around port and freight rail facilities. There are nine locations in six states, well beyond a 25-mile radius (Exhibit 172). Five sites have potential for barge access: Albany, Providence, New Haven or Bridgeport in Connecticut, the Port of Camden, and the Port of Wilmington. Others, including Buffalo, Syracuse and Rochester, are rail destinations. The mode split in 2001 in terms of container transport from and to the terminals was 84% truck, 2% barge and 14% rail. The forecast for 2020 is 57%, 23% and 20%, respectively, truck, rail and barge. Reducing truck VMT and congestion will reduce the need for $300 million in new highway capacity in the region. This program will reduce NOx by 200 tons and fuel consumption by 30 million gallons per year. The Port needs this inland port system since there is not enough land for sufficient terminal expansion. The environmental benefits to the States are substantial since this program will eliminate almost 800,000 truck trips and 50 million vehicular miles by 2020.

Exhibit 172: Port Inland Distribution Network

The PANYNJ would also benefit in that greater use of barges and rail will increase terminal productivity by 20%. It will reduce the time that containers sit on the dock. Containers that will move by barge or rail will sit one to two days vs. five to six days for truck transport. This will result in a deferral of future investments in container terminals, saving $20 million, with increased revenues from existing terminals of $15 million over the next 20 years.

The PANYNJ expresses the PIDN goal as follows:

"The PIDN program aims to lower inland distribution costs; reduce truck trips (vehicle miles traveled); improve air quality; save energy through reduced truck fuel use; increase port throughput capacity and spur economic development at feeder ports and hinterlands by providing new port platforms for value-added warehousing and distribution opportunities."

The Port Inland Distribution Network (PIDN) was therefore conceived to move non-New York metropolitan area freight handled in the Port of New York and New Jersey directly to inland hubs using non-highway modes. Under this plan the non-New York metropolitan area freight would not utilize the local highway network, reserving this capacity for the growth of local highway traffic.

Regional Port-Related Rail Capacity Improvements

The PANYNJ estimates that about 13 percent of its current marine cargo volume is transported off the port by rail. The stated goal is to increase rail handling to as much as 30 percent of the future total cargo volume. A barrier to this growth is that the rail capacity to handle it is limited. To overcome this barrier, the PANYNJ is currently investing $600 million in a comprehensive rail program to increase rail capacity for handling planned growth.

The $600 million rail program is a multi-year effort with the goal of ensuring that each container port in NJ and Staten Island has supporting intermodal rail infrastructure. The projects have included the development of three new intermodal terminals, rail support yards, and rail connectors.

ExpressRail

The initial ExpressRail on-dock intermodal terminal (Exhibit 173) was introduced in 1991. Volume has grown from 35,000 containers in 1991 to 303,000 containers in 2005. This volume increase results in a compounded growth rate of over 16% per year for more than a decade. The PANYNJ is developing an on-dock rail system and intermodal terminals to serve all of the Port's major marine container terminals.

Exhibit 173: PANYNJ ExpressRail Projects

Rail Access

PANYNJ and the major railroads serving the port, CSX and Norfolk Southern (NS), have been investing in increased capacity of the rail network in and around the port (Exhibit 174). Projects include double tracking the lines in New Jersey that access the port. This includes the Lehigh Line to the west and the Chemical Coast Line to the south. Of particular significance is a complex set of projects that add rail capacity in the immediate vicinity of the Port's major container terminals, Port Elizabeth and Port Newark.

Exhibit 174: Regional Rail Projects

The Lehigh Line double-tracking project has encountered significant local opposition. This opposition is difficult to understand because the project is straightforward and has little impact on the community. The line was double-tracked in the past and this project simply returns the line to its original condition. The Lehigh Line is a very active rail line and now is congested to the point that trains back up, creating a nuisance for the neighborhood. This congestion will be eliminated by the double track project. Unfortunately, the project has become a local political issue that, for a time, threatened to stop all New Jersey state rail investment.

Staten Island Railroad

There is a PA/EDC partnership to revitalize freight rail to Staten Island. This effort will involve the construction of a new terminal, with the Arlington Yard providing support facilities. The PANYNJ has acquired the property for the connector to the existing Conrail Chemical Coast line.

New York City Economic Development Corporation (EDC) and PANYNJ are working together to restore rail freight service between Staten Island and connections to CSX and NS rail networks in NJ. The project includes reactivating the Arthur Kill Lift Bridge (longest lift bridge in the world) after being out of service and mothballed for decades. The project will also rebuild the rail infrastructure on Staten Island, and develop an on-dock rail intermodal terminal at Howland Hook.

The new eight-track rail facility at the Elizabeth Marine Terminal opened in October 2004. The new terminal capacity in Elizabeth and Newark filled so rapidly that it overwhelmed the support yard and track capacity. As a result, last year the PANYNJ chose to complete several critical elements of its rail program at the Port Newark and Elizabeth-Port Authority Marine terminals up to two years sooner than previously projected, satisfying a request made by New Jersey Acting Governor Codey.

The Board previously authorized approximately $310 million for the port rail program. The Board authorized an additional $141 million for the project, which will allow for completion of three new components of the program. They are:

- Final design and construction of a second lead track to ExpressRail Elizabeth;
- Completion of ExpressRail Elizabeth's on-dock rail terminal, which will ultimately have 18 tracks;
- Construction of the ExpressRail Corbin Street rail support facility to provide capacity for staging, arrival and departure of two-mile-long trains, and integrate rail traffic from the three on-dock ExpressRail facilities;
- This work, which will be completed between 2007 and 2009, will complement and support previously authorized projects for on-dock rail terminals at the Howland Hook Container Terminal on Staten Island, Port Newark, and the Elizabeth-Marine Terminal.

Completion of this work will allow approximately 1 million containers a year to be handled by rail through these facilities.

In addition to the Elizabeth rail facility, the PANYNJ is actively working to install a rail terminal at the Howland Hook Marine Terminal, which will open in 2006.

Major rail projects for the PANYNJ include the Elizabeth Corbin Street grade crossing. The PANYNJ is constructing a grade crossing via the McLester Street realignment, compressing the roadway and constructing a rail bridge. The PANYNJ is planning a new ExpressRail facility with five to six times the amount of track, and capacity to handle one million lifts per year. Last fall PANYNJ opened a second dedicated rail terminal for Port Newark. Both of these projects are now completed.

On the New Jersey side the PANYNJ has been meeting with the railroads to increase the use of freight rail. Phase 1 includes a list of improvements to be financed with $25 million from the PANYNJ and $25 million from the railroads. The projects are aimed at furthering competitive rail service to the NY/NJ region. This includes a second track along the Chemical Coast line and a second track along portions of the Lehigh line from Bound Brook to PN/EMT and other major yards in north Jersey. It appears the work is going to move forward, though slower than anticipated.

On the NY side, the PANYNJ's $25 million along with NYSDOT's $15 million are being invested to accommodate heavier cars, improve clearances, and reduce conflicts with passenger rail service.

Lessons Learned

After several years of experience it is clear that some aspects of the PIDN and CPIP have been more successful than others. Demand for increased Atlantic Port capacity in general, and PANYNJ port capacity in particular has continued to be very strong as expected. NS has continued its rail service to Pittsburg. CSX successfully implemented the rail shuttle to New England over its Worcester, MA, terminal and is planning a new service to Buffalo, NY. The barge service between New York and Boston continues to operate. However, after a multi-year experiment, the initial PIDN barge service to Albany was discontinued after its operating subsidy ran out.

Last year container volume in the Port of New York and New Jersey grew by 7.6% overall and the rail volume, constrained by infrastructure, did not quite keep pace. As a result, a greater share of PANYNJ volume must use highway capacity in 2006 versus 2005.

There appears to be no shortage of unmet demand for increased intermodal rail services operating between the PANYNJ and major inland destinations. The railroads anticipate that as soon as the capacity improvement projects are completed, it will be possible to accommodate another round of growth. Implementing long-term plans takes a long-term perspective. It is clear that in spite of relatively soft rail growth of international containers in 2005, the long-term mode shift strategy is sound. While it is difficult, it appears to be easier to increase rail capacity than to increase highway capacity to service growing freight transportation demand.

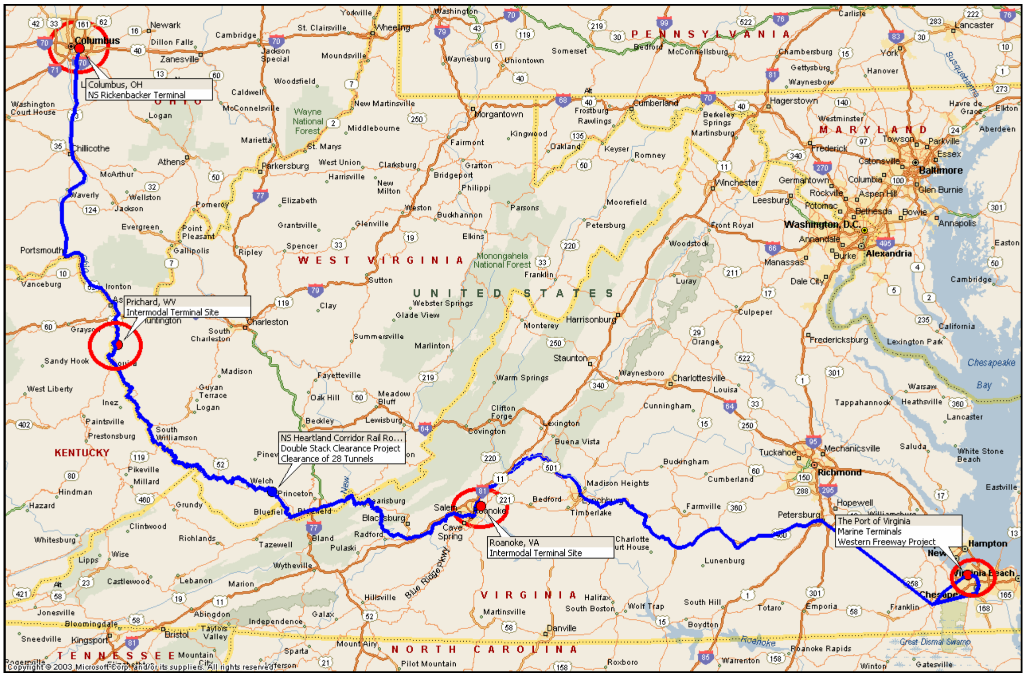
Market and political conditions change and plans need to remain adaptable. At present, it appears that PANYNJ rail solutions are more successful than barge solutions in meeting the infrastructure goals of the CPIP.

Heartland Corridor

Overview

The Heartland Corridor is a series of intermodal projects designed to improve freight mobility and rail intermodal capacity along the Norfolk Southern (NS) rail line between the Port of Virginia and Columbus, Ohio (Exhibit 175). This line serves the marine terminals at Norfolk and Portsmouth and runs through southern Virginia and southern West Virginia to Columbus, Ohio. NS routes continue beyond Columbus to serve other Midwest markets including Chicago and connections with western rail carriers at Chicago. The projects will enable double-stack train operations on the route, improve rail access to developing marine terminals in Portsmouth, and increase intermodal terminal capacity along the route with new terminals in Columbus, Roanoke, Virginia, and Prichard, West Virginia.

Exhibit 175: Heartland Corridor



Heartland Corridor Projects

Two of the largest inland rail intermodal markets for the Port of Virginia are Chicago and Columbus. NS currently operates its doublestack trains to Chicago via a circuitous route through Harrisburg, PA. The present route is 1264 miles while the Heartland corridor route is 1031 miles (Exhibit 176). However, the Heartland corridor route does not have the 20’3” vertical clearance necessary to operate double-stack container trains. There are 28 tunnels between Roanoke and Columbus which require modification to enable double-stack train operations on this route. The project to clear these tunnels is the most significant project of the Heartland Corridor with an estimated cost of $130 million. Once the clearance project has been completed, NS will be able to operate its Norfolk-Chicago double-stack trains on the Heartland Corridor route. This will save 233 miles relative to the route over Harrisburg and improve transit time to Chicago by about one day. Since Columbus will be on the route of the Chicago trains, double-stack service to Columbus will be significantly improved as well.

Exhibit 176: Heartland Corridor Projects

Portsmouth Rail Project

There are two new marine terminals being developed in Portsmouth. The first is being developed by APM Terminals, a subsidiary of AP Moller Company which owns Maersk SeaLand. The APM terminal is under construction and is scheduled to begin operation in 2007. The second marine terminal is being developed by the Virginia Port Authority on Craney Island just north of the APM terminal. The Craney Island terminal is planned to begin operation in 2017. Both of these terminals will be served by the Commonwealth Railway, a short line that operates from Suffolk to Portsmouth. The Commonwealth Railway will connect with NS and CSX at Suffolk to bring NS and CSX container trains to the APM and Craney Island marine terminals. On its existing route, the Commonwealth Railway must operate its trains through the cities of Chesapeake and Portsmouth to reach the APM terminal and future Craney Island terminal. This route passes through 14 at-grade street crossings creating the potential for significant conflict with local street traffic as train operations increase to serve the marine terminals.

Exhibit 177: Portsmouth Rail Projects

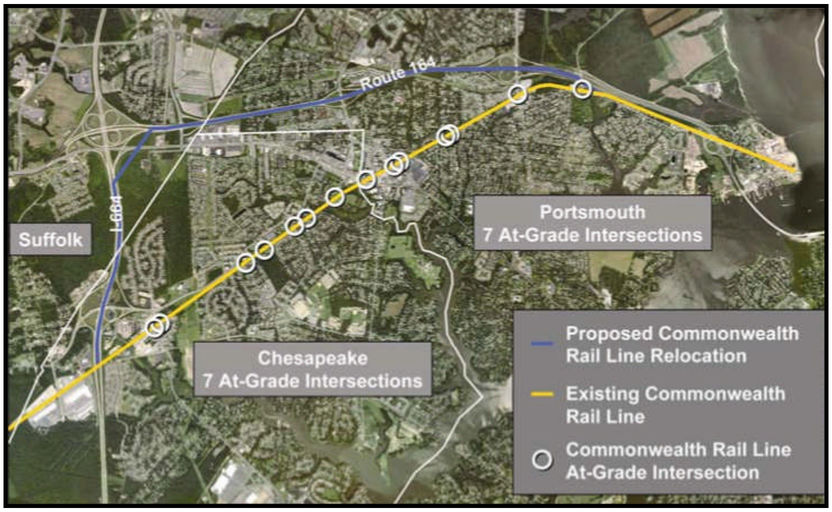
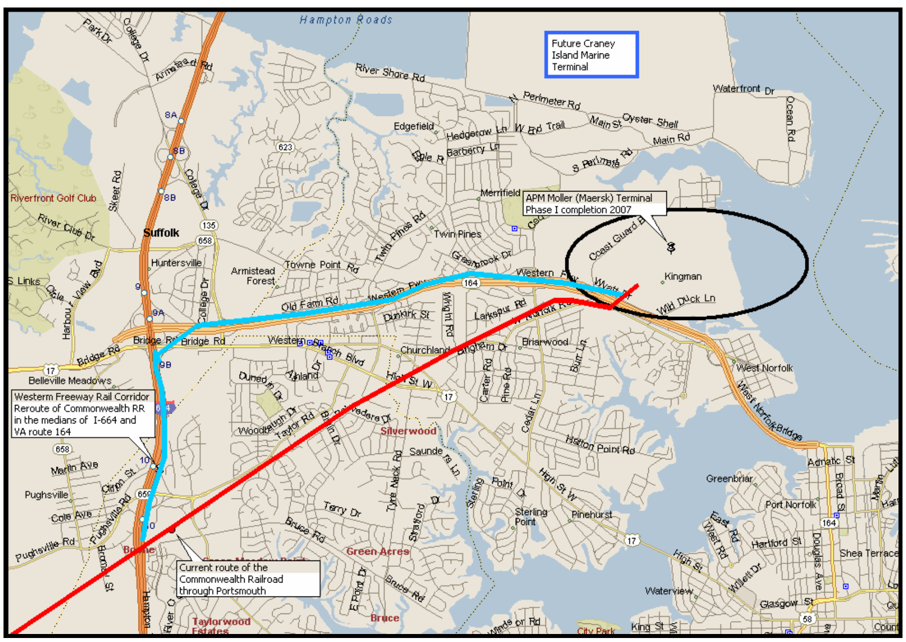


Exhibit 178: Western Freeway Rail Corridor



The Western Freeway Rail Corridor project (Exhibit 178) will relocate the Commonwealth Railway line to the median of highway routes I-664 and Route 164 eliminating the at-grade rail crossings. This will improve the safety of the rail operation and enable faster train speeds for rail service to the marine terminals. The Rail Corridor was planned in the 1980's when Route 164 was built. All of the bridges that cross Route 164 were built to accommodate two rail lines with sufficient clearance to allow double stack train operations. The Western Freeway project is estimated to cost $60 million.

Columbus Terminal Expansion

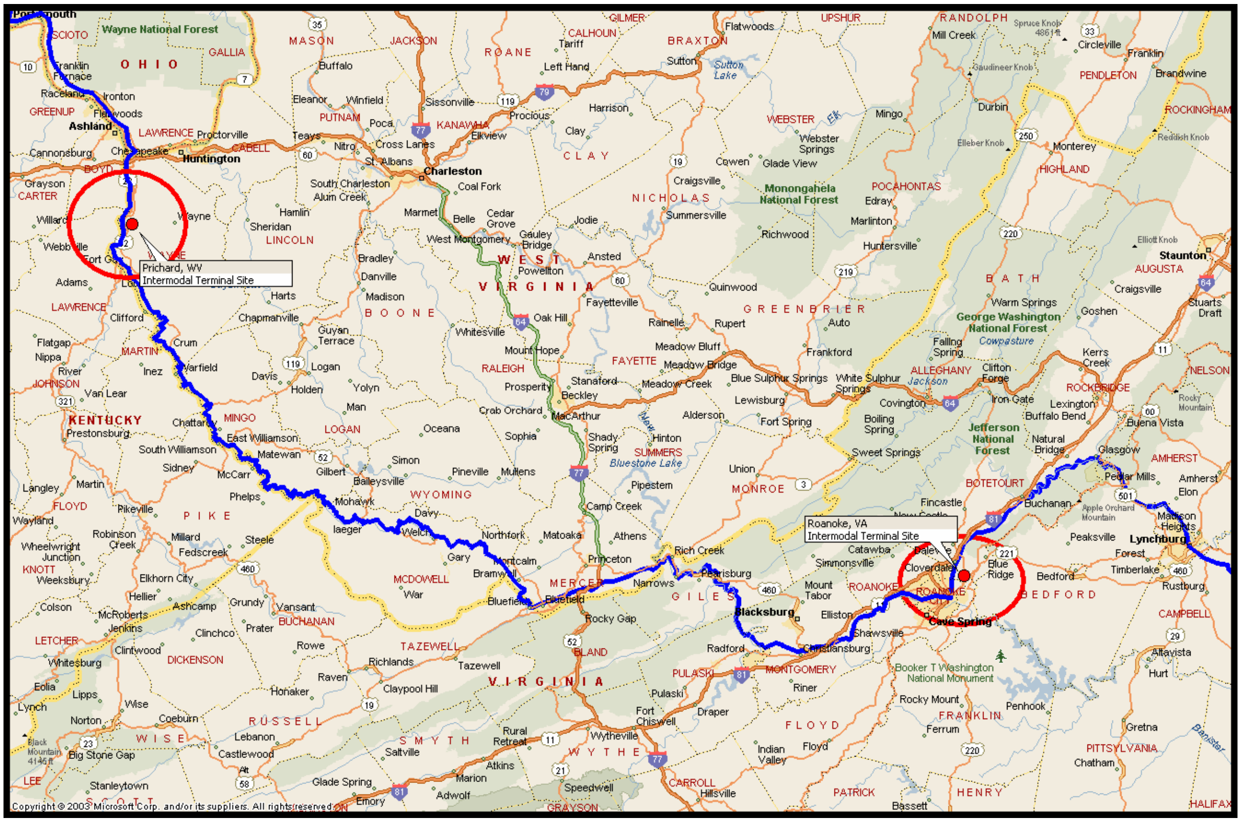
The present NS terminal at Columbus, Discovery Park, is currently operating well beyond its design capacity of 125,000 lifts. Columbus is a growing logistics and distribution hub driving the need for additional terminal capacity. An NS forecast projects over 240,000 lifts by 2015. NS has been working with the Columbus Regional Airport Authority (CRAA) to build a new intermodal terminal on a site of 275 to 300 acres located adjacent to the Rickenbacker Airport.

The initial capacity of this facility will be 250,000 lifts with the ability to expand to 400,000 lifts. This project is a part of the Heartland Corridor and is estimated to cost about $60 million. The NS terminal will be an attractive feature of the adjacent Rickenbacker Industrial Park where 1000 acres of additional development are being planned.

Roanoke, VA and Prichard, WV Intermodal Terminals:

Once the rail lines are cleared for double-stack train operations and NS is operating trains to Columbus and Chicago on the Heartland Corridor, the regions of Virginia and West Virginia can be opened to intermodal rail service. New intermodal terminals will be required for this service. The base load volume density needed to establish regular intermodal service will initially come from the Port of Virginia, Columbus and Chicago markets enabling the smaller markets at Roanoke and Prichard to included in the NS service with much less volume. Small intermodal terminals have been planned at Roanoke and Prichard as a part of the Heartland Corridor (Exhibit 179). The terminal at Roanoke will connect I-81 and I-64 to the Heartland Corridor. The terminals at Roanoke and Prichard will give the Roanoke Valley region of southeastern Virginia, and southwest West Virginia rail access to the Port of Virginia, Chicago and western markets over Chicago. The initial terminals are expected to be able to handle 15,000 to 20,000 lifts. The estimated cost of each terminal is about $8 million.

Exhibit 179: Roanoke and Prichard Terminals



Funding

The Heartland Corridor projects are estimated to cost $266 million and take five years to complete. Over $200 million of this amount will be for clearance projects and intermodal terminals on NS, which is more than can be justified based on private sector benefits alone.

While the Heartland Corridor Project will provide benefits to a broad spectrum of public and private stakeholders, it appears that the primary beneficiaries will be NS and the Port of Virginia. A cleared route from Norfolk to Columbus will improve the NS competitive position to Midwest markets and western markets over Chicago. The Port of Virginia will benefit by having improved double-stack rail access to its major interior markets. As Asian container imports continue to grow, ocean carriers are moving more cargo via all water services to the east coast, creating growth opportunities for east coast ports. The Port of Virginia, with its deep-water channels, its new APM marine terminal and long-term plan for marine terminal capacity at Craney Island is well positioned to take advantage of this growth opportunity. The improved rail access provided by the Heartland Corridor will provide strategic advantage for the Port as it competes for Midwest cargo.

As the key beneficiaries of the Heartland Corridor, NS and the Port of Virginia worked very closely together to develop support for public funding for these projects. NS and the Port of Virginia have a long-standing relationship in development of intermodal services for the Port. As a result of their work, local and congressional support from all three states was developed enabling

$143 million in federal funding earmarks in the federal transportation bill which passed in July, 2005. Exhibit 180 is a summary of project funding.

Exhibit 180: Heartland Corridor Funding

Project	Total Cost	Federal Funding	NS/State/Local funding
Double Stack Clearances	$130M	$95M	$35M
Intermodal Terminals	$76M	$33M	$43M
Western Freeway	$60M	$15M	$45M
Total	$266M	$143M	$128M

Securing the federal funding was a major accomplishment and excellent example of private public partnership in the development of a major transportation initiative. It is very likely that without federal support the key clearance and terminal projects would not go forward.

North American Inland Ports Network (NAIPN)

Overview

North American Inland Port Network (NAIPN) is a sub-committee of the North America's SuperCorridor Coalition (NASCO). North America's SuperCorridor Coalition, Inc., is a non-profit trade organization based in Dallas, Texas. It is a multi-national advocacy and lobbying group with the goal of promoting trade along a north-south corridor from Winnipeg to Mexico City via Kansas City and Dallas (Exhibit 181).

Exhibit 181: North America SuperCorridor

Key members of the NAIPN include:

- Hillwood's Alliance, Texas development
- KC SmartPort, an advocacy and lobbying organization that promotes the logistics industry in Kansas City including the proposed logistics park at Richards-Gebaur.
- The Port Authority of San Antonio's business park at Kelly Air Force Base, TX.
- Winnipeg Inland Port, a Manitoba group organized on the KC SmartPort model.

NAIPN advocates the interests of Inland Ports along the International Mid-Continent Trade and Transportation Corridor (IMCTTC).

NAPIN uses a University of Texas definition of an inland port as follows: "An Inland Port is a site located away from traditional land, air and coastal borders with the vision to facilitate and process international trade through strategic investment in multi-modal transportation assets and by promoting value-added services as goods move through the supply chain."

The definition lends the University's name and an element of credibility that supports NAPIN's simple, direct and totally understandable goal of promotion of public and private investment in this trade lane.

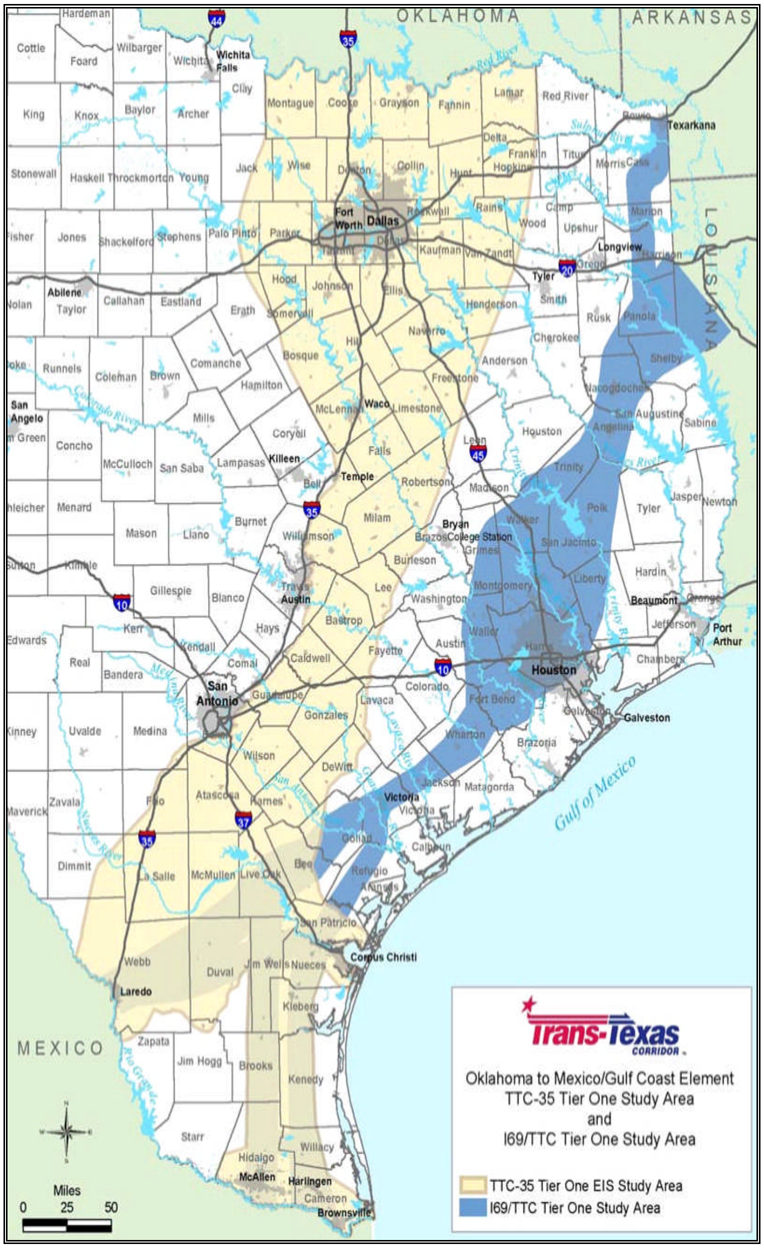
NAPIN and Texas DOT's privatized TransTexas Corridor

Apart from the University of Texas inland port definition there is some synergy between Super-Corridor activities and the Texas DOT in the promotion of the Trans-Texas Corridor. Texas's largest trading partner is Mexico and the congested I-35 corridor is the key trade route. The TransTexas Corridor (Exhibit 182) is a planned 50 year transportation infrastructure improvement program with the following features:

- separate lanes for passenger vehicles and large trucks
- freight railways
- high-speed commuter railways
- infrastructure for utilities including water lines, oil and gas pipelines, and transmission lines for electricity, broadband and other telecommunications services

Plans call for TxDOT to oversee planning, construction and ongoing maintenance, with private vendors responsible for daily operations.

Exhibit 182: Trans-Texas Corridor



Albany, NY Barge Service

Overview

The Albany barge service was an initiative to move containers on barges from the Port of New York and New Jersey to the inland river Port of Albany.

Exhibit 183: Albany Express Barge

The Port of Albany carried out the market analysis and a financial pro forma was developed. Albany had to ensure that the necessary infrastructure and security systems would be in place before PANYNJ would agree to participate. Albany also had to guarantee funding for two years. PANYNJ put up $6 million to initiate barge services for five locations, one of which was Albany. For each feeder port, the PANYNJ would contribute $25 per container that moves by barge up to 40,000 containers. Later on the feeder ports would pay the PANYNJ $5 per container in excess of 25,000 containers transported in any calendar year. The PANYNJ provided $200,000 per inland port for marketing and start-up services. PANYNJ had CMAQ funds totaling $3.3 million for the Port of Albany for the first two years of service.

Parties and Roles

This project was an element of the Port Authority of New York and New Jersey's (PA) Port Inland Distribution Network (PIDN). The project was a two-year demonstration underwritten by the Port of Albany, Port Authority of New York and New Jersey, State of New York, and the Federal Government. The service was recently terminated as the funding which supported the operation was not renewed. The operator of the barge was Columbia Coastal, an east coast ocean barge operator.

Service

The service operated from Port Elizabeth, NJ to Albany, NY, approximately 140 miles up the Hudson River. The initiative provided a second day service twice a week between federal marine terminals in Albany and marine terminals in the Port of New York and New Jersey. The barge competed with motor carriers using the parallel interstate highway, I-87.

Exhibit 184: Albany Barge Location

Lessons learned

The initial expectation was that ocean carriers and terminal operators would realize the economic and operational benefits of utilizing/supporting the barge service and its "free empty depot" in Albany. Ample opportunities were expected to match export loads with empty containers. Service could be priced competitively with trucks. Costs to provide service would be high but manageable. Growth would be steady and annual deficits would decline. A long-term source of operating assistance would be secured.

The actual operating experience was a much lower total volume and slower than anticipated growth. Total volume reached 540 loads and empties in mid 2004. All the loads were returned empty and little or no use was made of the Albany empty depot. Transportation costs were 50% - 75% greater than planned, primarily due to fuel surcharges. Unit stevedoring costs were 30% greater than planned due to low volumes and high premium payments for labor. Competitive motor carrier prices declined more than anticipated, putting additional financial pressure on the service.

While all of these reasons were important another major problem was the inability to attract major shippers and ocean carriers due to uncertainty of the barge's future. Shippers were unwilling to abandon suppliers unless the service was certain to be available for the long term. The critical nature of making a long term commitment is the same lesson identified by the Virginia Port Authority in the context of the Virginia Inland Port.

Beyond this the PANYNJ has identified the following lessons for PIDN Program:

- A significantly better understanding of program elements is necessary for success.
- Each service location has unique challenges and opportunities which should be well understood.
- The public policy objectives served by PIDN will become more pronounced over time.

- Re-activation of the Albany barge service could be warranted if long-term funding materializes or the business environment changes.

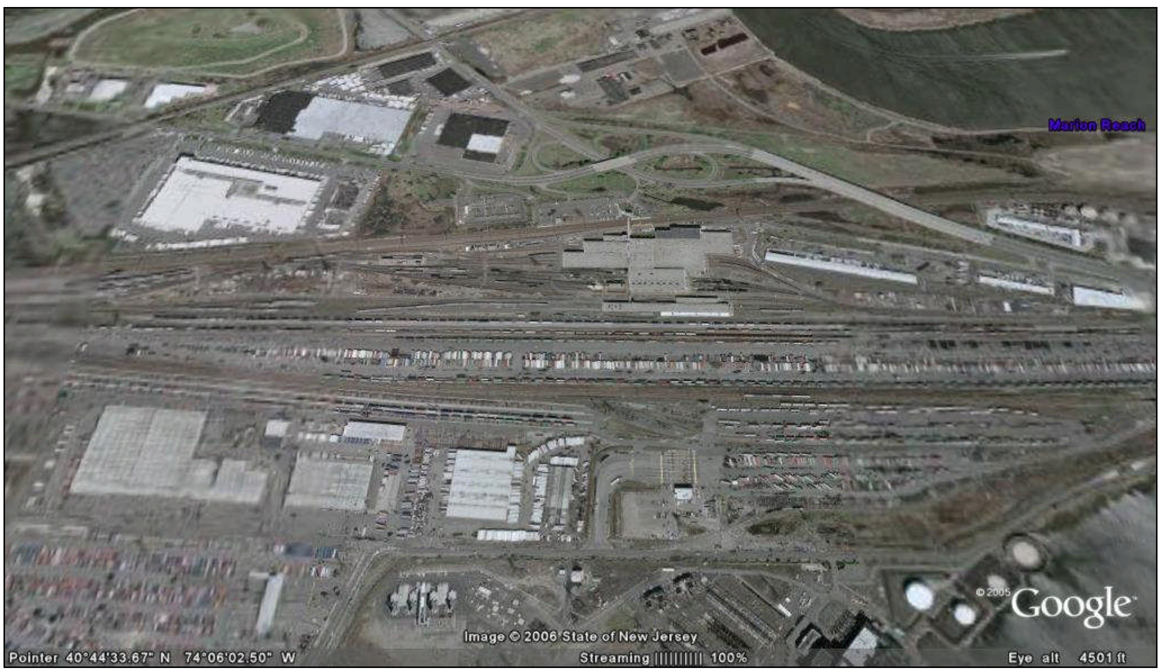
Worcester-Kearny Rail Shuttle

Overview

CSX Intermodal (CSXI) offers an intermodal service for marine containers moving between the Port of New York and New Jersey (PANYNJ) and New England markets. The rail service operates between CSXI's terminal in South Kearny, NJ and StackBridge, a privately owned terminal in Worcester, MA on the Providence and Worcester Railroad (P&W).

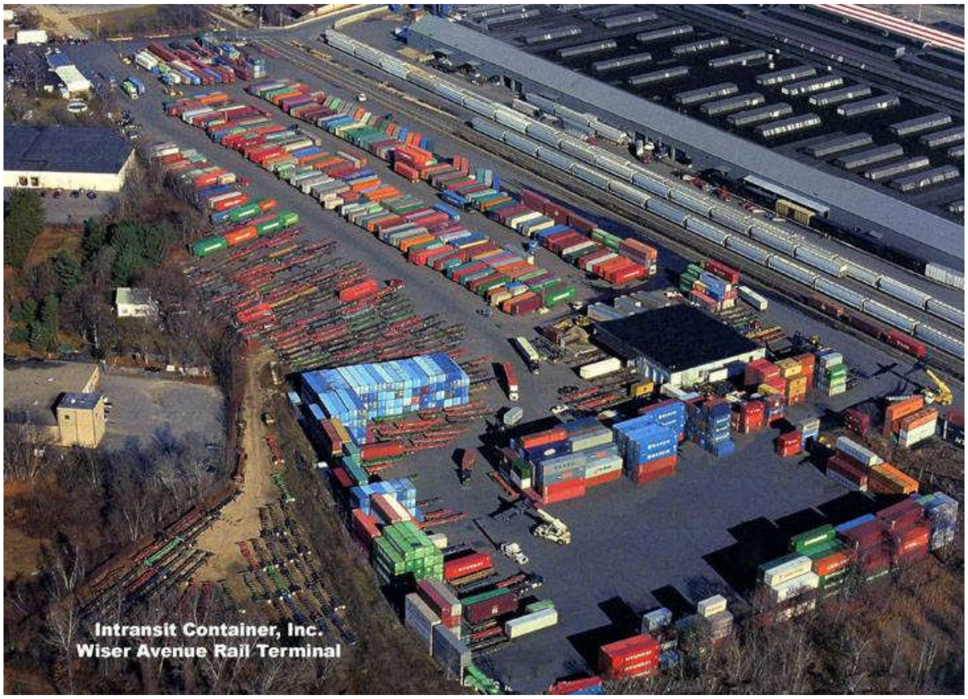
CSXI offers the transportation service to marine carriers. CSXI provides the train service and rail cars and the terminal at South Kearny (Exhibit 185). South Kearny is a former Conrail terminal that is now served by CSX and operated by CSXI.

Exhibit 185: South Kearny Terminal



The terminal in New England (Exhibit 186) is owned and operated by Intransit Container, Inc. (ICI), functioning as CSXI's terminal operator in Worcester. The primary function of these facilities is to receive Pacific Rim land bridge cargo moving via CSXI line haul rail service. ICI provides full marine container depot services and, through a subsidiary, provides nearby warehouse space and trucking service.

Exhibit 186: Intransit Container Terminal

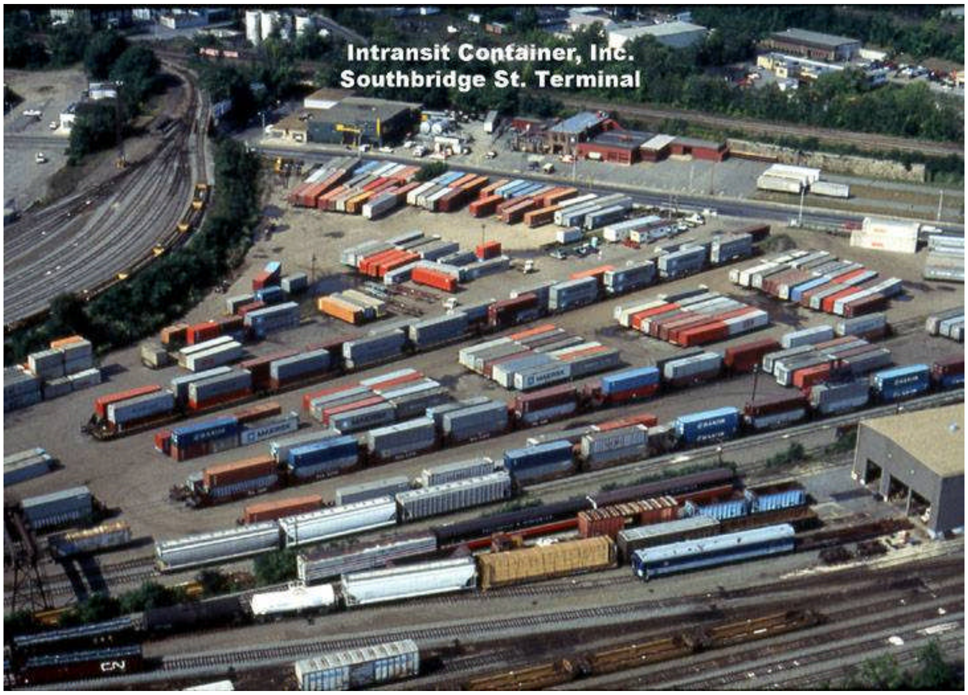


The marine carriers are the customers of CSXI and ICI. The cargo largely remains in bond and clears Customs in MA. Some of the cargo moves on a marine bill of lading to Boston.

Notwithstanding the fact that this is a private sector transportation solution, the Port Authority of New York and New Jersey feature this service as a part of their Port Inland Distribution Network (PIDN).

Stackbridge (Exhibit 187) is located on the P&W railroad, a New England regional rail carrier which connects with CSX Transportation (CSX) at Worcester. The P&W interchanges cars and switches the Stackbridge terminal.

Exhibit 187: Stackbridge Intermodal Terminal



Service

South Kearny is located approximately 5 miles from the main container terminals in the Port of New York and New Jersey. Stackbridge is located 35–40 miles from downtown Boston and is well located to serve the New England market. Worcester is approximately 160 miles from South Kearny (Exhibit 188).

Exhibit 188: Rail Shuttle Route

Containers are drayed between PANYNJ marine terminals and South Kearny Intermodal Terminal. The cargo is moved in a block of cars added to westbound trains moving between Northern

New Jersey and Selkirk (Albany), NY. The block is picked up by eastbound land bridge trains destined for Stackbridge and the Boston market. The cut off time at South Kearny is 1300 hrs. Monday, Tuesday and Thursday. Containers are available at StackBridge by 1500 hrs. the following day. The cargo is then drayed to destinations in New England.

The process is reversed to move containers from New England to PANYNJ. On the reverse move the cut time off is 1700 hrs. daily with availability at South Kearny at 0200 hrs. Thursday thru Monday. The minimum scheduled transit time is 57 hours; Saturday, Sunday and Monday departures are available Thursday morning, and Tuesday's departure is available early Friday morning.

Competition

The cargo could move by barge between PANYNJ and Boston or by motor carrier between PANYNJ and final destination.

Success Factors

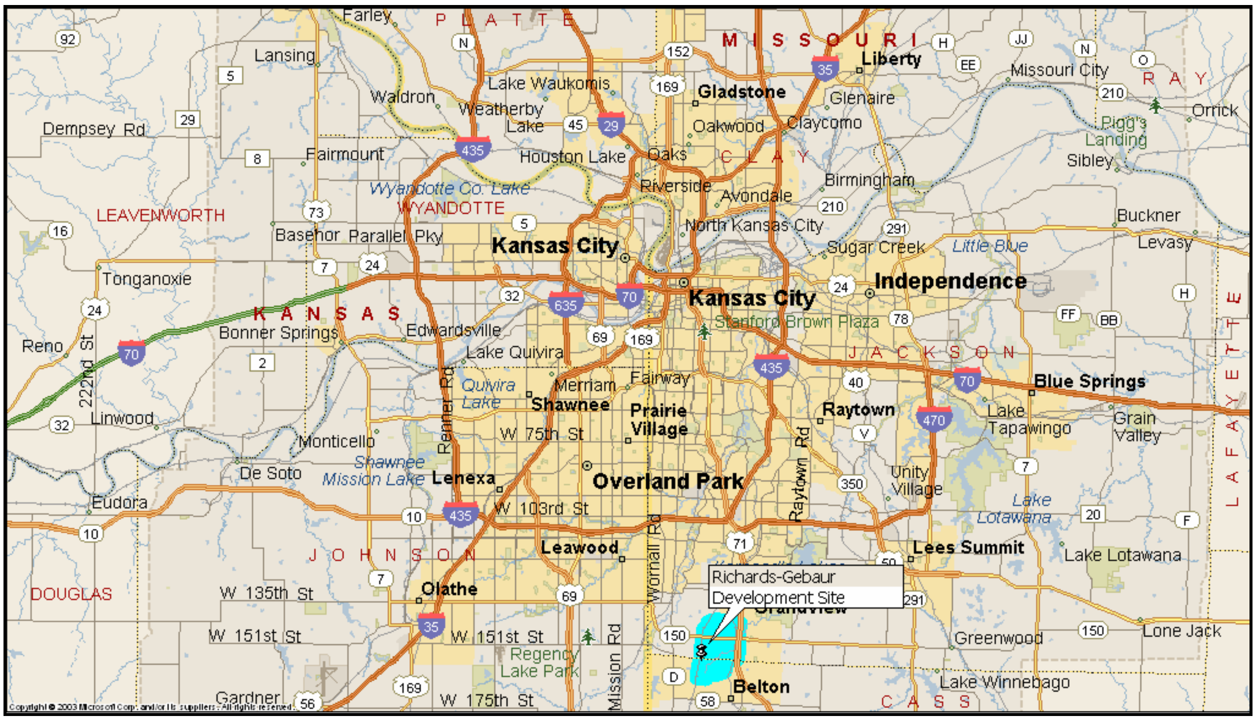
The highways in the region I-84, I-91, and I-95 are highly congested and truck costs are relatively high. The barge service is weekly, limiting departure flexibility and transit time. In addition the Boston port location may result in increased drayage cost to many MA and RI customer locations. A key driver of the rail economics is the availability of existing train capacity enabling CSXI to view the business as incremental to existing trains. If there were no train capacity it is doubtful that this short haul business could justify new dedicated train starts.

Richards-Gebaur ITC development

Overview

Richards-Gebaur (Exhibit 189) was operated as an Army Air Force, Air Force, and Air Force Reserve base from 1941–1994. In 1976, the Air Force converted the base to reserve status and declared approximately 1,362 acres surplus. In August 1985, the property was given back to Kansas City, to be used as a public airport. Between 1986 and 1994, approximately $12.2 million in federal airport development funds were obtained for airport improvements. This funding was subject to the city's agreement that the airport would be available to the public for aeronautical use.

Exhibit 189: Richards-Gebaur Redevelopment Site



The airport consistently lost money on its air operations and was projected to continue to loose more than $1.5 million annually. In 1997, the city identified an opportunity to redevelop the airport land into an intermodal rail-truck freight distribution center and industrial park. To enable this redevelopment, Kansas City submitted an application to the FAA requesting permission to close the airport and be released from its previous federal aviation obligations and commitments. The next five years were spent in a series of court battles that were resolved in favor of the logistics redevelopment. Following this litigation, the Port Authority of Kansas City was charged with economic development of the former Air Force Base with the objective of creating an international trade-processing center.

In 2004, the Port Authority selected CenterPoint Properties to plan and manage the redevelopment project. CenterPoint is a major industrial real estate developer, headquartered in Chicago, with considerable experience in logistics park development. The Port Authority plan provides for sale of the property to the master developer for diverse industrial uses, including distribution, light manufacturing and warehousing.

Services

The Kansas City Port Authority expects the Richards-Gebaur development to capitalize on Kansas City's position as the second largest rail hub and the third largest trucking hub in the country. In addition, Kansas City has more Foreign Trade Zone space than any other American city strengthening its position to compete for international trade. Kansas City is also well positioned for NAFTA trade having entered into agreements with Mexican and Canadian officials to take advantage of the major international North to South I-29 and I-35 trade corridors.

The Kansas Southern Railway (KCS) is expected to serve an intermodal terminal that will be built and financed by CenterPoint as a part of the development. This project will be similar in concept but somewhat smaller than the Joliet Arsenal redevelopment. The KCS has been pursuing business strategies seeking to capitalize on the synergies between the carrier's service area and NAFTA. In 2005, following a series of very complex international transactions, KCS acquired the controlling interest in TFM, the railway serving the key Mexico City-Laredo corridor. KCS, with its TFM acquisition, now provides single line service between Kansas City and Mexico City. In addition, KCS has developed a marketing alliance with the Canadian National railroad creating interline service routes to Canadian markets. These actions have positioned KCS to take advantage of the expected future growth of NAFTA trade.

ITPC Concept

Richards-Gebaur is being labeled an "International Freight Gateway" and positioned as the hub of an "Inland Trade Processing Center" or ITPC. ITPCs are intended by Customs to relieve pressure on congested border crossings and ports. It is unclear, however, whether an ITPC would serve as an effective anchor or attraction for logistics-based business development.

Project Status

CenterPoint does not yet have control of the Air Force Base property and it is actively engaged in resolving the administrative issues related to transfer of the property from the U.S. Government. These issues should be resolved in 2006 with groundbreaking expected in 2007.

Lessons Learned

Despite the best efforts of many willing partners working toward development of a logistics business park, this project has still taken more than a decade of effort, and groundbreaking has yet to occur. In many, if not most cases, the length of time required to resolve property acquisition, environmental, political and financing issues requires patience and staying power to finalize this type of development. Beyond the cost of the lost opportunities there is the general concern (perhaps not in this specific case) that by the time such a facility is finally built the market will have shifted resulting in significant loss of potential opportunity. A key lesson is that the developer and development authority must have political support, a significant commitment and staying power to drive the project to conclusion.

Port of Battle Creek, MI

Overview

Fort Custer Industrial Park is the largest modern industrial park in Michigan. In 1972, Battle Creek Unlimited, Inc. was created as a private, nonprofit organization to conduct economic development activities for the city of Battle Creek. Owned by the City of Battle Creek, the planned industrial complex now is home to more than 90 companies.

The U.S. Customs Port of Battle Creek and Foreign Trade Zone #43 serves Southwest Michigan from a central location in Fort Custer Industrial Park.

Battle Creek Unlimited (BCU), with a total staff of 15 people, is a private, nonprofit corporation under contract with the City of Battle Creek for economic development activities. The efforts of BCU are focused primarily in Fort Custer Industrial Park, the downtown central business district, and W.K. Kellogg Airport.

- Site location assistance in Fort Custer Industrial Park, the downtown central business district including Renaissance Zone sites, the Aviation and e-Learning Smart Zone of Battle Creek, and W.K. Kellogg Airport
- Employee selection and training for new companies locating in Battle Creek
- Gap financing and equity investment
- Tax incentive assistance
- Project management before, during and after site selection

The City of Battle Creek has the flexibility to grant tax abatements. If a tax abatement is approved by the City of Battle Creek (with concurrence of the State Tax Commission), the majority of local property tax can be cut in half for up to 12 years. A tax abatement allows 50% reduction of local taxes assessed on the building and equipment.

BC/CAL/KAL Inland Port Development Corporation

The private, nonprofit organization that administers Foreign Trade Zone #43, and markets the inland port of entry in Battle Creek, is BC/CAL/KAL Inland Port Development Corporation. The primary activity of the Inland Port Development Corporation is promotion and management of the FTZ and associated sub-zones to the benefit of regional employers.

The U.S. Customs Port of Battle Creek is an inland port of entry. The U.S. Customs Port of Battle Creek is adjacent to W.K. Kellogg Airport, allowing for convenient clearances of aircraft arriving from international points of departure. The Port of Battle Creek is centrally located in the 3,000-acre Fort Custer Industrial Park, providing a convenient terminal to companies in the largest modern industrial park in Michigan. Located midway between Detroit and Chicago along the I-94 corridor, the U.S. Customs Port of Battle Creek has twenty-five years of service to the Southwest Michigan region. Two full-time U.S. Customs Service personnel serve the port of entry and W.K. Kellogg Airport.

Kingman International Trade Processing Center

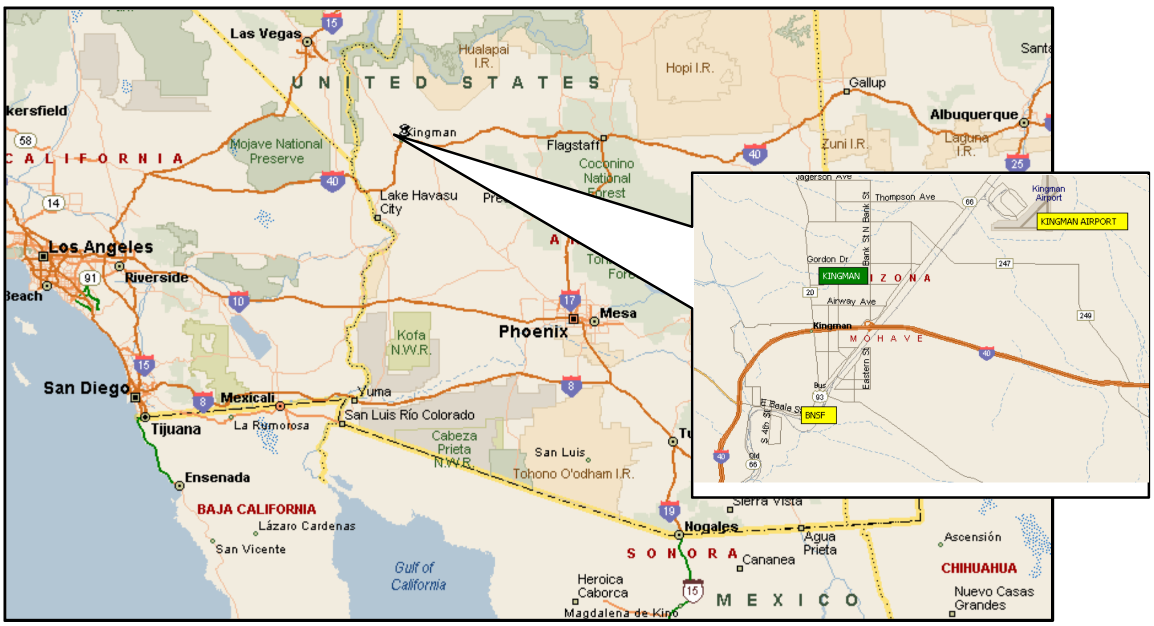
Overview

The proposed Kingman International Trade Processing Center (ITPC) would include:

- A "major intermodal center"
- In-bond processing of rail and truck cargoes from West Coast ports, Canada, and Mexico
- Direct shipment and US/Mexican/Canadian Customs processing of rail/truck/air cargoes for forward distribution .

Despite the volume of rail and truck traffic passing through or near Kingman, it is unclear how such a facility might add value. Much of the discussion to date has focused on technologies such as RFID, GPS, and CVS/IVO, but these technology discussions have apparently not yet been translated into a value proposition for potential tenants or customers.

Exhibit 190: Kingman AZ Site



Through Cargo vs. Market Potential

Project backers have used maps such as that shown in Exhibit 191 and the data in Exhibit 192 to demonstrate that Kingman sits astride a major trade corridor. The volume of cargo passing through Kingman is undeniably very large. All imports moving form LA/LB through Kingman, however, have either cleared Customs already or are traveling in-bond to destination and have no need of "trade processing" in Kingman.

Exhibit 191: Trade Volume Map

Exhibit 192: LA/LB Port Rail Data

Alameda Corridor East Daily Rail Forecast

Alameda Corridor Daily Rail Traffic

YEAR	2003	2010	2025
Passenger	0	0	0
Freight	35	67	137
Total	35	67	137

BNSF Mainline East Daily Rail Traffic

YEAR	2003	2010	2025
Passenger	17	38	62
Freight	57	82	121
Total	74	120	183

UP Mainlines Daily Rail Traffic

YEAR	2003	2010	2025
Passenger	14	26	44
Freight	55	78	117
Total	69	104	161

Los-San Corridor Daily Rail Traffic

YEAR	2003	2010	2025
Passenger	55	69	100
Freight	5	6	9
Total	60	75	109

BNSF Mainline West Daily Rail Traffic

YEAR	2003	2010	2025
Passenger	46	76	106
Freight	50	74	112
Total	96	150	218

Joint UP & BNSF Daily Rail Traffic

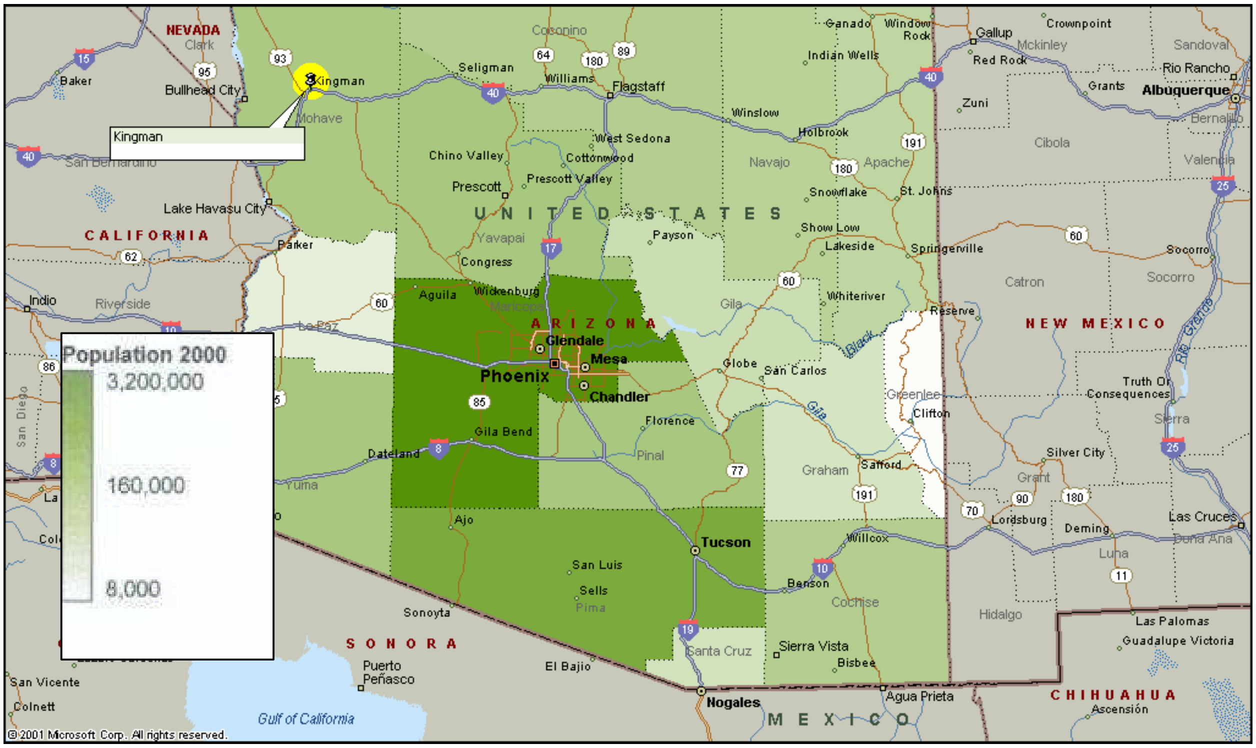
YEAR	2003	2010	2025
Passenger	11	24	36
Freight	92	96	138
Total	103	120	174

Additional examples of points made in Kingman's favor include:

- *"Of the top ten intermodal trucking facilities in Arizona* [presumably LTL terminals as well as rail intermodal ramps]*, none are in Kingman.*
- *Kingman lies astride the N-S Canamex I-93 corridor, but economic focus is biased toward Phoenix/Tucson.*
- *The only major Arizona cargo airports are in Tucson and Phoenix"*

Although the Kingman promoters view these points as indications of an untapped potential, they might more pragmatically be viewed as evidence that little if any market exists for a Kingman facility. As Exhibit 193 indicates, Kingman is isolated from the major population centers of Arizona and California. There are no major cities within 100 miles of Kingman.

Exhibit 193: Arizona Population by County



Outlook

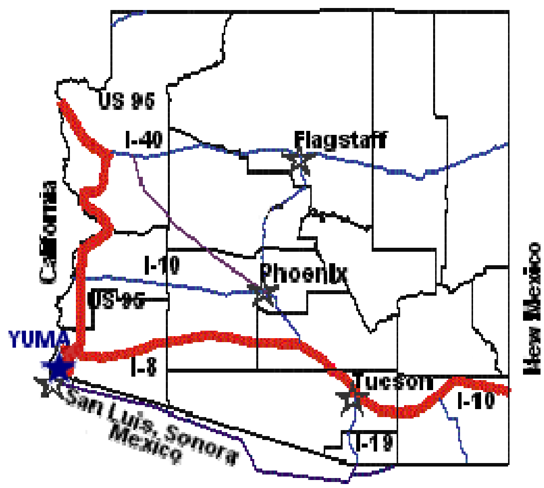
Advocates of the Kingman concept noted in one presentation that the project needed "economic foundation and commercial infrastructure compatible with anticipated growth". Those resources have not been forthcoming to date. City officials met with BNSF in early 2006, but no additional announcements have been made.

Greater Yuma Port Authority

Overview

The Yuma area is trying to build a new expanded port of entry on the border for truck traffic between Mexico and the U.S. The Greater Yuma Port Authority (GYPA) is the lead agency for building and planning a commercial border crossing just south of Yuma and east of San Luis (Exhibit 194). GYPA was established in 2000. GYPA used grant money to purchase 400 acres of land. The emphasis is on "trade processing". It is not clear whether there is any real market or opportunity to add value.

Exhibit 194: Yuma Project Site



The San Luis II commercial port-of-entry would enable trucks to cross easily at either Nogales or San Luis. The GYPA will develop a gateway for global trade and facilitate, promote, and support multi-modal transportation and trade opportunities to enhance economic development in the Greater Yuma area.

GYPA received a State grant to develop a Master Plan, including a Site Plan, a Utilities Plan, and a Facilities Plan. GYPA completed a Feasibility Study for a Commercial Port of Entry with a major portion of grant money coming from the state and other funding from GSA. GSA also funded a feasibility study for the present POE in San Luis. Other projects were slated for funding in FY06.

The border crossing at San Luis has become congested, and the plan is to shift the commercial vehicle (truck) crossing to an undeveloped area five miles east of San Luis.

Governance

GYPA is a non-profit regional government corporation with an 11-member executive board and an 11-member technical advisory committee. GYPA's government members are Yuma County, the City of San Luis, the City of Yuma, and the Cocopah Indian Tribe.

Services

The project area already has an industrial park and a foreign trade zone.

The project appears to anticipate that a new commercial point-of-entry would serve as a catalyst for business and industrial development. Studies to date, however, appear to have focused on facilities for the POE rather than on the market for new business development.

KC SmartPort

Overview

KC SmartPort is an economic development initiative designed to promote Kansas City as a logistics hub (separate from the KC Port Authority). Kansas City SmartPort is not an inland port facility, but rather an organization formed to promote and enhance the Kansas City metro area's status as "America's Inland Port Solution". KC SmartPort was created in June 2001 to combine a number of previous uncoordinated efforts.

SmartPort has two main focuses in its mission.

- To grow the area's transportation industry by attracting businesses with significant transportation and logistics elements;
- To make it cheaper, faster, more efficient, and secure for companies to move goods into, from, and through the Kansas City area.

SmartPort has also been defined to serve as an umbrella over Richards-Gebaur (separate case study) and FTZ space at the airport and elsewhere.

KC SmartPort received $500,000 in federal funding for 2003 and $750,000 for 2004 through the efforts of Congressman Graves. The funds were to be used for pilot projects rather than for facilities development. The focus has been tests of wireless and RFID data systems.

SmartPort has had significant success in attracting businesses to Kansas City, specifically new DCs for New Holland and Musician's Friend.

Appendix B: Preliminary Analysis of Innovative Container Transport Systems

Background

Movement of marine containers between marine ports and nearby inland sites is widely recognized as a potential problem. Multiple authors have cited growing highway and rail congestion in Southern California as a preamble to proposed solutions. The efficiency and capacity of the transportation linkage to the seaport is a critical factor in the feasibility of an inland port, so the project team reviewed several innovative linkage proposals.

These technology descriptions are based on materials and documents available in mid-2006. Many of these concepts have evolved since 2006, and this information is being updated in other studies now in progress (as of June 2008).

Proposed Container Transport Systems

The Study Team has identified several marine container transport systems proposed for application to Southern California ports. More proposals may exist, but are likely to be variations on those listed below.

Linear Induction Motor Systems

Liner induction motor (LIM) systems typically use a girder-like monorail to support or suspend a container-carrying vehicle. Linear induction motors use electromagnetic force to produce linear mechanical force, rather than torque as in typical rotary electric motors. Vehicles that use linear induction motors can have contact with the guideway through the wheels (they may also levitate on the cushion of air between magnets mounted on the guideway and others on the vehicle, often referred to as “magnetic levitation” or “maglev” technology). LIM allows for a very simple electric propulsion system with few moving parts.

Freight Shuttle. One LIM concept, called the *“Freight Shuttle”*[10], consists of an automated vehicle, a specially designed guideway, a linear induction propulsion system, and a control system (Exhibit 195). This system, like all the others discussed here, is envisioned as fully automated and unmanned, shifting the complexity to the central control system.

[10] *The Freight Shuttle: The Crisis in Freight Transportation and The Opportunity for a Green Alternative*, Stephen S. Roop, Ph.D., Texas Transportation Institute, Texas A&M University, 2006

Exhibit 195: Freight Shuttle LIM System

Note that Exhibit 195 shows the Freight Shuttle guideway at ground level in the marine or inland terminal. Fixed girder-like guideways have the disadvantage of presenting a barrier to terminal circulation.

The Freight Shuttle concept requires an exclusive, grade-separated right-of-way as it is not compatible with other systems or with driver-guided vehicles. Exhibit 196 shows the Freight Shuttle in a freeway median, a common concept for fixed-guideway systems. Exhibit 195 shows the floor of the Freight Shuttle vehicle to be approximately the same height as a container chassis. If so, it should fit under freeway and surface overpasses.

Exhibit 196: Freight Shuttle in Freeway Median

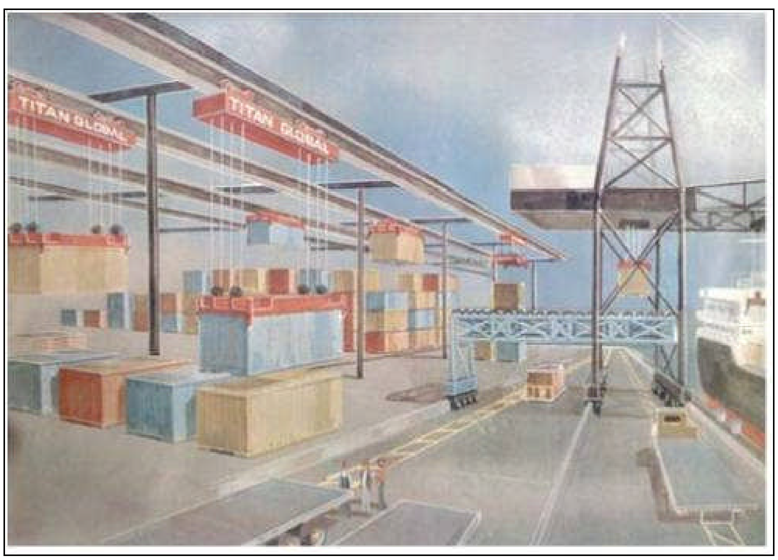
The Freight Shuttle is envisioned as running in a loop between a marine terminal and an inland terminal.

Auto-GO. Titan Global Technologies Ltd., a New Jersey based company, developed a suspended freight monorail concept that utilizes linear induction motors called Auto-GO**.** Auto-GO is an overhead cargo container handling system with fully automated single-container shuttles using linear induction motors (Exhibit 197). The Auto-GO system envisions container vehicles suspended from a girder system, each vehicle equipped with a spreader bar and cables to lift and drop containers at the terminals. This system would also be fully automated.

Exhibit 197: Auto-GO System over Highway

The transportation process would start inside the terminal where a gantry crane drops off the container (Exhibit 198). A cargo carrying system that is integrated with the carrying vehicle picks up the container and raises it by means of a specially designed bogie-spreader bar combination. The container is then secured under the container shuttle, and transported at 50 to 75 mph to its final destination.

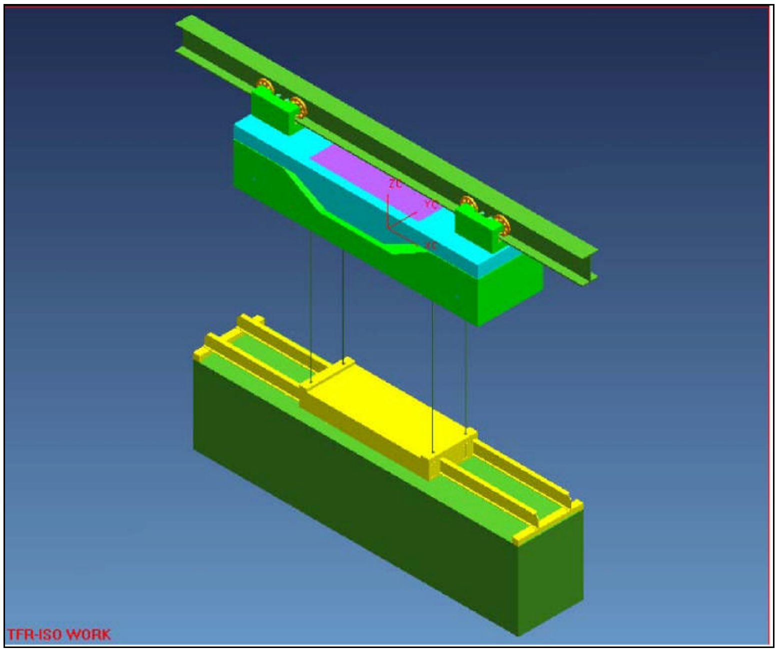
Exhibit 198: Auto-GO System in Terminal



Titan has built and tested a scale model of the Auto-GO system. The technologies used in the Auto-GO system guideway, switches, and movement control system, have been tested in the field and use of linear induction motors have been proven in operation of the monorail people-movers that Titan built in Miami, Florida; Pomona, California; and Dallas, Texas.

Grail. An Illinois Institute of Technology team developed a conceptual intra-yard GRail (Grid-Rail) system that utilizes linear induction motor technology. (Exhibit 199)

Exhibit 199: GRID Rail (GRAIL) Concept



Much of this concept was developed over a period for Sea-Land Corporation by August Design, Inc., originally for ship-to-shore application, and was not widely documented until 2000. Exhibit 200 shows the elevated Grail grid structure, similar to the Auto-GO concept shown in Exhibit 198.

The team also designed an elevated structure to move containers between terminals using a LIM vehicle. This between-yard structure provides for connecting freight nodes and allows for expansion capability by providing space for the under-hung GRail shuttle (Exhibit 201).

Exhibit 200: GRAIL Terminal Grid Structure

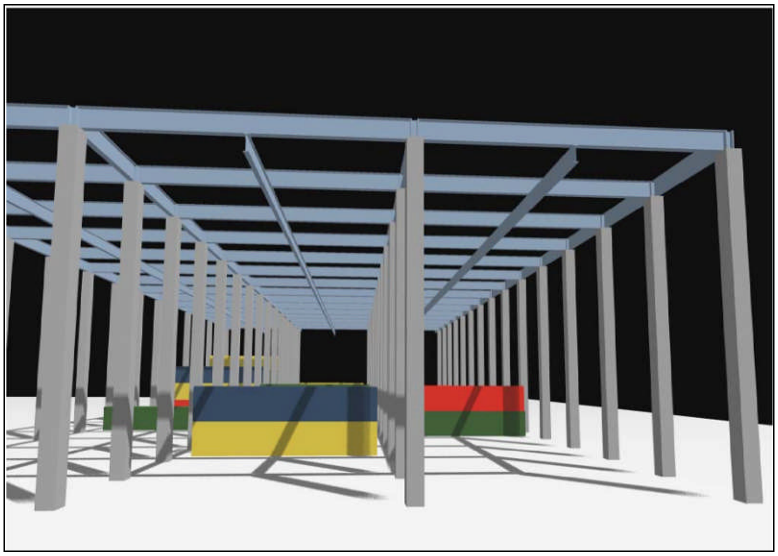
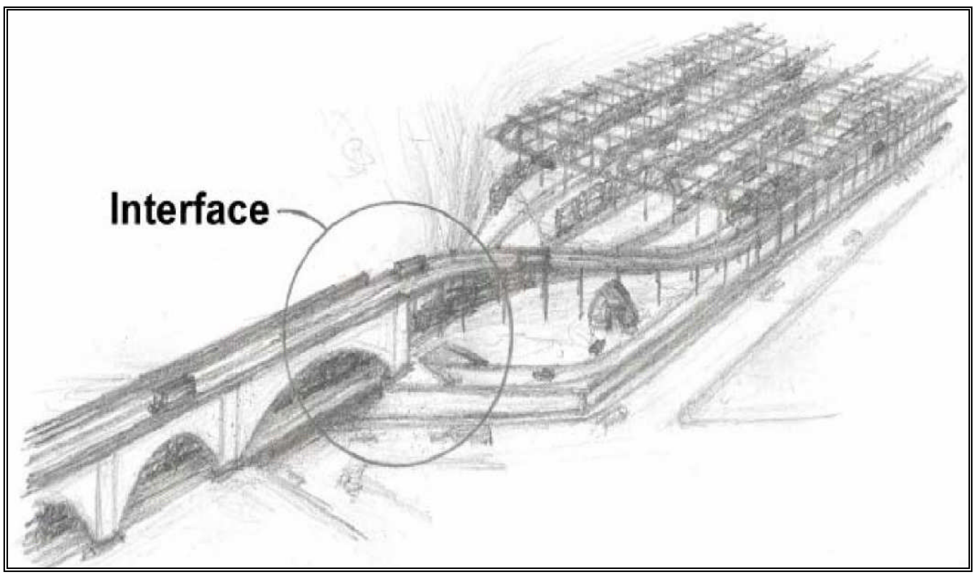


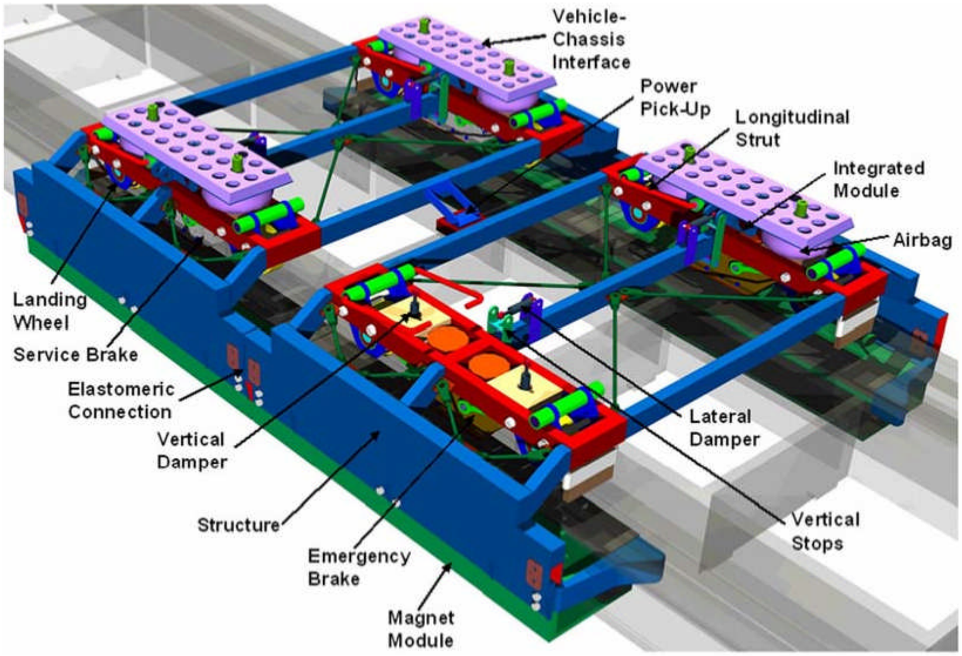
Exhibit 201: GRail Transition Structure



Maglev Systems

By adding magnetic levitation to LIM propulsion, Maglev proposals offer reduced friction, reduced noise, and higher speeds (Exhibit 202). These systems are also envisioned as fully automated. TransRapid International (a joint venture between Siemens and Thyssen-Krupp) is perhaps the farthest along in developing a Maglev container transport concept.

Exhibit 202: Detailed View of General Atomic's EDS Maglev Design



TransRapid's analysis (not verified by the study team) contends that a Maglev container system would have similar capital costs and lower operational costs than highway or rail (TransRapid, 2004). The analysis envisions a dedicated express container system connecting the ports to the Inland Empire, to Victorville, and to Beaumont, with capacity for five million containers per year.

CCDoTT considered a number of rights-of-way as shown on the map in Exhibit 203. Perhaps the most promising route is the one that follows I-15 through the Cajon pass. Proponents of Maglev freight systems cite their ability to climb steep grades. The freight Maglev system is projected to be able to carry containers up a 6% grade, versus 3% for conventional rail. The 6% claimed maximum grade for freight Maglev matches the maximum grade on Interstate highways, suggesting Maglev rights-of-way along interstate medians (assuming such medians are available).

Exhibit 203: TransRapid Maglev Route Proposals

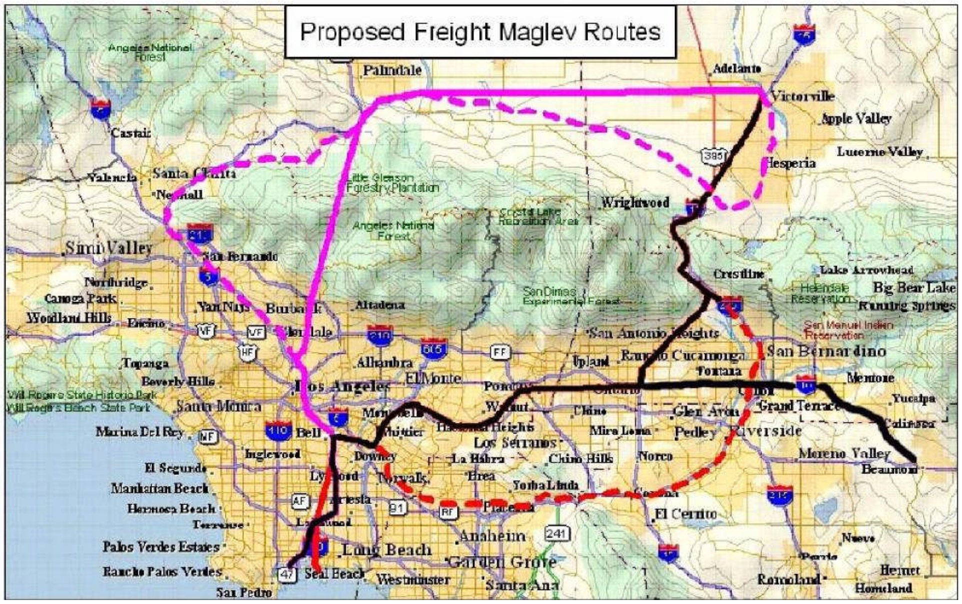
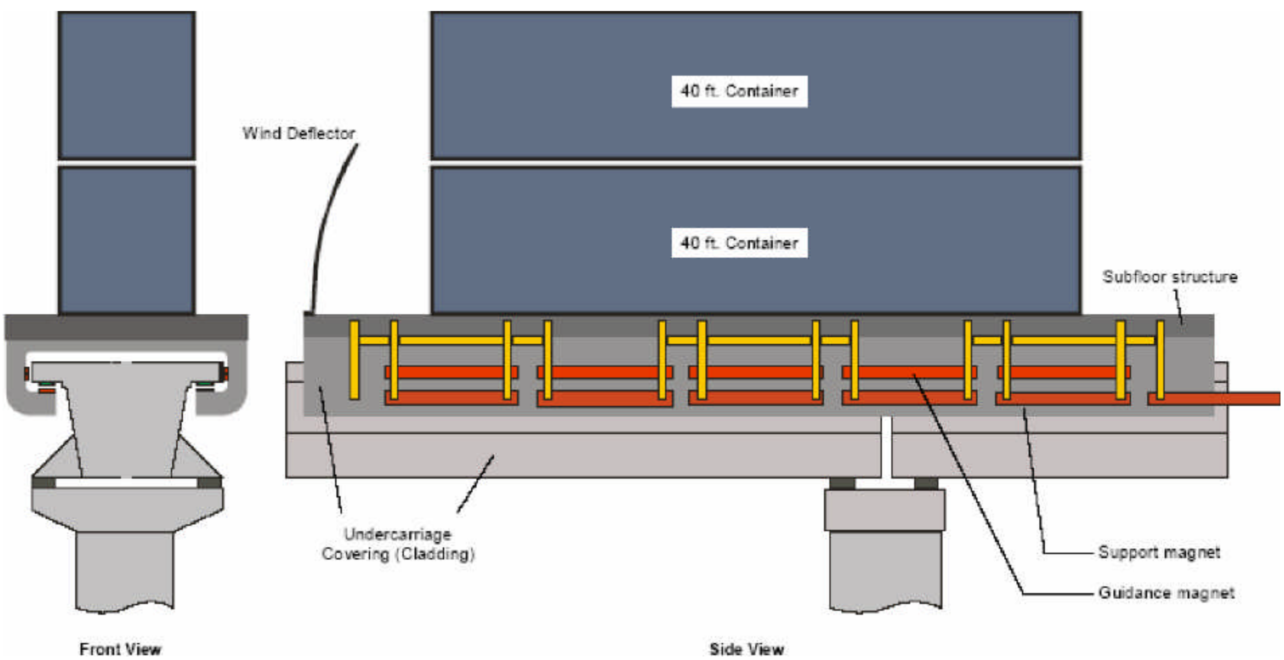


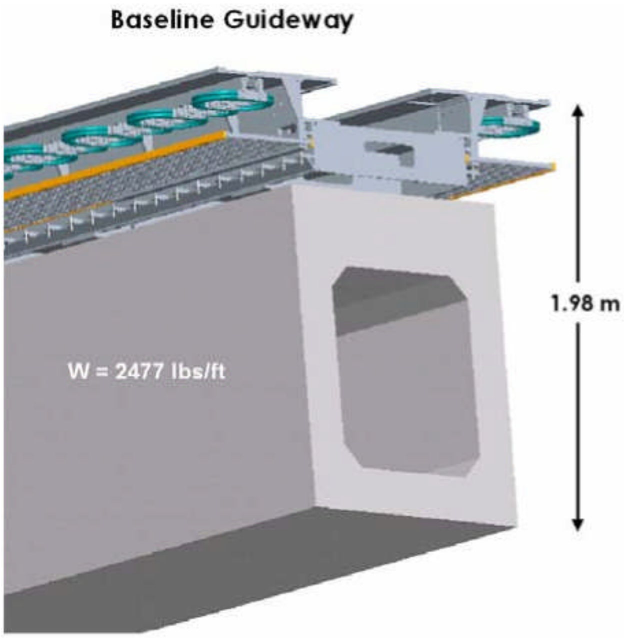
Exhibit 204 shows the TransRapid freight design in a double-stack configuration.

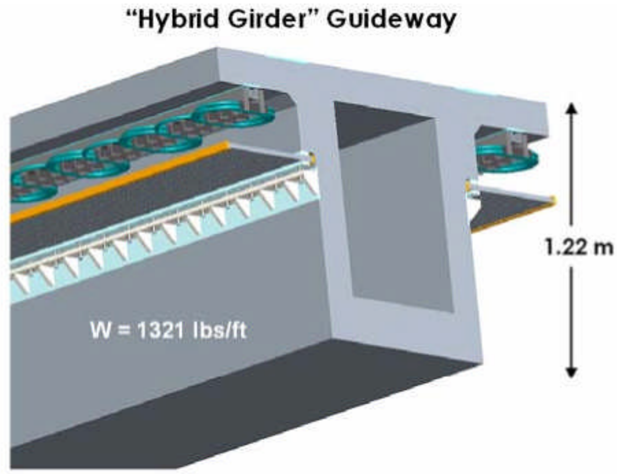
Exhibit 204: TransRapid Maglev Concept



The combined height of guideway (Exhibit 205), vehicles (Exhibit 202) and two high-cube (9'6") containers would be 25' – 27'. A double-stack Maglev system would not fit under Inter-state overpasses. A single-stack Maglev system would be 15' – 17' high, and would have to be depressed in the median to fit under most freeway overpasses.

Exhibit 205: TransRapid Maglev Guideway Concepts



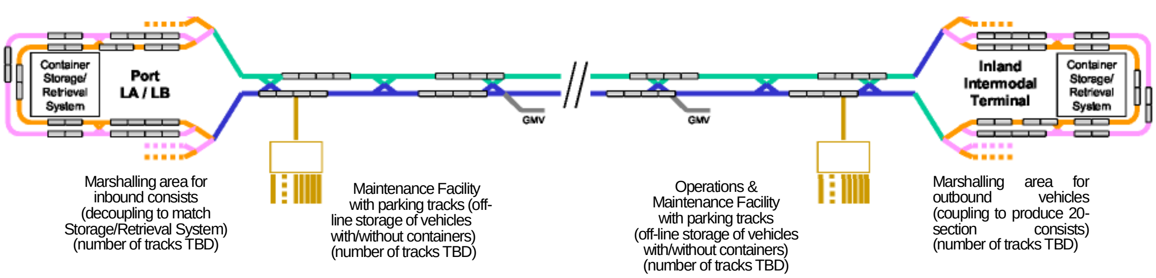


GIRDER LENGTH (Meters)	FREQUENCY (Hz) SINGLE SPAN	DOUBLE SPAN
18	10	10.4
24	5.67	5.92
30	3.45	3.87
36	2.52	2.61

Exhibit 206 shows a conceptual Maglev system linking a single port terminal with an inland terminal. The design shows two-unit and four-unit Maglev vehicles, instead of the single vehicles in most system proposals. The diagram also reflects the need for crossovers, maintenance facilities, and storage facilities ignored by other, less detailed proposals.

The terminals shown in Exhibit 206 include marshalling areas and "container storage/retrieval systems". Note that only one port terminal and only one terminal are shown. The system complexity would increase dramatically if the system were to serve multiple terminals on each end.

Exhibit 206: TransRapid's Port to Inland Intermodal Layout



In common with the other fixed-guideway proposals the Maglev system may require completely rebuilding or replacing existing marine terminals. Exhibit 207 shows a terminal concept developed by TransRapid. The automatic container storage/retrieval system has not been designed. Although several concepts have been developed by other authors for similar systems, none have been designed in detail or built. Each terminal served by the Maglev system would need a comparable system.

Exhibit 207: Maglev Terminal Concept

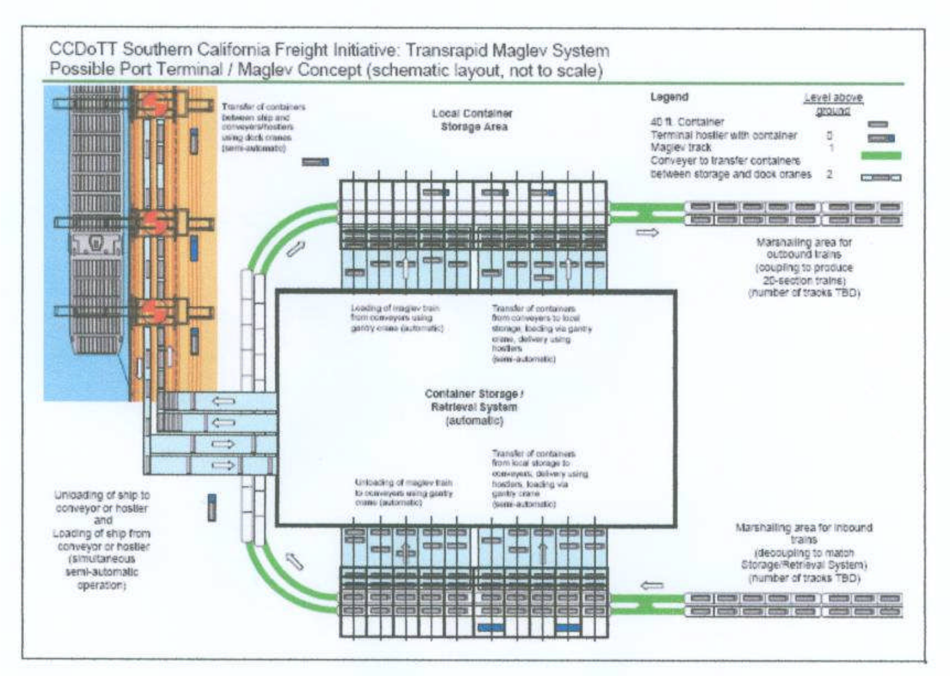
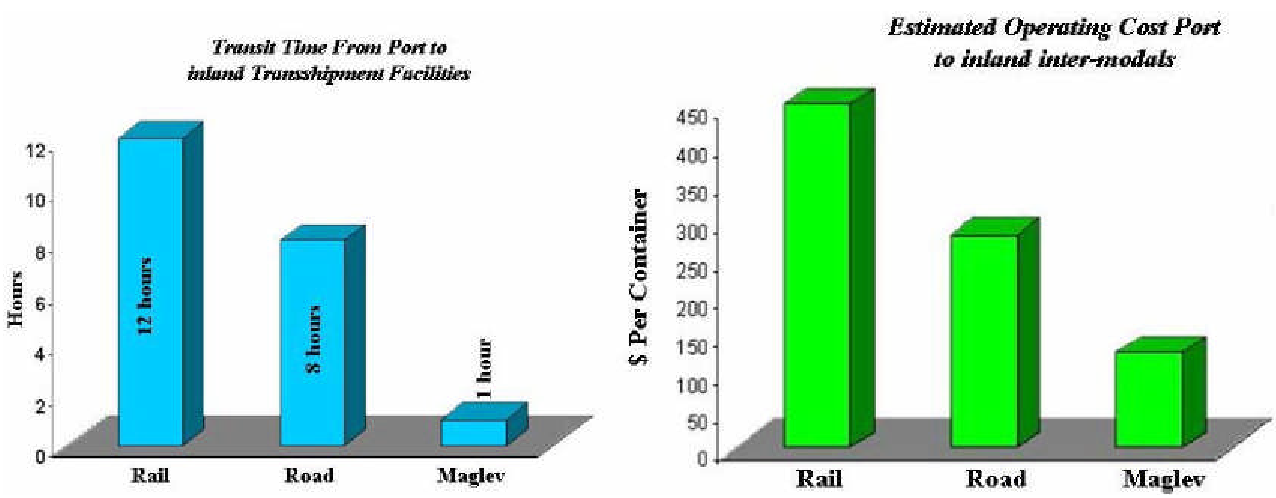


Exhibit 208 shows proponents' estimates of relative transit times and operating costs for a 100-mile trip (not verified by the study team, and inconsistent with other information).

Exhibit 208: Proponents' 100-mile Transit Time and Cost Estimates (unverified)

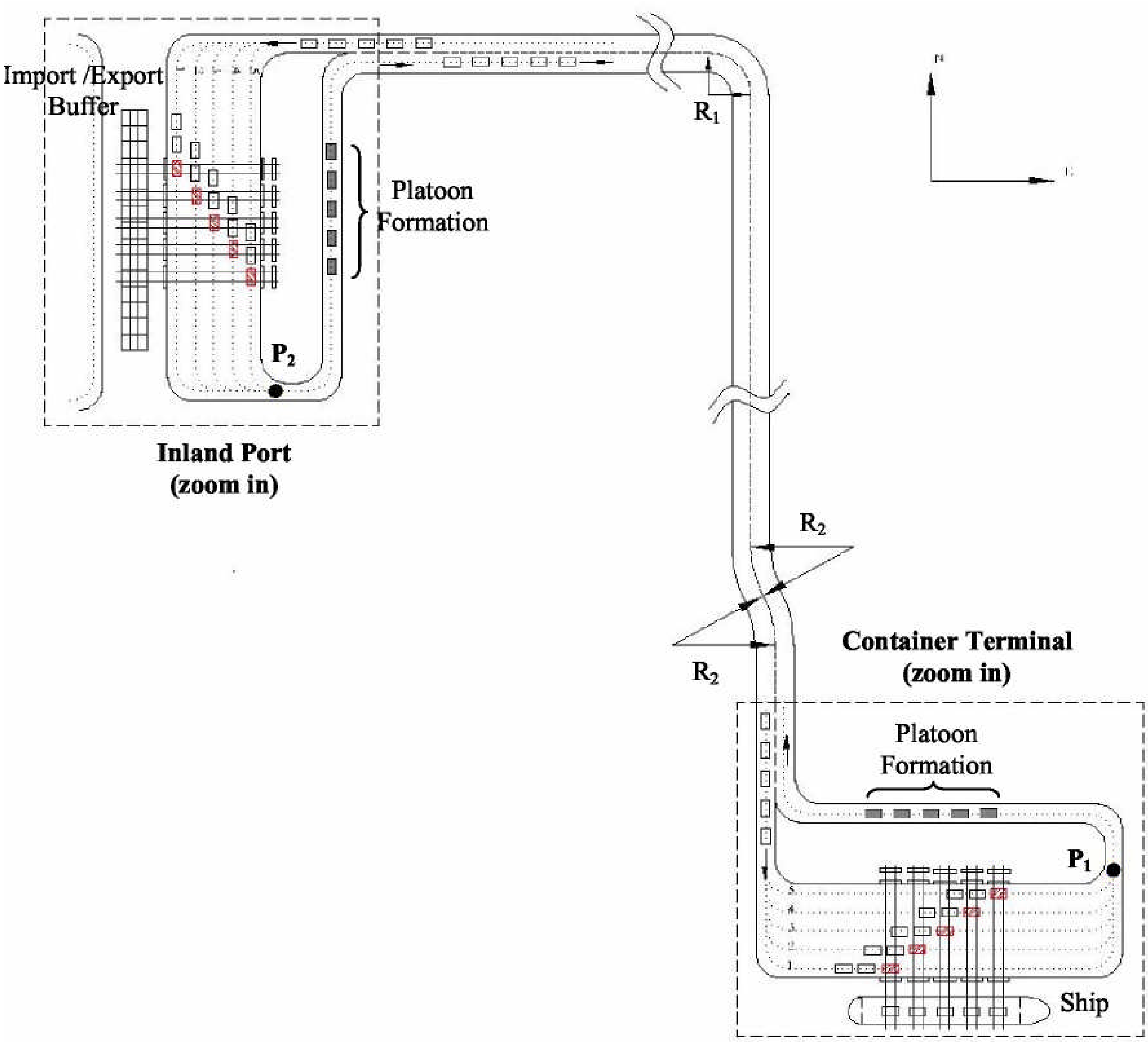


California State University is conducting a study on the engineering design and subsequent cost of the General Atomics (EDS) approach for container freight movement at the Ports. The EDS Maglev design will be projected onto the Port of Los Angeles / Long Beach / Alameda Corridor infrastructure to determine its feasibility as a means of transporting containers from the Port's terminals to the (ICTF) at the Alameda Corridor (Gurol, 2005).

Automated Truck Platoons

Another approach calls for groups of remote controlled, automated trucks traveling on exclusive roads. The proposed system (Exhibit 209) includes reconfigured marine and inland terminals with automated multi-lane cranes.

Exhibit 209: Conceptual Automated Truck Platoon System



Automated guided vehicles (AGVs) have been proposed and studied in several instances. The Delta Terminal at the Port of Rotterdam has been operating AGVs to transport containers within the terminal, while other European and Asian ports are reportedly experimenting with similar systems.

The system proposed for port to inland trip is much more ambitious. Since the automated trucks required to transport containers between a port and an inland port some distance away, they will need to travel at much higher speeds than the AGVs operating inside container terminals. The

Center of Transport Technology in the Netherlands studied a container transport system, called "Combi-Road", in which each container is pulled on a semi-trailer of an unmanned vehicle, and the vehicles are electrically driven along specially designed tracks. The proposed system, shown in Ex 9, is composed of automated trucks, automated cranes and a central control system. The central system would contain all the information on transportation tasks and road geometry, acquire real time information, and issue commands for all the trucks, cranes, etc.

Automated trucks would transport containers on a dedicated road. Inside the terminals containers would be handled by automated cranes. An automated truck would be issued commands for carrying a container from the inland port, joining a platoon, speeding up to a desired speed, cruising while on the road, slowing down when entering the container terminal, positioning itself under a quay crane for unloading, then repeating the cycle.

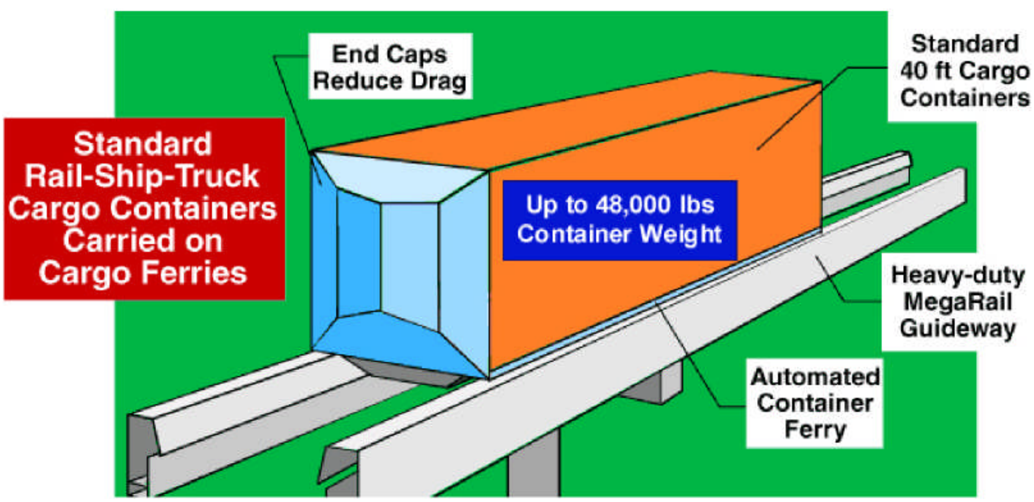
In common with other systems relying on agile port operations, all the import containers would be transported to the inland port before they are distributed to different destinations, and all the export containers would be processed in the inland port before they are transferred to the container terminal.

At the moment this system is strictly conceptual. Simulations of its performance connecting one marine terminal to one inland port have been conducted, but none of the equipment has been designed or demonstrated and more complex multi-terminal operations have not yet been addressed.

Automated Rail Vehicles.

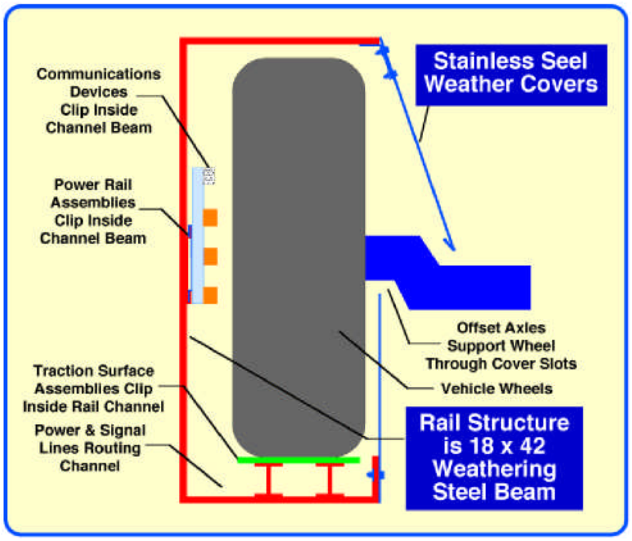
CargoRail. The CargoRail concept developed by the MegaRail Transportation Systems, Inc. employs rubber-tired vehicles (referred to as "Cargo Ferries") that would move along an exclusive elevated guideway (Exhibit 210).

Exhibit 210: CargoRail System



Each vehicle would operate individually, but would be fully automated and centrally controlled. Vehicles would operate on an enclosed weatherproof guideway (Exhibit 211).

Exhibit 211: CargoRail Guideway Concept



MegaRail Transportation Systems claims that this system is ready for a non-stop, 24-hour, 7-day a week operation at operational speeds of up to 75 mph. The maximum designed payload per vehicle is 50,000 lbs. This proposal appears to be derived from MegaRails' similar proposals for people movers.

CargoMover. Another proposal calls for automated vehicles operating over conventional railroad tracks, each carrying a single container. (Exhibit 212) A variation on this proposal would equip each vehicle to load or unload itself. CargoMover technology is designed to utilize European rail and wireless control systems. These systems are currently being deployed on several railway systems in Western Europe. CargoMover can also operate in conjunction with other train control systems. Siemens is currently testing several CargoMover vehicles.

Exhibit 212: Siemans Transportation CargoMover

Commonalities

As proposed these systems have several major features in common.

Agile Port Operations

Explicitly or implicitly all of the candidate concepts assume "agile port" operations, which were discussed in detail in the Task 1-2 report. While the "agile port" concept is subject to many interpretations, the core of the concept is transfer of unsorted inland containers from vessel to an inland point where sorting takes place. The objective of agile port operations is to dramatically reduce container dwell time at seaport terminals and thereby increase their throughput capacity with the same acreage.

It is unclear how critical agile port operations are to the design of the various systems. The technical transportation functions would appear to work equally well with sorted or unsorted containers. It is possible, however, that the ability to load and unload these systems expeditiously might be compromised by the need to sort containers at either end of the trip. Continuous loop systems do not cope well with vehicles that make different stops for different time periods. The capability of these systems to accommodate varying operating schemes needs further investigation.

If the efficiency of these systems depends critically on agile port operations, then their feasibility depends on the ability of ocean carriers, terminal operators, and the marine and inland terminals themselves to implement agile port operations. This is not a trivial question, as terminal infrastructure, terminal operating systems, vessel loading practices, vessel deployments, labor contracts and manning, and financial provisions would all have to change.

Terminal land requirements for intermodal operations of any kind are determined by peak-period throughput and dwell time. For agile port operations to reduce marine terminal dwell time they must provide substitute storage and buffer space inland. Greater reductions in marine terminal dwell time will require larger inland terminals.

Unmanned, automated vehicles.

All of the systems are planned to be completely automated, with unmanned vehicles controlled by a central computer system. Such systems are typically used in "people movers" in airports and other facilities. Transit systems with central control (e.g. BART) have operators on board with manual control options. While transit and people mover experience suggests that unmanned vehicles can be successfully controlled in uniform, closed-loop operations, the ability of such systems to cope with the complexity of multi-node systems or complex repositioning moves within terminals remains to be demonstrated. Likewise, the experience with localized people mover systems may not be translatable to distances of 60 – 100 miles between the ports and an inland terminal.

Exclusive grade-separated right-of-way

The most fundamental issue with all of these proposals is the requirement for an exclusive, grade-separated right-of-way. For most proposals (LIM, Maglev, automated rail vehicles) the required right-of-way would be the equivalent of a double-track surface or elevated railroad. The automated truck proposal would require the equivalent of a 2-3 lane highway.

Exclusive, grade-separated rights-of-way between the ports and inland terminals are arguably the scarcest resources in Southern California. As the study teams working on additional I-710 capacity and truck lanes have learned, right-of-way expansion through populated areas is a daunting task. None of the proposals suggest actual Southern California alignments.

Were potential exclusive, grade-separated available for surface LIM or Maglev systems they would also be available for conventional rail or truck operations, and the available proposals do not yet demonstrate that the innovative systems can provide greater throughput capacity then conventional systems.

Most proposed systems can be supported on pylons, like elevated rail transit systems. This feature does give some locational flexibility, but presents problems when confronted with other elevated structures in the alignment, particularly freeway overpasses. Community opposition to elevated systems is likely to be vehement and pervasive. The height of marine containers would make elevated container systems taller, more obtrusive, and more objectionable to residential and commercial neighborhoods than passenger systems. Marine containers are also sometimes visually unattractive. Finally, any proposal to move unmanned container vehicles over or through communities of any kind will have to address the potential for hazardous cargoes (e.g. chemicals or explosives) or objectionable cargoes (e.g. recyclables, animal hides).

Standard vertical clearances for interstate highways in urban areas is 14 feet, with a goal of providing at least one route option with 16 feet of clearance (the standard for rural interstates). The standard maximum height for a highway trailer or container/chassis combination is 13’6”. With 9’6” high-cube containers being very common and the norm for many transpacific imports, the guideway and vehicle combinations are effectively limited to a height of 4’ to bring the total within the 14’ interstate clearance limit. This limitation may require either redesign of some systems or depressed installations.

The various elevated fixed-guideway systems would need to be about 29’ to 30’ high to accommodate single-high 9’ 6” high-cube containers and provide 14’ of vertical clearance underneath to pass over another highway or road.

As noted elsewhere, elevated systems could not share the Alameda Corridor right-of-way. The Alameda Corridor is built with 24’8” clearances for eventual electrification above double-stack trains. Double-stack trains require 21’ – 22’ of vertical clearance. There is no possibility of squeezing elevated systems into the corridor with conventional double-stack trains.

Some Maglev proposal also contemplate double-stacked containers. An elevated Maglev system with double-stacked high-cube containers would be about 39’ tall, the equivalent of a 4 – 5 story building. A surface Maglev system with double-stacked containers would be about 25’ tall, too tall for either interstate overpasses or the Alameda Corridor.

None of the proposals, except the Maglev report, give construction cost estimates.

Potential Benefits

The proposed systems all claim essentially the same benefits.

Increased throughput capacity free of road and rail congestion

If each system operated as imagined, they would indeed expand total capacity independent of roads or railroads. Note, however, that right-of-way and terminal access used for these systems must be withdrawn from potential use by other modes. Capacity is discussed further below.

Reduced emissions and energy use through electric propulsion (except the automated diesel rail vehicles)

This would likewise be a valid benefit if the systems prove feasible. The same benefit could be obtained, however, by electrifying existing rail operations. The Alameda Corridor was built with sufficient clearances for subsequent electrification.

Low operating costs through automation and efficiency

None of the proposals, however, offer estimates of actual operating costs. As noted below, a full consideration of costs is much more complex than most technology proposals suggest.

Security

All the proposals claim improvements in security by operating on exclusive, grade-separated rights-of-way. None of the proposals, however, include a security assessment, and it is inherently difficult to secure dispersed unmanned systems.

Open Questions

Vulnerability to disruption

A fundamental disadvantage of automated, unmanned systems on exclusive guideways is their vulnerability to service failures and disruption. Without the ability to operate in a manual fall-back mode and isolated from other systems, the ability of an automated guideway system to recover from vehicle, systems, or guideway failures is extremely limited.

Failure of the central or propulsion systems on a single vehicle could bring LIM, Maglev, and similar systems to a halt, if there is no means to bypass or remove a stalled vehicle. Accidental or intentional guideway damage would likewise halt the system completely. In this respect, unmanned systems have a very high exposure to vandalism or terrorist attempts to disrupt the port system.

An unmanned system is obviously vulnerable to central control failure. While redundant and robust systems offer some protection, the complexity of a real-world, automated vehicle control system of the imagined scale implies less-than-perfect reliability. The Maglev system anticipates capacities of 16,000 one-way vehicle trips per day. At half capacity (8,000 trips per day) and 99.99% reliability, 8 failures per day could be expected.

Some proposals contemplate guideway systems with crossovers and other features to improve reliability. These features may reduce the vulnerability to vehicle or guideway failures, but they do not affect the risk of system failure and they can add substantially to the cost.

Lack of Gathering and Distribution Ability

All of the automated system proposals are presented as point-to-point linkages from a single marine terminal to a single inland point. The Port of Long Beach and Los Angeles, in contrast, consist of fourteen container terminals scattered over a 20- mile waterfront and separated by water, highway, rail, utility, and development barriers. None of the proposals to date address the challenge of transitioning from a closed loop linkage between two points and a multi-mode network across natural and man-made barriers. Connectivity between marine terminals and the ability to assemble and distribute trains across multiple terminals is already a challenge for Pacific Harbor Lines and a limiting factor in the growth of on-dock rail. Overlaying a new fixed-guideway gathering and distribution system would be a Herculean task.

Absent direct access to terminals, a fixed guideway system would require a port-area marshalling terminal with drayage to and from the marine terminals. This requirement would defeat the economics and the purpose of the proposed systems.

Marine Terminal Intrusion

All of the proposed systems, if given direct access to the marine terminal, would require substantial reconfiguration of the terminal itself. Different system presences in marine and inland terminals can be seen in Exhibit 195, Exhibit 198, Exhibit 200, Exhibit 207, and Exhibit 209.

On-dock rail facilities are normally sited at the rear or margin of marine terminals to avoid interference with routine terminal operations, specifically loading and unloading the vessel. The various automated systems would need to be similarly situated. Drawings showing convenient direct-to-vessel transfers typically ignore the large volume of containers that must be transferred to truck for local delivery. Raised guideway systems pose a particular problem for direct vessel transfer as they would create a physical barrier between the vessel and the rest of the terminal.

Dedicating space for a new fixed guideway interchange will necessarily reduce the net terminal acreage available for handling and storage.

More fundamentally, most of the automated systems rely on automated marine and inland terminals that currently exist only in concept. There is an inherent challenge in designing a ground level terminal for vessels and trucks that can also efficiently load and unload large volumes of containers from an elevated system. The throughputs envisioned for the Maglev system of 400 containers per hour must be viewed in the light of conventional container unloading and loading cycles of 20 per hour per lift machine, implying a need for up to 20 lift machines operating simultaneously to keep up with the Maglev throughput.

All of these considerations imply that marine and inland terminals will need to be reinvented and completely rebuilt or replaced before such transport systems can reach their potential.

Capacity

None of the proposals reviewed, except the Maglev report, provide working capacity estimates (e.g. containers per hour). Capacity is more than a function of speed and transit time. All of the rail systems anticipate multiple single-container vehicles on a closed loop, with the implications of real-time loading and unloading.

If the time required to unload and reload a vehicle is more than the safe headway between them, vehicles will have to queue up at the terminals. It typically requires an absolute minimum of five minutes to unload and reload a container from a rail car if the containers are pre-staged. An average time would be closer to ten minutes to allow for the unloaded container to be taken away and a second container positioned for loading. By this line of reasoning, either the system is limited to ten-minute headways or a significant amount of time must be allowed for queuing at both terminals.

- Dispatching single-container vehicles on ten-minute headways would yield a throughput of only 6 containers per hour.

- One-minute headways would yield a guideway throughput of 60 containers per hour, but could result in large queues for loading and unloading at each terminal.

- Thirty-second headways would increase the guideway throughput to 120 containers per hour, but containers would arrive much faster than they could be unloaded and reloaded to return.

- By comparison, a single highway lane has a nominal throughout capacity of about 1500 vehicles per hour.

Loading containers only one way would speed up the terminal operation but increase the operating costs and reduce the efficiency.

Operating Cost

All of the proposed systems claim lower operating costs than conventional rail or truck. Only one proposal, however, offers any numeric comparisons. Those comparisons lack detail and would require considerable analysis to verify..

The claims of lower operating cost are based on low energy use and unmanned operation. For example:

Projections for the energy requirements of the Freight Shuttle in Southern California setting suggest that, at current PG&E electrical rates, a 60-mile transit would cost roughly $20 in power use – the only variable cost in the Freight Shuttle cost structure – far lower than the variable costs associated with trucking.[11]

Unfortunately, such statements ignore the complexities. A full accounting would need to address:

[11] Roop, 2006

- System control operations and labor
- Energy costs
- Equipment and guideway maintenance cost.
- Terminal labor and systems cost
- Lift-on and lift-off costs (typically $30 to $40 per lift, or $120 to $160 for a round trip with one container each way)

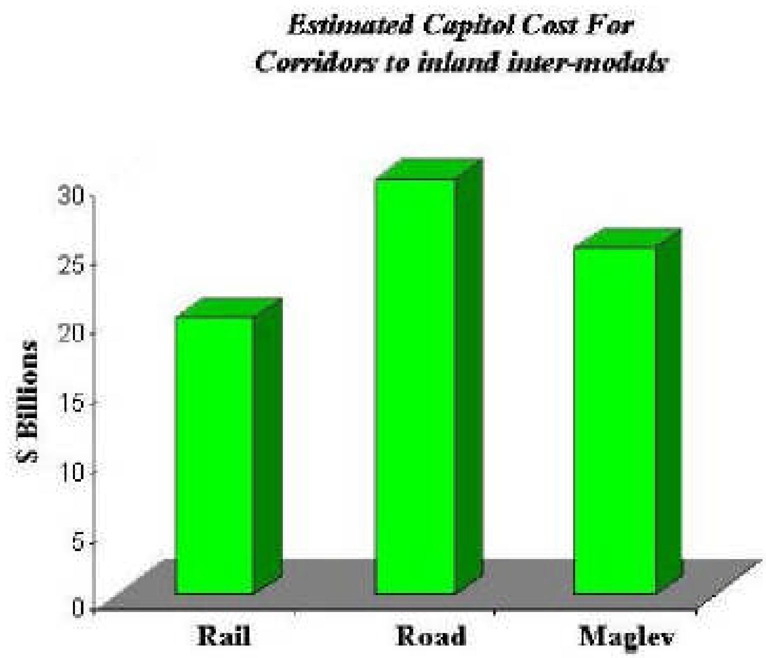
Capital Cost

Few of the proposals give any indication of capital costs. There are a number of concerns.

- While the proposals make plausible claims that the fixed guideway will be inexpensive to construct, there is no working experience to draw from and no estimates are given.
- None of these are commercial off-the-shelf ("COTS") systems and their cost is unknown. The proposed vehicles vary considerably in complexity, and only one (the automated CargoMover rail vehicle) exists in prototype. The LIM propulsion system requires almost no moving parts, but some of the vehicles have complex suspension, loading, unloading, or sensor systems (Exhibit 202, Exhibit 199)
- The capital costs to replace the marine and inland terminals with automated systems are likewise unknown.
- All of the systems incorporate elaborate automated control of unmanned vehicles. The cost of the vehicle control system components is unknown, and only one prototype exists.
- Perhaps the greatest unknown is the cost of acquiring and assembling the exclusive, grade-separated right-of-way through neighboring cities.

The maglev proposal gives the capital cost comparison shown in Exhibit 213. Without any detail, however, it is not possible to evaluate the estimates. In the graph, however, it does appear that the maglev system is expected to cost at least $5 billion more than a conventional rail system of the same incremental capacity. Terminal costs are apparently not included.

Exhibit 213: Maglev Proponents' Estimated Capital Costs to Carry an Additional 5+ Million Annual Containers (unverified)



Applicability to Southern California Inland Ports

As a practical means of connecting an inland port complex with marine container terminals in Long Beach and Los Angeles, these systems must be regarded as highly speculative at this point in their development.

All of these systems appear better suited to connecting a single large multi-user marine terminal with a single inland satellite terminal. This arrangement would be much more common in Europe or Asia than in North America. Were such a new terminal contemplated in Los Angeles or Long Beach, a successful automated system might be suitable to connect that terminal with an inland point in agile port operations.

These proposed systems would require substantially more detailed analysis before they could be considered as serious candidates for implementation.

Most critically, the availability or feasibility of an exclusive, grade-separated right-of-way must be firmly established. If the required right-of-way is not feasible, the technical merits of the proposed systems are irrelevant.

Need for Complete System Designs

None of the proposals reviewed to date describe a complete system.

- The Maglev system is the most advanced in its design but the terminals are conceptual "black boxes" at this point.

- The automated truck platoon system is "complete" in that the performance of conceptual terminal systems has been modeled, but no engineering or operational design has taken place.
- None of the proposals have identified a feasible right-of-way or addressed the complexity of serving multiple port terminals.

A complete system design would need to address each step of the port-to-destination movement.

1. **How are containers moved from vessel to system loading point (and vice versa)?** At present, every container in North America is moved on chassis between the apron under the crane and the container yard or on-dock rail terminal.
2. **How are containers loaded and unloaded to/from system vehicles?** At present, marine terminals in North America use gantry cranes, side loaders, reach stackers, or straddle carriers to handle containers or chassis, on rail cars, or on the ground.
3. **How does the system get into, through, and out of the marine (and inland) terminal?** Conventional rail tracks embedded in pavement allow trucks to pass over. No terminals have rail loading at ship side.
4. **How does the system link multiple marine and/or inland terminals?** As noted elsewhere, the Los Angeles and Long Beach terminals are scattered over 20 square miles of waterfront and separated by water, highway, rail, and development barriers.
5. **What right-of-way does the system use to link terminals?** Absent a feasible right-of-way other system features are irrelevant.
6. **How are system movements planned and controlled?** The system must correctly identify each container, move it to the correct terminal, position it for loading/unloading, and hand-off control to terminal gate (inland) or vessel (marine) systems.
7. **How does the system recover from disruptions?** The full range of potential disruptions might include vehicle failure or malfunction; central system failure or error; guideway failure or damage; power shortage or loss; and accidental or malicious damage.
8. **Where will import containers be sorted and forwarded to final destination by truck or rail?** The agile port concept on which all the systems implicitly rely shifts the sorting function to the inland terminal. The inland terminal must be sized, planned, equipped, and operated accordingly.
9. **What are the full capital costs of the system?** The capital costs must encompass the right-of-way, the guideway, the vehicles, the control system, the terminals, and any ancillary facilities or systems.

10. **What are the full vessel-to-destination operating costs?** The operating cost estimates would have to include every step: unloading the vessel, operating the terminals, loading and unloading, sorting, linehaul, transfer to another mode, overhead, etc.

11. **What is the system throughput capability?** The system will be limited by its slowest link, which is likely to be in the terminals rather than on the line-haul. The system will need to cope with volume peaks and valleys, and comparisons should be based on reliable, day-in/day-out throughput rather than optimized conditions.

12. **What impact will the system have on communities, highways, and other urban features?** The existing proposals point out the potential emissions advantages but do not discuss the potential neighborhood division and diminished property values associated with elevated systems, displacement of truck drivers, or exposure to hazardous/objectionable cargo.

As most of the proposed systems are highly conceptual, there is a long way to go before these systems can be evaluated with any confidence.

Sources

Innovative Transportation Technologies – an Alternative for Providing Linkages Between Port Terminals and Inland Freight Distribution Facilities, Branislav Dimitrijevic, International Intermodal Transportation Center, New Jersey Institute of Technology, Lazar N. Spasovic, Ph.D., National Center for Transportation and Industrial Productivity, New Jersey Institute of Technology, 2006

Urban Maglev Freight Container Movement at the Ports of Los Angeles/Long Beach, Kenneth A James, California State University Long Beach, and Sam Gurol, , General Atomics, 2006

Automated Shipping Container Transportation System Design for Chicago, Laurence Rohter P.E. and Carliss Jackson, Inter-PROfessional Projects Program, Illinois Institute of Technology; Bruce Dahnke, Skytech Transportation; Ariel Iris & Gerald Rawling, Chicago Area Transportation Study, 2006

Intelligent Transportation System for Container Movement between Inland Port and Terminals, Jianlong Zhang, Petros A. Ioannou and Anastasios Chassiakos, Center for Advanced Transportation Technologies, University of Southern California and College of Engineering, California State University, Long Beach, 2006