

North Jersey Transportation Planning Authority



FINAL ISSUES, NEEDS, AND
STRATEGIES REPORT

NJTPA Freight System Performance Assessment

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1.0 About This Report

■ 1.1 North Jersey Transportation Planning Authority Inc.

The North Jersey Transportation Planning Authority Inc. (NJTPA) is the Federally-designated Metropolitan Planning Organization (MPO) for a 13-county region covering northern New Jersey. Each year, the NJTPA oversees over \$1 billion in transportation investments. It evaluates and approves proposed transportation improvement projects, and provides a forum for interagency cooperation and public input into funding decisions. It also sponsors and conducts studies, assists county planning agencies, and monitors compliance with national air quality goals. NJTPA is responsible for preparing the region's Transportation Improvement Plan (TIP) and Regional Transportation Plan (RTP), which are critical in setting transportation policy and allocating funding.

The NJTPA region is one of the nation's leading centers for the production, consumption, and movement of goods. It hosts some of the nation's busiest seaports, airports, rail facilities, highways, and warehouse/distribution centers. The economic benefits of the region's freight infrastructure – in terms of job creation, access to markets, and lower consumer prices – are seen everywhere. But the costs of accommodating regional freight movement – in terms of congestion and related effects – are also highly visible. Safe, secure, and efficient freight movement is vital to the New Jersey economy, and must be accommodated within the goals of regional mobility, environmental quality, and other public policy guidelines. In response, NJTPA has been active in leading a variety of freight planning initiatives, including a special freight component of its previous RTP.

■ 1.2 Freight System Performance Assessment Study

Now, in support of its upcoming RTP update, NJTPA has undertaken a comprehensive Freight System Performance Assessment Study (FSPAS). In preparing the FSPAS, NJTPA has utilized a wide range of existing studies and resources, and has benefited from the valuable input of:

- **The NJTPA Board of Trustees.** The Board includes representatives from each of its 13 counties (Bergen, Essex, Hudson, Hunterdon, Middlesex, Monmouth, Morris, Ocean, Passaic, Somerset, Sussex, Union, and Warren); the Cities of Newark and Jersey City; a Governor's representative; the Commissioner of the New Jersey Department of Transportation (NJDOT); the Executive Directors of New Jersey Transit and the Port

Authority of New York and New Jersey (PANYNJ); and a Citizens' representative appointed by the Governor.

- **The NJTPA Freight Initiatives Committee (FIC).** The FIC is comprised of public agencies and private stakeholders with an interest in freight issues, and meets regularly to provide input and guidance for ongoing NJTPA efforts.
- **Public and private organizations and their staff, who provided supporting studies, data, expertise, and advice, both in writing and in person.** These include NJDOT, the New Jersey Institute of Technology, PANYNJ, New Jersey Transit, the New Jersey Turnpike Authority, the New Jersey Motor Truck Association, and other members of the region's freight community.

In preparing the FSPAS, NJTPA was supported by the consulting firm of Cambridge Systematics, Inc., in association with A. Strauss-Weider, Inc.; Edwards and Kelcey, Inc.; R.L. Banks and Associates; Moffatt and Nichol Engineers; and Reebie Associates.

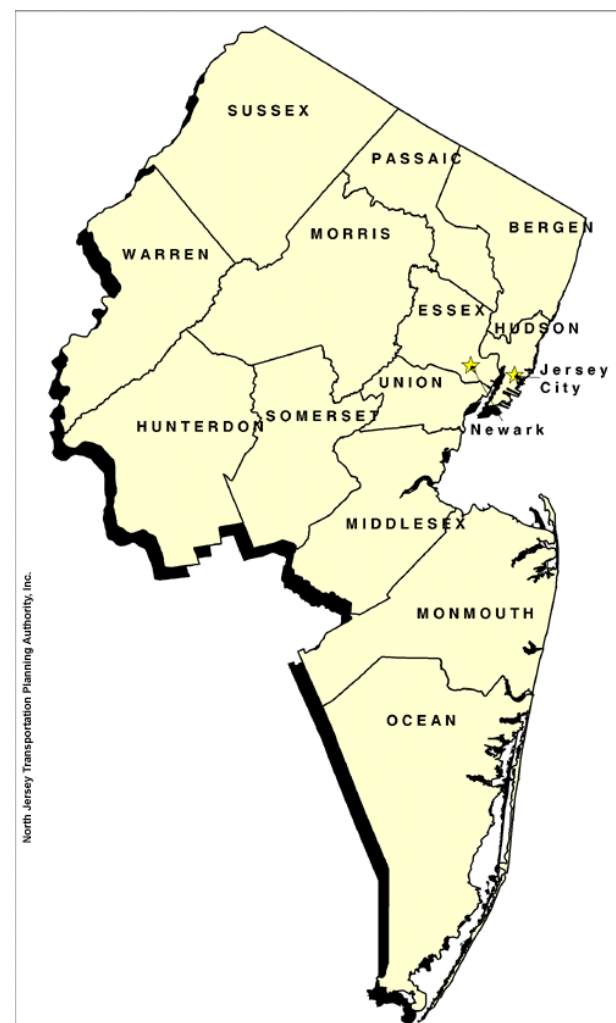
The FSPAS consists of the following major tasks:

- Creation of a Comprehensive Freight Database;
- Preparation of a report assessing *Current and Future Conditions* for the region's freight transportation system;
- Preparation of a report on *Regional Issues, Needs, and Strategies* related to freight movement;
- Preparation of *Freight Impact Concept Reports* on potential projects and actions for freight; and
- Preparation of a freight component for the NJTPA's RTP Update.

■ 1.3 Regional Issues, Needs, and Strategies Report

This Regional Issues, Needs, and Strategies Report addresses highway, rail, marine, aviation, and warehouse/distribution components of the region's goods movement system, with the goals of documenting current system conditions, presenting forecasts of future growth, evaluating future system conditions, and identifying critical issues as input to other work products under the FSPAS. As shown in Figure 1 on the following page, the study area consists of the 13 counties within the NJTPA region. Current and future conditions for areas outside of this region have also been referenced, where such conditions influence conditions within the region. Where available, data covering the entire State of New Jersey are presented.

Figure 1. The NJTPA Region



This Regional Issues, Needs, and Strategies Report is generally organized as follows:

- **Section 1.0 – About This Report.**
- **Section 2.0 – NJTPA Freight System Performance, Issues and Needs.** This section presents brief summaries of key transportation system performance data (presented in full form in the *FSPAS Current and Future Conditions Report*), and discusses critical system-related issues and needs.
- **Section 3.0 – Interregional and Institutional Issues and Needs.** This section addresses issues and needs going beyond specific transportation system infrastructure and operations in the NJTPA region.
- **Section 4.0 – Policy Options and Recommended Strategies.** The report concludes with a set of recommendations for positive action.

2.0 NJTPA Freight System Performance, Issues, and Needs

■ 2.1 Overview of the NJTPA Freight System

2.1.1 Current Conditions

“Freight movement” can be defined generally as the physical movement of materials, products, and/or property between two points. We refer to the first point as the origin (where freight is shipped) and the last as the destination (where freight is received). We refer to different transportation modes – air, water, truck, rail, or pipeline – over which freight can be moved. These transportation modes actually consist of point-to-point networks (waterways, highways, rail lines, and pipelines) and interchange points (where freight moves from one mode or one vehicle/vessel to another, such as airports, seaports, rail terminals, and warehouse/distribution centers (DCs)). We can refer to the “intermodal” movement of freight when talking (broadly) about a freight trip involving more than one mode, or (more narrowly) about a freight trip using a specially-designed shipping container designed to move readily between vessels, trucks, and railcars. Freight movement is generally measured in terms of tonnage shipped; units shipped (number of containers, automobiles, etc.); value shipped; vehicles moved (railcars, trucks, vessels, etc.); vehicle miles of travel (VMT); and ton-miles (tonnage times miles of travel).

Within the NJTPA region, the key drivers of freight movement are:

- **Consumer demand in the NJTPA region.** Freight movement is generated by the everyday economic activity of producing, processing, and consuming materials and goods. Millions of people buying millions of apples – and grapes, and everything else – generate a huge demand for freight movement.
- **Producer demand in the NJTPA region.** Production of raw materials, finished goods, and intermediate (partially completed) goods generates demand for freight movement, so that producer outputs can reach their markets.
- **Interchanging, handling, and processing activities.** Interchanging, processing, or other handling of goods and materials – through the region’s airports, seaports, rail terminals, warehouse/DCs, and “value added” manufacturing facilities – is an important part of accommodating freight demand generated by the NJTPA region’s producers and consumers, as well as through traffic. The locations and functions of

these facilities are critical in determining the mode(s) and the route(s) taken by a particular shipment of freight.

The region's demographics – its underlying base of producers, consumers, and intermediaries – are therefore a critical determinant of freight movement characteristics to, from, and within the NJTPA region. The NY/NJ region is the nation's largest consumer market and is also a major producer market, and in large part these demographics are responsible for what gets moved where, in what quantities, and by what modes.

In addition, as shown in Figure 3, the region's geography and position within the nation's overall transportation system have created a 'gateway' role for the region's interchange/handling/processing facilities, which is also highly significant in determining freight movement. This gateway function offers unique service advantages for the region (in the form of access to highly-developed infrastructure), but also imposes additional burdens (in the form of extra "through" traffic and related impacts). Key gateway elements include:

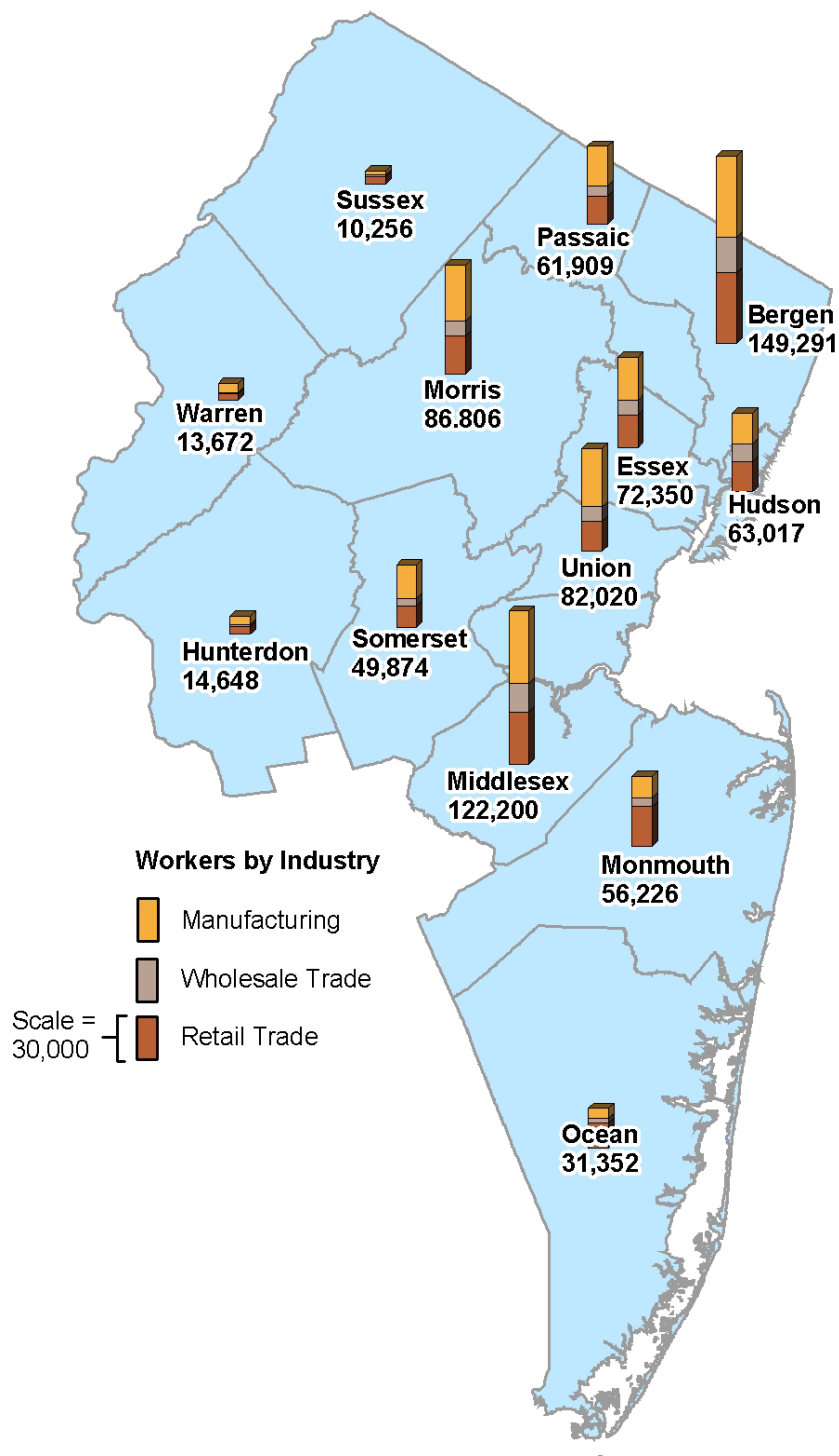
- **Seaports.** The region's seaports are perhaps its most visible gateways. Public and private marine terminals in the NJTPA region handle huge volumes of containerized and non-containerized commodities in both domestic (to and from U.S. ports) and international trade lanes. Much of this freight has an origin or destination within the NJTPA region, but a substantial share is moving to and from other areas – New York City, New England, the Mid-Atlantic, the Midwest, etc. In some cases, the cargo "stops" along the way and generates regional jobs (in the form of value-added processing and finishing, or warehouse/distribution activity), while in other cases, it simply passes through the region without any handling. Impacts are felt at marine terminals (which must handle additional traffic), and over the highway and rail systems that provide landside access to these terminals. Marine terminals (public and private) are located in Bergen, Essex, Hudson, Union, Middlesex, and Monmouth Counties.
- **Airports.** Within the New York-North Jersey-Connecticut metropolitan statistical area, Newark Liberty International Airport (EWR) is the leading gateway by tonnage for domestic air cargo, and the second-leading gateway (behind John F. Kennedy International Airport (JFK)) for international air cargo. As with seaports, much of this freight has an origin or destination in the NJTPA region, but a substantial share is associated with out-of-region origins and destinations. The biggest impact is actually on the highway side, as air cargo needs to be trucked longer distances to serve out-of-region customers. EWR is located in Union and Essex Counties.
- **Railroads.** The U.S. freight railroad system was developed as a private for-profit system, and remains for the most part under private ownership today. Nobody planned the entire system – rather, it evolved according to the business opportunities afforded different railroad operators. Between 1860 and 1930, rail system mileage expanded rapidly. Northern New Jersey developed as a key point in the national rail network, where major east-west lines terminated. Since the 1930s, many rail companies have gone out of business or merged, and the survivors have substantially consolidated and rationalized their systems to reduce cost and improve profitability. Today, northern

New Jersey continues to serve as the metropolitan area's gateway to the national rail system, for both east-west and north-south traffic. Impacts are felt on the rail system itself, as well as on truck routes accessing major railyards. Major rail terminals are located in Bergen, Hudson, Essex, Union, and Somerset Counties. Other counties – including Middlesex, Hunterdon, and Warren – are traversed by high-volume rail mainlines.

- **Highways.** Northern New Jersey is the southernmost point by which vehicles can access New York City and points further east into New England. Major highways and bridge/tunnel crossings of New York harbor, the Hudson River, and the East River were developed to link the “west of Hudson” region with the rest of the U.S. highway system via northern New Jersey. While much of the truck traffic on the NJTPA region's highways has an origin and/or destination in the region, a substantial share is related to traffic moving between New York City/New England and the rest of the country. Major bridge and tunnel crossings are located in Bergen, Hudson, and Union Counties, and every NJTPA county, except Ocean and Sussex, is impacted by one or more high-volume truck corridors.
- **Warehouse and distribution facilities.** Historically, warehouse and distribution activities in the NY/NJ/CT metropolitan area tended to be located in the urban centers, close to the population they served. But over time, the NJTPA region has evolved as the primary warehouse and DC for the New York/New Jersey region. Several factors – the growing need for larger facilities and better transportation access, increased urban congestion, and the shrinking pool of suitable urban land compared to the relatively low cost of developing in the region's “outer rings” – have resulted in the rapid expansion of warehouse/distribution clusters throughout the NJTPA region. These facilities attract trucks even in cases where the original shipper and the end user are both located outside the region (the tradeoff for the additional traffic, as we have noted, is substantial job creation and economic benefit for the host communities). Middlesex County hosts the largest concentration of large warehouse and DCs, followed by Hudson, Bergen, Essex, Union, Passaic, Morris, and Monmouth Counties.

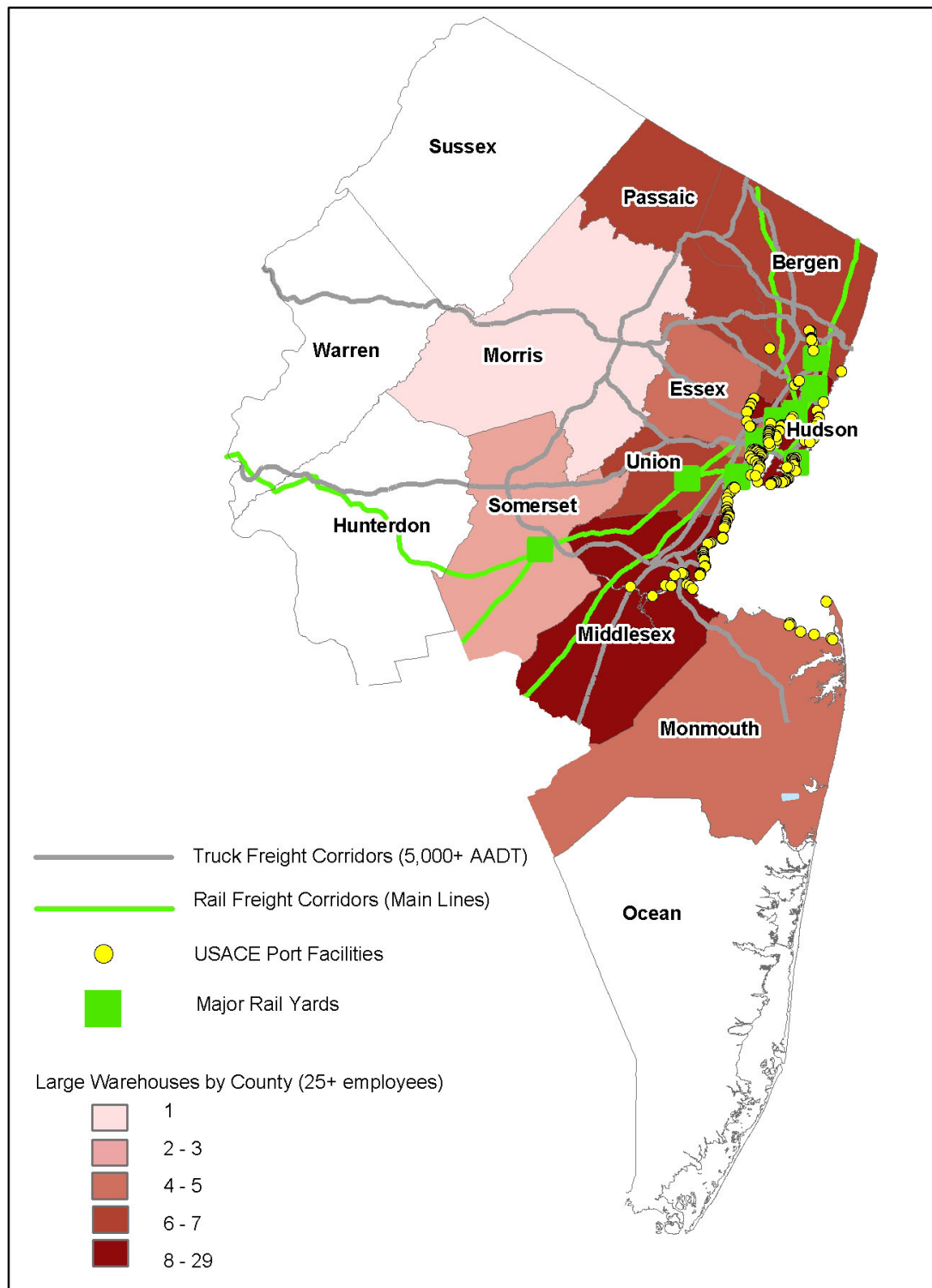
The interplay of multiple forces – county-level production and consumption, along with the provision gateway transportation services – creates a complex series of freight movements involving trucks, railroads, seaports, airports, and warehouse/DCs. There is no single source of data that provides a complete picture of these movements. For the FSPAS, we have attempted to integrate a number of data sources, including TRANSEARCH (a commercial data product of Reebie Associates), Port Authority of New York and New Jersey (PANYNJ), U.S. Army Corps of Engineers (USACE), and U.S. DOT. Table 3 on the following page shows estimated freight tonnages by mode for the NJTPA region, classified by modes of transport and general origin-destination patterns.

**Figure 2. Employment in Manufacturing, Wholesale, and Retail Trade
 2000**



Source: U.S. Census.

Figure 3. Regional Gateway Transportation Facilities



Sources: Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), USACE, Federal Aviation Administration (FAA), and InfoUSA database.

Table 1. Approximate NJTPA Regional Freight Tonnage

	Truck (2003)	Rail (2001)	Water (Approx. 2003)	Air (2003)	Total
Originating in any NJTPA County	164,458,387	8,365,016	32,444,828	430,051	205,698,282
To international (est.)	*	*	7,836,359	69,800	7,906,159
To outside region	107,512,317	8,317,484	24,608,469	360,251	140,798,521
To another NJTPA county	56,946,070	47,532	*	*	56,993,602
Terminating in any NJTPA county	144,778,511	16,327,506	58,042,572	477,545	219,626,134
From international (est.)			45,281,031	121,442	45,402,473
From outside region	87,832,441	16,279,974	12,761,541	356,103	117,230,059
From another NJTPA county	56,946,070	47,532	*	*	56,993,602
Originating/terminating, other (est.)	0	0	20,065,160	56,521	20,121,681
Subtotal of originating/terminating	309,236,898	24,692,522	110,552,560	964,117	445,446,097
International	0	0	53,117,390	191,242	53,308,632
Domestic (est.)	309,236,898	24,692,522	57,435,170	772,875	392,137,465
Traffic 'passing through' any NJTPA county that is not generated by another NJTPA county; traffic through multiple counties is counted only once.	111,938,944	*	*	*	*

*No data available.

Sources: TRANSEARCH, 2003; TRANSEARCH, 2001; PANYNJ, 2003; and USACE, 2002.

The tonnage originating and terminating entirely within the NJTPA region is estimated at over 445 million tons. Key highlights include the following:

- **Modal splits.** Trucks represented 69 percent of originating and terminating tonnage; rail represented six percent; water represented 25 percent; and air represented less than one percent.
- **Domestic vs. International splits.** Around 12 percent of originating and terminating tonnage are international by air or water; and around 30 percent is traffic moving

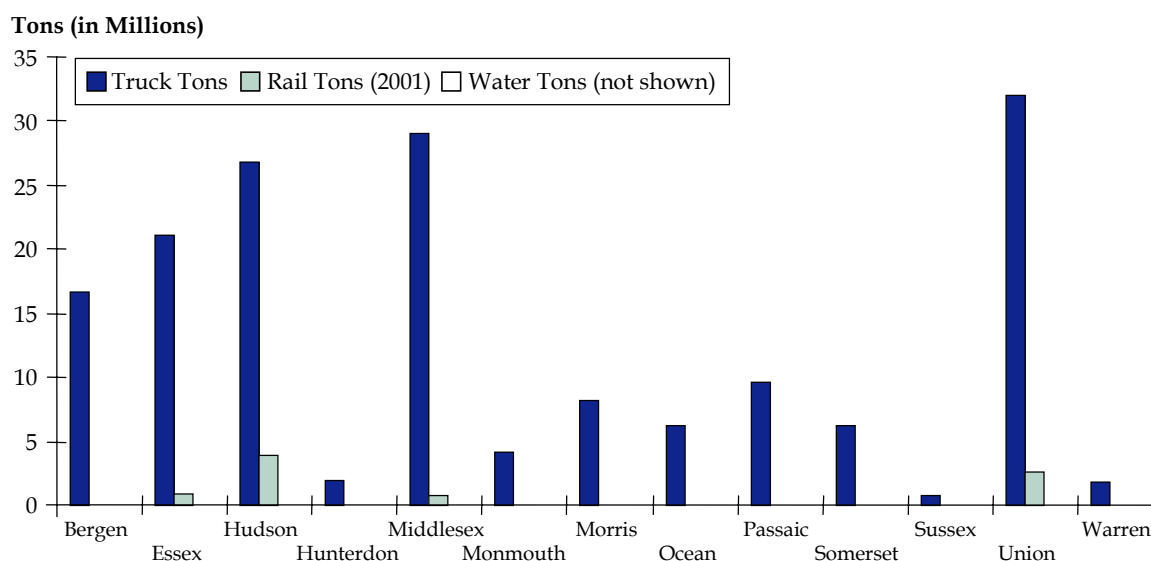
entirely within the NJTPA region by truck or water. The remaining 58 percent is tonnage moving between the NJTPA region and the rest of the U.S. by truck, rail, air, or water.

- **Directional splits.** Originating traffic (beginning in the NJTPA region and ending anywhere) totaled over 205 million tons. Terminating traffic (beginning anywhere and ending in the NJTPA region) totaled over 219 million tons.
- **Through traffic.** Around 309 million truck tons originate or terminate in NJTPA counties; another 111 million tons of *pass through* truck traffic are generated by moves that have neither an origin nor a destination in the NJTPA region. These through trucks represent around 25 percent of the region's truck tonnage, and primarily impact major regional through-corridors (I-95/NJ Turnpike, I-78, I-80, and I-287).
- **Modal profiles.**
 - Trucks provide point-to-point service between shippers and receivers, and also serve as feeders and distributors for rail, water, and air cargo facilities – so it is not surprising that they handle more than two-thirds of the region's total freight tonnage. Almost 40 percent of truck tonnage are associated with trips entirely within the NJTPA region, underscoring its importance for the local movement of goods. More truck tonnage is originated (164 million tons) than terminated (145 million tons). This reflects the fact that the region is a net importer and warehouse of international goods, which turn into originated truck trips for receivers within and outside the region.
 - More rail traffic is terminated in the region (16 million tons) than is originated (8 million tons). This reflects the fact that the region is a net consumer of rail-carried commodities. Rail tonnage is substantially lower than truck tonnage, but rail is critically important for long-haul movement of carload and intermodal goods.
 - Waterborne trade has a huge impact on the region. Interestingly, it appears that international and domestic tonnages are relatively in balance – while most of the attention tends to focus on international commodities, water is extremely important for domestic moves, both within the region and to/from other coastal origins and destinations. For international tonnage, imports heavily outweigh exports (45 million tons terminated versus 8 million tons originated), while the opposite holds for domestic tonnage (13 million tons confirmed terminated versus 25 million tons confirmed originated). To some extent, this reflects the receipt of international cargos and their subsequent re-shipment to domestic receivers.
 - Air cargo in the NJTPA region is focused on domestic service, and while it accounts for a small share of tonnage, that tonnage tends to be high-value time-sensitive goods that are critical to regional and global business.
- **County-level profiles.** Figures 4 and 5 on the following page provide estimates of originating, terminating, and through freight tonnage handled by each county.

County-level breakdowns of waterborne tonnage are not available due to the limitations of source data.

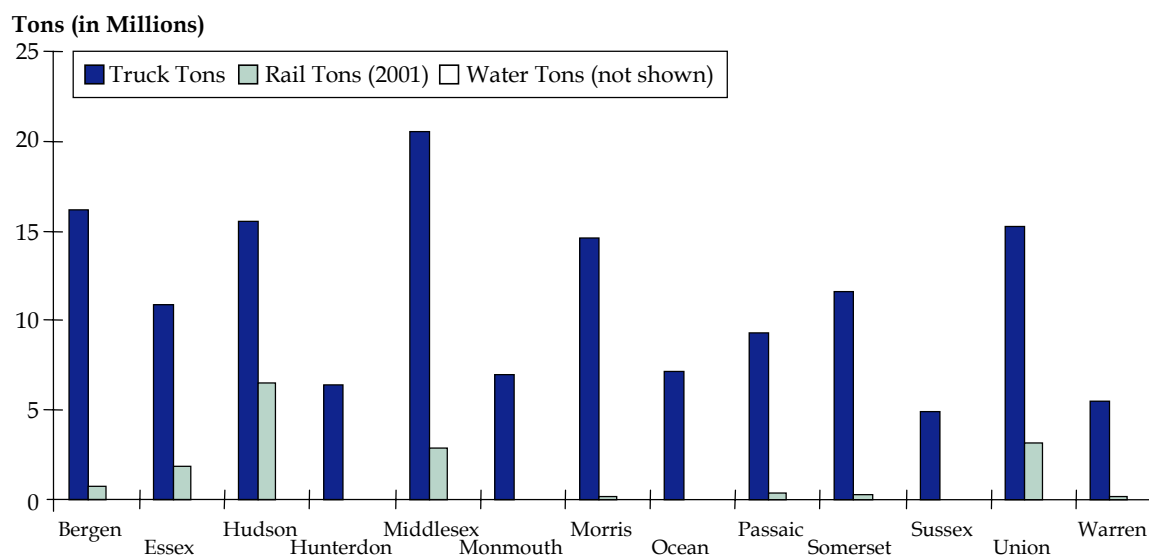
- For originating tonnage, there is a substantial difference between the five leading truck counties (Union, Middlesex, Hudson, Essex, and Bergen) and the other NJTPA counties. These five counties are key regional gateways and host marine terminals, railyards, and warehouse/DCs that generate substantial outgoing (e.g., originating) tonnage. Waterborne originations are significant for Hudson, Union, Middlesex, and Essex Counties; rail originations are most significant for Hudson and Union Counties.
- For terminating tonnage, the counties show less differentiation in terms of truck tonnage, due presumably to the fact that each of these counties consumes goods that must arrive by truck. Where we see major differences is terminating tonnage by water (at port facilities in Union, Hudson, Essex, and Middlesex Counties) and by rail (at terminals in Hudson, Union, Essex, Bergen, and Middlesex Counties).

Figure 4. Originating NJTPA Tonnage by Mode and County
2003



Sources: Transearch 2003, Transearch 2001, PANYNJ 2003, USACE 2002

**Figure 5. Terminating NJTPA Tonnage by Mode and County
2003**



Sources: Transearch 2003, Transearch 2001, PANYNJ 2003, USACE 2002

2.1.2 Future Forecasts

For the FSPAS, year 2025 and 2030 forecasts were developed for each component of the freight transportation system examined in Section 2.0 – highways, rail, seaports, airports, and warehouse and distribution – to allow us to make some judgments about the adequacy of future freight infrastructure and operations, and to highlight areas where improvement and attention is most critical. The forecasts were drawn from:

- The FHWA’s *Freight Analysis Framework* (truck and rail);
- The NY/NJ *Comprehensive Port Improvement Plan* (CPIP) and USACE’s *Harbor Navigation Study* (marine terminals);
- The PANYNJ *Port Inland Distribution Network* (PIDN) Study (marine terminal-generated truck and rail);
- The NJDOT *Portway Extensions and CMS* (marine terminal-generated truck and rail based on CPIP marine terminal forecasts, plus regional travel demand forecasts for all vehicle types within the Portway Extensions model); and
- Industry and facility trendlines interpreted and extrapolated by the FSPAS team (air and warehouse) based on anticipated future conditions.

Within the NJTPA region, there are several different forecasts available for marine terminals. We have developed two alternative forecasts: one based on CPIP and one based on the Harbor Navigation Study. These are intended as what-if scenarios.

- CPIP assigns a certain amount of international container arrivals to over-the-wharf handling at the region's marine terminals, and the remainder to rail and truck arrivals from other U.S. gateways. This is our **Forecast Scenario 1**.
- The USACE forecasts assign more containers to the marine terminals, and are silent on the issue of rail handling. We assumed that total international container arrivals would be the same as under CPIP, and reduced the volumes from other U.S. gateways by an equivalent amount. This is our **Forecast Scenario 2**.

The two scenarios produce different results for international container handling through the region's marine terminals, as well as different results for truck and rail volumes and routings generated by international container handling. Additionally, the landside handling of international containers is expected to change over time – favoring substitution of rail and barge for truck – under the PANYNJ's Port Inland Distribution Network (PIDN) initiative. Forecast Scenario 1 reflects initial PIDN projections (PIDN v1), while Forecast Scenario 2 reflects revised projections (PIDN v2) with reduced truck substitution. Apart from this difference in the treatment of international containerized freight, the two forecast scenarios are identical.

Working with different modes, base years, forecast sources, units, and analytical tools necessarily introduces some level of inconsistency, but we have worked to try and synthesize an overall multimodal forecast that coordinates the various elements, corresponds generally to current and anticipated conditions based on available information, and serves as a useful platform for “big picture” freight system evaluation.

In particular, it should be noted that Forecast Scenario 1 is actually based on a modified version of the CPIP forecast (“2025 high”) that was developed for the Portway Extensions project in cooperation with the CPIP planning team. The modified forecast is accelerated by five years versus CPIP's base forecast, and also assumes expansion of Global/MOTBY, which CPIP did not. To develop Forecast Scenario 2, the USACE forecast growth rate was substituted for the CPIP growth rate, and all other assumptions were kept constant; this was necessary to allow the team to adjust the Portway Extensions highway model (which was based on the modified CPIP forecast) to test the alternative USACE forecast. Furthermore, we have tried to isolate growth expected in the NJTPA region rather than port-wide. As a result, the total maritime volumes in Forecast Scenarios 1 and 2 do not correspond exactly to published CPIP and USACE forecasts.

The forecasts were initially developed for year 2025 due to the availability of previous forecasts using that horizon, and were linearly extrapolated to year 2030 for consistency with NJTPA planning requirements. Forecasts of container traffic by water and by rail are presented in 20 feet equivalent unit (TEU), and can be converted to tons if desired using the rule of thumb of seven tons per TEU. Forecasts of highway traffic are presented in VMT, rather than tons or TEUs, to allow for meaningful comparisons with auto traffic. Finally, it must be emphasized that the forecasts presented in Table 2 are unconstrained –

that is, they represent the amount of traffic that could be anticipated based on demand, assuming that sufficient capacity is available to realize that demand.

Table 2. Unconstrained Freight Forecasts for NJTPA Region

Type	Annual Growth	Base Year Volume (NJTPA Region)	Year 2025 Forecast	Year 2030 Extrapolated
Marine (PANYNJ and private terminals)				
Int'l container, Scenario 1	3.5%	2,798,578 TEUs (2001)	6,398,107	7,600,933
Int'l container, Scenario 2	4.6%	2,798,578 TEUs (2001)	8,236,786	10,314,037
Other freight (approx.)	1.4%	93,107,904 tons (2003)	126,421,680	135,522,478
Rail (ExpressRail and private terminals)				
All container, Scenario 1	5.6%	1,827,734 TEUs (2003)	6,015,930	7,886,628
All container, Scenario 2	3.9%	1,827,734 TEUs (2003)	4,177,251	5,173,524
Non-container	2.4%	12,819,526 tons (2003)	21,826,764	24,632,927
Highway (a.m. peak over Portway Extension model network)				
All container, Scenario 1	3.0%	34,785 VMT (2000)	72,669	84,206
All container, Scenario 2	3.2%	34,785 VMT (2000)	76,344	89,341
Other trucks (average)	2.1%	328,864 VMT (2000)	551,409	611,456
Non-truck (average)	1.3%	10,545,579 VMT (2000)	14,678,449	15,682,023
Air				
All freight, including air-truck	2.5%	964,117 tons (2003)	1,659,796	1,877,907
Warehouse				
Warehouse space	2.8%	671,218,968 s.f. (2004)	1,198,725,181	1,376,211,561

Sources: Comprehensive Port Improvement Plan, USACE Harbor Navigation Study, NJDOT Portway Extensions, U.S. DOT Freight Analysis Framework, NYMTC Regional Freight Plan, and Cambridge Systematics/Edwards and Kelcey/A. Strauss-Weider/Moffatt and Nichol.

■ 2.2 Highway Performance, Issues, and Needs

2.2.1 Highway System Performance

Trucks are the ‘glue’ that holds the entire freight transportation system together. They move goods to and from shippers and receivers; warehouse/distribution facilities,

airports; seaports, and rail terminals. Unless a shipper or receiver is located directly on an airport, seaport, or rail line, he/she is absolutely dependent on trucking for the shipment and receipt of goods. Safe, efficient trucking services are therefore imperative – not only to provide door-to-door freight transportation, but also to ensure the effective operation of other freight modes and facilities.

Truck Volumes

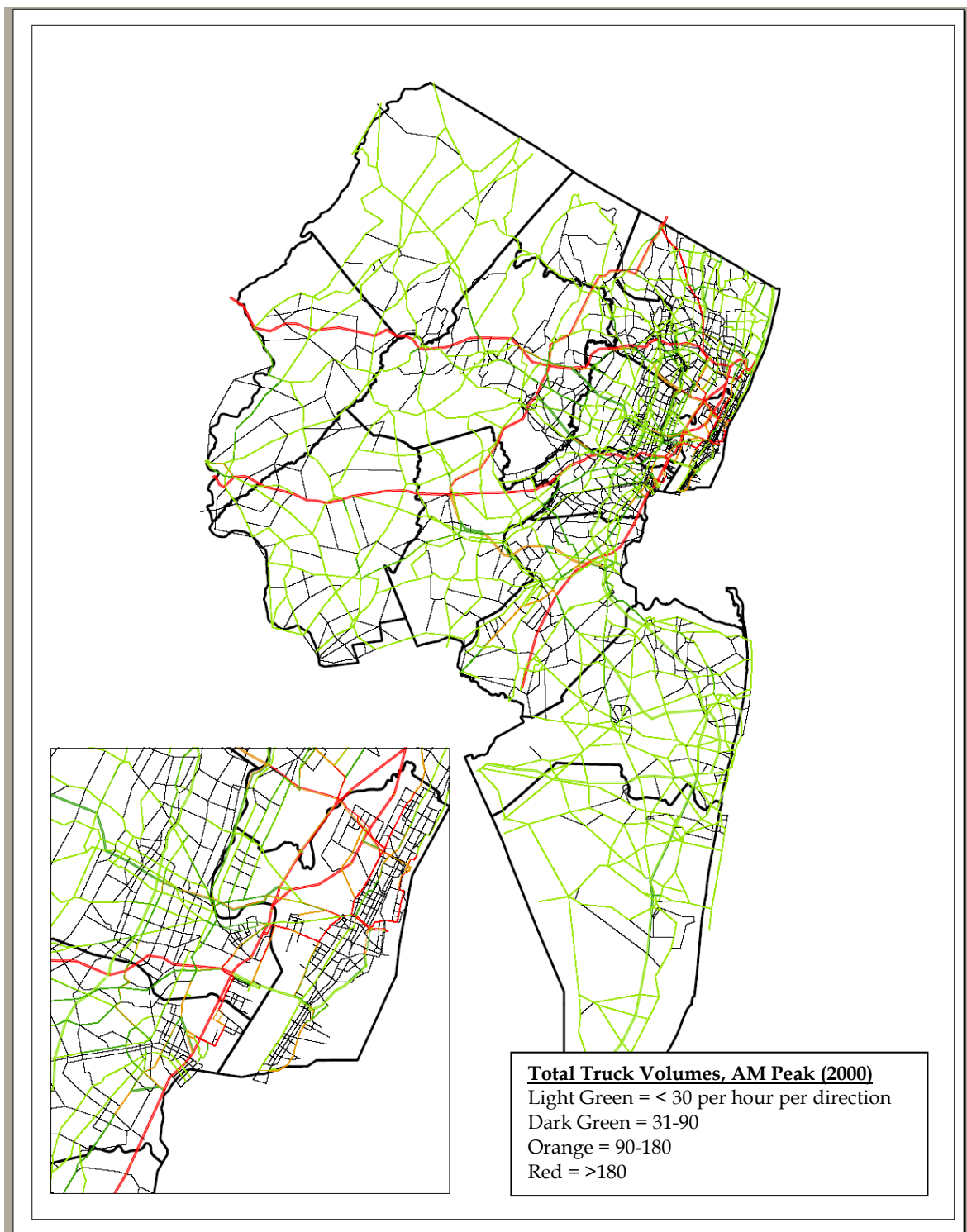
The NJTPA region’s highway system consists of different elements, all of which are important:

- Major arterials (primarily interstate highways) accommodating longer-distance travel;
- Regional arterials (primarily state and county highways) accommodating shorter-distance travel, and linking local access roads with major arterials); and
- Last mile connectors (primarily county and local roads), which provide access to the front door of a shipper, receiver, or freight handling facility.

As shown on Figure 6 on the following page, our highway network model reported that the highest volume truck segments (> 180 per hour per direction) in the NJTPA region are found on:

- The New Jersey Turnpike below the George Washington Bridge (Bergen, Hudson, Essex, Union, and Middlesex);
- I-78 west of the New Jersey Turnpike (Essex, Union, Somerset, Hunterdon, and Warren);
- I-80 west of the George Washington Bridge (Bergen, Passaic, Morris, and Warren);
- I-287 from I-80 to the New York state line (Somerset, Morris, Passaic, and Bergen);
- NJ 3/NJ 495 (Hudson and Bergen);
- NJ 17 (Bergen); and
- NJ 440 (Hudson).

**Figure 6. Modeled AM Peak Truck Volumes,
2000**



Source: NJDOT Portway Extensions Model, Edwards and Kelcey/Cambridge Systematics.

Other significant truck volume segments (91 to 180 per hour per direction) include segments of:

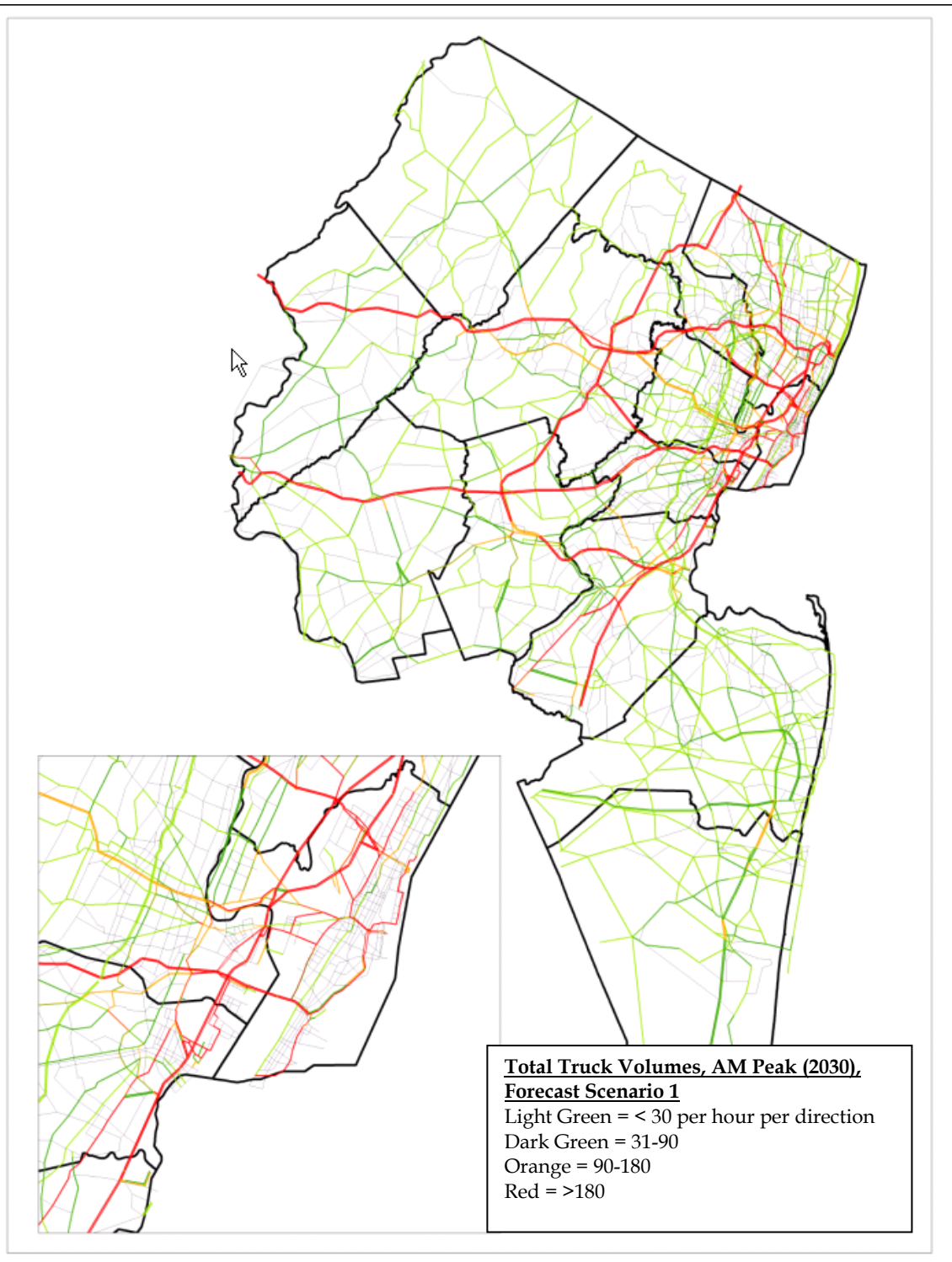
- I-280 (Hudson and Essex);
- U.S. 1+9 (Middlesex, Union, Essex, Hudson, and Bergen);
- U.S. 46 (Bergen, Passaic, and Morris);
- U.S. 202 (Passaic);
- NJ 3 (Bergen and Passaic);
- NJ 4 (Bergen);
- NJ 7 (Hudson);
- NJ 24 (Union);
- NJ 63 (Hudson);
- NJ 82 (Union); and
- Doremus Avenue (Essex).

Interestingly, referring back to Table 2, the model suggests that overall truck VMT will grow substantially faster than non-truck VMT, which is very consistent with national forecasts. This is largely a function of changing freight logistics and utilization patterns at the national level – per capita, we are moving more goods through more facilities and over longer distances. Overall, truck VMT in the NJTPA region is forecast to nearly double by 2030, while background (non-truck) VMT is forecast to increase by 1.5 times.

Obviously, this growth has the potential for significant impacts. To identify critical locations, we assigned the year 2030 projected traffic onto the year Portway Extensions highway network without improvements, and without allowing traffic (freight or non-freight) to shift out of the peak periods or change modes. The year 2030 highway network included several highway improvements in the vicinity of Port Newark/Elizabeth (the NJDOT “Portway Phase I” program), but no other regional projects.

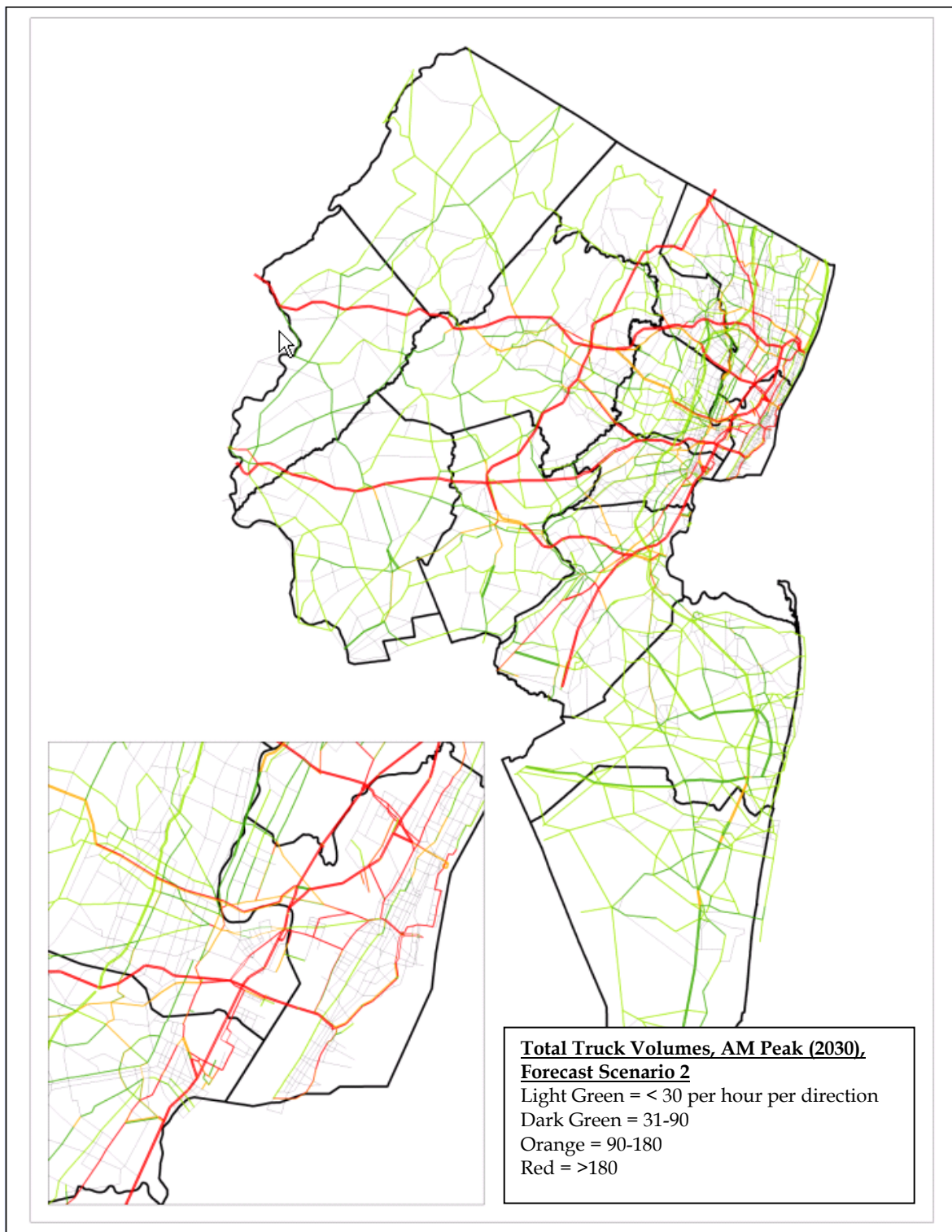
As shown on Figures 7 and 8 on the following pages, under both forecast scenarios there will be continued intensification of truck activity on existing high-volume truck segments (>180 per hour per direction), while most of the moderate-volume truck segments in year 2000 will move into the high-volume category. Major corridors affected include all of the New Jersey Turnpike, I-78, I-80, NJ 17, and NJ 24; most of I-287, U.S. 1 and 9, NJ 3/495, NJ 4, and NJ 440; and most of the waterfront industrial access roads in Hudson, Essex, and Union Counties. Other major segments of concern include I-280, U.S. 22, U.S. 46, U.S. 202, NJ 7, NJ 10, NJ 18, NJ 21, NJ 31, NJ 63, NJ 82, CR 503 and CR 505 through Bergen County, and some truck-carrying portions of the GS Parkway in Ocean County.

**Figure 7. Modeled AM Peak Truck Volumes, Scenario 1
2030**



Source: NJDOT Portway Extensions Model, Edwards and Kelcey/Cambridge Systematics.

**Figure 8. Modeled AM Peak Truck Volumes, Scenario 2
2030**



Source: NJDOT Portway Extensions Model, Edwards and Kelcey/Cambridge Systematics.

Truck Percentages

Besides volume, another important measure of truck movement is the percentage of trucks (compared to total traffic) over a network segment. This highlights segments that are particularly important for freight movement. Figure 9 on the following page illustrates container truck percentages, while Figure 10 illustrates non-container truck percentages (including tractor-trailers, single-unit trucks, and other truck types).

As can be seen from Figure 7, container trucks do not impact most of the regional highway network, although there are a few corridors in the region where the container truck percentage in the a.m. peak exceeds five percent. Container truck impacts tend to be concentrated and significant within these identified areas; and given the importance of container movement to the region's seaports and overall economy, container truck performance must be a high priority. The highest percentage segments for container trucks include:

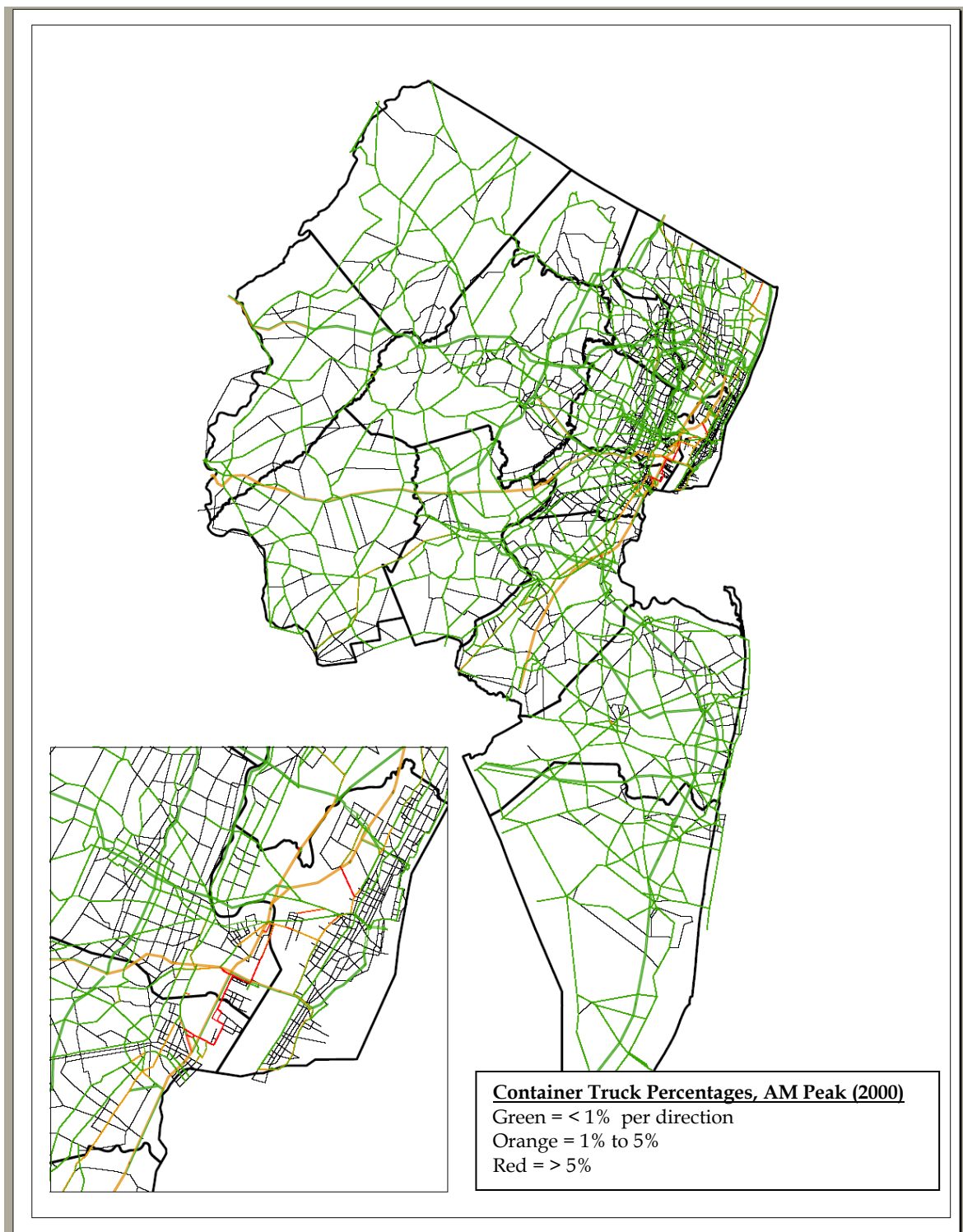
- Most of the New Jersey Turnpike, I-78, and NJ 17.
- Most of the local roads in the vicinity of Port Newark/Elizabeth.
- Various sections of I-80 (Warren); U.S. 1+9 (Hudson, Bergen, Essex, Union, and Middlesex); U.S. 202 (Somerset and Hunterdon); and NJ 24 (Morris).

In contrast, Figure 8 shows that many more segments experience non-container percentages of five percent or higher in the a.m. peak. Generally, these segments include not only the high-volume truck segments, but also a substantial number of local and regional roads. Every county in the NJTPA region experiences high truck percentages on some of its roads. This is not surprising – every county produces and consumes goods, and generates the demand for truck movement as a result. The fact is that for the most part, these local-serving trucks are not container trucks, but rather a mix of other truck types.

There is a relationship between container and non-container trucks, in that many container trips begin or end at warehouses, where the contents are transferred to and from other trucks (often smaller trucks). This “multiplier” effect has not been quantified, but even if it is large, it would still account for a small percentage of total truck trips – for the a.m. peak, the model shows 2,600 container truck trips; 4,200 large (6+ axle) truck trips; and 102,300 other (smaller) truck trips.

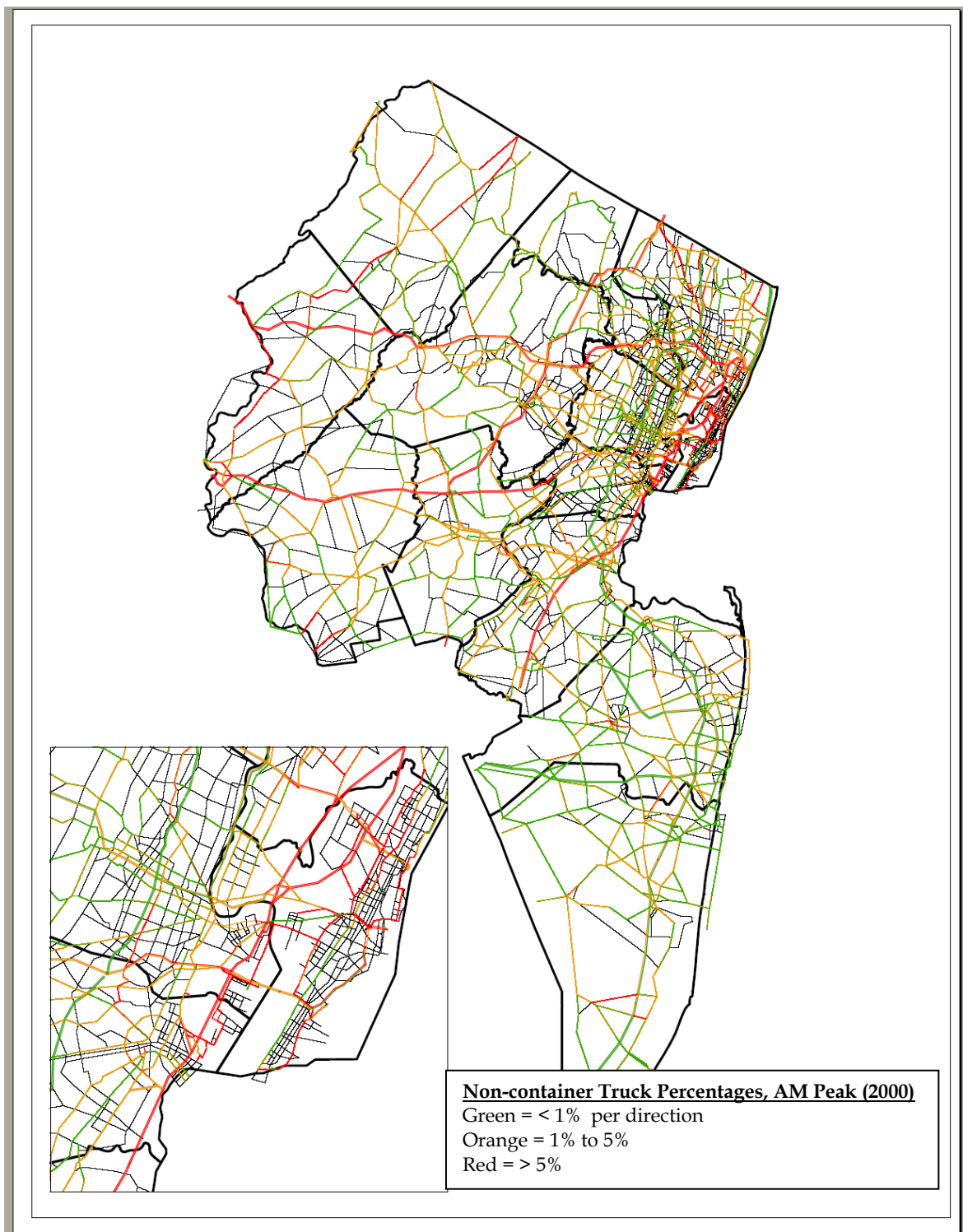
There is also a strong relationship between container trucks and international imports and exports. International container moves through PANYNJ and other U.S. seaports are forecast to grow strongly through the year 2030, and container truck VMT will reflect this by growing at an estimated 3.0 to 3.2 percent per year, compared to 2.1 percent per year for all other truck types. Overall, container truck VMT will lag growth in international waterborne containers, because of the mitigating impact of PIDN improvements.

**Figure 9. Modeled AM Peak Container Truck Percentages
2000**



Source: NJDOT Portway Extensions Model, Edwards and Kelcey/Cambridge Systematics.

**Figure 10. Modeled AM Peak Non-Container Truck Percentages
2000**



Source: NJDOT Portway Extensions Model, Edwards and Kelcey/Cambridge Systematics.

These model results refer only to the a.m. peak. In most parts of the country, for major interstate highways, truck volumes tend to be relatively constant throughout the day and evening. As a result, trucks can be a *much* higher percentage of traffic in the evening/overnight hours.

System Level of Service

Figure 11 on the following page illustrates the a.m. peak level of service (the volume/capacity ratio from all vehicle types) on the NJTPA region's highway network. It seems to confirm common-sense experience: many highway segments in the NJTPA region are operating at poor to unacceptable levels of service (>0.95) today, and many other segments are operating at fair to marginal levels (0.75 to 0.95). Moreover, while conditions are the "most red" in the inner core counties, no county is immune.

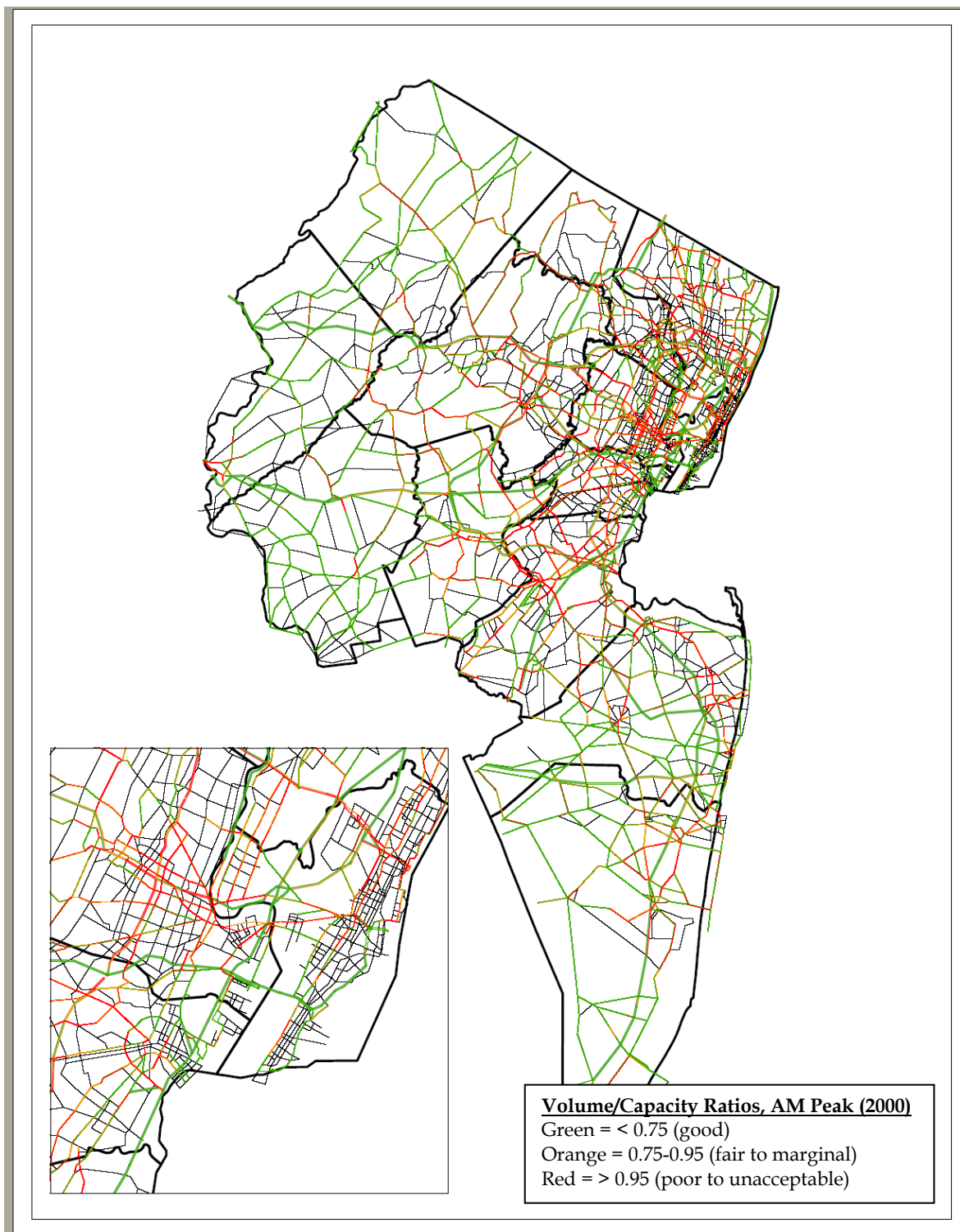
While Figures 6 through 7 previously showed the highest truck volumes on major interstate highways, on regional connectors, and in the vicinity of Port Newark/Elizabeth, Figure 11 shows that:

- Some of these high-volume truck segments are not actually performing at poor to unacceptable levels of service, at least not yet.
- Many of the segments showing unacceptable levels of service are not high-volume truck segments. Their performance is primarily due to the high levels of peak period auto traffic they have to carry.

Figures 12 and 13 show forecasted year 2030 levels of service for the regional network during the a.m. peak. The model indicates an obvious and significant increase in the number of segments, mileage of segments, and amount of VMT accruing on segments with an unacceptable level of service (volume-capacity ratio of 0.95 or worse). At a systemwide level, most of the deterioration in performance is due to increases in background VMT, which are substantially higher than increases in truck VMT. However, truck VMT is growing at a faster rate than background VMT, so it will make an increasingly large contribution to congestion; in addition, truck VMT tends to be concentrated on key corridors, where it has a disproportionately large impact compared to systemwide average VMT.

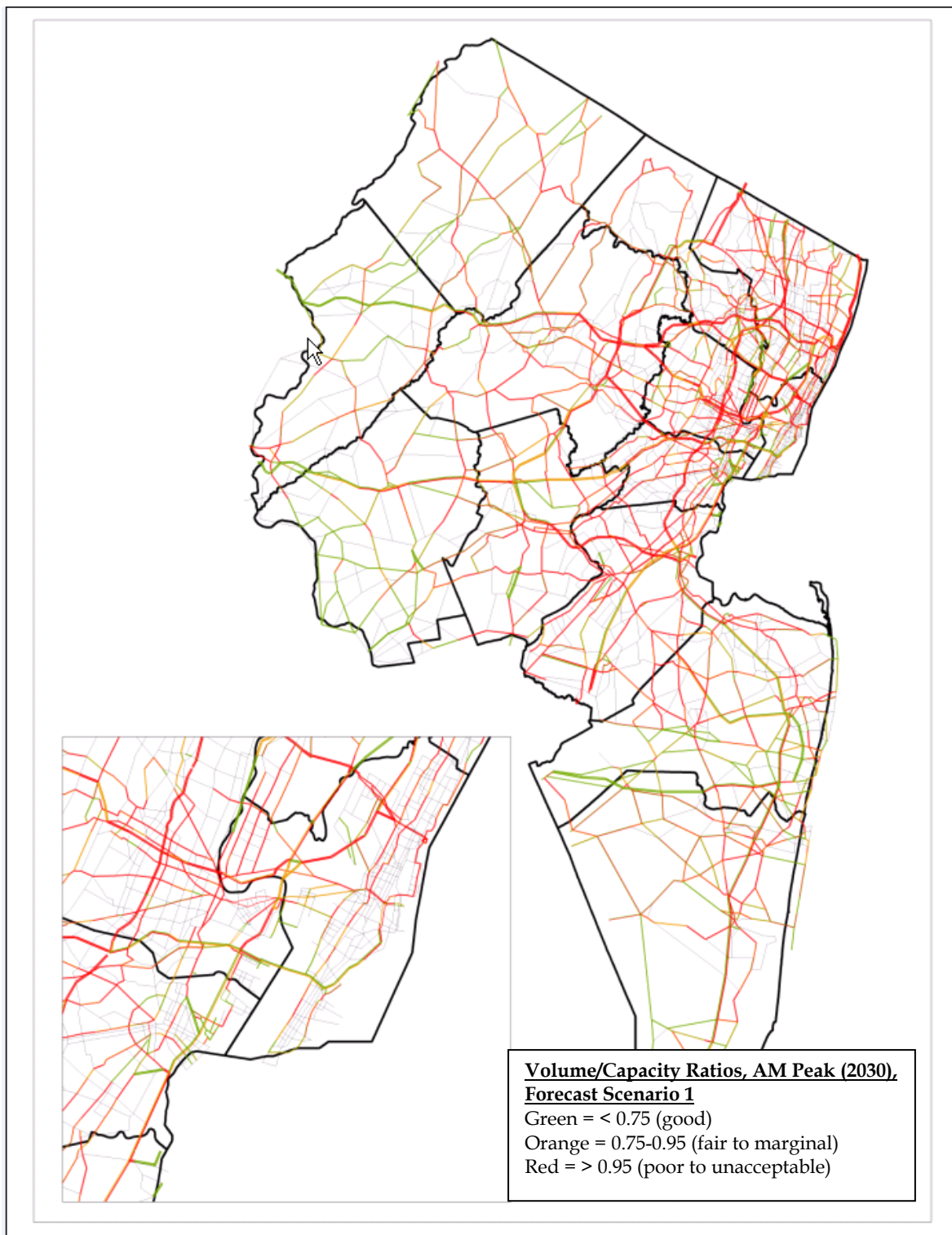
These results are based on forcing the model to accommodate a fixed projected level of peak-period demand. In practice, this worst case scenario is unlikely to occur – or can, at least, be made less likely to occur – through strategies discussed later in this section.

Figure 11. Modeled AM Peak Level of Service
2000



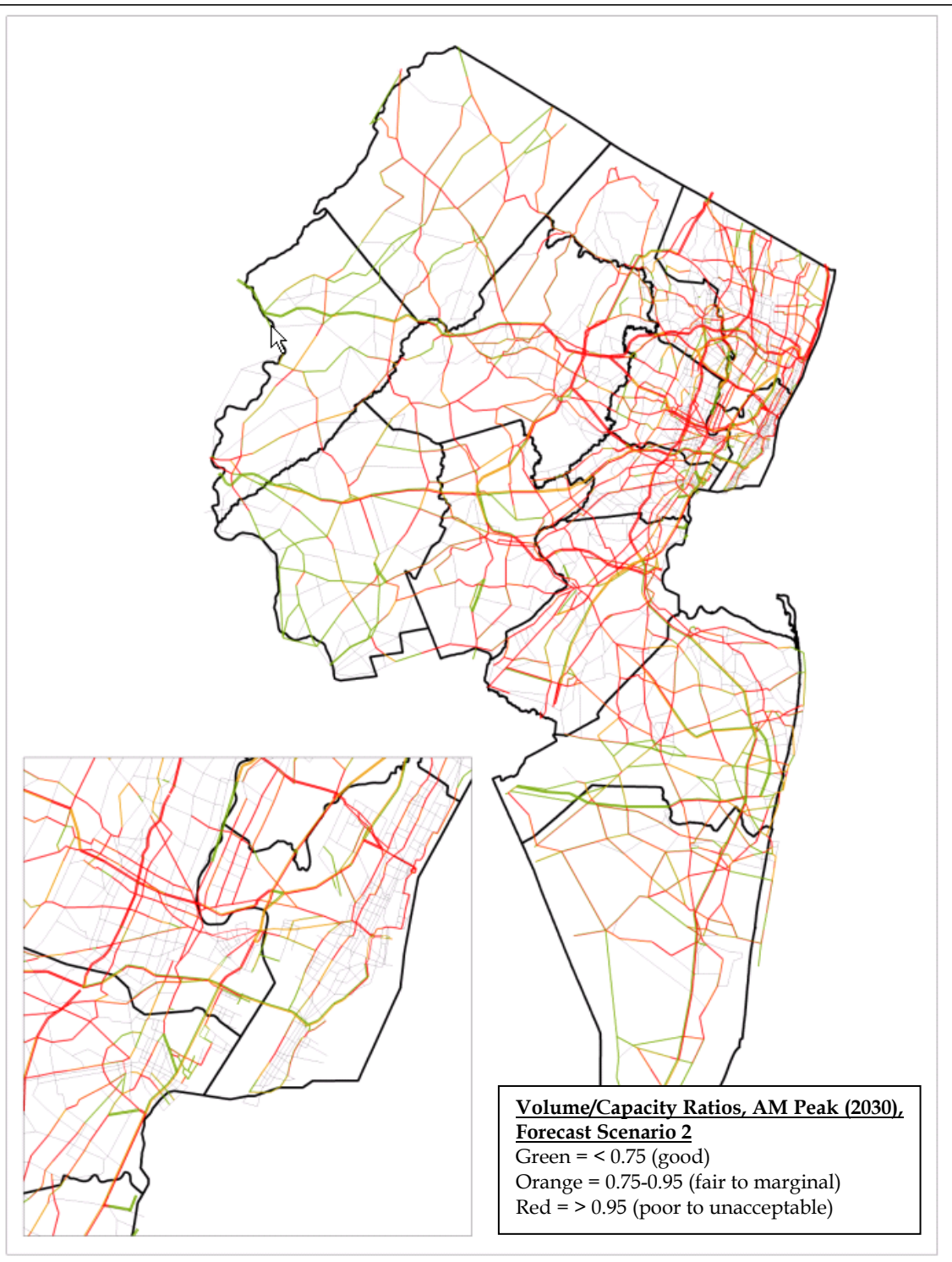
Source: NJDOT Portway Extensions Model, Edwards and Kelcey/Cambridge Systematics.

**Figure 12. Modeled AM Peak Level of Service, Scenario 1
2030**



Source: NJDOT Portway Extensions Model, Edwards and Kelcey/Cambridge Systematics.

**Figure 13. Modeled AM Peak Level of Service, Scenario 2
2030**



Source: NJDOT Portway Extensions Model, Edwards and Kelcey/Cambridge Systematics.

Truck Accidents

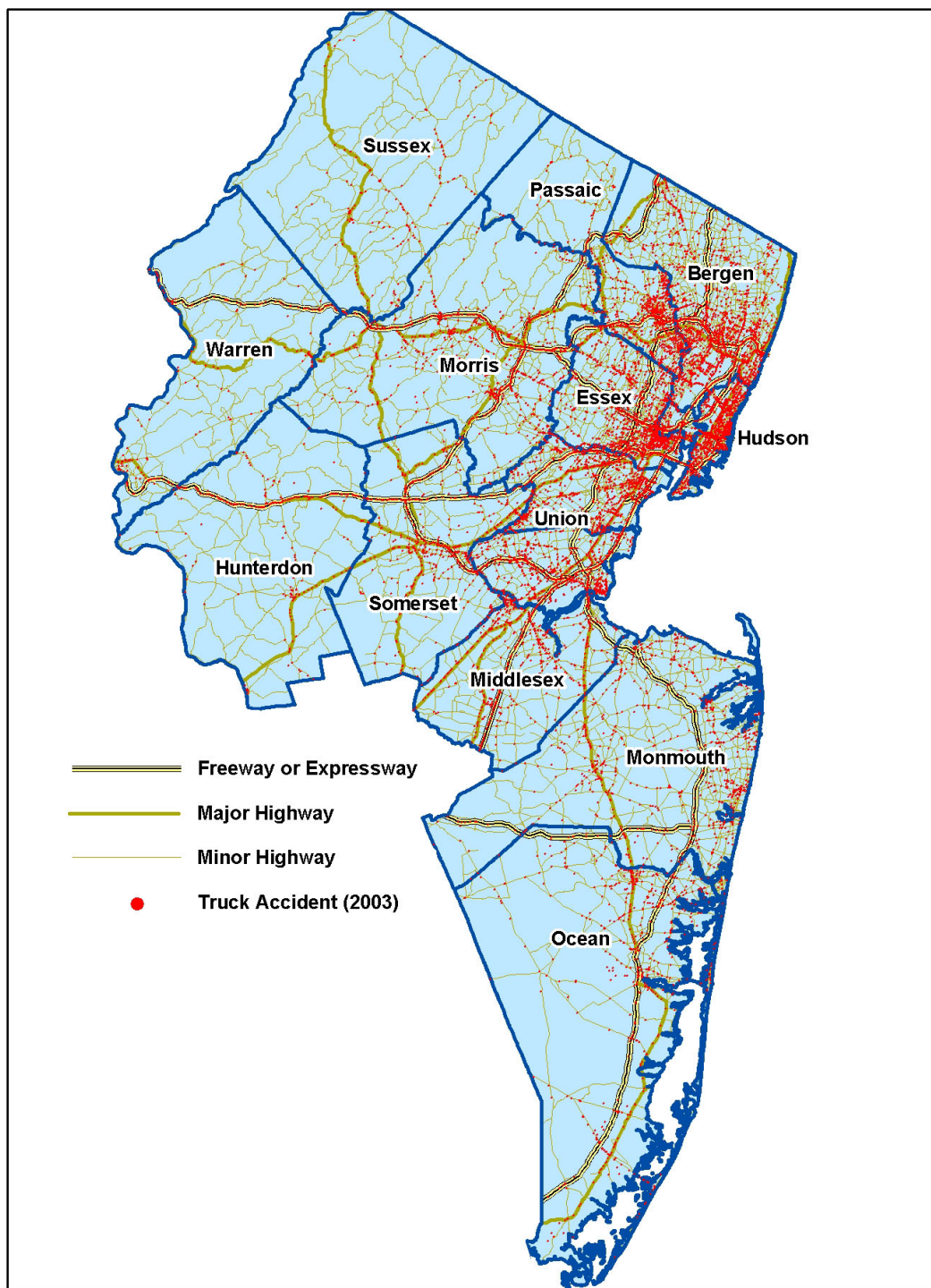
Accident locations (all types) involving trucks are mapped on Figure 14. Accident locations are highly clustered in the industrial areas of Hudson, Bergen, Essex, and Union Counties; and along major regional access roads (NJ Turnpike, I-78, I-80, and I-287). They also appear on local roads in each of the NJTPA region's counties – you can almost trace out a county's road system just from the accident data. It is interesting to compare Figure 6 (which shows a limited number of high-volume truck corridors traversing Hudson, Bergen, Essex, and Union) with Figure 14 (which shows accident locations over a very broad geographic area), suggesting that many of these accidents are on lower-volume local streets. This highlights the need to look beyond pure volume data and volume/capacity ratios when evaluating truck issues.

2.2.2 Highway System Issues

System Capacity, Performance, Safety, and Reliability

- **Overall decline in system performance.** As discussed in the previous section, the NJTPA highway system is forecast to undergo significant declines in level of service, with much of the system “going to red.” This affects “mainline” routes (interstate and state highways), as well as county and local roads throughout the NJTPA region. While the majority of highway miles and highway system impacts are associated with and due to private automobile travel, trucking also makes a substantial contribution to these impacts, and its relative contribution is forecast to increase every year.
- **Interchanges and last-mile connectors.** Capacity, condition, and geometric design of truck roads, especially interchanges and last-mile connectors, are critical issues. Trucks are operating over a variety of roads – some well-designed for this purpose, others less well-designed. The condition of last mile connectors in particular has been documented as a nationwide problem. Within the NJTPA region, modeling identifies a number of last-mile problem areas within the industrial core, as well as a number of problematic interstate highway interchanges in outlying areas. Much of NJDOT's Portway Extensions program is devoted to improving interchanges and last-mile connectors to facilitate truck movement and industrial access.
- **Local-serving trucks.** There is no way to eliminate trucks in areas that produce or consume goods. If you did, there would not be any production or consumption. Even in non-industrial areas, trucks must be accommodated. The challenge is to do it in a way that minimizes conflicts with non-industrial land uses, and with automobile and pedestrian traffic within communities.

Figure 14. Truck Accident Locations
2003



Source: NJDOT.

- **Through truck traffic.** On major arterials and crossings within the NJTPA region, a substantial share of highway capacity is consumed by through traffic. The nature of the highway system is that it is an open system, and does not limit its use to the host community – but mechanisms to manage and mitigate through traffic need to be explored. Much of the impact of through traffic is felt in outlying, non-industrial areas.
- **Container and non-container trucks.** As previously noted, non-container trucks have far more systemwide impact, but container trucks can impact key corridors.
- **Bridges and tunnels.** Hudson River bridge and tunnel constraints (capacity, geometric design, etc.) have long been recognized as an important issue. This affects a substantial amount of truck traffic originating in the NJTPA region (bound for downstate NY and New England), as well as a significant amount of through truck traffic to and from these regions. Elsewhere, aging bridge and tunnel structures require periodic improvement and/or replacement.
- **Urban congestion and passenger mobility.** Congestion from both trucks and automobiles is highest in the dense employment centers, where the region’s freight activity is most concentrated – and where opportunities to improve the highway infrastructure tend to be most constrained. Even if freight traffic remained flat over the next 25 years (which it will not), growing auto traffic would reduce the amount of highway capacity available for freight movement. Conversely, to the extent that truck impacts in peak travel periods can be reduced, more capacity will be available for passenger traffic. Truck and auto solutions can and must work in tandem.

Land Use and Economic Development

- **Sprawl and increased VMT.** Some of the increases in passenger and truck VMT will be due to a greater number of overall trips, due to more people and more goods being moved. But some of the increases in VMT will be due to increasing trip lengths. As outlying lands are developed with residential uses, new longer-distance trips are added to the system. Over the past decade, we have seen a comparable type of “freight sprawl,” where more trips are being generated by warehouse/DCs and inter-modal facilities on the periphery of (or outside) the region, resulting in more VMT than if these facilities were located in the region’s core.
- **Sprawl and lost economic opportunity.** While some warehouse/distribution activity is infilling available close-in sites, most of the newer larger facilities – particularly private contract warehouse/distribution facilities – are electing to locate outside of the region’s core, along well-defined major interstate corridors in New Jersey and eastern Pennsylvania. The NJTPA region gets the traffic, while these other regions get the jobs associated with warehouse/distribution activity.

Industry Competitiveness and Performance

- **Intermodal access and connectivity.** As goes trucking, so go the region's seaports, rail terminals, air cargo facilities, and warehouse/DCs. Trucks are the lifeblood of the freight system; without efficient, reliable, safe, and cost-effective trucking to serve these facilities, their viability is seriously compromised. Access roads in the vicinity of Port Newark/Elizabeth are especially critical, and have been the subject of extensive recent planning by the PANYNJ and NJDOT.
- **Business and economic impacts of trucking availability, performance, and cost.** Beyond intermodal access and connectivity, trucking is vital to maintaining the overall economic health and vitality of the region – if trucking costs rise and/or performance suffers due to transportation system bottlenecks and inefficiencies, the region's producers, wholesalers, retailers – and ultimately its consumers – pay the price.
- **Enforcement and regulation.** Truck size and weight, hazardous materials handling, routing, pick-up/delivery hours, and hours of service are all subject to regulation. Properly used, they are tools for facilitating truck movement where and when the infrastructure is best suited to accommodate them, consistent with the needs of the businesses they serve.
- **Truck driver shortages.** The nation is nearing crisis conditions with regard to truck driver shortages. The new hours of service rules, while now in litigation, have reduced the effective amount of time that drivers can work. Further, fewer individuals are choosing to be truck drivers at a time when the demand for such services is rapidly increasing. This is in part due to wage pressures and perceived working conditions. Additional security-related requirements now being implemented – credentialing of hazardous materials (hazmat) drivers and pre-clearance programs for port access.

Environmental, Community, and Security Issues

- **Environmental and community concerns over growing truck traffic.** More than ever, transportation improvements are subject to careful scrutiny for their community impacts. Freight operations and improvements must successfully address issues of congestion, emissions, noise, vibration, and equity.
- **Accidents, hazardous materials handling, overweight shipments, and cargo security.** These are paramount concerns, given the fact that the NJTPA region's trucking activity takes place within a densely-populated area, and that a substantial share of cargo handled by its trucks has an international origin.

Implementation and Delivery

- **Project prioritization and availability of funding.** Freight-oriented projects must be programmed and delivered within the context of overall system needs. Programming

needs to emphasize the systemwide benefits of freight projects, to avoid the perception that freight improvements are somehow “at the expense” of auto improvements.

2.2.3 Highway System Needs

1. *Optimize highway system capacity, performance, safety, and reliability through a combination of physical, operational, economic, and institutional solutions that address NJTPA-serving trucks, through trucks, and background non-freight traffic.*
2. *Identify and implement “smart growth” land use and economic development strategies that minimize VMT impacts associated with goods movement, reduce the need for highway system investments, and maximize economic opportunity and benefit for the NJTPA region as a whole.*
3. *Promote the competitiveness and performance of NJTPA’s trucking and truck-served businesses through infrastructure improvements, effective regulation, and other strategies as appropriate.*
4. *Ensure that environmental/community issues (congestion, emissions, noise, vibration, equity, etc.) and security issues are fully addressed in current and future highway planning and operations.*
5. *Develop transportation programming and funding processes that take full account of freight project opportunities and benefits, and allow for their evaluation within a larger multimodal investment strategy.*

■ 2.3 Rail System Performance, Issues, and Needs

2.3.1 Rail System Performance

While rail is not as flexible a mode as truck, rail can offer an attractive per-unit cost for longer-distance and/or lower-value freight moves. Within the NJTPA region, the freight railroads are critically important for a number of reasons: they provide needed services to the region’s shippers and receivers; they provide critical connections to the region’s marine terminals; and they provide an alternative to trucking, reducing pressure on the region’s highways. The NJTPA region’s rail system consists of:

- Mainlines, accommodating higher-volume, higher-speed traffic;
- Branches, secondary tracks, running tracks and industrial tracks, accommodating lower-volume, lower-speed traffic and last mile connections to industrial customers;
- Intermodal terminals that exchange rail containers with trucks and marine terminals;

- “Transload” or “transflow” yards for the exchange of non-containerized commodities between rail and trucks, or between rail and marine terminals; and
- Classification yards for breaking longer trains into shorter trains, and vice-versa.

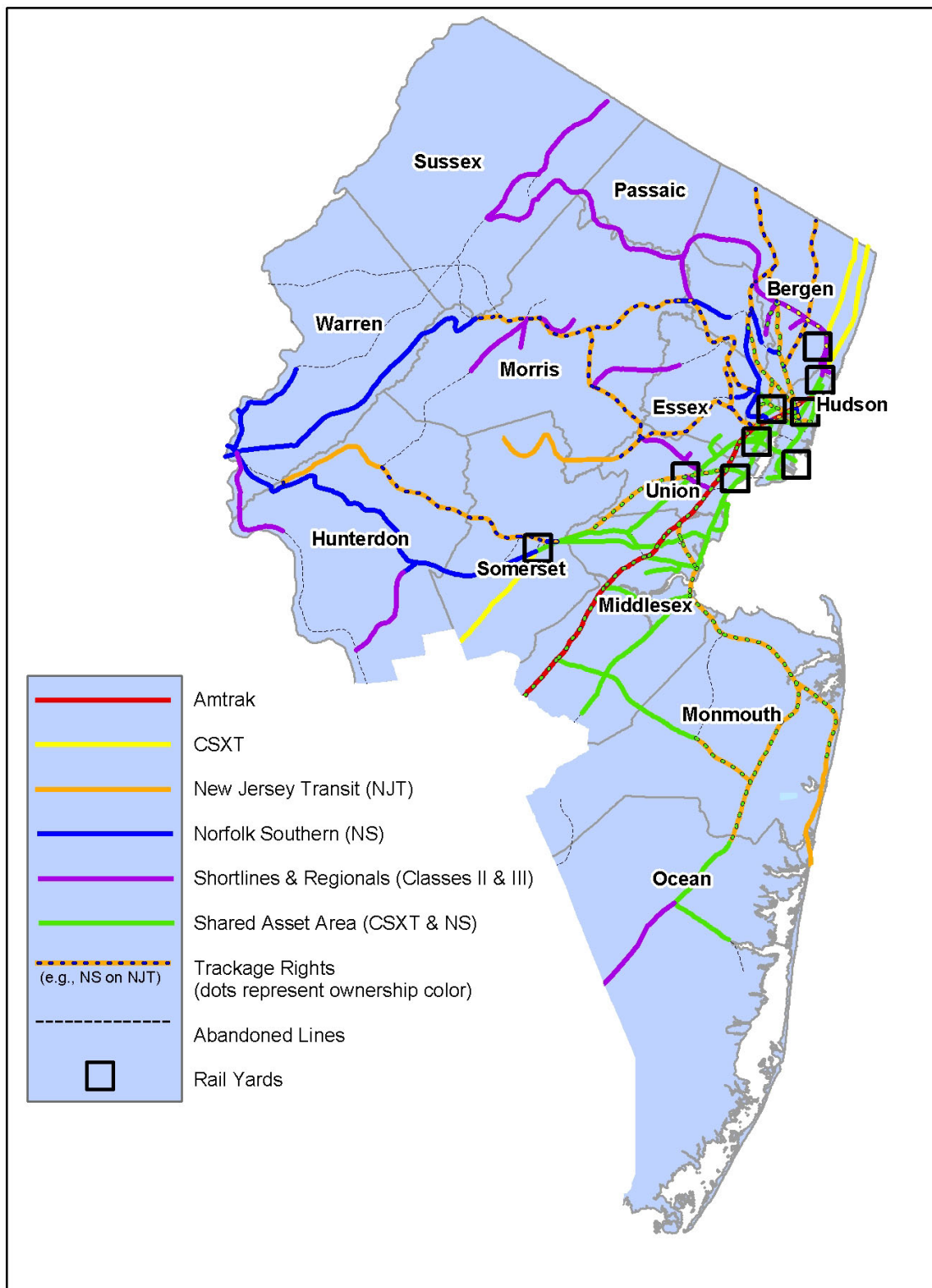
The NJTPA region’s rail system (see Figure 15 on the following page) is operated by:

- Two national Class I railroads – Norfolk Southern (NS) and CSX – which operate major systems in the region. A third Class I – the Canadian Pacific (CP) – also offers limited service, but does not own track.
- Conrail, a subsidiary of NS and CSX, which serves as a terminal railroad for NS and CSX within the North Jersey Shared Assets Area (NJSSA). The NJSSA was formed as a result of the 1999 acquisition by and division of Conrail routes between NS and CSX. It includes main lines of NS and CSX that link the region with the national rail system, secondary freight and passenger lines (including Amtrak’s Northeast Corridor), and lines owned and operated by shortline railroad companies.
- Eight shortlines, including the Black River and Western RR (BRW&BDRV); East Jersey Railroad (EJR); Morristown and Erie Railway (ME); New York Cross Harbor RR (NYCH); New York and Greenwood Lake Railway (NYGL); New York Susquehanna and Western RR (NYS&W); Port Jersey Railroad (PJRR); and Raritan Central Railway.
- New Jersey Transit, which permits freight railroads to operate over many of its segments, and which operates passenger traffic over the NJSSA Lehigh Line.
- Amtrak, which shares some of its Northeast Corridor with the freight railroads.

Figures 16, 17, and 18 following illustrate the various flows associated with different types of rail traffic. These graphics were developed by Reebie Associates and Cambridge Systematics for American Association of State Highway and Transportation Officials’ (AASHTO) *Freight Rail Bottom-Line Report*, based on model assignments of FRA’s Waybill Sample to the national rail network, and may not reflect actual line-by-line volumes, but support the following observations:

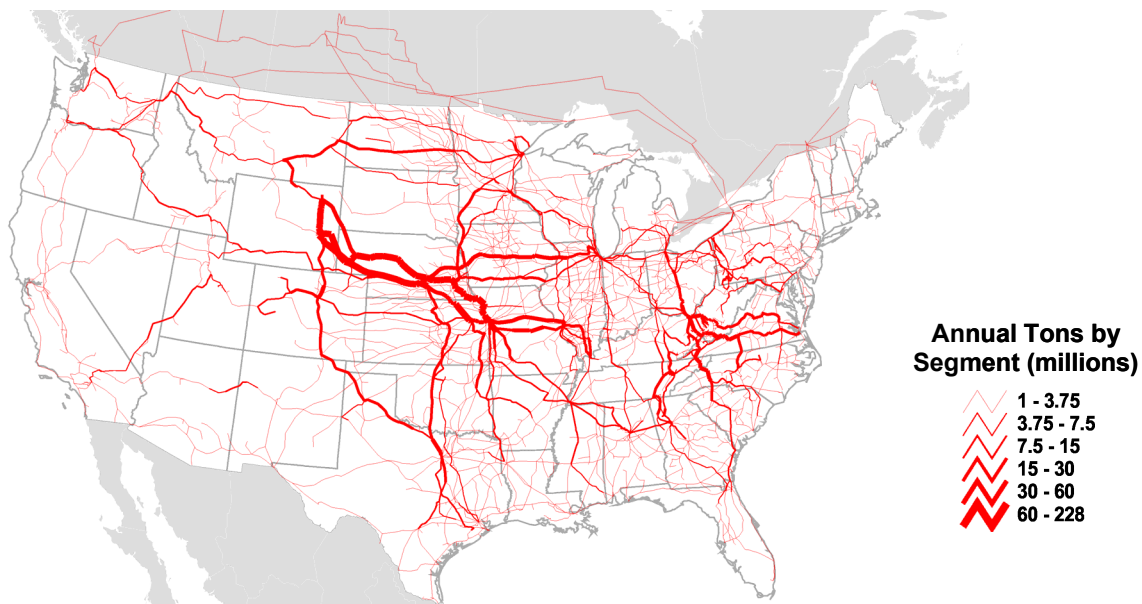
- **Unit train.** Generally speaking, unit trains carry a single type of bulk commodity (coal, grain, etc.) between two points. Unit train traffic is not highly significant for the NJTPA region – the largest unit train flows are associated with Powder River Basin (Wyoming) coal, Appalachian coal, and Midwest grain.
- **Carload or “loose car.”** Carload services feature trains carrying many different types of commodities and railcars (boxcars, flatcars, liquid bulk tank cars, dry bulk hopper cars, etc.) for many different shippers and receivers. Carload traffic represents around one-half of NJTPA rail tonnage. North-south flows (Florida, Atlanta, Gulf) and east-west flows (Chicago and Great Lakes) converge in the area.

Figure 15. The NJTPA Region's Major Rail Lines and Railyards



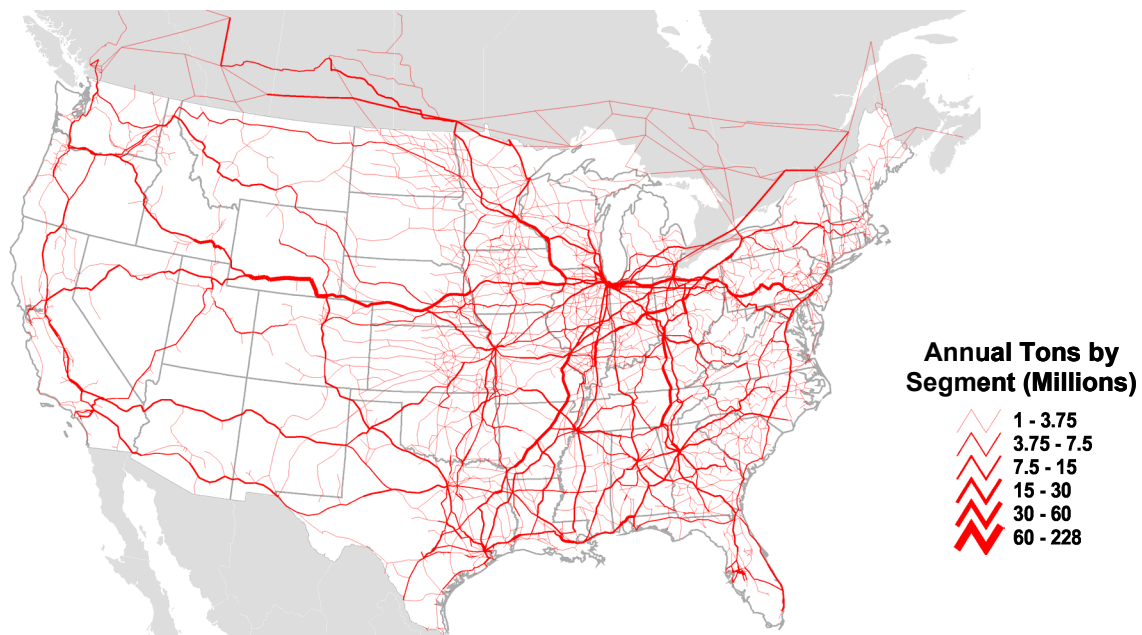
Source: FRA.

Figure 16. Unit Train Commodity Tonnage Flows
2000



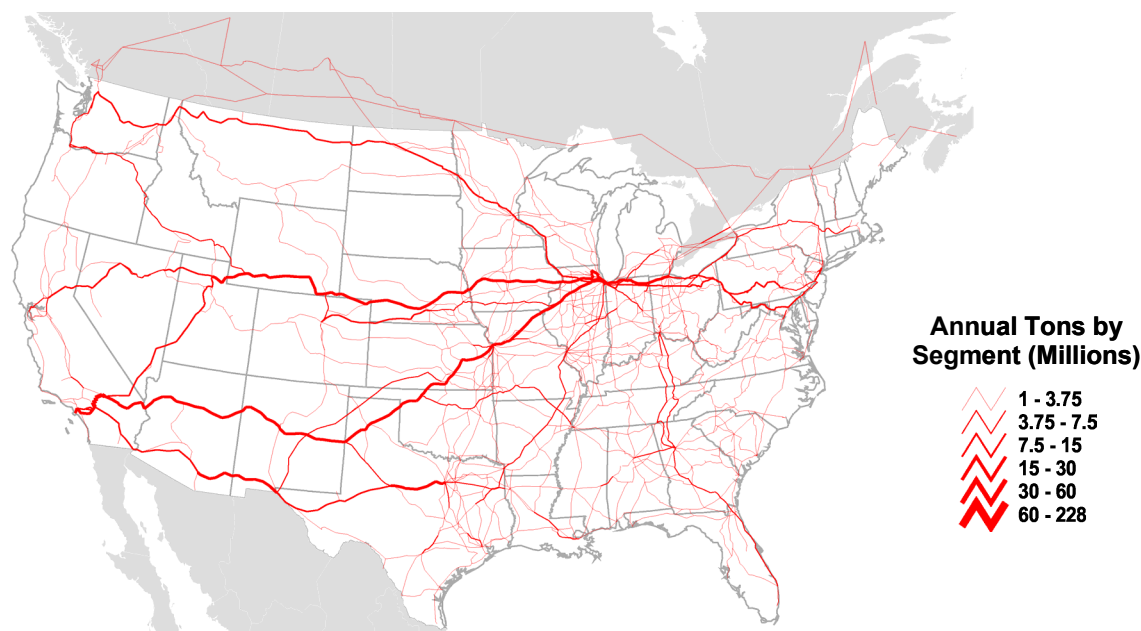
Source: Reebie Associates and Cambridge Systematics, *AASHTO Freight Rail Bottom-Line Report*.

Figure 17. Carload Commodity Tonnage Flows
2000



Source: Reebie Associates and Cambridge Systematics, *AASHTO Freight Rail Bottom Line Report*.

Figure 18. Intermodal/Auto Tonnage Flows
2000



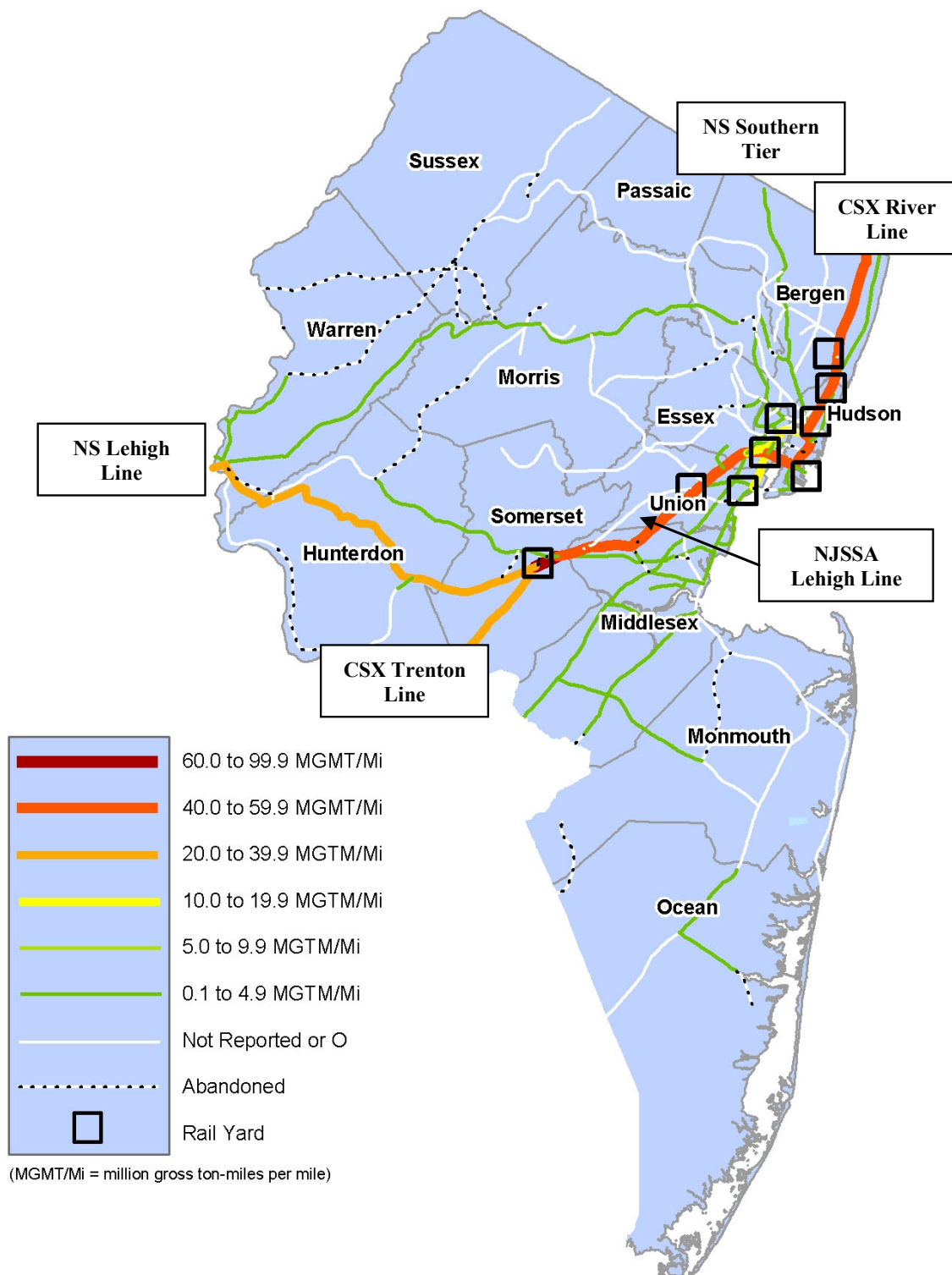
Source: Reebie Associates and Cambridge Systematics, *AASHTO Freight Rail Bottom-Line Report*.

- **Intermodal and auto.** Intermodal from a railroader’s perspective means carrying intermodal shipping containers in specialized double-stack cars (DST) as containers on rail flatcars (COFC), as container-carrying trailers on rail flatcars (TOFC), or as truck units on rail flatcars (piggyback, or “pig”). Automobiles are handled in specialized bi-level or tri-level railcars. Intermodal and auto accounts for around one-half of NJTPA rail tonnage. Northern New Jersey is the eastern terminus of the nation’s most heavily-used intermodal routes, with service via Chicago from Los Angeles/Long Beach, Oakland, Portland, and Seattle/Tacoma.

As shown in Figure 19, according to FRA year 2000 data, the highest-tonnage lines in the region are the CSX River Line and the shared asset portion of the Lehigh Line. The NS portion of the Lehigh Line and the CSX Trenton Line, which join the shared asset portion of the Lehigh Line at Manville, are the next highest tonnage lines.

From Table 3 below, the general finding is that peak day demand slightly exceeds capacity on the *P&H Line* and the *Chemical Coast Line*, and matches capacity on the double-tracked shared asset segment of the *Lehigh Line* (over which NJ Transit operates). These lines can be considered to be operating at their peak, with little capability of absorbing additional traffic unless improvements are made.

Figure 19. Rail Traffic Density by Line
 2000



Source: Federal Railroad Administration.

**Table 3. Estimated Capacity and Demand on Major Rail Lines
2003**

	NS Lehigh Line	CSX Trenton Line	NJSSA Lehigh Line	P&H Line	Northern Running Track	National Docks	Chemical Coast	Port Reading Secondary	CSX River Line*
Average daily freight trains	18	13	32	23	23	16	17	3	22
Average daily total trains	18	13	94	25	25	16	17	3	22
Peak day trains	23	16	100	29	29	20	21	4	28
Existing capacity 2003	30-40	30	41 (single-track portion) 80-100 (double-track portion)	26	42	36	20	15	30

*Includes through trains only.

Source: R.L. Banks Associates, Inc.

Estimates of railyard volumes were not developed as part of this study. This information is not readily available, although some estimates have been published by the PANYNJ, and by the NYMTC *Regional Freight Facilities Inventory*, the *Comprehensive Port Improvement Plan* technical documents, and the *Portway Extensions and CMS Study*. The PANYNJ's ExpressRail facility has recently been expanded to accommodate increasing levels of international container traffic; capacity constraints are anticipated at other terminals, but we do not have good estimates of when demand might begin to exceed capacity.

Table 4 on the following page suggests that train volume growth will place severe demands on rail line capacity, both within and beyond the borders of the shared assets area. Infrastructure improvements will be necessary to provide additional capacity if the indicated volumes are to be accommodated. This is true for both Forecast Scenarios 1 and 2, although capacity shortfalls are somewhat greater under Forecast Scenario 1, which assumes a higher number of intermodal landbridge trains.

**Table 4. Estimated Through-Train Capacity and Demand
2025**

	NS Lehigh Line*	CSX Trenton Line*	NJSSA Lehigh Line	P&H Line	Northern Running Track	National Docks	Chemical Coast	Port Reading Secondary	CSX River Line*
2003 Traffic/2003 Capacity									
Average daily freight trains	18	13	32	23	23	16	17	3	22
Average daily total trains	18	13	94	25	25	16	17	3	22
Peak-day trains	23	16	100	29	29	20	21	4	28
Existing capacity 2003	30-40	30	41 (single track portion) 80-100 (double track)	26	42	36	20	15	30
2025 Traffic/2003 Capacity									
2025 Forecast Scenario 1									
Average daily freight trains	36	23	60	42	41	24	29	4	40
Average daily total trains	36	23	120	42	41	24	29	4	40
Peak-day trains	45	29	135	53	51	30	36	5	50
2025 Forecast Scenario 2									
Average daily freight trains	30	20	52	36	35	23	26	4	34
Average daily total trains	30	20	112	36	35	23	26	4	34
Peak day trains	38	25	125	45	44	29	33	5	43
Existing Capacity 2003	30-40	30	41 (single track portion) 80-100 (double track)	26	42	36	20	15	30

**Table 4. Estimated Through-Train Capacity and Demand
2025 (continued)**

	NS Lehigh Line*	CSX Trenton Line*	NJSSA Lehigh Line	P&H Line	Northern Running Track	National Docks	Chemical Coast	Port Reading Secondary	CSX River Line*
2025 Traffic/2025 Capacity									
2025 Forecast									
Scenario 1									
Average daily freight trains	36	23	60	42	41	24	29	4	40
Average daily total trains	36	23	120	42	41	24	29	4	40
Peak-day trains	45	29	135	53	51	30	36	5	50
2025 Forecast									
Scenario 2									
Average daily freight trains	30	20	52	36	35	23	26	4	34
Average daily total trains	30	20	112	36	35	23	26	4	34
Peak-day trains	38	25	125	45	44	29	33	5	43
Future Capacity 2025 with planned improvements	30-40	30	80-100 (double track portion)	60-80	60-80	36	60-80	30	30

Source: R.L. Banks Associates, Inc.

2.3.2 Rail System Issues

System Capacity, Performance, Safety, and Reliability

- **Rail capacity and performance shortfalls in the NJTPA region.** As discussed previously, within the NJTPA region, several rail lines are already at capacity, and future growth forecasts suggest that significant improvements will be required to accommodate additional traffic.
 - Without capacity improvements, capacity shortfalls are anticipated on the NS Lehigh Line, the Shared Asset Lehigh Line, P&H Line, Northern Running Track, Chemical Coast, and CSX River Line.
 - With capacity improvements currently planned by NJDOT and the railroads (reflected in the “Future Capacity 2025” line in Table 4), and after presumed operational changes to take advantage of these projects, capacity constraints would be alleviated on the P&H Line, Northern Running Track, and Chemical Coast, but would still be present on the NS Lehigh Line, the Shared Asset Lehigh Line, and

the CSX River Line. Further improvements would be needed if anticipated levels of growth are to be accommodated.

- Forecast Scenario 1, which relies more heavily on intermodal rail for international container imports to the NJTPA region, would generate seven additional trains per day on the NS Lehigh Line, seven additional trains per day on the CSX River Line, and 10 additional trains on the Shared Asset Lehigh Line compared to Forecast Scenario 2. These segments will be above capacity under either scenario, and improvements are indicated in either case, but the need for and timing of those improvements would be accelerated under Forecast Scenario 1.
- **Rail capacity and performance issues at the national level.** Rail service and capacity developments on a broader, national context have significant implications on north Jersey transportation. If rail traffic cannot get to and from the region because of constraints in the national system, then that traffic has to get to and from the NJTPA region some other way.
 - Large (Class I) railroads are enjoying solid traffic increases this year. According to the Association of American Railroads, “[F]or the first eight months of 2004, total U.S. railcar loadings of 11,388,043 units were up 3.3 percent (368,951 carloads).” The AAR, which does not include rail intermodal shipments in its carload count, further reports “U.S. intermodal traffic in 2004 through August totaled 7,048,452 trailers and containers, up 9.5 percent (612,938 units) over 2003.”
 - In recent years, most major railroads have struggled at some point with operational problems and capacity constraints. This year, increased traffic is straining rail capacity in some areas and corridors. Union Pacific (UP), in particular, has struggled with rail congestion and employee downsizing issues, which, in turn, created gridlock problems and major slowdowns on the major routes. According to UP Executive Vice President-Marketing and Sales, Jack Koraleski, “UP had underestimated the economy’s growth and traffic on UP lines, underestimated employee retirement rates had no practical mechanism to limit volume growth and suffered from bad weather” (Trains Magazine, August 2004).
 - Current service problems have caused major slow downs in train speeds that translate into a loss of resources and revenues. On average, freight train speeds are down due to congested infrastructure and strained capacity. UP estimated that a loss of one mile per hour across its entire network equates to 250 locomotives and 180 train-service employees (Trains Magazine, August 2004). Other railroads have been feeling the strain as well. Burlington Northern Santa Fe, UP’s largest competitor, also experienced a decline in its service this past spring. While the railroads insist that the situation is improving with average train speeds on the rise again, significant improvements in infrastructure are necessary to handle the overall forecasted growth in freight volumes.
- **Forecast uncertainty.** Train volume forecasts contain an underlying assumption that rail’s current modal share (versus truck or water) in key commodity lanes will remain constant into the future. That assumption is a two-edged sword – a decrease in market share would slow the projected train volume growth, while a market share increase would cause faster growth and higher eventual volumes. Given the growth

of rail intermodal over recent years, constraints on highway capacity, driver recruitment and retention problems, potentially high fuel prices if not fuel shortages, upward pressure on trucking costs, and diminishing highway capacity, it would seem that rail market share is more likely to increase than diminish. On the other hand, railroads will only carry the freight if it is profitable to do so, and their future operating ratios cannot be reliably predicted.

Land Use and Economic Development

- **In-region railyard capacity vs. outlying intermodal terminals.** The concept of “freight sprawl,” previously identified as a highway issue, is also starting to impact rail operations. For example:
 - NS opened its \$31 million Rutherford Intermodal Terminal (near Harrisburg, PA) in the summer of 2000. It serves at least two strategic roles in NS’s intermodal network. First, it serves as a sorting point where railcars are swapped among trains in order to send solid trainloads to appropriate terminals. Similarly, trailers or containers may be moved from flatcar to flatcar to accomplish the same purpose. Second, eastbound trailers or containers may be unloaded from railcars at Rutherford and trucked to destinations in the region.
 - Such activity avoids potential congestion on the rail network and at the North Jersey intermodal terminals. However, the trailers transported over the road between Rutherford and North Jersey customers to avoid rail congestion add to highway congestion, particularly on I-78.
 - The development and use of the Rutherford terminal is not unique. Similar developments have occurred or are underway in Los Angeles, Chicago, and Memphis, where outlying terminals have been developed to supplement older terminals nearer to the city and/or port. Other similar projects are under consideration by railroad or municipal sponsors. Outlying terminals are attractive to railroads, because land is both available and less expensive, and, whether a new greenfield site or a brownfield site, may offer the opportunity to purchase sufficient land to both handle future expansion and provide a buffer, so that neighbors are not unduly affected by noise and lights. Municipalities and railroads both see an opportunity to develop logistics and light industrial business adjacent to such facilities, hopefully generating employment, tax revenue, and rail carload and/or intermodal traffic.
 - As rail intermodal traffic continues to grow, it will become more feasible and more beneficial to segregate traffic groups like international, domestic, traffic bound to the core of the region versus traffic bound to outlying customers. This trend, along with scarce capacity at older/near-city/port-area terminals, will favor the construction and expansion of outlying terminals like Rutherford. Many fear this is part of an overall decreased emphasis on rail service for close-in areas; some (including NJTPA, in a filing with the STB) argue that this has already occurred within the shared asset area.

- In view of this trend, it is vital to preserve and expand capacity at the NJTPA region’s close-in rail facilities, which provide the least-VMT truck trip to and from the end user. The greater the capacity and the lower the costs of operating and accessing close-in terminals, the less need there is to focus activity at outlying terminals. With this strategy, there can be a productive and mutually-supporting relationship where close-in facilities are used to serve close-in demand, and outlying facilities can be used to serve other demand and accommodate overflow traffic as needed. The development of new outlying facilities might be planned and developed to generate the most economic benefits (rail and trucking jobs, warehouse/DCs, and retention/attraction of rail-served industries) within the NJTPA region. The goal would be to accomplish this with the highway impact, and the greatest use of underdeveloped “freight opportunity” sites. This type of strategy acknowledges an industry trend that probably cannot be reversed, and turns it to the region’s advantage.

Industry Competitiveness and Performance

- **Intermodal access and connectivity.** Rail is a vital gateway for domestic and international trade, and provides critical access to the region’s seaports and rail-dependent industries.
- **Class I railroads operate as for-profit businesses, not public purpose agencies.** Unlike the highways, which are publicly-owned, the nation’s freight rail system is – with limited exceptions – a privately-owned system, operated on a for-profit basis, and accountable to its shareholders. With very high costs to maintain and operate its private system, and faced with strong competition from over-the-road trucking, railroads have evolved their business strategies – and made difficult choices – in response to changing conditions and market demands.
 - System rationalization. The railroad industry as a whole has reduced the number of miles it operates, pruning lower-profit lines and services and allowing it to focus on higher-profit lines. Railroads have merged to consolidate their services and improve their operating economies. And increasingly, larger railroads are focusing on “hub-to-hub” service strategies that aim to concentrate as much traffic as possible on selected corridors, leaving smaller railroads (regionals, shortlines, and switching railroads) or trucks responsible for “last mile” pickup and delivery.
 - Diversification of commodities and services. Historically, rail focused on heavy, lower-value commodities moving in bulk – such as coal, stone, lumber, and chemicals – where per-mile transportation cost is critical, and speed and reliability of delivery are often less important. In recent years, however, the rail industry has evolved to serve higher-value shipments – such as intermodal shipping containers, truck trailers, and automobiles – where speed and reliability of delivery are significant factors. Many railroads have instituted premium scheduled services, and some are exploring strategies to become more competitive with trucking over shorter distances.

- Partnership with other modes. Throughout its history, rail has been a key partner for the nation’s seaports, primarily for shipment of bulk materials such as coal, petroleum, or chemicals. With the rapid expansion of international container markets beginning in the 1970s (and continuing today), railroads have become key partners for moving containers to and from seaports, offering double-stack container (DST) and container-on-flatcar (COFC) services. They have also become key partners for the trucking industry, handling a variety of domestic intermodal traffic in the form of trailers (trailer-on-flatcar) and truck chassis (“piggyback”) services.
- Strategic marketing and captive shipping. In order to make the most profitable use of assets, railroads aggressively market their best customers and most profitable services, offering their best service and price. It is sometimes argued that smaller customers, less profitable services, and “captive shippers” are not marketed as aggressively, or offered the most competitive possible price and/or service. Within the NJTPA region, it has been argued that the Class Is have been insufficiently focused on marketing and serving customers within the shared asset area. On the other hand, it must also be noted that rail volumes for selected NJTPA markets – such as PANYNJ intermodal traffic – have reached record levels.
- Capacity allocation among market segments. In situations where market demand is growing but capacity is not, logic dictates that the railroads will assign the most capacity to their most profitable markets, leaving their least profitable markets with reduced access to rail. This is simple supply and demand, and it appears to underlay the “demarketing” issue discussed in the last paragraph. If the NJTPA region fails to expand rail capacity, we can expect that the rapidly-growing and highly-profitable international container services will get priority for available capacity, to the potential detriment of carload services – and the numerous industries that depend on them, and can ill-afford to move their products by truck. Interestingly, the use of outlying intermodal terminals such as Rutherford could help address this issue – by reducing the number of intermodal trains transiting the NJTPA region, more capacity will be retained for carload traffic and related industries. We would argue that to effectively serve the region’s rail needs over the coming decades, a combination of close-in and outlying rail capacity will be vital. The key question is: where and how to develop outlying capacity to minimize transportation system (highway and rail) impacts, while maximizing economic benefits?
- **Shortline railroad issues.** The future holds both opportunities and challenges for shortline railroads in North Jersey.
 - One opportunity likely afforded many small railroads is the potential to provide additional “last-mile” contract switching services; whereby, the shortline performs intraplant switching services on behalf of large rail users. Other opportunities include development of transload and warehousing functions. Transloading is a concept that allows railroads to distribute products to companies, which: 1) may not have access to a rail siding, 2) ship smaller volumes of products, or 3) prefer the flexibility of truck delivery. Many such customers may have been unaware of viable rail shipping options or simply no longer consider rail. Transloading is not

limited to shortline railroads; Class I railroads can, and do, provide that same function in several locations.

- The most pressing issue, however, is also likely the most challenging: the need to upgrade shortline infrastructure to accommodate 286,000 pound railcar loads. North Jersey shortlines are not alone in this need: many small railroads across the country cannot accommodate this new industry standard. The inability of small and medium-sized railroads to accept larger railcars from Class I connections will have a major impact not only on the North Jersey rail system capacity, but it also may force some shortlines out of business in the longer term.
- Another potential need as traffic increases may be improving the connections between Class I carriers and shortlines. As traffic volumes grow, so too will the infrastructure requirements necessary to facilitate interchange (the exchange of freight cars from one railroad to another). Inadequate facilities would dampen the possibility of capturing and providing new business that may become available.
- **Short-haul service opportunities.** Rail is generally considered to be increasingly competitive with trucking as distances increase, with the “break even” point typically put at 400 to 600 miles. However, there are certain kinds of rail moves – generally unit trains – that have proven competitive at much shorter distances. Many communities are exploring the possibility of running short-distance intermodal trains on defined high-volume corridors between major container generators and receivers, as public-private partnerships with the railroads. Absent public participation, the degree to which the railroads might be interested in this concept is uncertain. The recent NJDOT Portway Extensions Study suggested further exploration of this rail market strategy.

Environmental, Community, and Security Issues

- **Environmental and community concerns related to growth in rail traffic.** As with trucking, rail operations and investments are subject to increasing public attention. An efficient rail system helps reduce the amount of freight that has to be moved by truck. Maintaining current levels of rail traffic, and growing these levels in the future – through both long- and shorter-haul services – is important in managing regional congestion. However, the provision of rail services to achieve these regional benefits can also have local impacts – in the form of at-grade crossings, noise, vibration, and other effects. To the extent practical, these location-specific effects should be addressed and offset, so that the system-level benefits of rail freight can be achieved without the downside costs.
- **Grade crossing safety and cargo security.** As with trucking, these are paramount concerns, given the fact that the NJTPA region’s rail activity takes place within a densely-populated area, and that a substantial share of cargo handled by its trucks has an international origin.

Implementation and Delivery

- **Potential need for substantially increased public investment in rail capacity.** Public investment in rail capacity may be the necessary response to the growing demands on the industry, which collectively has not earned its cost of capital in many years.
 - An article published on August 16, 2004 in *The American Journal of Transportation* offers the perspective on the railroad industry’s lack of capacity investment that, “the industry’s reluctance in recent years to make large investments in capacity is understandable. Facing competition from other modes of transport, railroad pricing has gone down every year for the last 30 in real terms through 2002, with companies putting the emphasis on consolidation and cost-savings.”
 - NS has been one of the stronger financial performers, except in the wake of the difficult division of Conrail assets and operations. However, “NS has not earned its cost of capital for a number of years, and when NS or any company fails to earn its cost of capital, reinvestments in the company are more limited than they would be otherwise,” said NS Chairman and CEO David Goode in his letter responding to the STB’s request, which went to all major U.S. and Canadian railroads on June 9, for a status report on capacity issues. “If demand continues to grow at this pace,” Goode added, “the rail industry will need to invest substantially more in locomotives, information technology (IT) systems, yards and terminals, railcars, track, etc. than it is doing today. However, increased investment in additional capacity cannot always be justified economically in the current cost of capital environment. Therefore, if demand continues to grow without the industry earning enough to sustain its capital requirements for growth, it may have little choice but to ration capacity in the future.”
 - The *AASHTO Freight Rail Bottom Line Report* states that historically, “public participation in rail system investments has addressed the bottom of the system: grade crossings, branch lines, and commuter rail services. The present need is to treat the key elements at the top of the system: nationally significant corridor choke points, intermodal terminals and connectors, and urban rail interchanges. Investments at this level hold the most promise of attracting and retaining freight-rail traffic through improvements in service performance.” In some cases, states have already taken a public policy-driven approach in the form of public-private partnerships. The next step involves alliances among railroads, states, and the Federal government.

2.3.3 Rail System Needs

Overall rail system needs follow directly from the issues identified above, and can be characterized as follows. Strategies for meeting each of these needs are discussed in Section 4.0 of this report.

1. *Optimize rail system capacity, performance, safety, and reliability through a combination of physical, operational, economic, and institutional solutions that address current and future market needs, in partnership with the region’s railroads.*
2. *Identify and implement “smart growth” land use and economic development strategies for the expansion, development, and utilization of rail facilities to minimize highway VMT impacts, reduce the need for highway system investments, and maximize economic opportunity and benefit for the NJTPA region as a whole.*
3. *Promote the competitiveness and performance of NJTPA’s railroads and rail-served industries through infrastructure improvements and other strategies as appropriate.*
4. *Ensure that environmental/community issues (congestion, emissions, noise, vibration, grade crossings, equity, etc.) and security issues are fully addressed in current and future rail planning and operations.*
5. *Develop transportation programming and funding processes that take full account of public-private partnership opportunities for rail freight investments, and allow for their evaluation within a larger multimodal investment strategy.*

■ 2.4 Marine System Performance, Issues, and Needs

2.4.1 Marine System Performance

Overview

The Port of New York and New Jersey (PONYNJ) district, which encompasses publicly-owned Port Authority of New York and New Jersey (PANYNJ) facilities as well as privately-owned marine terminals in both New Jersey and New York, is the second-largest marine transportation hub in the United States, trailing only the Ports of Los Angeles/Long Beach. Marine transportation has been enormously important in the region’s history – from the founding of New York as a colonial port, to the emergence of New York and New Jersey as a center of industrial production, to its evolution as a focus of world trade and commerce – and continues to play a leading role in the region’s freight transportation system. The region’s marine terminals are designed to handle a wide range of commodities, including:

- **Containers.** Intermodal shipping containers can contain basically anything, but typically are used for high-value goods that need to be transferred to/from truck or rail with maximum speed, security, and visibility. Containers are typically “stuffed” at their origin point, trucked or railed to a marine container terminal, moved internally within the terminal by yard equipment, and loaded onto vessels using specially-designed cranes; the process is reversed at the receiving port. Container terminals are highly specialized and expensive to develop; they must offer wharfside cranes, extensive storage, large truck gates, and equipment maintenance facilities; and often feature

on-dock rail terminals and consolidation/transfer warehouses (for “stripping” containers that are overweight or whose contents need to be separated for different receivers, or for the reverse “stuffing” process). Containers come in a variety of lengths – 20 feet, 40 feet, 45 feet, and even up to 53 feet (for domestic over-the-road containers only) – and the volume of containerized traffic can be measured in terms of boxes or lifts (the number of containers handled), TEUs (20-foot equivalent units), or cargo tonnage. The first containers (starting in 1956) were handled on ships carrying mixed cargo, but today they are handled mostly on purpose-designed container ships generally capable of handling between 2,000 and 8,000 TEUs. From an economic perspective, we care mostly about the tonnage of commodities inside the box; from a transportation perspective, we care mostly about the box itself, since that is what we need to physically move. This distinction becomes important when considering the fact that the region imports about twice as much containerized tonnage as it exports, and the empty boxes either have to be shipped somewhere (with nothing inside to pay their way) or left to pile up in the region.

- **Automobiles and motor vehicles.** The modern automobile terminal is an integrated facility for shipping/receiving, storing, and processing motor vehicles. Typically, vehicles are driven onto and off of large vessels designed specifically for vehicle handling – these “Pure Car Carriers” are basically large floating parking structures. At the receiving terminal, vehicles may undergo value-added processing – dealer prep, installation of options, etc. – that generates local jobs above and beyond the transportation of the vehicle itself.
- **Break-bulk and neo-bulk.** These are non-containerized cargos that move in packaged units. Break-bulk usually refers to cargo (boxes of fruit, pallets of lumber, bags of cocoa, etc.) that can be handled by traditional stevedoring equipment. Neo-bulk usually refers to cargo moving in larger, heavier units that require specialized handling equipment, such as rolled steel or paper, “super sacks” of clay, or large machines such as generators. Generally, break bulk and neo-bulk are carried on smaller vessels capable of handling multiple cargo types, often with ship-mounted cranes. Break-bulk and neo-bulk terminals typically employ wharveside cranes that are smaller than container cranes, and almost always offer on-terminal warehousing for cargos requiring weather protection, climate control, and/or extended storage.
- **Dry bulk.** These are dry commodities that are shipped loose in a vessel hold, without packaging. Typical dry bulk commodities include coal, sand, salt, cement, grain, etc. In small quantities, these commodities may move in break-bulk or neo-bulk form, but in larger quantities they tend to move as dry bulk, in specialized vessels. Dry bulk can be stored in enclosed silos or sheds or domes, covered piles, or open piles.
- **Liquid bulk.** These are liquid commodities that are shipped loose in a vessel hold, without packaging. Typical liquid bulk commodities include crude petroleum, petroleum products, chemicals, molasses, and oils. In small quantities, these commodities may move in break-bulk or neo-bulk form, but in larger quantities they tend to move as dry bulk, in specialized vessels. Liquid bulk is typically stored in enclosed tanks.

Maritime terminology tends to be fairly flexible, but the term “general cargo” is often used to refer to some combination of containers, autos, break-bulk, and neo-bulk cargo, while “bulk cargo” is often used to refer to some combination of liquid and dry bulk cargo.

The New York and New Jersey waterfronts have evolved substantially over the last several hundred years. The first ports were break-bulk ports, where cargo was passed hand-to-hand. This was a slow process, requiring ships to be tied up for extended periods. As a result, the dominant type of marine terminal design was a “finger pier” – a wide pier extending into the water, with vessel berths on either side, and often a warehouse structure in the middle.

With time, the relative importance of break-bulk shipping has declined. Specialized terminals for handling of liquid bulk, dry bulk, autos, and containers have been developed. These terminals employ fast methods of loading and unloading, requiring vessels to dock for relatively short periods, but also requiring substantial amounts of on-terminal storage and efficient landside access by highway and rail. To provide the needed acreage, areas between historic finger piers were filled in, and new terminals were developed in “greenfield” areas, where required land resources and transportation connections could be more easily provided than in developed urban areas.

Perhaps the most significant step in this evolutionary process has been the rise of containerization. From the shipment of the first container in 1956 (from Port Newark), the container has become the dominant means of transporting high-value goods across international and domestic waterways. The reason is that it works – it allows for fast, reliable, seamless, cost-effective transport across both natural boundaries and jurisdictional barriers. The availability of container transport has revolutionized business practices, allowing national supply chains (the receipt of materials for processing into finished goods) and distribution chains (the shipment of finished goods to market) to be transformed into international supply and distribution chains. This in turn has revolutionized retailing, supporting the growth of huge “big box” importers such as Wal-Mart and Home Depot.

Today, millions of containers are shipped each year to and from the U.S. West Coast, Gulf Coast, and East Coast. The PONYNJ is by far the leading container port on the U.S. East Coast, and more than 85 percent of PONYNJ containers are shipped through PANYNJ marine terminals in the NJTPA region:

- **Port Newark.** Port Newark Container Terminal and American Stevedoring (which moves containers on barges to and from the Red Hook Container Terminal in Brooklyn);
- **Port Elizabeth.** APM (comprising the former Maersk and SeaLand operations) and Maher Terminals; and
- **Bayonne Peninsula.** Global Marine Terminal.

The PANYNJ is also one of the nation's leading automobile handling ports. All of the PANYNJ's major auto handling facilities are located in the NJTPA region:

- **Port Newark** – Originally known as Foreign Auto Preparation Services (FAPS), Toyota Motor Logistics Center;
- **Port Elizabeth** – Distribution and Auto Storage (DAS); and
- **Bayonne Peninsula** – Northeast Auto Terminal (NEAT) and BMW.

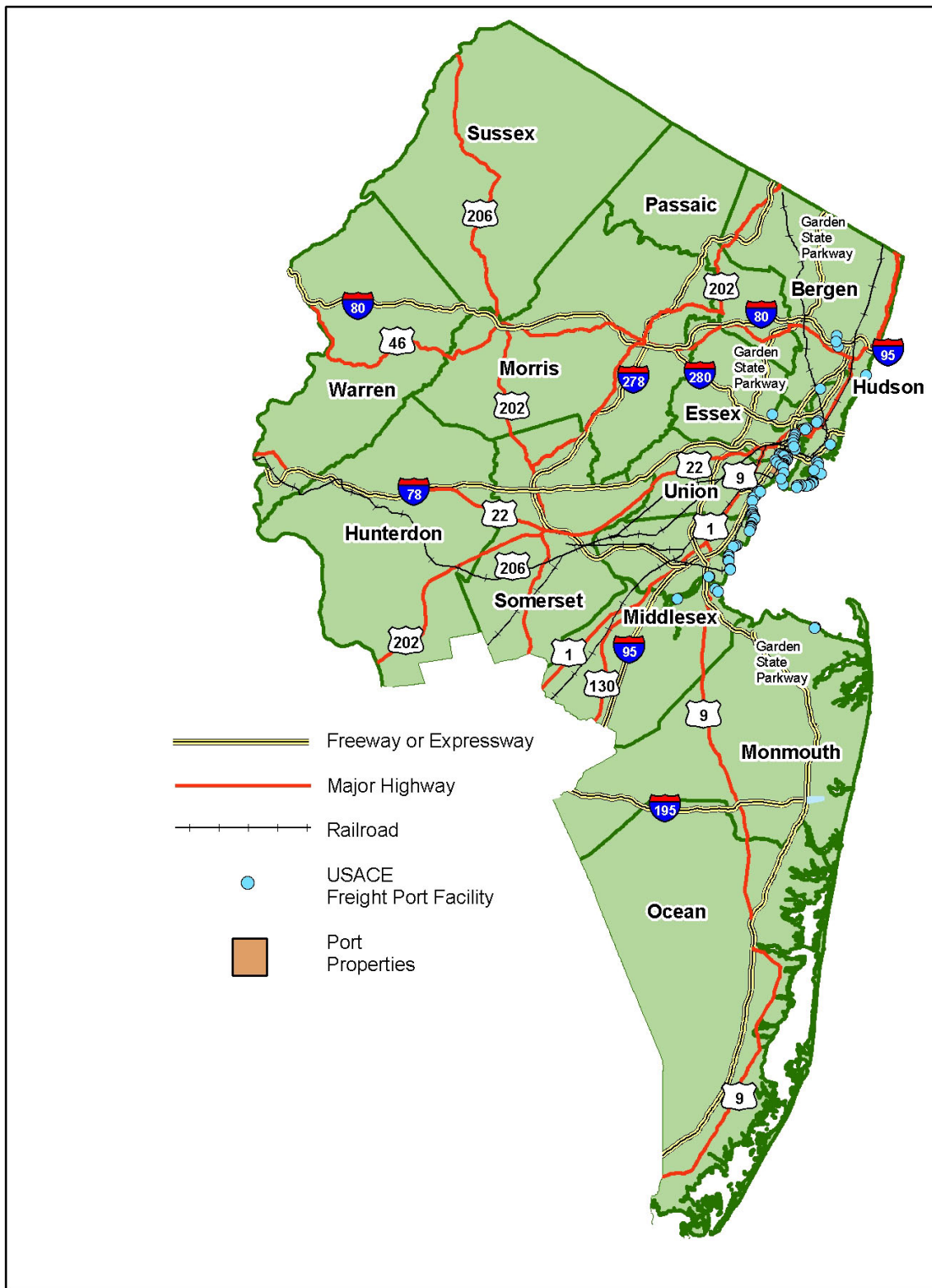
In addition to these PANYNJ facilities, the NJTPA region hosts privately-owned freight handling marine terminal facilities, as identified by the USACE. The locations of these facilities are illustrated in Figures 20 and 21 on the following pages. Other important public facilities in the NY/NJ region (not shown) include the Howland Hook Marine Terminal on Staten Island, the Red Hook Marine Terminal in Brooklyn, and the South Brooklyn Marine Terminal.

Marine Terminal Volumes

Historic and current data on marine freight traffic for the PONYNJ as a whole is readily available from a number of sources, including the American Association of Port Authorities (AAPA), USACE, and PANYNJ. However, the data can be “apples and oranges” depending on the year, the included geography, and the type of cargo being examined. Table 5 below provides a portwide breakdown of marine freight tonnage for year 2002 by commodity type, including tonnage of all types.

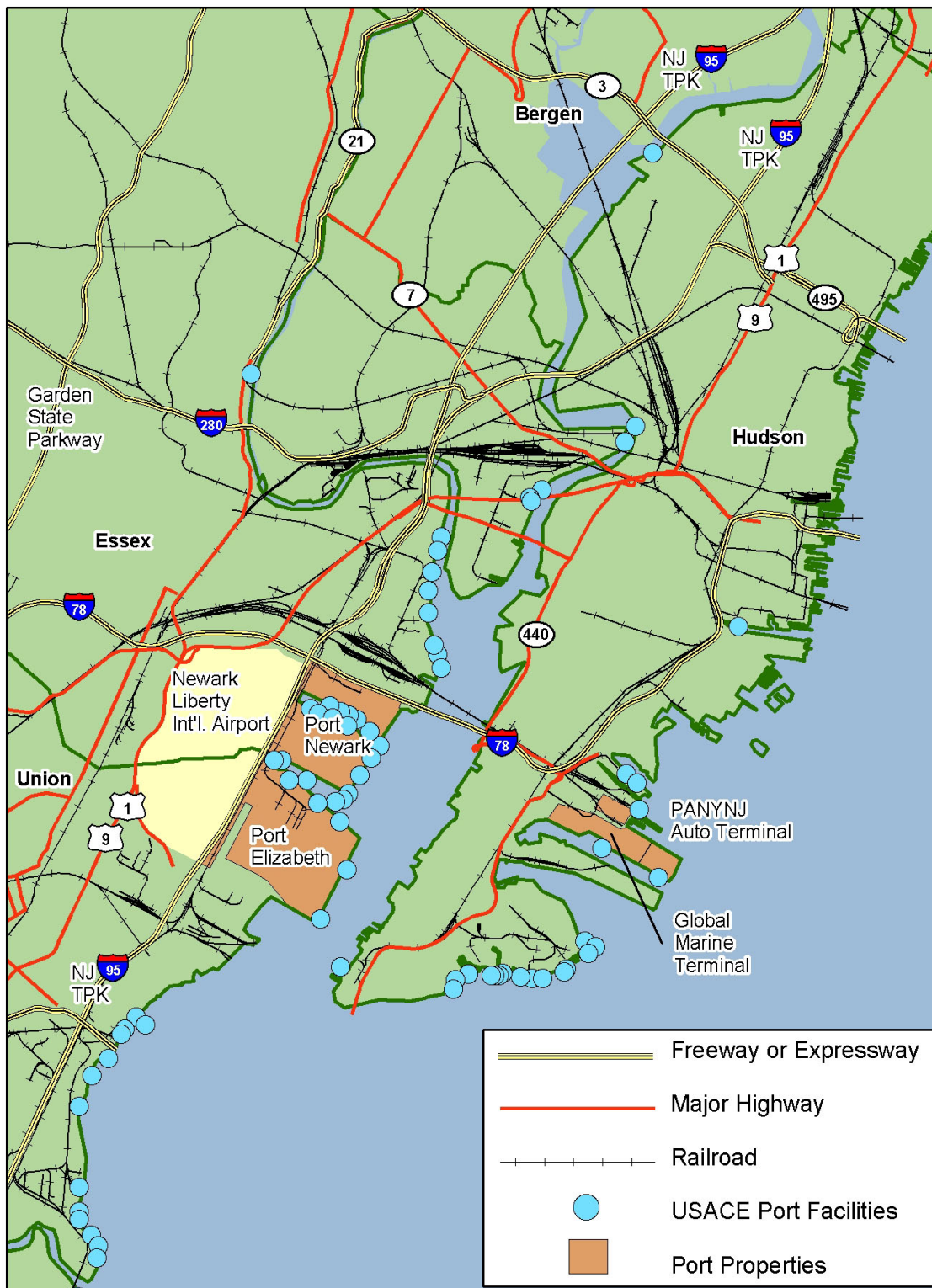
Determining how much of this tonnage is associated with the NJTPA region is not a trivial task. Excluding inactive facilities and active mooring facilities for passenger boats, fishing boats, and service craft, the USACE database identifies more than 180 freight-handling marine terminals in the entire PONYNJ, of which 75 are located within the NJTPA region. The estimate of NJTPA waterborne tonnage was summarized in Table 1 previously, and is shown with additional detail in Table 6 below. International container and auto data is sourced from PANYNJ; domestic coastwise data is sourced from TRANSEARCH; and the remainder has been approximated from USACE data.

Figure 20. Location of Freight-Handling Marine Terminals in NJTPA Region



Source: USACE.

Figure 21. Location of PANYNJ Marine Terminals in NJTPA Region



Source: USACE and PANYNJ.

**Table 5. PONYNJ Waterborne Tonnage (Thousands)
2002**

	International		Domestic Coastwise		Internal	Total
	Originating	Terminating	Originating	Terminating		
Petroleum products	869	23,608	19,645	8,173	24,359	76,654
Crude petroleum	70	12,068	68	504	558	13,268
All manufactured equipment	1,364	6,040	519	238	349	8,510
Other chemicals	1,175	2,342	348	1,633	664	6,162
Other agricultural products	635	4,381	-	955	1	5,972
Soil, sand, gravel, rock, stone	9	1,917	596	564	2,453	5,539
Lime, cement and glass	78	2,346	-	327	411	3,162
Iron ore and scrap	1,215	37	81	50	743	2,126
Primary non-ferrous metal products	1,064	988	-	-	-	2,052
Pulp and waste paper	1,986	30	-	-	-	2,016
Coal	1	809	-	1,182	-	1,992
Paper products	356	708	-	-	-	1,064
Vegetable products	107	921	-	-	6	1,034
Other non-metallic minerals	28	875	-	-	-	903
Primary iron and steel products	173	337	-	-	-	510
Forest products	183	320	-	-	4	507
Waste and scrap	-	-	82	-	420	502
Fish	34	254	-	-	-	288
Processed grain and animal feed	111	132	-	-	-	243
Grain	21	99	-	-	-	120
Primary wood products	21	94	-	-	-	115
Oilseeds	15	84	-	-	-	99
Non-ferrous ores and scrap	72	18	-	-	-	90
Sulphur, clay and salt	23	56	-	-	-	79
Fertilizers	16	21	-	-	-	37
Slag	2	-	-	-	-	2
Unknown or not elsewhere classified	525	932	-	-	-	1,457
Total	10,153	59,419	21,339	13,626	29,968	134,505

Source: USACE, 2002.

**Table 6. Approximate NJTPA Waterborne Traffic
2003**

	International		Domestic Coastwise		Internal	Total
	Originating	Terminating	Originating	Terminating		
Tons						
International containerized	5,601,026	11,843,630				17,444,656
International autos	70,757	984,758				1,055,515
Crude petroleum	70,000	12,068,000				12,138,000
Other (mostly petrochemical), approximated only	2,094,576	20,384,643				22,479,219
Petroleum products			22,270,749	7,635,800		29,906,549
Chemicals			158,914	1,540,611		1,699,525
Waste paper/scrap metal (not trash or municipal waste)			2,140,909	3,250,621		5,391,530
Other/unknown			37,897	334,509	20,065,160	20,437,566
Total	7,836,359	45,281,031	24,608,469	12,761,541	20,065,160	110,552,560
Units						
Containers (TEUs)	1,788,090	1,511,327				3,299,417
Autos (vehicles)	42,883	596,823				639,706

Sources: TRANSEARCH, 2003; PANYNJ, 2003; and USACE, 2002.

Marine Terminal Performance

- **Containers.** The two most important recent studies of regionwide container capacity were done under the PONYNJ Comprehensive Port Improvement Plan (CPIP) and the USACE’s Harbor Navigation Study and Limited Re-evaluation Report. The CPIP analysis estimates place container capacity at around 8 million TEUs annually. The USACE estimates capacity (with ongoing/anticipated improvements) at 7.9 million TEUs in 2010, 8.4 million TEUs in 2020, and 10.5 million TEUs in 2030. Recent estimates by Moffatt & Nichol are consistent with the above, indicating capacity to be in the 4.7 million lift (8 million TEU) range, after completion of the existing port redevelopment effort and a relatively short “learning curve” period.
 - Overall, the consensus is that the PONYNJ has sufficient capacity to handle its existing container volumes (4,067,811 TEUs in 2003).

- According to CPIP-based forecasts, the PONYNJ has sufficient capacity to handle growth generally through the 2030 to 2040 period. As indicated previously in Table 2, our Forecast Scenario 1 (adapted from CPIP) is for a 3.5 percent annual growth rate in container traffic within the NJTPA region, from a base year of 2001. CPIP actually offers a range of potential futures, depending on which Atlantic coast ports deepen their channels. Assuming the PANYNJ deepens to 50 feet as currently planned, the CPIP forecast range is 5.6 million to 6.2 million TEUs in 2020, and 8.5 million to 10.4 million TEUs in 2040. These demand levels are within the range of CPIP and capacity estimates (8 million TEUs) and USACE capacity estimates (10.5 million in 2030).
- According to USACE-based forecasts, the PONYNJ also has sufficient capacity to handle growth generally through the 2025 to 2030 period. As indicated previously in Table 2, our Forecast Scenario 2 (adapted from USACE) is for a 4.6 percent rate within the NJTPA region, from a base year of 2001. For the port as a whole, USACE offers point forecasts of 8,248,570 TEUs in 2020 (below the estimated capacity of 8.4 million TEUs) and 11,460,041 TEUs in 2030 (slightly more than the estimated capacity of 10.5 million TEUs).
- **Automobiles.** Automobile terminal capacity has also been studied, but to a lesser extent. Generally, studies have indicated the need to add auto terminal acreage and/or improve facility throughput to accommodate future volumes, but have found existing capacity adequate to current levels of demand.
- **Other cargo.** Capacity for other types of cargo has not been comprehensively studied. Many, if not most, of the non-container/non-auto terminals are privately-owned and operated. Growth rates for non-container/non-auto terminals have been relatively low – in the one to two percent per year range – so there has been less stress on terminal infrastructure, compared to containers, which have grown at a rate of 7.5 percent per year since 1993.

2.4.2 Marine System Issues

System Capacity, Performance, Safety, and Reliability

- **Defining container terminal capacity and demand.** Over the past decade, container terminal capacity and demand have been some of the most-studied freight questions in the region.
 - All of the various studies have agreed that capacity is a function of a terminal’s physical and operational characteristics, in which the physical characteristics (acres of storage, number of berths and cranes, size of the gate, etc.) create a maximum bound for how much the terminal can physically handle, while the operational characteristics (amount of container stacking, amount of yard equipment and labor, hours of operation, amount of time that containers remain on terminal, crane and gate processing efficiency, etc.), and how much of this maximum bound can be achieved in practice.

- Beyond a certain point, it becomes increasingly difficult and costly to squeeze more capacity out of a terminal; the question of how far an operator wants to push the terminal depends largely on the profitability of doing so. Capacity is almost always presented as a static engineering measure, but it might be better characterized as a dynamic business measure – a measure of how much throughput a terminal operator can profitably handle, given his/her physical and operational assets and costs.
- Throughout the 1990s, we saw West Coast ports push more through their terminals than was previously thought possible in the U.S. Since then, we have seen East Coast ports – including NY/NJ – make comparable gains that were thought to be even less likely. As a result, recent estimates of container terminal capacity for the PONYNJ properly assume more intensive operation and greater utilization of physical assets, and show more available capacity than older estimates did.
- Over the past decade, container traffic through PONYNJ has outstripped almost every forecast. Today, actual traffic is well in excess of the CPIP forecast, and appears to be tracking closer to the USACE forecast. The USACE forecast has been criticized for envisioning that the region’s import and export tonnages will come into balance, which is counter to historic regional and national trends. What seems more likely to us is that imports will grow at a faster than forecast rate, while exports lag, so that the USACE totals will be achieved, but with a continued import-export imbalance.
- Both demand forecasts support the notion that there is sufficient portwide container capacity through year 2025, with implementation of planned/proposed physical and operational improvements to marine terminals, navigation channels, and highway/rail systems. Beyond 2025, the USACE forecasts imply the need for further capacity by 2030, while the CPIP forecasts imply further capacity may not be needed until 2040.
- **Need for physical and operational to container terminals.** To accommodate rapid growth in container volumes over the past several years, the PANYNJ’s marine terminal operators have operated their facilities more intensively. They have achieved substantially greater operating efficiencies using more intensive storage, improved information and management systems, longer operating hours, etc. Continued gains in operating efficiency will provide increased capacity without significant increases in the actual size of the Port, but must be matched with supportive physical improvements, as envisioned in PANYNJ’s improvement program (see Section 4.0).
- **Need for marine navigational improvements.** Navigation channels and berths must be able to accommodate the types of vessels that will want to use them, and increasingly the need is for 50-foot channels to accommodate “mega-containerships.” These used to be referred to as “next generation,” but in light of the fact that nearly all of the containership capacity built or ordered in the last few years has been in this class, they must be considered current generation. Accommodating these vessels means addressing both vessel draft (minimum water depth at lowest tides) and air draft (vertical clearance below bridges and other obstructions at highest tides). The program to provide vessel draft improvements is well underway, as has been noted, but

there is a significant air draft issue – the Bayonne Bridge, which limits the heights of vessels transiting the Kill van Kull – remaining to be addressed.

- **Need for market access and intermodal connectivity improvements.** Bulk shippers and receivers – power plants, refineries, food processors, lumber and paper mills, etc. – are often located directly on the water. Container shippers and receivers are almost never located directly on the water – they are inland, close to their producers and consumers. Efficient inland access by highway and rail is essential to serve inland markets and customers.
 - Highway and roadway congestion related to truck freight, and particularly international waterborne cargo, is of particular concern in the roadway system serving the PONYNJ and the major intermodal rail ramps in the region. The PANYNJ capital program includes funding to address needed roadway improvements. Potential new marine facilities, such as MOTBY, will require additional investment in roadway access (as well as rail access) to facilitate successful development.
 - The regional rail intermodal system has been the subject of study, including the Rail Freight Capacity Analysis Study of the North Jersey Shared Assets Area, conducted for the PANYNJ. A number of capacity constraints has been identified, and the Governor’s Blue Ribbon Panel, for example, identified \$360 million in regional rail improvements that are required. Historically, railroads have not generated sufficient return on investment to support the level of capital investment that appears to be required.
 - The possibility of substituting barge and rail for truck moves to serve markets in the 75- to 400-mile range has also been studied extensively by PANYNJ. An analysis of 1998 and 1999 data by PANYNJ and Moffatt and Nichol, as reported in the Portway Extensions Study, found that 52 percent of PANYNJ containers had an origin or destination between 75 and 400 miles, mostly in a series of “Dense Trade Clusters” (Worcester/Framingham, Hanover, Reading and Camden, Pittsburgh, Hartford and Springfield, Rochester, Albany, Buffalo, and Syracuse). This suggested the possibility of developing a transportation strategy to serve these dense trade clusters using alternative (rail or barge) modes in lieu of truck. The PANYNJ subsequently developed a “Port Inland Distribution Network” (PIDN) concept, which emphasizes serving dense trade clusters by non-highway modes, using rail and barge services. Several of the rail services are in place. The PANYNJ has implemented barge service to the Port of Albany, and Bridgeport is close to starting up a barge service to PANYNJ.
 - It must be recognized that mid-range (75- to 400-mile) landside markets seem to be in a period of adjustment. Recent data suggests that the percentage of PANYNJ containers associated with these dense trade clusters may be declining – possibly as a result of their being served increasingly through other ports – but the volumes are still substantial.

Land Use and Economic Development

- **Economic benefit.** The PONYNJ represents billions of dollars of accumulated capital investment, and is a huge economic engine for the region – not only in terms of direct and indirect employment, but also in terms of its provision of transportation services. It means that local and regional shippers and receivers have a nearby gateway to international markets, avoiding the need to use more distant facilities. The PONYNJ is predominantly a local- and regional-serving port – only around 15 percent of its containers have a landside origin or destination beyond 400 miles – so the vast majority of its impacts (transportation, environmental, community, etc.) are tied to the provision of local and regional benefits. Even for that 15 percent of non-regional traffic, the region actually derives some measure of benefit:
 - Traffic that enters and leaves the region in its waterborne container generates marine handling jobs and (in the case of on-dock rail) rail handling jobs as well.
 - Traffic that is transferred between a waterborne container and a domestic container (which can be physically larger, but is limited to over-the-road weight) or truck generates additional cargo handling jobs.
 - Traffic that undergoes some degree of “value-added” processing in regional warehouse/DC facilities provides even a higher degree of regional economic benefit.
- **Port-serving warehouse and distribution investment.** Another key component of the freight infrastructure that has become increasingly important in the logistics supply chain is the distribution center and warehousing resources that are available. The growth of Asian imports through Southern California has been facilitated by remarkable growth in the supply of distribution centers in the “Inland Empire” centered around Ontario and San Bernardino. The rapid growth of the Port of Savannah has been supported by a strategy of providing economical, user-friendly distribution center facilities in close proximity to the Port. In congested North Jersey, the land available for such facilities is scarce and costly. The need for port land for basic ship loading/unloading/container storage facilities has also diverted the warehouse/DC function further from the Port. More remote areas have become the centroid of DC development, such as the Exit 8A area of the NJ Turnpike. NJTPA has identified underutilized “freight opportunity” sites, many in the vicinity of PONYNJ, which could be the location for DC/warehouse investment that would contribute to the attractiveness of PONYNJ and North Jersey as an import load center.
- **Substitution of other ports or landbridge rail for PONYNJ marine terminals.** The diversion of international freight movements (including those that have been “domesticized” through transloading) to other ports or intermodal rail terminals outside the North Jersey area would have the effect of eliminating much of the economic benefit that these terminal facilities generate. Some have argued that this would have offsetting benefits in terms of congestion reduction, but the fact is that the large local consumer market would still need to be served – just from further away, which is likely to produce more highway VMT rather than less highway VMT, and will particularly impact outlying non-industrialized corridors.

- **Empty containers and import-export balance.** Containers carrying import tonnage tend to remain in the region unless and until they can carry export tonnage; otherwise, there is nothing to pay the cost of their trip. If the USACE forecasts prove correct and the region achieves an overall import-export balance, that would tend to keep containers from accumulating in the region. However, that is not the case today, and in the event that such a balance is not achieved in the future, the region will continue to face the issue of how and where to best handle empty containers.

Industry Competitiveness and Performance

- **Container markets and competitive pressures.** The PONYNJ is the nation's second-leading container port complex and the leading Atlantic coast gateway for international freight. The North Jersey freight transportation and distribution complex and its comparative advantage, however, do not go unchallenged. Other international gateways challenge PONYNJ as port of entry/exit for imports and exports.
 - Savannah has experienced rapid growth in volume serving the north Asian import market, which is the fastest growing segment of international trade. Growth in Savannah has been facilitated by a strategy that emphasizes the development of distribution centers close to the Port to serve the retail import that dominate the North Asian trade.
 - Halifax and Montreal provide competition for the North Europe trade, a major component of PONYNJ volume.
 - Norfolk also competes for the Midwest market on several trade routes. Norfolk Southern Railroad is promoting the investment of public funding in improved intermodal access from Norfolk to the Midwest.
 - West Coast ports, primarily Los Angeles and Long Beach, and the Class I railroads, pursue strategies to preserve and grow their current substantial share of North Asia imports destined for the Midwest and east. The ports are developing a variety of strategies to capitalize on their significant port capacity, while mitigating issues such as congestion and emissions. These strategies include implementation of extended hours at the ports, new modes such as short-haul rail shuttles serving the inland warehouse/DC/transload complex, and technology such as “virtual container yards” to optimize equipment utilization. The railroads (UPRR and BNSF primarily) are addressing current crew and equipment shortfalls, while also developing plans to address line-haul capacity constraints on their transcontinental routes.
 - Over the past several decades, the PONYNJ has been challenged by these ports, but has successfully maintained its preeminent market position. Its ability to hold and reinforce this position will depend largely on its ability to provide needed improvements to services, facilities, and accessibility, consistent with changing customer needs.

- **Changing customer needs.** Customer needs are changing rapidly, and the ability of ports and their host regions to respond effectively is a key challenge.
 - One well-documented trend is the increased use of larger containerships. The largest vessels currently deployed in transpacific fleets offer more than 8,000 TEUs of capacity – more than double the capacity of the largest ship capable of transiting the Panama Canal – and require channel depths of up to 50 feet. As larger vessels penetrate the Atlantic trades, leading Atlantic ports need to offer their terminals and ocean carriers deeper channels, larger berths, larger and faster cranes, and more container storage capability.
 - A second key trend is the changing identity of the “customer.” Traditionally, a landlord port (like PANYNJ) that owns and leases marine terminals has treated the terminal operators as its customer; the terminal operator, in turn, has treated the ocean carriers as its customers; and the ocean carriers, in turn, have treated shippers as their customers. But over the past decade, major ocean shippers like Wal-Mart and Home Depot have increasingly cut out the middle men, and negotiated directly with their favored ports to obtain facilities and services – especially near-port warehouse/distribution and rail connections – that best support their logistics needs. Ports like Savannah – the fastest-growing port on the Atlantic – have been successful in marketing directly to shippers. PANYNJ, its terminal operators, and their carriers will all need to cooperate in the planning and provision of shipper-oriented facilities and services to remain competitive.
 - A third key trend is port diversification. Faced with greater uncertainty about port capacity and performance, shippers are increasingly looking to spread their risk by using multiple ports of call. This means that customers need the ability to route Asian and South American cargo to the East Coast, Atlantic and South American cargo to the West Coast, and efficient rail and highway connections bridging the two. The PANYNJ has traditionally served mostly local and regional (within 400 miles) markets, but may increasingly be asked to serve other markets in the future.
 - A fourth trend, related to port diversification, is growth in direct all-water Asian trades. China trade is the fastest-growing segment of the container trade, and China is a major trading partner for the NY/NJ region. Historically, the preferred way for China imports to reach NY/NJ has been via West Coast ports and rail landbridge. But as West Coast ports face increasing congestion and the national rail system shows signs of strain, more logistics decision-makers are electing to use all-water services – eastbound via the Panama Canal (via smaller ships of less than 4,000 TEUs) or westbound via the Suez Canal. The possibility of “Suez backflow” has been anticipated by many analysts, but few analysts anticipated that the Panama Canal would play a significant role. These services seem certain to generate significant additional all-water China services for PANYNJ, and may well accelerate its growth beyond forecast levels. Widening of the Panama Canal to accommodate larger vessels is planned, and could be accomplished in the next 10 years; this would likely result in a significant additional boost for Asia to U.S. East Coast all-water services.

Environmental, Community, and Security Issues

- **Cargo security.** There has been substantially increased emphasis on the security inspection and clearance of international cargo, particularly containers. Many ports are already implementing personnel screening and credentialing systems, and employing non-invasive inspection technologies. There has been discussion at the national level of requiring 100 percent inspection of import containers, possibly at the port of origin. Whatever form that future security requirements take, it is possible that on-terminal operations and global transportation logistics may be significantly impacted. Freight movement may cost more, take longer, and require more terminal area, equipment, and personnel.
- **“Green port” initiatives.** Throughout the U.S., the community and environmental impacts of marine terminals have received increasing attention.
 - Off peak terminal operations. Terminals in many ports – including PANYNJ – have implemented longer operating hours to allow for off-peak movement of trucks.
 - Scheduled pickups and deliveries. Appointment systems have been implemented at many ports to coordinate the availability of marine terminal labor with trucker needs.
 - Queuing penalties. In Southern California, legislation has been passed to limit the amount of time that trucks are permitted to wait in line outside of marine terminals for gate processing. The effect, from some reports, has been for terminals to speed up their gate processing so that trucks get through the gate, but once within the terminal, they are not having their containers unloaded or loaded any faster. The overall benefit of the legislation remains in question.
 - Mode shifting. Projects like the Alameda Consolidated Transportation Corridor in Southern California are designed to facilitate rail access in order to reduce dependence on trucking. The PANYNJ’s PIDN initiative aims to substitute rail and barge for trucking in key high-density corridors.
 - Emissions. In Southern California, initiatives requiring “cold-ironing” of vessels (shutting down vessel engines while docked, and switching to shoreside electrical power) will be implemented. There has been a further proposal that would mandate that port-related emissions be “frozen” at current levels, although how this would be accomplished is far from certain.

Implementation and Delivery

- **Need for innovative approaches.** The maintenance of a healthy regional freight transportation economy and its resulting economic benefits, particularly in view of growing volumes of international trade, requires an enormous financial commitment to the physical infrastructure required to handle the volumes in a sustainable fashion. The PANYNJ provides some of the required investments, and the Federal government picks up some of the cost as well. But the investments associated with regional port

infrastructure are multimodal (marine, highway, rail, warehouse and distribution) and multijurisdictional (local, regional, and multistate) in nature. There is no single entity that can be responsible for all the needed investments. In order to meet the investment challenges discussed above to preserve the vitality of North Jersey's freight industry and its economic benefits, new approaches to project financing and development authority may be required.

2.4.3 Marine System Needs

Overall marine system needs follow directly from the issues identified above, and can be characterized as follows. Strategies for meeting each of these needs are discussed in Section 4.0 of this report.

1. *Optimize marine system capacity, performance, safety, and reliability through a combination of physical, operational, economic, and institutional solutions that address current and future market needs, in partnership with marine terminal owners, operators, carriers, and customers.*
2. *Identify and implement land use and economic development strategies for the expansion, development, and utilization of marine facilities to minimize highway VMT impacts, reduce the need for highway system investments, and maximize economic opportunity and benefit for the NJTPA region as a whole.*
3. *Promote the competitiveness and performance of NJTPA's ports and port-served industries through infrastructure improvements, and other strategies as appropriate.*
4. *Ensure that environmental/community issues (congestion, emissions, noise, vibration, grade crossings, equity, etc.) and security issues are fully addressed in current and future marine facility planning and operations.*
5. *Develop transportation programming and funding processes that take full account of the complex intermodal and multijurisdictional investments necessary to ensure healthy and beneficial marine terminal operations.*

■ 2.5 Air Cargo System Performance, Issues, and Needs

2.5.1 Air Cargo System Performance

Air cargo is primarily focused on the movement of high-value, light-weight, time-sensitive commodities – perishables, equipment and instruments, high-end consumer goods, and printed information. Air cargo relies almost exclusively on trucking for its last-mile connections, and in some cases trucking can be used for longer segments of an “air cargo” trip. Air cargo is vital in providing the NJTPA region's shippers with access to domestic

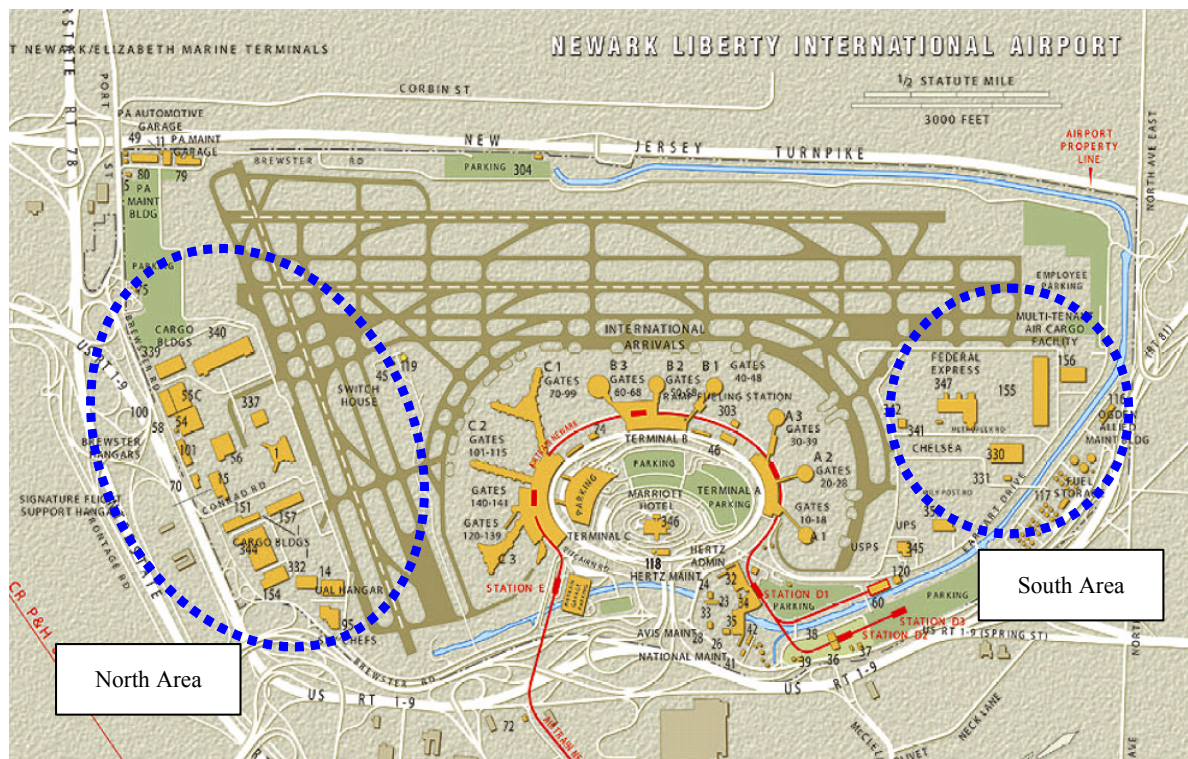
and international markets, and in providing its consumers with access to a wide range of goods and services.

Air cargo is typically handled in several ways:

- All-cargo airlines;
- Integrated carriers that manage and coordinate both air and truck fleets; and
- Passenger carriers that carry cargo in the aircraft hold (also known as “belly cargo”).

As shown in Figure 22, EWR is the hub of air cargo activity for the NJTPA region and the overnight/small package center for the larger bi-state area. Operated by PANYNJ, EWR is also one of the largest hubs of air cargo activity in the world. The airport focuses primarily on domestic cargo movement through integrated carriers, such as FedEx, UPS, and the U.S. Postal Service (USPS). With the increasing amount of international aircraft activity at EWR, international cargo activity has also developed. However, JFK in New York remains the leading international cargo facility in the bi-state region.

Figure 22. Air Cargo Facilities at EWR



Source: PANYNJ.

The air cargo-related facilities in the NJTPA region consist of:

- On-airport facilities at EWR;
- Air cargo facilities in the immediate vicinity of the airport (also known as “through the fence” operations); and
- Air cargo forwarder facilities, which are generally located within a 30-minute drive time to the airport.

EWR has 290 acres and nearly 1.4 million square feet of space devoted to cargo activity on the north side (Essex County) and south side (Union County) of the airport, including:

- **The FedEx Cargo Complex (South Area).** This complex was completed in 1995, and includes three buildings. Known as the Newark Regional Hub, it is a key national facility for FedEx and services the entire bi-state area.
- **The UPS package handling and distribution center (South Area).** This facility was completed in 1987 and occupies 28 acres.
- **The USPS Facility (South Area).** This \$2.6 million, 36,000-square-foot postal facility opened in 1983.
- **The Airis International Air Cargo Center (North Area).** Built on the site of the former North Terminal, the Center consists of two buildings containing 192,000 square feet, which opened in 1998; and 76,000 square feet, which opened in 1999.
- **The United Airlines Cargo Facility (North Area).** This facility contains 42,000 square feet of cargo area and 7,300 square feet of office space. The building was completed in 2001.
- **The Continental Air Cargo Facility (North Area).** This 110,000-square-foot facility was completed in 2001.
- **The Port Authority Multi-Tenant Cargo Building (North Area).** This was completed in the North Area in 2003.

Additional air cargo-related operations exist in the area immediately adjacent to the airport on the south side in Elizabeth, New Jersey. This location balances easy access to the airport with far less expensive lease rates. With on-airport space increasingly constrained, the Elizabeth area provides needed capacity to allow the continued growth of cargo activity at the airport.

EWR cargo volumes peaked at around 1.2 million from 1997 to 2000. In 2000, EWR was ranked 18th in the world in terms of cargo activity. Memphis, TN ranked first in the world, and handled almost 2.5 million tons of air cargo in 2000. Memphis is the key hub for FedEx. JFK was ranked sixth and handled 1.8 million tons.

As presented in Table 7, air cargo activity declined in 2001 concurrent with the recession and the events of September 11. EWR dropped to less than 900,000 tons in 2001, but has recovered business since then, with 937,010 tons in 2002 and 964,117 tons in 2003. In 2003, EWR ranked 21st among world cargo airports. Memphis continued as the leading cargo facility, handling nearly 3.4 million tons. JFK also dropped in rank to 11th, handling 1.6 million tons.

Table 7. Air Cargo Tonnage at EWR

Year	EWR Air Cargo Tonnage
1999	1,183,573
2000	1,193,392
2001	876,972
2002	937,010
2003	964,117

Source: PANYNJ and Airports Council International.

Generally, air cargo facilities at EWR are considered adequate for current levels of demand; from review of available information and discussions with PANYNJ and industry stakeholders, we are not aware of any significant capacity issues. Assuming continued economic growth and consumer activity, it is anticipated that air cargo at EWR will grow between two and three percent annually (a midpoint estimate of 2.5 percent annually is shown in Table 2) in terms of tonnage during the planning period.

Because of the substantial truck substitution affecting domestic air cargo, it is likely that the mileage attribute will grow faster than the tonnage attribute. Projections made in terms of tonnage tend to show smaller anticipated growth. The implications of handling this volume of tonnage at EWR remain to be assessed.

2.5.2 Air Cargo System Issues

System Capacity, Performance, Safety, and Reliability

- **Adequacy of EWR capacity and accessibility for future demand.** For the highway, rail, and marine systems, available tools and studies allowed us to draw general conclusions regarding future demand, future capacity, and the need for capacity and/or freight access improvements. Comparable studies are not available for EWR, so this question remains to be addressed.

- **Interrelationship of NY/NJ regional air cargo hubs.** LaGuardia is not a significant freight airport; JFK does not handle as much domestic cargo as EWR, but it handles far more international cargo, and is one of the nation’s leading international hubs. From interviews with air cargo industry personnel, we know that a substantial amount of EWR international traffic is actually trucked to and from JFK in order to clear U.S. Customs, due to its superior facilities. This creates additional truck trips on congested corridors.

Land Use and Economic Development

- **Economic benefit.** Air cargo serves the high end of the freight spectrum – express packages, high-value consumer goods, specialized industrial machinery, and other time-sensitive premium cargo. For the most part, there would be a substantial loss of value (in terms of service cost, speed, reliability, visibility, and security) to shippers and receivers, as well as the likelihood of additional truck VMT to reach out-of-region air cargo facilities, if commercial air cargo services were not available at EWR. Air cargo facilities are also significant job generators, because each is a warehouse/DC for consolidating/deconsolidating and unloading/loading cargo. In the case of major integrated carriers such as FedEx, the operation can be quite large; Fed Ex actually consolidates traffic from several states (by air and by truck) for loading onto international flights from EWR, and vice-versa.
- **Opportunities for warehouse/distribution development.** Air cargo facilities can either be on-airport (with a direct truck to aircraft connection via a storage building), or off-airport (where cargo is consolidated into suitable units for loading onto aircraft, and then trucked to the airport, or where cargo is received directly from the airport, and then deconsolidated). On-airport space is limited, and over time it may be necessary and desirable to expand nearby off-airport facilities. A number of Freight Opportunity sites identified by NJTPA may be suitable for such a purpose.

Industry Competitiveness and Performance

- **Changes in the state of the economy.** Freight is a derived demand based on the needs of businesses and people. When the economy is expanding, then more cargo is generally moved. When the economy is contracting, then less cargo tends to be moved. This consideration is reflected in the tonnage trends for EWR – as the economy has moved out of recession, the air cargo tonnage has increased.
- **Efforts to increase “open skies” and new routes.** The Federal government has continued efforts to create open sky agreements between the U.S. and other entities. While most of the overseas markets are now open, several key regions in Europe, Asia and South America remain restricted in terms of air cargo service. In addition, EWR continues to add international flights, increasing the number of overseas connections available at the airport.
- **Growth in E-commerce.** Consumers now have access to three sales channels: “brick and mortar” stores, mail or phone order catalogues, and web-based purchases. Web-

based purchases are the newest channel and the fastest growing. As the vast majority of the web-based purchases are delivered via integrated carriers (such as FedEx and UPS), the growing use of this sales channel can increase the amount of cargo handled at EWR.

- **Service disruptions in other modes.** As demonstrated in 2002 by the West Coast port strike, air cargo activity may temporarily increase when there are disruptions in the international and domestic freight transportation system. Air cargo activity in 2004 may show an increase due to rail freight capacity and crew issues in the U.S., the accelerating truck driver shortage and new hours of operation regulations, potential congestion issues at U.S. ports, and rail system performance.
- **Truck substitution.** As a primarily domestic air cargo hub, the activity at EWR reflects the national trend towards substituting less expensive, time-definite, truck service for air cargo movements. According to the *2002/2003 Boeing World Air Cargo Forecast*, the amount of freight handled by trucks in the U.S. grew by 4.5 percent annually between 1995 and 2000, while air freight grew by 1.9 percent annually over the same period. The increased use of trucking is having a profound impact on air cargo activities and airports, including:
 - Significant reductions in the amount of cargo moving by air domestically (as demonstrated in the EWR tonnage trends).
 - An increased demand for on- and off-airport facilities that can handle both truck-air and truck-truck operations.
 - At least 20 percent of all cargo operations on-airport typically can be truck-to-truck moves (no loading on aircraft).
 - Increased action by the airlines to grow or develop their truck operations faster than aviation operations. For example, BAX and FedEx are expanding their ground operations faster than their aviation activities in the U.S. In addition, DHL is attempting to develop new ground service in the U.S., either as an outgrowth of its current unit or as part of its acquisition of Airborne.
 - Truck substitution requires greater connectivity between the airport and the highway system, as well as on- and off-airport facilities that can handle both trucks and air cargo activity. Current and planned roadways improvements at EWR are designed to improve truck access for the airport.
- **Substitution of ocean transport for international air cargo movement.** Similar to the substitution of trucks for domestic air cargo movements, shippers are more often specifying maritime cargo movements for international shipments where the transit times are flexible. The cost savings of using oceanborne freight services rather than air are significant. This is less of an issue at EWR, where most of the activity is related to domestic cargo movement; the future development of domestic coastwise shipping may offer an alternative to air cargo, albeit probably at a slower speed than truck.

Environmental, Community, and Security Issues

- **New security requirements.** New security requirements by the Federal government regarding mail and known shipper rules have already affected the way that certain air cargo shipments are handled. New regulations will also affect air cargo choices. Combined with the less security restrictions on truck-based movements, security can have a dampening effect on both air cargo demand and supply. Security measures are currently evolving; the industry will need to adjust to any new measures implemented, which could potentially cause short-term disruptions in service. Long-term changes for airport and facility access, as well as belly cargo applications, may also occur.

Implementation and Delivery

- **Adequacy and availability of funding for needed improvements.** This is an issue that will need to be addressed by further study.

2.5.3 Air Cargo System Needs

Overall air cargo system needs follow directly from the issues identified above:

1. *Optimize air cargo capacity, performance, safety, and reliability through a combination of physical, operational, economic, and institutional solutions that address current and future market needs, in partnership with the region's air cargo stakeholders.*
2. *Identify and implement land use and economic development strategies for the development of air-cargo supporting warehouse/distribution facilities to minimize highway VMT impacts, reduce the need for highway system investments, and maximize economic opportunity.*
3. *Promote the competitiveness and performance of NJTPA's airports and air cargo-served businesses through infrastructure improvements and other strategies as appropriate.*
4. *Ensure that environmental/community and security issues are fully addressed in current and future planning and operations.*
5. *Develop transportation programming and funding processes that take full account of air cargo investment needs and requirements.*

■ 2.6 Warehouse/Distribution Performance, Issues, and Needs

2.6.1 Warehouse/Distribution Performance

Warehouses and DCs are an often overlooked element of the freight transportation system. Nevertheless, these facilities play a key role in goods distribution and the NJTPA region.

Warehouses and DCs are defined as structures that are primarily used for the receipt, temporary storage, possible modification/customization and distribution of goods that are enroute from production sites to where they are consumed. Warehouses and DCs are often sites where value is added to the products moving through them. Examples of value added activities include final assembly and customization of products and preparing products for the sales floor (including packaging and tagging).

Warehousing operations vary considerably in size, ranging from just a few thousand square feet to buildings that are over one million square feet. Warehouses may contain temperature-controlled space, which is essential for maintaining perishable food.

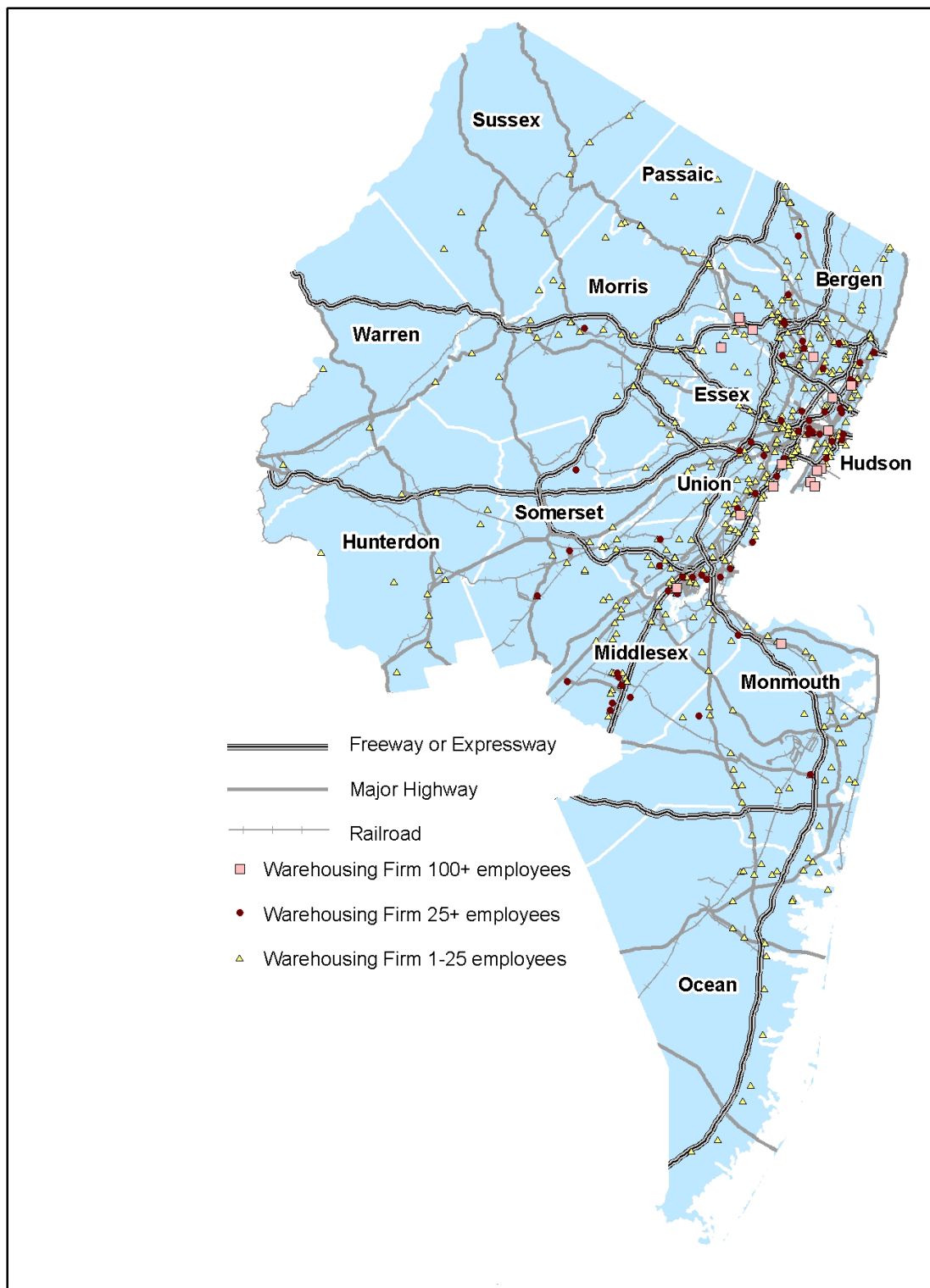
Warehouses and DCs can be located at or adjacent to airports and ports to support cargo operations. Warehouses may also have rail sidings for the receipt or shipping of products. The vast majority of the freight moving from warehouses and DCs tends to be handled by trucks.

Warehouses and DCs in the NJTPA region serve the area, the surrounding states, and North America. The region has one of the highest concentrations of warehousing and DC space in North America, and is considered a key location for this activity in the U.S.

Figure 23 on the following page shows the location of the largest warehouse and distribution facilities in the region, as reported by the InfoUSA database. The largest warehouse concentrations are located in Bergen, Hudson, Essex, Union, and Middlesex Counties. However, other counties also host substantial warehouse and DC activity. By following the warehouse locations, it is possible to trace out the alignments of many of the region's major freight roads – the Turnpike, I-80, I-78- I-287, U.S. 1, U.S. 9, U.S. 17, etc.

It should be noted that this data does not include private warehouses operated by wholesalers and retailers (Barnes and Noble, etc.), which have a substantial presence in the region.

Figure 23. Location of Major Warehouse and Distribution Facilities



Source: InfoUSA.

The northern/central New Jersey area contains over 778 million square feet of industrial property, with an additional 5 million square feet currently under construction. The majority of this space consists of warehouse and DCs, with over 670 million square feet in the NJTPA counties. By comparison, Laredo Texas, another key distribution location, has 65 million square feet. It is estimated that nearly 422,000 people work in New Jersey warehouses and DCs, making this activity one of the leading job generators in the State.

Since the third quarter of 1998, the NJTPA region has added 70 million square feet of space, primarily consisting of warehouses and DCs. The availability rate has decreased, dropping from over 10 percent to less than seven percent, despite all of the new construction. The average asking lease rate has generally increased throughout the region. Older industrial structures are being demolished or converted to other uses. The new construction, increasingly oriented towards warehousing and distribution, has provided the region with state-of-the-art capacity.

The high level of new speculative construction (defined as no tenant prior to start of construction) would usually indicate that the real estate cycle for warehouses and DCs is peaking, particularly when much of the new construction and facility purchases are being made by real estate investors. However, the demand for warehouses and DCs does appear to be growing for the reasons previously articulated, and growth is anticipated to continue at an annual rate of around 2.8 percent (as shown in Table 2 previously).

2.6.2 Warehouse/Distribution Issues

System Capacity, Performance, Safety, and Reliability

- **Location of new capacity.** The outlook is for continued strong demand for warehouses and DCs, assuming economic and international trade trends continue. We can assume that the market will look to meet that demand, but there are important choices about where the market will choose to do so – and these choices have significant implications for NJTPA’s transportation system and economy. Demand for both greenfields and underutilized properties should grow. Locations closer to the region’s core are preferred. If not available or prohibitively priced, then demand will most likely be accommodated in locations further south on the New Jersey Turnpike and in Pennsylvania (particularly on the I-78 and I-81 corridors). Continued monitoring of availability and lease rates over the next year will indicate either a continuation of increased demand or a peaking of the demand cycle.
- **Monitoring real growth in demand.** The U.S. began to emerge from the most recent recession, with renewed economic activity showing in 2004. As the economy improves, the demand for products grows. Commercial brokers noted an exceptionally strong market in northern and central New Jersey. Current published information and discussions with industry members indicates that 2004 has been an outstanding year for the warehousing and DC business in New Jersey. However, there are some mixed signals which will need to be watched closely, particularly the

sense that many recent transactions have been between real estate investment trusts, rather than involving end-users for the space.

Land Use and Economic Development

- **Economic opportunity.** The big opportunity in warehouse and distribution, as previously noted, is economic development. Freight happens, and it is forecast to continue to happen, and the region will continue to see the traffic from it happening. The issue on the table is: what will the region do to make freight pay to achieve an economic benefit that allows the region to address the negative impacts of freight movement, while improving the region's overall employment, tax base, and quality of life?
- **Location and accessibility factors for outlying and close-in development.** There are several trends at work:
 - Much of the newer warehousing and DC space is located along the New Jersey Turnpike, with key concentrations around Interchanges 12, 10, 9, and 8A. A significant inner ring of these facilities also exists in the Meadowlands, Hudson County, the City of Newark, Union County, and parts of Bergen County. A growing outer ring of warehouses and DCs has been developing on the New Jersey Turnpike at Interchanges 7A and south, as well as in Pennsylvania on the I-78 corridor towards Harrisburg. As locations in the NJTPA region become less available or expensive, warehouse developers, operators, and users have shifted to these more distant locations.
 - At the same time, the countervailing opportunity is to utilize close-in underutilized properties where feasible, to provide services closer to the point of production or consumption, thereby, reducing the transportation distances required and supporting the economic development objectives of host communities. The NJTPA recently sponsored a major study of Freight Opportunity sites, and there has been interest from the development community in pursuing this approach to the next level of investigation.
 - These tendencies are not mutually exclusive. Some types of operations find their greatest economies and efficiencies using outlying locations, with large buildings close to major highways. Others will be optimized to take advantage of closer-in locations, offering both large and small footprint opportunities, as well as the possibility of rail and/or water access.

Industry Competitiveness and Performance

- **International trade and overseas production.** Warehouses and DCs have taken on new importance in the global economy. Goods are produced at the least cost location, but final assembly, customization, and shelf-readiness is undertaken near the end users. Accordingly, as more goods are produced overseas, these final elements of the production process are occurring near the key points of entry to the U.S. The Port of New York and New Jersey is one of the leading gateways in North America. Combined with the proximity of one of the nation's largest concentrations of consumer

activity, the demand for warehousing and DC space for final customization and shelf-readiness is growing. The relationship between the port and warehouses was highlighted to the recent Portway Extensions Concepts Study. The study identified the economic development benefits of the relationship, as well as outlined near- and longer-term improvements to facilitate movements between the Port and key locations of warehousing activity.

- **Sensitivity to disruptions in the freight transportation system.** Demand for warehousing and DC space has also grown as a result of the increasing amount of disruptions and congestion in the nation’s freight transportation system. Crew and capacity shortages on major segments of the nation’s rail freight system have caused significant delays, reduced the predictability of delivery times, and caused users to shift to truck, air, and all-water route services. Similarly, some labor unrest at port facilities around the country has occasionally affected supply chains. Severe weather events have created unanticipated disruptions. Much of the economic efficiency in the modern “just in time” logistics process has been derived from the reduction of inventory (which is held in warehouse and distribution facilities); but with increased uncertainty in the logistics chain, many companies have had to increase their levels of inventory, “just in case.” Decreasing transportation certainty – which we can expect more of as the region and the nation face growing transportation demand – fuels increasing need for warehouse/distribution capacity.
- **Impact of truck driver shortages.** One effect of driver shortages is that warehouse and DC locations closer to the region’s core and port are now more desirable, because drivers can make more deliveries per shift from the closer in locations, and fewer drivers are needed as a result. This has led to increased interest in underutilized property redevelopment, as well as other inner ring sites in the NJTPA region. In the inner area, warehouse and DC development will increasingly compete with other uses for available property.

Environmental, Community, and Security Issues

- **Local impacts.** Major warehouse and DCs can be significant trip generators. Ideally, they can offer the possibility of alternative modes of access (rail and/or water in lieu of truck), and can be located in clusters served by targeted truck-oriented highway improvements and sited to generate minimum conflict with other land uses. The public sector has a significant role in promoting “smart growth” development practices to minimize the environmental downsides of these uses.
- **Site development issues.** It is recognized that some of the properties, identified as freight opportunity sites by NJTPA, may pose environmental challenges, and public sector participation may be important in making certain projects financially viable.

Implementation and Delivery

- **Public-private partnership opportunities.** The market has done an excellent job of making NJTPA one of the nation’s leading warehouse and DCs, but the public sector

can fill several important roles – most notably, encouraging the market to behave in a manner that best meets public policy objectives. It can do so through policies, through guidance, and also through direct participation with the private sector in the development and implementation process.

2.6.3 Warehouse/Distribution Needs

Overall needs follow directly from the issues identified above:

1. *Optimize warehouse and distribution center capacity, performance, safety, and reliability through support, guidance, and potential participation with the private sector in the development and implementation process, and through the provision of supporting transportation improvements.*
2. *Identify and implement “smart growth” land use and economic development strategies for the development of warehouse and distribution center facilities to minimize highway VMT impacts, reduce the need for highway system investments, and maximize economic opportunity.*
3. *Promote the competitiveness and performance of NJTPA’s warehouse and distribution facilities and customers through infrastructure improvements and other strategies as appropriate.*
4. *Ensure that environmental/community and security issues are fully addressed in current and future planning and operations.*
5. *Develop transportation programming and funding processes that take full account of warehouse and distribution center investment needs and requirements.*

3.0 Interregional and Institutional Issues and Needs

■ 3.1 Interregional and Institutional Issues

Beyond NJTPA’s freight transportation infrastructure and operations, there are several important issues related to interregional and institutional relationships and actions. We believe the most critical of these issues can be summarized as follows.

Planning Across Boundaries

Most freight trips are hundreds or thousands of miles in length, cross multiple jurisdictional boundaries (local, county, region, state, and/or nation), and involve both public and private assets and infrastructure. Given these conditions, no single entity in the trip chain “owns the problem” and no single entity can “fix the problem” acting alone. To borrow an analogy, we can think of the intermodal freight transportation system as a series of interconnected pipes and valves, connecting every part of the U.S. to every part of the world. The capacity in each pathway is limited by its smallest component. If NJTPA builds a 12-inch valve connected to a six-inch pipe coming out of Pennsylvania, it’s a waste of resources – at least until someone fixes the pipe in Pennsylvania. Conversely, if the NJTPA region offers a six-inch valve at the end of a 12-inch pipe coming out of Pennsylvania, it can gain major benefit by upgrading to a 12-inch valve – basically, NJTPA becomes the direct beneficiary of “downstream” investments outside the region.

- **Multistate planning initiatives.** There are a variety of multistate planning initiatives underway that could impact the NJTPA region. For some of these initiatives, NJDOT and/or NJTPA have been active participants; for others, they have served a review and oversight role; and for others, the initiative has not yet reached the state line, so that participation would be a future opportunity. Major multistate initiatives include:
 - The Comprehensive Port Improvement Plan (CPIP). As previously discussed, the CPIP is a multistate (NY and NJ), multiagency effort to document the NY/NJ region’s container terminal capacity and future demand, current and future impacts, and other issues.
 - The Port Inland Distribution Network (PIDN). The PIDN initiative – which aims to substitute rail and/or barge in lieu of trucks for the landside collection and distribution of PANYNJ containers within a 75- to 400-mile radius – was developed by PANYNJ. But the “other end” of these PIDN trips will be in New Jersey, New York, Pennsylvania, Connecticut, and possibly other states as well, so it becomes a

- multistate effort. Leadership is actually coming from some of these other states; for example, the Port of Bridgeport is taking the initiative to implement a Bridgeport to PANYNJ container barge service.
- The Mid-Atlantic Rail Operations Study (MAROPs). MAROPs is a joint effort of the States of New Jersey, Pennsylvania, Delaware, Maryland, and Virginia, plus the I-95 Northeast Corridor Coalition (of which New Jersey is a member), plus three major railroads (Norfolk Southern, CSX, and Amtrak). Together, this MAROPs working group developed a consensus recommendation for a 20-year, \$6.2 billion freight/passenger rail investment strategy to upgrade aging infrastructure, and substantially improve rail system capacity and performance throughout the Mid-Atlantic corridor. The hoped-for benefit is reduced stress on highway systems from freight and passenger travel. The projects identified for New Jersey supplement other rail improvements planned by the railroads and the State, and reflect additional needs due to increased rail traffic attracted by coordinated multistate improvements.
 - The Virginia I-81 Rail Corridor Study. The State of Virginia has undertaken several studies to test the impact of improving rail capacity along one or both of the NS lines paralleling I-81 through Virginia. The goal is to divert trucks from I-81 and possibly I-95, reducing or delaying the need for highway system investments. In Virginia, I-95 carries a mix of local-serving and long-haul trucks, but I-81 carries predominantly long-haul trucks that are serving markets in Pennsylvania, New Jersey, New York, and New England. If Virginia builds infrastructure to improve rail flows, the issue becomes: what must the “upstream” states (Maryland, Pennsylvania, New Jersey, and New York) do to upgrade the corresponding parts of their systems, in order to achieve benefit from Virginia’s investment? Does New Jersey allow this rail traffic to turn into truck traffic when it reaches Pennsylvania, or does it try to continue the rail move into the NJTPA region?
 - The New York Cross Harbor Freight Movement DEIS. This ongoing study and its preceding Major Investment Study examine opportunities to increase the percentage of freight moving from the “west of Hudson” to the “east of Hudson” via rail. Currently, the only direct rail link between the NJTPA region is via the little-used New York Cross Harbor Rail Road float operation. NJTPA and others have reviewed the project documentation to date, evaluated issues and potential impacts on the NJTPA region, and provided substantial comments as part of the public record.
 - **In-state and in-region initiatives.** Planning across boundaries is an interstate commerce problem – we can just as easily talk about discontinuities in pipelines between Ocean and Bergen Counties, for example. Cooperation and coordination at the intraregional level – with the State of New Jersey, with the two other metropolitan planning organizations (MPOs) representing central and southern New Jersey, with the counties, and with local governments – is essential to getting the most benefit from freight improvements.
 - A good example of a local project that benefits the region’s overall freight system is the Kapkowski Road Transportation Planning Study in Union County. The

project eliminates the intersection of North Avenue and Kapkowski Road with a flyover, separates port and non-port traffic at NJ Turnpike Exit 13A, and improves the Dowd/Division/North Avenue intersection. These improvements will substantially reduce conflicts between Port Newark/Elizabeth traffic and non-freight traffic to the Jersey Gardens Mall, IKEA, several hotels, and other land uses.

- The International Intermodal Transportation Corridor (IITC) is envisioned as a multicounty economic zone of interlinked businesses, served by an efficient goods movement infrastructure, and providing the institutional framework for implementing comprehensive land use and transportation planning in the port district.
- The NJDOT Portway Phase I project is a coordinated program of 11 independent-utility freight-oriented highway improvement projects in several counties. The projects – currently in various stages of implementation – are designed to strengthen highway access to and between regional marine terminals, intermodal rail facilities, warehouse/distribution centers, and future development sites identified as freight opportunities.
- The NJDOT Portway Extensions project built on the objectives of Portway Phase I with an additional series of recommended improvements, covering a larger geographic portion of the NJTPA planning region, addressing multiple modes, and dealing with operational, as well as physical improvements.

Guiding Private Commerce to Achieve Public Benefit

Transportation services are products, which are offered by private sector providers, to public and private customers looking for the best available deal that meets their needs. Logistics decisions – what to ship, where, and by what modes – are made by the private sector, not dictated by the public sector. The public sector in many cases has built the infrastructure that they operate over (roads, seaports, airports), but other parts of the infrastructure remain largely in private ownership (railroads, warehouse and distribution centers, vehicles, equipment, information systems, etc.). Regardless of what the public sector does, freight happens – but the public sector has a lot to do with how, where, and when it happens, and can act to guide the private sector to make freight transportation and freight logistics decisions that are consistent with public objectives.

- **Role of the public sector.** The public sector plays three hugely important roles in freight transportation: it helps establish the “playing field” on which modes compete for business (through development of infrastructure and regulation of freight operations); it provides transportation improvements that selectively advantage (or remedy disadvantage in) certain “pipelines”; and it guides the development of critical nodes (intermodal transfer points, warehouse and distribution centers, freight-oriented land uses, etc.) that generate freight transportation system demand and affect routing and mode choices. The public sector cannot dictate freight movement, but it can have a considerable influence on the transportation choices that are made by the private sector.
- **Need for public/private cooperation.** The public sector is most effecting in achieving public benefits (congestion reduction, economic development, etc.) from freight initia-

tives when it acts with the input and cooperation of the freight shippers, carriers, and intermediaries who actually use the system. Private stakeholders can help identify needs, projects, and policies that support their facilities and operations while also meeting public purposes. NJTPA has established a Freight Initiatives Committee which meets regularly to obtain stakeholder input and guidance.

Achieving Equity of Benefits and Impacts

The public benefits of freight improvements – economic benefit, improved systemwide mobility, etc. – tend to accrue over larger areas, while the negative impacts – changes in highway or rail traffic through neighborhoods, development of new freight facilities, loss of tax revenues associated with other potential uses – tend to accrue over smaller areas. This can create perceptions that benefit and cost are not equitably distributed, and make it difficult to implement needed freight improvements.

- **Perceptions of equity.** This concern over equity is not just an issue in the NJTPA region, or in the New York-New Jersey metropolitan area. This seems to be the case everywhere we have worked in the U.S., and the relationship seems to hold regardless of scale – neighborhoods feel they are being burdened with impacts so that cities can benefit, cities feel burdened so counties can benefit, etc. Conversely, cities blame neighborhoods for holding freight projects hostage without legitimate cause, counties blame cities, etc.
- **Practical challenges of reconciling interests.** A thorough, fair understanding of the benefits and impacts of freight projects is enormously helpful. With a good understanding of who benefits, where, and how – versus who is impacted, where, and how – it is possible to craft projects and programs that appropriately balance benefit and impact. The Alameda Consolidated Transportation Corridor project in Southern California was an excellent example of an ultimately successful process to identify both regional benefits and local community impacts, and to ensure that local communities received appropriate impact mitigation and benefit. These kinds of accommodations cannot be reached if parties hold to a Build Absolutely Nothing Anywhere Near Anything (BANANA) mentality, or if some parties fail to acknowledge the legitimate interests and concerns of other parties.

Funding Freight Improvements

Freight funding is a long-recognized problem. Federal transportation funding – which is allocated by MPOs in their designated regions through the Regional Transportation Plan and Transportation Improvement Plan process – is mostly geared toward highways, and makes few special provisions for freight-related projects. Consequently, truck-oriented projects must compete with auto-oriented projects for available funds. Federal assistance for railroads is very limited and devoted primarily to safety, rather than capacity; many states (including New Jersey) have tried to fill the breach with state rail assistance programs, but budgets are typically small (in New Jersey’s case, \$10 million annually). Funding for publicly-owned marine terminals comes mostly from agency operating revenues and Harbor Maintenance Tax proceeds. Funding for publicly-owned airports comes

mostly from operating revenues, passenger facilities charges, and other assistance. Many different strategies for addressing this issue have been/are being discussed at the Federal level.

- **Overall funding.** In light of current and projected Federal budget deficits, substantially increased funding for transportation may be difficult to achieve. States have not been willing to raise their gas taxes, and while many state contribute to freight improvement programs, the amount of funding tends to be small, and the outlook for state budgets does not look to accommodate significant increases.
- **Dedicated freight funding pools.** The idea of creating dedicated freight funding in the next round of Federal transportation legislation has been discussed extensively. With less funding available than needed, limiting the states' use of that funding use may be impractical. Some states have explored the use of dedicated freight funding; for example, Florida has established a statewide fund for port improvements.
- **Program eligibility for freight projects.** Trucks can benefit from highway improvements under existing Federal funding categories (National Highway System and NHS connectors, Surface Transportation Program, Congestion Mitigation and Air Quality (CMAQ), etc.). But very few rail and marine improvements have been funded under Intermodal Surface Transportation Efficiency Act (ISTEA) and Transportation Equity Act for the 21st Century (TEA-21). Some - including the barge service between the Red Hook Container Terminal and Port Newark - were funded under CMAQ based on a demonstrated reduction in highway-related needs, but these were special cases. Loan programs have also been used to fund freight improvements - for example, the Alameda Corridor project received a \$400 million loan guarantee to be repaid from operating revenues. Expanded eligibility would provide more flexibility in the use of available funds.
- **User-based financing.** Having the private sector pay a greater share of transportation improvements is an idea that many states are pursuing with increasing vigor. For roads, this can take the form of increased tolling, or public-private partnerships where the private sector builds the facility and is repaid from toll revenues.
- **Public-private partnerships.** The public sector generally has access to capital at a lower rate than the private sector - it can borrow more, for less cost, for a longer period. One emerging strategy is for the public sector to provide loan financing, and have the loan repaid by the freight carrier from its revenues. Recently, the state of Delaware provided the capital funding to repair a rail bridge giving NS access to the Port of Wilmington, and is being repaid from NS revenues. Many freight projects have a very large up-front capital cost and must generate revenues for many years to pay that cost back. The private sector will often look at these projects as higher-risk and prefer smaller investments with lower-risk, nearer-term returns. The ability and willingness of the public sector to provide capital and absorb a share of risk may allow for the creation of more partnerships in the future.

- **Tax credits and incentives.** Tax rebates, payments in lieu of taxes, and other strategies are being used or considered in many states as inducements for the private development of freight facilities and infrastructure deemed in the public interest.

Providing Regional Leadership

Many have argued that freight planning is made substantially more difficult in the New York-New Jersey region because “no one is in charge.” Transportation and land use leadership, authority, governance, and funding powers are divided among a broad range of local, regional, state, and multistate entities, all seeking to promote or defend their particular views of an equitable distribution of benefit and impact.

- **Division of powers.** We would argue that this division of powers has not been crippling – the region is one of the nation’s leading freight centers, and continues to plan and deliver major freight-oriented improvements. At the same time, where you have multiple entities pursuing multiple agendas according to their own views of equity, this division of powers can make for a less efficient planning process, consume more time, money and effort than strictly necessary, and in the worst case produce less than optimal solutions.
- **Need for effective regional leadership.** Effective regional leadership does not mean “ruling the roost.” It does mean being responsible for formulating a compelling regional vision, identifying issues and opportunities, developing the information needed to evaluate potential actions and strategies, and guiding diverse public and private stakeholders to agreements on mutually beneficial solutions. Such leadership will be especially needed to address the challenges of declining system performance, increasing system demand, limited funding, and the challenges of “planning across boundaries” and achieving equitable distribution of benefit and cost.

■ 3.2 Interregional and Institutional Needs

The issues outlined in Section 3.1 suggest the following list of interregional and institutional needs.

1. *Develop a focused strategy for NJTPA participation in multistate freight initiatives and NJTPA coordination and facilitation of in-state and in-region initiatives across jurisdictional boundaries.*
2. *Develop a focused strategy to guide the private sector to invest and operate NJTPA’s freight system, to the extent possible, in a manner consistent with public benefit and public purpose, and to leverage private investment with public participation as warranted.*
3. *Develop NJTPA policies and procedures to promote the achievement of an equitable balance of benefit and cost among different stakeholders in freight improvement projects.*

4. *Explore and pursue NJTPA opportunities for the creative financing and implementation of freight improvements.*
5. *Provide NJTPA regional leadership to promote the exploration and implementation of needed freight improvements, consistent with the roles and responsibilities of all participating stakeholders, possibly within new institutional structures.*

4.0 Policy Options and Recommended Strategies

■ 4.1 Overview

Section 2.0 of this report defined various freight issues and needs associated with the NJTPA's highway, rail, marine, airport, and warehouse/distribution systems. For each mode, the issues and needs were organized according to five cross-cutting themes:

1. System Capacity, Performance, Safety and Reliability;
2. Land Use and Economic Development;
3. Industry Competitiveness and Performance;
4. Environmental, Community, and Security Issues; and
5. Implementation and Delivery.

Section 3.0 of this report defined additional issues and needs associated with interregional and institutional relationships. These were organized into five major areas:

1. Planning Across Boundaries;
2. Guiding Private Commerce to Achieve Public Benefit;
3. Achieving Equity of Benefits and Impacts;
4. Funding Freight Improvements; and
5. Providing Regional Leadership.

This section discusses policy options and recommended/potential strategies to successfully meet each of these identified needs.

■ 4.2 Modal Strategies

4.2.1 Highway Strategies

Need #1: Optimize highway system capacity, performance, safety, and reliability through a combination of physical, operational, economic, and institutional solutions that address NJTPA-serving trucks, through trucks, and background non-freight traffic.

- **Pursue modal diversion strategies emphasizing alternative modes to relieve pressures on congested highways.** As highway conditions worsen, alternative modes – transit for passengers, rail and water for freight – will become increasingly competitive, and should help offset growth in highway demand to some degree. This involves elements of modal substitution (decisions by a logistics manager to use rail or water instead of truck) and modal partnership (decisions by truckers or trucking companies to use rail or water to move their equipment instead of driving it over the road for some portion of the trip). The difference between these elements is significant. From a business perspective, modal substitution is sometimes seen as a threat to trucking’s market share, but we would argue – and most studies agree – that the base amount of traffic that could undergo substitution is fairly small compared to the enormous projected growth in truck-dependent traffic. In other words, trucking’s market share is not at risk. On the other hand, modal partnership is a means for the trucker or trucking company to make more efficient and more profitable use of the nation’s overall transportation system, and should be increasingly attractive as highway conditions worsen with time – so this can be a very positive business opportunity for both large and small truckers. It may even help with the industry’s driver shortage and hours of service problems. The trucking industry is already one of the railroad industry’s biggest customers, so this would be an easily-imagined evolution of current practice. The strategy of modal diversion is not applicable where highway capacity is readily available and/or trucking demand is low, but it is highly applicable to high-density highway corridors and “hot spots” such as major water crossings. Key opportunities include:
 - Long-haul rail. Trucks and/or containers would move by rail for extended segments of what would otherwise be an all -highway move. For example, current planning by the State of Virginia is looking at major improvements to rail lines paralleling I-81 to divert up to 25 percent of heavy trucks from that corridor, reducing or delaying the need for capacity improvements to I-81 itself.
 - Short-haul rail. There may be additional opportunities for rail to substitute for segments of truck trips – not just over long hauls, but potentially over shorter distances as well, using shuttle trains or sprint trains. Agreements to begin a short-haul container rail shuttle between the Port of Oakland and a distribution center in Shafter, CA have been reached, and the Alameda Consolidated Transportation Authority is negotiating to begin a short-haul service between the Ports of Los Angeles/Long Beach and a distribution center in Colton, CA.

- Water. Increasingly, the use of waterborne transportation – in the form of coastal “short sea” shipping as well as local barge and ferry services – are being viewed as a viable means of substituting for over-the-road mileage. It’s a mistake to view these services as stealing traffic from trucks. Rather, they would provide additional capacity for the truck (and the trucking company), only in the form of water rather than asphalt.
- **Pursue temporal diversion strategies to minimize peak-hour travel.** As peak period highway capacity becomes increasingly scarce, both freight and passenger traffic will favor off-peak travel, when capacity is more available. Generally, truckers already do this to the extent practical – time is money to a trucker, and time spent in congestion is money wasted – but their pick-up and delivery windows are determined by the schedules of their shippers and receivers. Running the region’s container ports in the off-peak is an important first step, but as previously noted, container trucks are a small portion of the region’s truck VMT, and the effects of this beneficial policy must be multiplied by expanding the reach of such strategies throughout the entire system. Accomplishing this may require a combination of strategies:
 - Increasingly, shippers and receivers will need to remain open in the off hours to allow for pickups and deliveries during that period. This will probably be easier for larger shippers and facilities than for smaller ones. Appropriate incentives should be identified.
 - Where one party in the shipper-receiver chain can handle cargo in the off-peak but the other cannot, secured off-peak handling depots could be used for the intermediate staging of pickups and deliveries. The logistics of this operation might be challenging, but the goal would essentially be to pool the incremental cost of off-peak transportation among the largest number of users, so that individual businesses would be minimally impacted.
 - Improved truck rest and truck staging areas. Today, truckers are using an ad hoc system of rest stops and highway shoulders for intermediary staging – helping them to time their trip to avoid peak periods. These functions should be carefully managed by the planning and implementation of substantially expanded rest area capacity.
 - Congestion pricing is being used as a traffic management strategy in many parts of the country. As previously noted, many types of truck trips are inelastic – they will happen when they have to happen according to the needs of shippers and receivers – but there is flexibility for other types of trips, and congestion pricing may in some cases be effective (as a supplement to the pure cost of congestion itself) in encouraging off-peak travel. On the other hand, more aggressive congestion pricing for passenger trips – which may be more elastic – could be a strategy to create additional capacity in the peak periods when it is needed most, to the benefit of non-elastic freight (and non-freight) traffic.
- **Pursue spatial diversion strategies to reduce conflicts between trucks and cars.** Creating physically separate transportation networks for trucks and passengers has long been recognized as an opportunity to improve freight system performance and reliability, as well as overall highway safety. To date, few freight-only roads have

been built – the Tchapotoulas Corridor in New Orleans is probably the best example – but the approach is being looked throughout the country. Strategies could include:

- Truck-only lanes on existing roads. This would be an extension of the trend to special purpose lanes – car-only lanes (like the Turnpike express lanes), HOV lanes, transit lanes, and high-occupancy toll (HOT) lanes. The truck lanes could feature improved geometry and control systems, and would improve passenger flow and passenger safety by removing trucks from general purpose lanes. However, it must be noted that truck-only lanes are proving to be a difficult sell when they involve the loss of general purpose lanes; this strategy might prove more attractive when adding new lanes to existing corridors, but even with new lanes there will be substantial pressure not to shut cars out.
- New truck-only limited access routes. Recent planning for the I-710 Freeway (serving the Port of Long Beach) considered and rejected dedicated truck lanes. In Virginia, the construction of two truck-only toll lanes paralleling I-81 is being considered, but there are fears that a very high toll would be needed to fund their construction, and truckers would divert to alternate routes. Even so, the construction of limited access truck-only lanes – with or without tolls – is a promising strategy in highly congested corridors. The toll option would be especially attractive for corridors with high volumes of through truck traffic, where through traffic – which does not contribute to the region’s economy – could at least contribute to offsetting its impacts, above and beyond gas tax revenues.
- Aggressive transit implementation for passengers. One of the most effective and attractive ways to create capacity for trucks is to get cars out of their way. Every passenger (or rather, about 1.1 passengers) on transit is one car that has been spatially diverted – eliminated from the system. For high-density corridors shared by freight and passengers – such as the NJ Turnpike, major interstate and state highways, etc. – this is an important opportunity. It would not, however, have much affect on freight movements in areas with lower passenger travel density.
- Passenger-only high-occupancy toll (HOT) lanes. This is a strategy to “back in” to freight improvements – by providing additional capacity for cars, paid for by cars, capacity could be freed up on general purpose lanes for use by trucks. The upside of this approach is that it appeals to the legitimate needs of auto users; the downside is that increasing overall demand could soon erase the capacity gained in the general purpose lanes, leaving little or no ultimate benefit for trucks.
- **Pursue Intelligent Transportation Systems (ITS) strategies to manage capacity and demand.** Throughout the country, there has been an increased use of electronic systems for scheduling, managing, and routing truck pickups and deliveries by the private sector. At the same time, the public sector is using real-time traffic information systems for monitoring its highways, responding to incidents, and adjusting operations (signal timing, lane functions, routing advisories, etc.) in real time. In addition to traditional truck safety enforcement, many regions are implementing driver credentialing systems and other programs to support the safe and secure handling of international goods, adding a security dimension to these ITS applications. Prior studies conducted in this region and throughout the country have identified an

array of ITS elements, user services and market packages that when grouped and prioritized forms a blueprint of system architecture to serve the needs of the goods movement community. The prioritization of services (as presented in Tables 8 and 9 below) is based upon proven technologies, degree of difficulty to implement, and immediate user needs.

Table 8. ITS Strategies - Advanced Traveler Information Services

	User Services																
	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	#15	#16	#17
Market Packages	Pre-Trip Travel Information	En-Route Driver Information	Route Guidance	Traffic Control	Incident Management	Travel Demand Management	Archived Data Management	Commercial Fleet Management	Commercial Vehicle Administrative Process	Commercial Vehicle Electronic Clearance	Electronic Payment Services	Hazardous Material Incident Response	On-Board Safety Monitoring	Automated Roadside Safety Inspection	Emergency Notification and Personal Security	Emergency Vehicle Management	Maintenance and Construction Operations
Broadcast traveler information	◆	◆															
Interactive traveler information	◆	◆									◆						
Autonomous route guidance		◆	◆														
Dynamic route guidance		◆	◆		◆												
ISP-based route guidance	◆	◆	◆								◆						
Integrated transportation mgmt/route guidance		◆	◆								◆						
Yellow pages and reservation	◆	◆									◆						
Dynamic ridesharing	◆	◆	◆			◆					◆						
In vehicle signing		◆		◆													

Table 9. ITS Strategies - Advanced Traveler Monitoring Systems

	User Services																
	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	#15	#16	#17
Market Packages	Pre-Trip Travel Information	En-Route Driver Information	Route Guidance	Traffic Control	Incident Management	Travel Demand Management	Archived Data Management	Commercial Fleet Management	Commercial Vehicle Administrative Process	Commercial Vehicle Electronic Clearance	Electronic Payment Services	Hazardous Material Incident Response	On-Board Safety Monitoring	Automated Roadside Safety Inspection	Emergency Notification and Personal Security	Emergency Vehicle Management	Maintenance and Construction Operations
Network surveillance				◆													
Probe surveillance				◆													
Surface street control				◆	◆												
Freeway control				◆	◆	◆											
High-occupancy vehicle (HOV) lane management				◆		◆											
Traffic information dissemination				◆													
Regional traffic control				◆													
Incident management system					◆												
Traffic forecast and demand management				◆		◆											
Electronic toll collection						◆					◆						
Emissions monitoring and management																	
Virtual TMC and smart probe data		◆		◆	◆												◆
Standard railroad grade crossing																	
Advanced railroad grade crossing																	
Railroad operations coordination																	
Parking facility management						◆					◆						
Regional parking management						◆					◆						
Reversible lane management				◆	◆												
Speed monitoring				◆													◆
Drawbridge management				◆	◆												

- Pre-Trip Travel Information provides travelers with details about various travel modes, so that informed decisions can be made about which is the best method of travel at specific time given the existing conditions. Prior to beginning a trip, travelers will be able to access real-time traffic data via the radio, television and the Internet.
- En-Route Driver Information provides travel information to drivers while they are already on the road. Variable Message Signs (VMS) and Highway Advisory Radio (HAR) advise drivers of alternate travel routes and methods.
- Route Guidance provides travelers with route suggestions, directions, and maps. This includes standard directions based on static map data, as well as directions that are based on real-time traffic and transit conditions. Route Guidance helps travelers make informed decisions about the best route for the current traffic and transit conditions.
- Traffic Control uses real-time traffic data to minimize traffic congestion. Traffic Control consists Traffic Surveillance, which is used for Traffic Flow Optimization and Control Functions, as well as Providing Information. Real-time and historical traffic surveillance data is processed and used to control ITS equipment that is in the field.
- Incident Management includes identification of an incident, determination of an appropriate response, implementation of response and pre-planned responses. Once an incident and a response plan are identified, the response must be implemented. This involves providing information and coordination to all agencies that are involved. Incident management also involves pre-planned responses, such as emergency evacuation plans.
- Travel Demand Management creates and disseminates plans that are designed to improve the travel conditions.
- Archived Data Management compiles and organizes ITS data. The data is stored and can be accessed when necessary.
- Commercial Fleet Management provides drivers of commercial vehicles and dispatchers with real-time information. The real-time data are used to direct the drivers to the best routing option for the current traffic conditions.
- Commercial Vehicle Administrative Processes include the Electronic Purchase of Credentials, Automated Mileage and Fuel Reporting and Auditing, and International Border Electronic Clearance. Through the use of electric transponders, trucking companies can track vehicle mileage and fuel usage. The transponders can also be used to easily identify drivers and cargo at international border crossings.
- Commercial Vehicle Electronic Clearance provides vehicle information that can be electronically accessed at fixed facilities, such as inspection stations, weight stations, tollbooths, and ports of entry. This helps easily identify vehicles, vehicle credentials, drivers, driver credentials, and vehicle safety information. Commercial Vehicle Electronic Clearance also enables vehicles to communicate with fixed facilities.

- Electronic Payment Services enables travelers to pay for tolls, fares, and parking services electronically. These electronic payment methods can be combined into one system.
- Hazardous Material Incident Response provides communication between hazardous materials (HAZMAT) carriers and local agencies. HAZMAT incident notification informs enforcement agencies and HAZMAT agencies of details of incidents that occur with vehicles that are transporting hazardous material. An Operation Focal Point provides a main response center that receives and responds to calls from HAZMAT carriers.
- On-Board Safety Monitoring detects problems with the vehicle and alerts the driver of the problem. The carrier and enforcement agencies are also notified of problems with the vehicle.
- Automated Roadside Safety Inspection provides a quick and efficient way to perform roadside inspections on commercial vehicles. Automated inspections can be performed at fixed facilities or by using a vehicle system. At fixed facilities, all data will be stored and available for access by the Federal Motor Carrier Safety Administration. The vehicle system can be used in conjunction with manual roadside inspection processes. The collected data can then be transmitted to a fixed facility so that inspection records can be updated.
- Emergency Notification and Personal Security provide emergency alert signals that are transmitted to emergency response agencies. Depending on the system, the signals can be initiated manually (Driver and Personal Security), automatically (Automated Collision Notification), or both (Remote Security and Emergency Monitoring).
- Emergency Vehicle Management monitors the emergency vehicle fleet, determines the best route, and provides signal priority. The emergency vehicle fleet will be tracked and the most appropriate vehicle will be dispatched. Dispatched emergency vehicles will be provided with route guidance information as well and signal priority system.
- Maintenance and Construction Operations, which includes Maintenance Fleet Management, Roadway Management, Work Zone Management and Safety, and Roadway Maintenance and Work Plan Dissemination, exchanges information about maintenance and construction activities with other agencies. Maintenance and Construction Operations also helps to track maintenance vehicles and to effectively schedule maintenance/construction activities.
- Weigh-in-motion Devices and Protocols. These strategically located stations provide management support and regulatory compliance enforcement. These stations would best be deployed at marine and intermodal rail terminals and along strategic highway links.
- **Identify and designate “Priority Freight Projects” for study and investment.** Ultimately, while the approaches discussed above can help reduce the need for truck-oriented highway improvements, substantial and potentially very expensive investments in our roads, bridges, and tunnels will still be needed to accommodate

growing demand from both freight and non-freight traffic. Bridges and tunnels, mainline corridors, regional/local routes, and last-mile connectors must be addressed. Current initiatives – Portway Phase I, Portway Extensions, the International Intermodal Transportation Corridor, etc. – are a good start, but are only the beginning of what will be needed over the next 30 years. Successful delivery of highway system performance improvements for freight and passengers is – and must be – a core mission of transportation planning at all levels of government, both within the NJTPA region and throughout the State of New Jersey. It is therefore recommended that NJTPA develop and maintain a designated inventory of Priority Freight Projects, to highlight projects of special significance and emphasis in the planning and programming process. This could include physical improvements, operational improvements, and planning/feasibility studies. Truck-oriented Priority Freight Projects could include:

- Independent-utility projects already identified within the NJTPA region through major planning initiatives such as Portway Phase I, Portway Extensions, and the International Intermodal Transportation Corridor.
- Other regionally significant roadway infrastructure projects in current planning that substantially address key freight needs: major corridors for local-serving and through trucks, last-mile connectors, interchanges, and bridges and tunnels.
- New studies of emerging hot spots throughout the region.

Need #2: Identify and implement “smart growth” land use and economic development strategies that minimize VMT impacts associated with goods movement, reduce the need for highway system investments, and maximize economic opportunity and benefit for the NJTPA region as a whole.

- **Where possible, locate major truck generators to minimize VMT.** The diversion strategies discussed above attempt to reduce the number of truck trips, or their timing, or the amount of background traffic they will encounter. Smart growth strategies provide an additional opportunity – the chance to manage the location of trip ends. By encouraging the development of critical truck trip generators – intermodal facilities, warehouse/distribution centers, shipper/receiver clusters, etc. – in areas where the transportation infrastructure is well-suited to truck activity and/or where their activities would generate the least VMT, we improve overall utilization of the system and reduce the need for infrastructure improvements. Land use in New Jersey is largely a matter of local decision-making and can be difficult to coordinate across multiple jurisdictions to achieve regional objectives, but to the extent practical, the opportunities should be explored.
- **Encourage clustered freight development in the NJTPA region.** There are a variety of names for clustered freight development – trade zones, industrial parks, freight villages, integrated logistics centers, etc. – but whatever the name, the concept is to create a concentration of freight-dependent uses in a location that is well-served by transportation infrastructure (preferably allowing for alternative modes), and close by its major suppliers and customers (to minimize truck VMT). Incentives – in the form of preferential zoning, tax status, development assistance, and transportation

improvements – can be considered to facilitate clustered freight development in close-in areas.

- **Encourage redevelopment of Freight Opportunity Sites.** A special form of clustered freight development would focus on freight opportunity sites identified by previous NJTPA/NJIT studies. These are economically or environmentally challenged underutilized properties within the urbanized core of the region which are well-suited for freight uses in terms of their size and accessibility, and which would allow for alternative modes and/or minimum VMT by virtue of their close-in locations. Special incentives, assistance, and promotion of these sites should be considered.

Need #3: Promote the competitiveness and performance of NJTPA's trucking and truck-served businesses through infrastructure improvements, effective regulation, and other strategies as appropriate.

- **Support projects that specifically promote intermodal access and connectivity.** Some of the needed improvements have been identified under current initiatives (Portway Phase I, Portway Extensions, and the IITC). Additional projects will no doubt be needed. In formulating capacity strategies (modal diversion, temporal diversion, spatial diversion, ITS, and Priority Freight Projects), special emphasis should be given to intermodal access and connectivity enhancements.
- **Support projects and regulatory approaches that improve trucking availability, performance, and cost.** Recognizing that NJTPA does not have a formal role in the regulatory process, it can nevertheless serve an advisory function regarding the impact of regulation and enforcement on industry performance and competitiveness. NJTPA does, of course, play a major role in the programming of Federal funds for transportation improvements, and can pursue the goals of improved trucking availability, performance, and cost through this activity.
- **Continue to support the Federal Initiative Committee (FIC) and to work directly with industry stakeholders.** The FIC provides a regional forum for public and private stakeholders to discuss issues, exchange ideas and concerns, and identify consensus strategies that benefit both the public and the private sectors.

Need #4: Ensure that environmental/community issues (congestion, emissions, noise, vibration, equity, etc.) and security issues are fully addressed in current and future highway planning and operations.

- **Continue and expand efforts to engage the public in freight issues and project discussions.** This would include efforts above and beyond the requirements of environmental documentation. The FIC already provides a good forum for open public input and discussion, and other opportunities – such as local forum programs – could be explored as needed in support of particular planning initiatives.

- **Continue to coordinate closely with other agencies (local, regional, state, and Federal) on safety and security issues.**
- **Pursue additional study of critical issues (hazardous materials movement, overweight containers, major accident locations, etc.) as needed to inform policy.**

Need #5: Develop transportation programming and funding processes that take full account of freight project opportunities and benefits, and allow for their evaluation within a larger multimodal investment strategy.

- **Research and evaluate alternative financing strategies for delivering highway improvements.** Creative financing approaches will be essential for the implementation of needed freight improvements.
- **Develop mechanisms for the special consideration of freight-oriented highway projects within the NJTPA programming process.** Freight-oriented projects must be programmed and delivered within the context of overall system needs, and get their fair share of attention and investment – no more, no less. Some MPOs have tried to develop rigid scoring systems to compare freight versus passenger projects, highway versus rail projects, etc.; such approaches, in our view, have been of limited value, because these complex issues tend to resist being reduced to numbers. What would be most helpful is a series of guidelines, to be employed by human decision-makers, that would define critical freight-oriented factors to be considered in programming evaluations and decisions.

Table 10. Highway System Needs, Issues, and Strategies

Needs	Issues	Strategies
<p>#1: Optimize highway system capacity, performance, safety, and reliability</p>	<ul style="list-style-type: none"> • Overall system performance is declining due to increasing truck and auto traffic. • Interchanges and “last-mile” connectors are particularly impacted. • Local-serving trucks will continue to impact communities. • Through truck traffic will continue to impact the region. • Container and non-container trucks will affect different areas. • Bridges and tunnels face capacity, design, and age constraints. • Urban congestion means declining passenger and freight mobility. 	<ul style="list-style-type: none"> • Pursue modal diversion strategies using alternative modes (long-haul rail, short-haul rail, water) to relieve congested highways. • Pursue temporal diversion strategies (off-hours operation of terminals and warehouse/distribution centers, truck rest/staging areas, congestion pricing) to minimize peak travel. • Explore spatial diversion strategies (truck-only lanes, passenger transit, and HOT lanes) to reduce conflicts between trucks and cars on critical corridors. • Pursue ITS strategies (ATIS, ATMS) to manage capacity and demand. • Identify and designate “Priority Freight Projects” for study and investment.

Table 10. Highway System Needs, Issues, and Strategies (continued)

Needs	Issues	Strategies
#2: Identify and implement “smart growth” land use and economic development strategies	<ul style="list-style-type: none"> • “Freight sprawl” (trend to locate freight facilities outside the region where land is cheap) is producing increased truck VMT and reducing economic benefit. • Truck rest areas are needed to accommodate layovers. 	<ul style="list-style-type: none"> • Where possible, locate major truck generators to minimize in-region VMT. • Encourage clustered freight development in the region, particularly on Freight Opportunity Sites previously identified by NJTPA. • Explore strategies for improving the location and function of truck rest and service areas.
#3: Promote the competitiveness and performance of NJTPA’s trucking and truck-served businesses	<ul style="list-style-type: none"> • Trucks provide critical intermodal access and connectivity. • Business and economic vitality depends on trucking availability, performance, and cost; driver availability becoming an issue. • Enforcement and regulation remain critical issues. 	<ul style="list-style-type: none"> • Support projects that specifically promote intermodal access and connectivity. • Support projects and regulatory approaches that improve trucking availability, performance, and cost. • Continue supporting FIC and working with stakeholders.
#4: Ensure that environmental, community and security issues are fully addressed.	<ul style="list-style-type: none"> • Environmental and community concerns over truck traffic and accidents are increasing. • Hazardous materials handling, overweight shipments, and cargo security have heightened importance. 	<ul style="list-style-type: none"> • Continue and expand efforts to engage the public in freight issues and project discussions. • Continue to coordinate closely with other agencies (local, regional, state, and Federal) on safety and security issues. • Pursue additional study of critical issues (hazardous materials movement, overweight containers, major accident locations, etc.).
#5: Develop transportation programming and funding processes that take full account of freight project opportunities and benefits.	<ul style="list-style-type: none"> • Freight needs to be higher on the investment agenda, but there are already too many legitimate transportation needs and too little available public money. 	<ul style="list-style-type: none"> • Develop mechanisms for the special consideration of freight-oriented projects within the NJTPA programming process; research and evaluate alternative financing strategies for highway improvements.

4.2.2 Rail Strategies

Need #1: Optimize rail system capacity, performance, safety, and reliability through a combination of physical, operational, economic, and institutional solutions that address current and future market needs, in partnership with the region’s railroads.

- **Support implementation of rail improvements already identified by New Jersey and its railroads.** The following are considered critical-path projects.

- The Lehigh Line will face greatest pressure within the NJSAA. It has a large freight traffic base at present that will grow significantly. It also hosts a large volume of NJT trains which, although held constant in the projected train counts, also could increase. Completion of the missing segment of double track between Bound Brook and Potter will be necessary.
- The P&H Line and the Northern Running Track, which together comprise the main route through the NJSAA, also will need to be upgraded to full double-track and equipped with CTC signal control system on both main tracks.
- The Chemical Coast Secondary, north segment, also should be brought to up to double main track, CTC signal - controlled configuration. Support trackage parallel to the main track should be retained in addition to the second main track rather than sacrificed by conversion to main track. These enhancements would improve the flow of trains in and out of the terminals and yards along this segment as well as easing conflicts between through trains and Conrail local switching assignments.
- The Port Reading Secondary provides a currently little-utilized alternate route connecting NS and CSX main lines to the south and west with facilities along the Chemical Coast Secondary, Oak Island Yard and with North Bergen and Little Ferry via the River Line. The line is lightly used because it is slow speed, unsignalled, has only one short passing track and connects with the already congested Chemical Coast Secondary. Those configuration and operational issues have kept the route undesirable and lightly used but the Study Team believes that it will become necessary to use the line as an alternative to the Lehigh Line, even after the latter is improved. An appropriate set of improvements to the Port Reading Secondary includes track upgrading, siding extension and CTC signal system installation.
- In addition, the southern portion of the Chemical Coast Secondary should receive a second track and a CTC signal system. Access to the west end of the upgraded Port Reading Secondary route would be enhanced by construction of the proposed connection between the Port Secondary and the CSX Trenton Line, allowing CSX to access the Port Reading Secondary without occupying the Lehigh Line. This set of improvements, which are assumed to follow improvement of the Chemical Coast Secondary north segment described above, would enable the Port Reading Secondary/Chemical Coast route to: 1) provide efficient connection between the NS and CSX main routes at Bound Brook and the many customers south of PN and 2) accommodate some traffic between Bound Brook, Oak Island or North Bergen and points north as an alternative to the Lehigh Line.
- **Support “independent utility” projects identified as part of multistate initiatives.** The Mid-Atlantic Rail Operations Study (MAROps) proposed \$6.2 billion in rail improvements over a 20-year period in New Jersey, Pennsylvania, Delaware, Maryland, and Virginia. Some of these projects have independent utility (e.g., they offer benefit, independent of other improvements that may or may not occur), while other projects must be packaged together in order to provide benefits. As a first step, the independent utility projects from MAROps could be identified and promoted.

- **Evaluate the long-range need for other rail improvements, including major state and multistate projects.** Planned improvements address most of the anticipated shortfalls, with the exception of the Shared Asset Lehigh Line, the NS Lehigh Line, and the CSX River Line, which are anticipated to reach capacity at or near year 2025. This is the case for both forecast scenarios, although the shortfalls are larger under Scenario 1, which places the greatest emphasis on bringing West Coast containers into the NJTPA region via rail.
 - It is important to remember that actual, line-specific increases in train traffic and consumption of capacity should trigger improvements, not the passage of time or an overly rigid plan.
 - Capacity needs also may be influenced by passenger operations on the Lehigh Line, the NJT Southern Tier Route lines and any lines which might come to host passenger service.
 - The CSX River Line and the NS Lehigh Line experience the greatest traffic today, and improvements leading to complete, or near complete, double track CTC-signaled configuration will become appropriate as traffic grows. (The River Line faces challenging topography that may limit the feasibility of adding track in some locations.) The CSX Trenton Line experiences significantly less traffic than the River and Lehigh Lines but it too is likely to require additional improvements such as addition or extension of passing sidings on its single-track portions, as well as vertical clearance improvements. The NS Southern Tier route is lightly used due to topography, capacity, configuration, and relatively few on-line customers. At present, no significant change in use or volume can be foreseen and hence no improvements are contemplated but as traffic grows on the NS Lehigh Line, it could become desirable to increase use of the Southern Tier route.
 - These rail improvements would need to be closely coordinated with comparable projects upstream and downstream (in Central and Southern New Jersey, in Pennsylvania, and in New York State), and might prove very expensive at a systemwide level. Given that the Alameda Corridor was envisioned nearly 20 years before it actually opened, it is not too soon to begin thinking about these types of major rail projects.
- **Continue to monitor and understand national rail system conditions - infrastructure, operations, traffic and service patterns, etc. - as they impact rail demand in the NJTPA region.** As previously noted, our train volume forecasts contain an underlying assumption that rail's current modal share (versus truck or water) in key commodity lanes will remain constant into the future. It is possible that deterioration in the nation's highway system will tend to move an increased share of traffic from truck to rail; however, it is also possible that infrastructure costs, service costs, or market decisions could lead to a reduced share of traffic moving by rail. It really is an open question, and the decisions of the public sector - particularly whether and where to participate in investments - may have much to do with the result.

Need #2: Identify and implement “smart growth” land use and economic development strategies for the expansion, development, and utilization of rail facilities to minimize highway VMT impacts, reduce the need for highway system investments, and maximize economic opportunity and benefit for the NJTPA region as a whole.

- **Seek to maximize the capacity and operational efficiency of close-in railyards.** To the extent that the hand-off between rail and truck can be accomplished close to shippers and receivers, the highway VMT associated with these moves can be minimized. This may require improvements to railyards, as well as the rail lines and highways that provide access to them.
- **Promote the Portway Extensions railyard access improvements.** The Portway Extensions study identified several projects for making the region’s intermodal rail terminals more accessible to trucks.
- **Recognize that “outlying” railyards are both desirable and unavoidable, and look to locate them within the NJTPA region to minimize VMT and capture economic benefit.** There are several locations within the NJTPA region that may be suitable for the development of new railyard capacity.

Need #3: Promote the competitiveness and performance of NJTPA’s railroads and rail-served industries through infrastructure improvements and other strategies as appropriate.

- **Support projects that specifically promote intermodal access and connectivity.** Some of the needed improvements have been identified under current initiatives (PANYNJ improvements, Portway Extensions, and the IITC). Additional projects will no doubt be needed.
- **Support projects and regulatory approaches – marketing incentives, system preservation initiatives, and shortline improvements – that improve rail availability, performance, and cost in the NJTPA region.** The creation of the Shared Asset Area was viewed as an opportunity to improve the availability of rail service to NJTPA area customers, but it has been argued by some (including NJTPA) that the railroads have not been aggressive enough about offering and marketing such services. NJTPA should continue to explore strategies and project opportunities that would lead to greater levels of in-region service by both the Class Is and the shortlines. These could include:
 - Marketing incentives and support to improve awareness of rail services and broaden railroad service offerings;
 - System preservation initiatives, to ensure that current trackage and rights-of-way are retained for potential use in the future; and
 - Shortline system improvements to improve last-mile service and support higher weight railcars.

- **Identify opportunities to expand rail markets with innovative services such as short-haul rail and resuscitation of historic services such as railcar floats.**
 - Short-haul rail services are a primary opportunity for major benefits to the NJTPA region. Rail is generally considered to be increasingly competitive with trucking as distances increase, with the “break even” point typically put at 400 to 600 miles. However, there are certain kinds of rail moves – generally unit trains – that have proven competitive at much shorter distances. Many communities are exploring the possibility of running short-distance intermodal trains – sometimes referred to as “sprint trains” – on defined high-volume corridors between major container generators and receivers. For example, the Virginia Port Authority (VPA) operates an inland port terminal (basically a truck-rail interface with adjoining warehousing) at Front Royal, VA, with connecting rail service to VPA facilities at Hampton Roads. The Port of Oakland is moving ahead with plans to develop an intermodal rail link to a major inland container yard in Shafter, CA, around 100 miles north of Los Angeles. The basic idea is to eliminate the need for truck trips on selected high-density corridors, to improve access to and from inland markets, to allow inland terminals to operate as functional extensions of marine terminals, and to improve the overall economic competitiveness of regions at both ends of the trip. The opportunity for the NJTPA region is to explore selected container trip generators and receivers (marine terminals, intermodal railyards, major warehouse/distribution clusters, and/or future “integrated logistics centers”) that could be served effectively by rail in lieu of truck. This is a traffic mitigation strategy, a regional industry competitiveness strategy, an intermodal connectivity strategy, and a rail business opportunity, all rolled into one. To date, the market has not elected to provide this type of service in the NY/NJ region, and some form of capital and/or operating subsidy may be required.
 - Rail floats are a secondary opportunity with more limited benefit to NJTPA rail shippers and receivers. Historically, the NY/NJ region was served by an extensive rail float operation in which railcars were loaded onto barges, floated across the Hudson River, and unloaded at the other end. With the rise of trucking and the construction of major bridges, rail float operations have declined to a subsistence level. The possibility of upgrading the rail float system has been explored by New York City (which recently refurbished two transfer bridges in South Brooklyn), and by PANYNJ and NJTPA (which have commissioned studies of rail float potential). For rail float, the physical issues – what vessels to use, how to design the transfer bridges, etc. – seem solvable in the future, since they have been solvable in the past. We are substantially more concerned about demand issues (could a float provide a level of cost, speed, reliability, and frequency that would be competitive with trucking) and business issues (could a railroad offer a float service that covered the cost of the extra rail handling required). A rail float operation actually provides very limited benefit to NJTPA shippers and receivers, few of whom use rail to access east of Hudson markets.
- **Continue to support the FIC and to work directly with industry stakeholders.** The FIC provides a regional forum for public and private stakeholders to discuss issues,

exchange ideas and concerns, and identify consensus strategies that benefit both the public and the private sectors.

Need #4: Ensure that environmental/community issues (congestion, emissions, noise, vibration, grade crossings, equity, etc.) and security issues are fully addressed in current and future rail planning and operations.

- **Continue and expand efforts to engage the public in freight issues and project discussions.** This would include efforts above and beyond the requirements of environmental documentation. The FIC already provides a good forum for open public input and discussion, and other opportunities – such as local forum programs – could be explored as needed in support of particular planning initiatives.
- **Continue to coordinate closely with other agencies (local, regional, state, and Federal) on safety and security issues.**
- **Pursue additional study of potential grade crossing elimination projects in cooperation with other regional and state agencies.** A list of potential grade crossings for further consideration was prepared by NJ Transit is shown in Table 11 on the following page.

Table 11. Selected At-Grade Crossing Locations

Line and Owner	Crossing Location and Milepost
Trenton Line (CSX)	Sunnymead Road (54.30); Route 601 (47.39); Hollow Road (45.29); Spring Hill (44.57); Province Line (44.20); Route 518 – Lambertville-Hopewell Road (42.03)
Lehigh Line (Shared Asset)	Rahway Ave (20.05); Inman Ave (23.18); Tingley Road (23.69); Front Street (26.32); Clinton Street (27.43); New Brunswick (27.96); New Market Rd (29.01); Prospect Ave (29.14); South Ave (30.06); Cedar Ave (31.41)
Lehigh Line (NS)	Thirteenth Street (37.03); Roycefield Road (39.48); Valley Road (39.79); Auten Road (40.50); Beekmans Lane (41.35); Woodfern Road (45.78); Main Street (48.61); Rockafellow (49.66); Flemington Road (54.13); Hamden Road (57.01); Landsdown Road (57.74); Pittstown (60.77); Kennedy Road (71.95); Lee Ave (73.67)
National Docks (Conrail)	Chapel Ave (3.27)
Northern Branch (Conrail)	St. Pauls Avenue
River Line (CSX)	69th Street (2.58) – to be eliminated by HBLRT MOS-3; Bergen Turnpike (5.95); Mount Vernon Street (6.59); Pedestrian – Bogota (8.xx); New Bridge Road (10.92); Clinton Ave (11.67); Main Street (11.91); Church Street (12.06); Central Ave (12.15); Columbia Ave (12.54); Madison Ave (12.84); New Milford Ave (13.12); Haworth Ave (14.27); Durie Ave (14.85); Old Hook Road (15.37); LaRoche Ave (16.10); Harriet Ave (16.22); Lafayette Ave (16.35); Blanche Ave (17.12); Broadway (17.35); Clinton Ave (18.25)
Port Reading Secondary	Main Street (0.47); Bakelite Road (1.69); Washington Ave (4.61); New Brunswick Ave (5.31); Clinton Ave (5.66); Helen Street (6.62); South St. (6.89); St. George Ave (13.84); Rahway Avenue (14.89); Blair Road (15.71)
Chemical Coast	Railroad Avenue (11.xx); First Ave (Private) (16.8x)

Source: NJ Transit.

Need #5: Develop transportation programming and funding processes that take full account of public-private partnership opportunities for rail freight investments, and allow for their evaluation within a larger multimodal investment strategy.

- **As a matter of policy, endorse the potential need for and appropriateness of substantial public investment in the region’s rail system to achieve public benefits.** Public investment in rail capacity may be the necessary response to the growing demands on the industry, which collectively has not earned its cost of capital in many years.
 - An article published on August 16, 2004 in *The American Journal of Transportation* offers the perspective on the railroad industry’s lack of capacity investment that, “the industry’s reluctance in recent years to make large investments in capacity is understandable. Facing competition from other modes of transport, railroad pricing has gone down every year for the last thirty in real terms through 2002, with companies putting the emphasis on consolidation and cost-savings.”
 - NS has been one of the stronger financial performers, except in the wake of the difficult division of Conrail assets and operations. However, “NS has not earned its cost of capital for a number of years and when NS or any company fails to earn its cost of capital, reinvestments in the company are more limited than they would be otherwise,” said NS Chairman and CEO David Goode in his letter responding to the STB’s request, which went to all major U.S. and Canadian railroads on June 9, for a status report on capacity issues. “If demand continues to grow at this pace,” Goode added, “the rail industry will need to invest substantially more, in locomotives, IT systems, yards and terminals, railcars, track, etc., than it is doing today. However, increased investment in additional capacity cannot always be justified economically in the current cost of capital environment. Therefore, if demand continues to grow without the industry earning enough to sustain its capital requirements for growth, it may have little choice but to ration capacity in the future.”
 - The *AASHTO Freight Rail Bottom Line Report* states that historically, “public participation in rail system investments has addressed the bottom of the system: grade crossings, branch lines, and commuter rail services. The present need is to treat the key elements at the top of the system: nationally significant corridor choke points, intermodal terminals and connectors and urban rail interchanges. Investments at this level hold the most promise of attracting and retaining freight-rail traffic through improvements in service performance.” In some cases, states have already taken a public policy driven approach in the form of public-private partnerships.
 - By taking an “Alameda Corridor” public-private partnership approach to rail investments, the NJTPA region might receive substantial benefits in the form of improved rail operations and service, reduced truck traffic, and the opportunity to provide environmental improvements (grade separations, noise/vibration reduction, etc.) in sensitive areas of the alignments. The important institutional issues – how does the public sector participate in funding major improvements to

privately-owned, for-profit infrastructure, what guarantees the achievement of public benefits, and who delivers needed “downstream” capacity in the rest of the system – remain to be addressed.

Table 12. Rail System Needs, Issues, and Strategies

Needs	Issues	Strategies
#1: Optimize rail system capacity, performance, safety and reliability	<ul style="list-style-type: none"> • There are current and projected future rail capacity and performance shortfalls in the NJTPA region. • Rail capacity and performance at the national level has been inconsistent and future performance is open to question. • There is uncertainty about whether rail will gain or lose market share relative to trucking, and how this can be impacted by public policy and public investment. 	<ul style="list-style-type: none"> • Support implementation of rail improvements jointly identified to date by New Jersey and its railroads. • Evaluate the long-term need for other major rail improvements. • Support Class I and shortline projects as part of NJ and multistate initiatives. • Continue to monitor and understand national rail system conditions.
#2: Identify and implement “smart growth” land use and economic development strategies	<ul style="list-style-type: none"> • Consistent with the “freight sprawl” trend, we have seen the development of new out-of-region railyard capacity to serve the NJTPA region, which increased truck VMT. 	<ul style="list-style-type: none"> • Seek to maximize the capacity and operational efficiency of close-in railyards; identify opportunities for new in-region rail facility development. • Promote the Portway Extensions program to improve railyard accessibility.
#3: Promote the competitiveness and performance of NJTPA’s railroads and rail-served industries	<ul style="list-style-type: none"> • Class Is operate as for-profit businesses, not as public benefit providers. Some of their emerging strategies – broader services and greater partnership with trucking and ports – are clearly positive. Others – system rationalization, cutbacks in “last mile” service, and perceived ‘demarketing’ of less critical customers and services – are sometimes seen as counter to the public interest. • Shortline railroads need improvements to handle 286,000 lb railcars and closer integration with larger railroads. • There may be opportunities to offer rail services over shorter distances in highly-congested corridors. 	<ul style="list-style-type: none"> • Support projects that specifically promote intermodal access and connectivity. • Cooperate with the railroads to develop marketing incentives, preservation initiatives, and improvements to increase rail availability, performance, and cost, particularly in the NJSSA. • Identify opportunities to expand rail markets with innovative services such as short-haul rail and resuscitation of historic services such as railcar floats. • Continue to support the FIC and work with industry.

Table 12. Rail System Needs, Issues, and Strategies (continued)

Needs	Issues	Strategies
#4: Ensure that environmental, community and security issues are fully addressed.	<ul style="list-style-type: none"> • There are environmental and community concerns over growth in rail traffic, particularly associated with reactivation of historic rail lines. • Grade crossing safety remains an important issue, and becomes even more critical with projected growth. • Cargo security has a heightened focus, due to rail's role in handling hazardous materials and international containers. 	<ul style="list-style-type: none"> • Continue and expand efforts to engage the public in freight issues and project discussions. • Continue to coordinate investments with other agencies (local, regional, state, and Federal) on safety and security issues. • Pursue additional study of potential grade crossing elimination projects in cooperation with other regional and state agencies.
#5: Develop transportation programming and funding processes that take full account of freight project opportunities and benefits.	<ul style="list-style-type: none"> • There is a potential need for substantially increased public investment in rail capacity to meet future needs and secure public benefits from the rail system. 	<ul style="list-style-type: none"> • As a matter of policy, endorse the potential need for and appropriateness of substantial public investment in the region's rail system to achieve public benefits.

4.2.3 Marine System Strategies

Need #1: Optimize marine system capacity, performance, safety, and reliability through a combination of physical, operational, economic, and institutional solutions that address current and future market needs, in partnership with marine terminal owners, operators, carriers, and customers.

- **Support implementation of planned physical and operational improvements for the region's container terminals.** To accommodate rapid growth in container volumes over the past several years, the PANYNJ's marine terminal operators have operated their facilities more intensively. They have achieved substantially greater operating efficiencies using more intensive storage, improved information and management systems, longer operating hours, etc. Continued gains in operating efficiency will provide increased capacity without significant increases in the actual size of the port, but must be matched with supportive physical improvements to meet anticipated demand over the next two decades. Ongoing and currently planned improvements include:
 - 75 acres of new container storage from redevelopment of existing terminals and 340 acres of container yard redeveloped;
 - 7,200 linear feet of wharf reconstruction with 25 new container cranes (12 installed, 13 on order);

- Reconfiguration and optimization of Maher, APM, and PNCT terminals (Port Newark/Elizabeth) and Howland Hook Marine Terminal; and
- Planned expansion of container terminal capacity at Global/MOTBY.
- **Support implementation of planned navigation channel improvements.** Navigation channels and berths must be able to accommodate the types of vessels that will want to use them, and increasingly the need is for 50-foot channels to accommodate “mega-containerships.” These used to be referred to as “next-generation,” but in light of the fact that nearly all of the containership capacity built or ordered in the last few years has been in this class, they must be considered current generation. Accommodating these vessels means addressing both vessel draft (minimum water depth at lowest tides) and air draft (vertical clearance below bridges and other obstructions at highest tides). The current plan is: ongoing deepening of the Kill Van Kull and Newark Bay to 45 feet (scheduled completion 2004) and the Arthur Kill and Port Jersey Channel to 41 feet (scheduled completion in 2005); and subsequent deepening of major channels to 50 feet (in contracting process).
- **Support implementation of needed landside access improvements - including highway projects, rail improvements, and the PIDN initiative.** Many shippers and receivers are not located near the water, so efficient inland access by highway and rail is essential.
 - Highway and roadway congestion related to truck freight, and particularly international waterborne cargo, is of particular concern in the roadway system serving the PONYNJ and the major intermodal rail ramps in the region. The PANYNJ capital program includes funding to address needed roadway improvements. The NJ Turnpike is investing \$30 million to create a new interchange that will alleviate congestion at the Croxton Yard intermodal facility in Secaucus. The NJDOT Portway Phase I and Portway Extensions programs are addressing roadway improvements to serve the port and related intermodal and distribution sites, including the capacity to accommodate heavyweight loads. Potential new marine facilities, such as MOTBY, will require additional investment in roadway access (as well as rail access) to facilitate successful development.
 - Expansion of the ExpressRail terminal is underway, along with the improvement of other rail facilities, including the Staten Island Rail Road and Chemical Coast Connector (serving Howland Hook). Other rail system future rail improvements should be targeted to improve intermodal access and connectivity. The PANYNJ has committed \$25 million to regional rail improvements, matched by an additional \$25 million by the regions two Class I railroads, but additional investment is required. Historically, railroads have not generated sufficient return on investment to support the level of capital investment that appears to be required to meet the demands of growing freight volumes.
 - The Port Inland Distribution Network (PIDN) initiative developed by PANYNJ envisions the substitution of barge and rail for a percentage of truck moves to/from selected markets in the 75- to 400-mile range (Worcester/Framingham, Hanover, Reading and Camden, Pittsburgh, Hartford and Springfield, Rochester,

Albany, Buffalo, and Syracuse). Several of the rail services are in place. The PANYNJ has implemented barge service to the Port of Albany, and Bridgeport is close to starting up a barge service to PANYNJ. This is a strategy to improve access to the port by increasing capacity in alternative modes, helping to defraying the need for highway improvements; it is also a strategy to reinforce a close relationship between the PANYNJ and key market regions; it also functions as an environmental impact mitigation strategy for a major source of regional container truck traffic. As noted previously, the Port's mid-range (75- to 400-mile) landside markets seem to be in a period of adjustment, and trends will need to be closely monitored.

- **Support continued evaluation of other current and future marine system needs, including: air drafts; post-2025 container needs; non-container capacity; and private marine terminal operations.**
 - The program to provide vessel draft improvements is well underway, as has been noted, but there is a significant air draft issue – the Bayonne Bridge, which limits the heights of vessels transiting the Kill van Kull – remaining to be addressed.
 - While current studies suggest that major physical expansion of the port is not needed to meet container capacity needs through the year 2025, there may be expansion needs in the beyond-2030 timeframe. It is extremely difficult to predict either demand or capacity for that period – the only certainty is that our forecasts will be wrong, either by a little or by a lot – but initial efforts to develop some form of post-2030 strategy should begin to take shape, so that actions taken today support (rather than preclude) actions that will be need to be taken tomorrow.
 - Continued study of and planning for non-container markets – automobiles, neo and break bulk, liquid bulk, and dry bulk – should be pursued.
 - Given that a large amount of the marine terminal traffic in the Port of New York and New Jersey involves private terminals, a better understanding of their operations and needs could prove highly useful.

Need #2: Identify and implement land use and economic development strategies for the expansion, development, and utilization of marine facilities to minimize highway VMT impacts, reduce the need for highway system investments, and maximize economic opportunity and benefit for the NJTPA region as a whole.

- **Maximize economic benefits from port activity through development of related warehouse/distribution center capacity in the NJTPA region.** Port-serving warehouse and distribution investment has become increasingly important in the logistics supply chain. This investment can occur near the port (as in the case of Savannah, which provides extensive near-terminal space), or some distance from the port (as in the case of Ontario and San Bernardino, California, which are fed by and benefit from the ports of Los Angeles and Long Beach).
 - In congested North Jersey the land available for such facilities is scarce and costly. The need for port land for basic ship loading/unloading/container storage

facilities has diverted the warehouse/DC function further from the port. More remote areas have become the emerging centroids of DC development, such as the Exit 8A area of the NJ Turnpike.

- Encouraging port-related warehousing to remain and grow on suitable properties within the NJTPA region – as opposed to locating out-of-region, is a major economic opportunity and a critical planning challenge. The development of regional DC/warehouse districts, by making the public investments, and/or addressing the legal and regulatory climate in order to attract private development. Areas such as Exit 12 of the NJ Turnpike, South Kearny and similar with the right support could be developed as significant nodes that add to the attractiveness of the PONYNJ and North Jersey for large shippers, and also add significant economic development.
- These near-port DC investments would be made more attractive by the development of the high-capacity, alternative mode transportation corridors to maximize their accessibility while minimizing truck-related impacts, as proposed in the Portway Extensions program.
- **Look to utilize Freight Opportunity Sites to provide needed port-serving warehouse and distribution center capacity.** As previously noted, NJTPA has identified underutilized “freight opportunity” sites, many in the vicinity of PONYNJ, which could be the location for DC/warehouse investment that would contribute to the attractiveness of PONYNJ and North Jersey as an import load center. Many of these sites would require public investment in transportation connections and environmental remediation to make them economically attractive to private sector investment, but the potential public benefits are substantial.
- **Investigate the potential for Inland Port operations.** The idea of an Inland Port is to move containers (or other unit cargo) from congested marine terminals to inland depots (which could be truck transfer terminals or industry clusters) using a dedicated short-haul rail or truck service. The operation could benefit the marine terminal by moving containers off-terminal more quickly, freeing up storage space for other containers – effectively “building a larger terminal” without adding any square footage. The service could benefit truckers by allowing them to drop off and pick up maritime containers without traveling through the most congested parts of the region’s highway system, saving them time and money and reducing the levels of traffic experienced by other highway system users. Additionally, the inland depot might be a secured 24-hour facility that supports off-peak trucking activity. The service could provide an economic benefit by increasing the overall capacity of the system, and could also provide a transportation benefit by reducing the amount of truck VMT occurring in congested waterfront areas. The concept has been discussed by many ports throughout the country, but has not been implemented to date – so at this point, there are still important issues regarding its operational feasibility, benefit, and cost.
- **Support programs for the effective management of empty containers.** If the region’s import-export trade comes into balance, empty containers may be less of a problem, but we should not wait and hope that world trade will solve the issue for us. One

possible approach is land-used based, and would designate key areas as suitable or unsuitable for the short-term and long-term storage of containers. Another possible approach is information-based, and would allow third parties to exchange containers without moving them through intermediary short or long-term storage facilities. Still another approach that has been discussed is the imposition of a penalty for long-dwelling empty containers on marine terminals, to encourage faster turnaround (and greater throughput) per acre.

Need #3: Promote the competitiveness and performance of NJTPA's ports and port-served industries through infrastructure improvements and other strategies as appropriate.

- **Ensure that the region's marine terminals offer the throughput capacity, landside accessibility, and warehouse/distribution facilities necessary to serve the NJTPA region and compete effectively for growing world container trade.** This requires implementation of the various improvements discussed under Need #1 and Need #2.
- **Identify opportunities to expand port markets with innovative services such as short-haul rail, short-sea shipping, in-region barge, and truck ferry operations, which might particularly advantage overweight shipments.**
 - As discussed earlier, short-haul rail corridors may be an opportunity to improve transportation access between container marine terminals and key market clusters, remove trucks from congested highways, and improve marine terminal efficiency by reducing on-terminal dwell time. Three market clusters – central New Jersey (Exit 8A area), southern New York State (Orange County) and eastern Pennsylvania – appear to be promising candidates. There might also be short-haul linkages between marine terminals, major customers, and third-party off-port container depots as part of a regional container management strategy.
 - Increased use of short-sea shipping is being promoted by the U.S. Maritime Administration and others as a means of reducing truck traffic on I-95 and other key north-south corridors. The idea is to move trucks and/or containers (not drivers) between northern and southern ports using barges or small container ships, instead of trucking. The all-water service is could not be as fast or frequent as trucking, but could offer two major advantages – without a driver on the waterborne leg, there are no driver wages and no hours-of-service issues. Malcolm McLean, the inventor of the ocean shipping container, attempted to start such a service for trucks but was unsuccessful; however, there are a number of successful coastwise container barge services operating on the Atlantic coast today, and the PANYNJ to Port of Bridgeport container barge will be the next to come on line. It may take some experimentation to find the services that have long-term viability, but the overall prospects for short-sea shipping to and from the NJTPA region seem quite promising.
 - Expanded use of in-region barges. Today, barges move tremendous amounts of petroleum, petroleum products, and other chemicals throughout the region, and also shuttle containers between the Red Hook Container Terminal in Brooklyn and

the American Stevedoring terminal at Port Newark. This is not the flashiest form of freight transportation, but every ton moved locally on a barge through Newark Bay or New York Harbor is a ton not moved by truck. There are practical limitations to what freight barges can accomplish, based on the degree that they are time and cost-competitive with other modes, but the possibilities of a larger role are worth further exploration.

- Increased use of in-region truck ferries is another option that might fill selected market niches. This would be a “floating highway” – trucks would drive onto a barge or vessel, instead of onto a bridge, and would be carried across the water rather than driving. Not every waterfront point is a candidate – successful services would generally need to offer a shorter distance trip by water than by truck, with competitive cost, speed, frequency, and reliability.
- Shipments that are too heavy for over-the-road trucks might be particularly advantaged by the availability of an alternative mode.

Need #4: Ensure that environmental/community issues (congestion, emissions, noise, vibration, grade crossings, equity, etc.) and security issues are fully addressed in current and future marine facility planning and operations.

- **Cooperate in the development of cargo security measures that safeguard the public without compromising freight system performance.** There has been substantially increased emphasis on the security inspection and clearance of international cargo, particularly containers. Many ports are already implementing personnel screening and credentialing systems and employing non-invasive inspection technologies. There has been discussion at the national level of requiring 100 percent inspection of import containers, possibly at the port of origin. Whatever form that future security requirements take, it is possible that on-terminal operations and global transportation logistics may be significantly impacted. Freight movement may cost more, take longer, and require more terminal area, equipment, and personnel.
- **Promote alternative mode strategies for landside distribution.** As we have noted previously, the use of alternative (non-truck) modes for the collection and distribution of port-related cargo is an important mitigation strategy.
- **Pursue “green port” strategies such as off-peak gates, appointment systems, off-terminal equipment exchanges, chassis pooling, and emissions management.** At the PANYNJ and throughout the U.S., the impacts of marine terminals have received increasing attention, and ports and communities have responded in a variety of ways.
 - Off peak terminal operations. Terminals in many ports – including PANYNJ – have implemented longer operating hours to allow for off-peak movement of trucks.
 - Scheduled pickups and deliveries. Appointment systems have been implemented at many ports to coordinate the availability of marine terminal labor with trucker needs.

- Off-terminal exchange of containers, chassis, and other equipment. This avoids the need to drop off, store, and pick up equipment at a marine terminal or other intermediate facility – with appropriate information and control systems, equipment could be exchanged directly between users.
- Pooling of chassis. The creation of common-user chassis pools could substantially reduce trips to and from marine terminals, as well as in-terminal processing time.
- Emissions management. This covers a broad range of strategies. The most benign is alternative-fueled on-terminal vehicles, which many U.S. terminals have already adopted. In Southern California, legislation has been passed to limit the amount of time that trucks are permitted to wait in line outside of marine terminals for gate processing. The effect, from some reports, has been for terminals to speed up their gate processing so that trucks get through the gate, but once within the terminal, they are not having their containers unloaded or loaded any faster, so the overall benefit of the legislation remains in question. Also in Southern California, initiatives requiring “cold-ironing” of vessels (shutting down vessel engines while docked, and switching to shore-side electrical power) will be implemented, and it will be interesting to see if there is actually any benefit (some analysts believe not). There has been a further proposal in Southern California that would freeze allowable port-related emissions at current levels.

Need #5: Develop transportation programming and funding processes that take full account of the complex intermodal and multijurisdictional investments necessary to ensure healthy and beneficial marine terminal operations.

- **Explore new institutional structures to finance and deliver multimodal investments.**

The maintenance of a healthy regional freight transportation economy and its resulting economic benefits, particularly in view of growing volumes of international trade, requires an enormous financial commitment to the physical infrastructure required to handle the volumes in a sustainable fashion. The PANYNJ provides some of the required investments, and the Federal government picks up some of the cost as well. But the investments associated with regional port infrastructure are multimodal (marine, highway, rail, warehouse and distribution) and multijurisdictional (local, regional, and multistate) in nature. There is no single entity that can be responsible for all the needed investments.

 - In order to meet the investment challenges discussed above to preserve the vitality of North Jersey’s freight industry and its economic benefits, new approaches to project financing and development authority may be required. One approach might be an investment fund supported by user charges to support the projects necessary to meet the increasing needs of the industry. This fund may be supported by targeted Federal and state investments in specifically identified projects that are clearly public benefit investments, for which user charges are inadequate or inappropriate.
 - Because of the cross-jurisdictional and public-private nature of many of the needs, a regional authority may be appropriate to manage the funding and development of projects serving the freight industry. The Alameda Corridor Transportation

Authority in Southern California, a joint powers authority comprised of the Cities of Los Angeles and Long Beach and the Ports of Los Angeles and Long Beach, is a possible model. ACTA was responsible for the financing, construction and management of the Alameda Corridor, a rail link serving the two ports and providing improved service to the regional rail network. ACTA is also contributing to other projects related to improving freight movement in the Los Angeles basin.

- Such an agency would also be eligible for financing under the Transportation Infrastructure Finance and Innovation Act (TIFIA) program, a source of patient capital at tax exempt rates for public-private transportation projects. The International Intermodal Corridor, identified in the current pending Transportation Bill may represent an appropriate scope of responsibility.

Table 13. Marine System Needs, Issues, and Strategies

Needs	Issues	Strategies
<p>#1: Optimize marine system capacity, performance, safety and reliability</p>	<ul style="list-style-type: none"> • Container terminal capacity and demand are still being debated; the consensus is that major expansion is not needed, but physical and operational improvements to get the most of existing facilities will definitely be required. • Improvements to vessel navigation, market access, and intermodal connectivity are clearly needed – work is underway, but needs remain. 	<ul style="list-style-type: none"> • Support implementation of planned physical and operational improvements for the region’s container terminals and navigation channels. • Support implementation of needed landside access improvements – including highway projects, rail improvements, and the Port Inland Distribution Network initiative. • Support continued evaluation of other current and future marine system needs, including: air drafts; long-range container needs; non-container capacity; and private marine terminal operations.
<p>#2: Identify and implement “smart growth” land use and economic development strategies</p>	<ul style="list-style-type: none"> • Marine terminals are huge economic engines – from the terminals themselves, from port-serving warehouse and distribution facilities, and from regional businesses that receive cost/logistics benefits. • Substitution of other ports and/or more landbridge rail for PONYNJ terminals would increase truck VMT and decrease economic benefit. • Empty containers are undesirable. 	<ul style="list-style-type: none"> • Maximize economic benefits from port activity through development of related warehouse/distribution center capacity, potentially utilizing Freight Opportunity Sites. • Investigate the potential for Inland Port operations, where containers are hauled between the waterfront and an inland facility by rail or off-peak trucking, reducing terminal ‘dwell time’ and improving terminal efficiency, and also reducing peak period truck impacts. • Identify empty container management strategies.

Table 13. Marine System Needs, Issues, and Strategies (continued)

Needs	Issues	Strategies
#3: Promote the competitiveness and performance of NJTPA’s ports and port-served industries	<ul style="list-style-type: none"> Customer needs are changing to include: larger ships, integrated warehouse/distribution capacity, better landside access, and greater reliability. The PONYNJ needs to be responsive to these needs to remain competitive. If so, it could possibly capture a substantial increase in all-water services from Asia via the Suez and Panama canals. 	<ul style="list-style-type: none"> Work with the PANYNJ and State of NJ to ensure that NJTPA’s marine terminals offer the capacity, performance, landside access, and warehouse/distribution facilities to serve the region and state, and to compete for growing world trade. Identify opportunities to expand port markets with innovative services such as short-haul rail, short-sea shipping, coastwise and in-region barges, and truck ferry.
#4: Ensure that environmental, community and security issues are fully addressed	<ul style="list-style-type: none"> Cargo security remains a critical issue. In the face of increased attention to environmental impacts, many ports are exploring “Green Port” initiatives such as: off-peak operations, scheduled truck delivery, off-terminal equipment exchanges, chassis pooling, and emissions management. 	<ul style="list-style-type: none"> Cooperate in the development of cargo security measures that safeguard the public without compromising freight system performance. Promote alternative mode strategies for landside distribution – rail and barge. Pursue “green port” strategies where feasible and applicable.
#5: Develop transportation programming and funding processes that take full account of freight project opportunities and benefits	<ul style="list-style-type: none"> To meet multimodal investment needs for marine terminals, innovative approaches are needed. 	<ul style="list-style-type: none"> Explore new institutional structures to finance and deliver multimodal investments.

4.2.4 Air Cargo System Strategies

Need #1: Optimize air cargo capacity, performance, safety and reliability through a combination of physical, operational, economic, and institutional solutions that address current and future market needs, in partnership with the region’s air cargo stakeholders.

- In cooperation with PANYNJ, continue to explore a range of issues for EWR air cargo, including future demand, adequacy of current and future cargo capacity, need for airside improvements, need for landside access improvements, and relationship between EWR and JFK customs operations.**

Need #2: Identify and implement land use and economic development strategies for the development of air-cargo supporting warehouse/distribution facilities to minimize highway VMT impacts, reduce the need for highway system investments, and maximize economic opportunity.

- **Maximize economic benefits from port activity through development of related warehouse/distribution center capacity in the NJTPA region, potentially using Freight Opportunity Sites.** As previously discussed, air cargo facilities can either be on-airport (with a direct truck to aircraft connection via a storage building), or off-airport (where cargo is consolidated into suitable units for loading onto aircraft then trucked to the airport, or where cargo is received directly from the airport and then deconsolidated). On-airport space is limited, and over time it may be necessary and desirable to expand nearby off-airport facilities. A number of Freight Opportunity sites identified by NJTPA may be suitable for such a purpose.

Need #3: Promote the competitiveness and performance of NJTPA's airports and air cargo-served businesses through infrastructure improvements and other strategies as appropriate.

- **Ensure that EWR offers the throughput capacity, landside accessibility, and warehouse/distribution facilities necessary to serve the NJTPA region and compete effectively for growing air container trade.** The programmatic requirements to make this happen will, as previously noted, require further study to define.
- **Explore opportunities to reduce inefficiencies and truck traffic generated by using JFK Customs facilities to clear EWR cargo.** One possibility is to upgrade customs operations at EWR, although NJTPA is unlikely to have much influence in that regard. Another possibility was suggested (unsuccessfully) several years ago by a group looking to establish a water ferry between the two airports. Our work on the Hunts Point Waterborne Freight Assessment found it would be very difficult for freight vessels to operate effectively in Jamaica Bay due to environmental sensitivity, speed restrictions, and low fixed bridges; our work also found that there is not an immediately identifiable location for a ferry landing to serve EWR. However, the idea still has some adherents.

Need #4: Ensure that environmental/community and security issues are fully addressed in current and future planning and operations.

- **Cooperate in the development of cargo security measures that safeguard the public without compromising freight system performance.** As previously noted, security measures are currently evolving; both the public and the private sectors will need to adjust to any new measures implemented.

Need #5: Develop transportation programming and funding processes that take full account of air cargo investment needs and requirements.

- Review the adequacy/availability of funding pending study of needed improvements.

Table 14. Air Cargo System Needs, Issues, and Strategies

Needs	Issues	Strategies
<p>#1: Optimize air cargo system capacity, performance, safety and reliability</p>	<ul style="list-style-type: none"> • EWR capacity appears sufficient for the present, but future needs remain to be assessed. • EWR international cargo often is trucked to JFK to clear customs, creating additional truck trips. • Truck substitution -- the use of trucking to handle segments of an “air cargo” trip -- is an important trend. Water substitution may also be an emerging trend. 	<ul style="list-style-type: none"> • In cooperation with PANYNJ, continue to explore a range of issues for EWR air cargo, including future demand, adequacy of current and future cargo capacity, need for airside improvements, and need for landside access improvements. • Explore opportunities to reduce inefficiencies and truck traffic associated with use of JFK Customs facilities to clear EWR cargo. • Explore opportunities to increase use of off-peak periods for “truck substitution” moves.
<p>#2: Identify and implement “smart growth” land use and economic development strategies</p>	<ul style="list-style-type: none"> • Air cargo provides an economic benefit opportunity for warehouse and distribution development. 	<ul style="list-style-type: none"> • Maximize economic benefits from port activity through development of related warehouse/distribution center capacity in the NJTPA region, potentially using Freight Opportunity Sites near the airport.
<p>#3: Promote the competitiveness and performance of NJTPA’s airports and air-cargo served businesses</p>	<ul style="list-style-type: none"> • Several trends suggest an upswing in air cargo -- an improving economy, “open skies” initiatives, growth in E-commerce, and service disruptions in other modes. 	<ul style="list-style-type: none"> • Ensure that EWR offers the throughput capacity, landside accessibility, and warehouse/distribution facilities necessary to serve the NJTPA region and compete effectively for growing air container trade.
<p>#4: Ensure that environmental, community and security issues are fully addressed</p>	<ul style="list-style-type: none"> • New security requirements are evolving and impacts on cargo are highly uncertain, and may encourage truck substitution. 	<ul style="list-style-type: none"> • Cooperate in the development of cargo security measures that safeguard the public without compromising freight system performance.
<p>#5: Develop transportation programming and funding processes that take full account of freight project opportunities and benefits</p>	<ul style="list-style-type: none"> • Adequacy and availability of funding for needed improvements is not yet known. 	<ul style="list-style-type: none"> • Review the adequacy and availability of funding pending further study of needed improvements.

4.2.5 Warehouse and Distribution Strategies

Need #1: Optimize warehouse and distribution center capacity, performance, safety and reliability through support, guidance, and potential participation with the private sector in the development and implementation process, and through the provision of supporting transportation improvements.

- **As a matter of policy, formally endorse the goal of supporting warehouse/distribution space in the NJTPA region.** Warehouse/distribution facilities are a means of creating economic benefit and supporting the region’s trucking, rail, and marine freight industries. NJTPA can support their retention and guide their creation through provision of information, land planning and development support, and transportation improvements.

Need #2: Identify and implement “smart growth” land use and economic development strategies for the development of warehouse and distribution center facilities to minimize highway VMT impacts, reduce the need for highway system investments, and maximize economic opportunity.

- **Where possible, locate warehouse/distribution facilities to minimize VMT.** As previously discussed, smart growth strategies are an opportunity to channel traffic to its most appropriate routes by managing the locations of trip ends. By encouraging the development of warehouse/distribution centers in areas where the transportation infrastructure is well-suited to truck activity and/or where their activities would generate the least VMT, we improve overall utilization of the system and reduce the need for infrastructure improvements.
- **Encourage intermodal logistic center development in the NJTPA region.** There are a variety of names for clustered freight development – trade zones, industrial parks, freight villages, integrated logistics centers, etc. – but whatever the name, the concept is to create a concentration of freight-dependent uses in a location that is well-served by transportation infrastructure (preferably allowing for alternative modes), and close by its major suppliers and customers (to minimize truck VMT). Incentives – in the form of preferential zoning, tax status, development assistance, and transportation improvements – can be considered.
- **Primary consideration should be given to underutilized “freight opportunity sites” identified by NJTPA.** Close-in sites and/or rail-served sites are preferred where possible, because they tend to reduce the amount of VMT associated with truck movements. Appropriate incentives and development assistance programs should be identified.

Need #3: Promote the competitiveness and performance of NJTPA’s warehouse and distribution facilities and customers through infrastructure improvements and other strategies as appropriate.

- **Seek to maximize the amount of warehouse and distribution center activity within the NJTPA region, and minimize the amount of development that is “lost” to other regions.** The demand for industrial space in the NJTPA region is expected to roughly double through the year 2030. But it doesn’t have to be here – it could be in eastern Pennsylvania or elsewhere – and it will not come here unless the region does everything possible to provide the right conditions for these uses to stay, to grow, and to prosper. That means a public policy that is supportive of, and attentive to, industry requirements – particularly their need for an efficient, reliable, cost-effective transportation system.
- **Continue to support the FIC and to work directly with industry stakeholders.** This is critical in the largely private world of industrial real estate development.

Need #4: Ensure that environmental/community and security issues are fully addressed in current and future planning and operations.

- **Provide assistance in identifying and addressing site development issues.** It is recognized that some of the properties identified as freight opportunity sites by NJTPA may pose environmental challenges, and public sector participation may be important in making certain projects financially viable.
- **Continue and expand efforts to engage the public in freight issues and project discussions.** This would include efforts above and beyond the requirements of environmental documentation. The FIC already provides a good forum for open public input and discussion, and other opportunities – such as local forum programs – could be explored as needed in support of particular planning initiatives.

Need #5: Develop transportation programming and funding processes that take full account of warehouse and distribution center investment needs and requirements.

- **Explore public-private partnership development and funding opportunities within the overall structure of NJTPA’s planning and programming responsibilities.**

Table 15. Warehouse and Distribution Needs, Issues, and Strategies

Needs	Issues	Strategies
#1: Optimize warehouse/distribution system capacity, performance, safety and reliability	<ul style="list-style-type: none"> • Builders have a choice of locations: close-in, or in outlying areas. For larger facilities, outlying areas are being preferred. 	<ul style="list-style-type: none"> • As a matter of policy, formally endorse the goal of supporting warehouse/distribution space in the NJTPA region, in appropriate areas with suitable transportation, land use, and community conditions. • Encourage off-peak operations to minimize peak-period generation of truck trips.
#2: Identify and implement “smart growth” land use and economic development strategies	<ul style="list-style-type: none"> • Warehouse/distribution activity is a major economic opportunity. Growth in outlying areas means more VMT to serve the NJTPA region, along with lost jobs and revenues to the region. 	<ul style="list-style-type: none"> • Where possible, locate warehouse/distribution facilities to minimize VMT and maximize benefit to the region; encourage “intermodal logistic center” development. • Primary consideration should be given to underutilized “freight opportunity sites” identified by NJTPA.
#3: Promote the competitiveness and performance of NJTPA’s warehouse/distribution facilities and customers	<ul style="list-style-type: none"> • International trade and overseas production are key drivers of demand. Operations are sensitive to disruptions in the overall freight transportation system. 	<ul style="list-style-type: none"> • Seek to maximize the efficiency and reliability of other freight system elements – highway, rail, port, and airport – that affect the viability and performance of warehouse/distribution facilities in the region. • Continue to support the FIC and work with industry stakeholders.
#4: Ensure that environmental, community and security issues are fully addressed	<ul style="list-style-type: none"> • Development can have local impacts, in the form of increased traffic and potential conflicts with other uses. • Site development of Freight Opportunity Sites may pose environmental challenges. 	<ul style="list-style-type: none"> • Provide assistance in identifying and addressing site development issues. • Continue and expand efforts to engage the public in freight issues and project discussions.
#5: Develop transportation programming and funding processes that take full account of freight project opportunities and benefits	<ul style="list-style-type: none"> • There may be opportunities for increased public-sector involvement to achieve public purpose objectives. 	<ul style="list-style-type: none"> • Explore public-private partnership development and funding opportunities within the overall structure of NJTPA’s planning and programming responsibilities.

■ 4.3 Interregional and Institutional Strategies

Need #1: Develop a focused strategy for NJTPA participation in multistate freight initiatives and NJTPA coordination and facilitation of in-state and in-region initiatives across jurisdictional boundaries.

- **Continue to take active role in interagency coordination, emphasizing NJTPA initiatives.**
- **Establish formal working structures with out-of-state partner agencies to identify and coordinate multistate corridor projects.** This would be an extension of current practices, where partner agencies meet on an as-needed or informational basis.
- **Establish formal working structures with in-state partner agencies to identify and coordinate in-region/in-state freight projects.** In other states, these structures have been most successful when they are responsible for allocating funding, even in limited amounts.

Need #2: Develop a focused strategy to guide the private sector to invest and operate NJTPA's freight system, to the extent possible, in a manner consistent with public benefit and public purpose, and to leverage private investment with public participation as warranted.

- **Coordinate transportation and economic development activities, including reuse of Freight Opportunity Sites, with interested private sector parties.** This can be accomplished through the continued efforts of NJTPA's FIC, and through expanded outreach efforts to key industry sectors. Efforts will be closely coordinated with the NJ Office of Smart Growth, local jurisdictions, and other affected agencies.

Need #3: Develop NJTPA policies and procedures to promote the achievement of an equitable balance of benefit and cost among different stakeholders in freight improvement projects.

- **Seek to maximize public knowledge and awareness regarding freight issues, real benefits, and real impacts.** The focus is on identifying shared interests in transportation system safety/security/performance, equity of impact and benefit, need for funding, etc.
- **Seek to maximize transparency, openness, inclusiveness, and respect for divergent points of view in the freight planning process; but recognize that the ultimate goal is to make progress in meeting critical challenges, not to 'talk the problem to death'.**

Need #4: Explore and pursue NJTPA opportunities for the creative financing and implementation of freight improvements.

- **Maximize Federal assistance for regional freight projects through legislation.**
- **Maximize other non-Federal (state, PANYNJ, private industry, etc.) assistance for regional freight projects, possibly through a dedicated freight funding pool associated with a statewide freight partnership.**
- **Aggressively pursue innovative funding opportunities such as expanded Federal program eligibility, user-based financing, public-private partnerships, and tax credits/incentives.**

Need #5: Provide NJTPA regional leadership to promote the exploration and implementation of needed freight improvements, consistent with the roles and responsibilities of all participating stakeholders, possibly within new institutional structures.

- **As noted in #1 and #4, establish a formal working structure - a New Jersey Freight Partnership - to identify and coordinate freight projects, and consider a dedicated freight funding pool to be directed by same.** The goal is not to usurp existing jurisdictional responsibilities and prerogatives, but to set an overall vision and to coordinate mutual efforts. Membership could consist of a variety of Federal, state, regional, and local agencies, along with private sector stakeholders. NJTPA's current FIC might serve as the "seed" for such a partnership. This proposed Freight Partnership could provide an overall coordinating function to freight related initiatives; moreover, it could provide a series of Industrial Development Working Groups, operating as subcommittees to address critical locations and/or freight issues, to facilitate and promote key freight initiatives of regional and statewide significance.

Table 16. Interregional and Institutional Needs, Issues, and Strategies

Needs	Issues	Strategies
#1: Strategy for NJTPA participation in multistate freight initiatives and coordination/facilitation of in-state and in-region initiatives	<ul style="list-style-type: none"> • Multistate planning initiatives underway or upcoming • In-state and in-region initiatives underway or upcoming 	<ul style="list-style-type: none"> • Continue to take active role in interagency coordination, emphasizing NJTPA initiatives. • Establish formal working structures with out-of-state partner agencies to identify and coordinate multistate corridor projects; this would be an extension of current practices, where partner agencies meet on an as-needed or informational basis. • Establish formal working structures with in-state partner agencies to identify and coordinate in-region/in-state freight projects; in other states, these structures have been most successful when they are responsible for allocating funding, even in limited amounts.
#2: Strategy to guide the private sector to invest and operate consistent with public benefit and public purpose, and to leverage private investment with public participation as warranted	<ul style="list-style-type: none"> • Role of the public sector • Need for public/private cooperation 	<ul style="list-style-type: none"> • Coordinate transportation and economic development activities, including reuse of Freight Opportunity Sites, with interested private sector parties; this can be accomplished through the continued efforts of NJTPA’s FIC, and through expanded outreach efforts to key industry sectors.
#3: Policies and procedures to promote equitable balance of benefit and cost among freight stakeholders	<ul style="list-style-type: none"> • Perceptions of equity • Practical challenges of reconciling interests 	<ul style="list-style-type: none"> • Seek to maximize public knowledge and awareness regarding freight issues, real benefits, and real impacts; focus on identifying shared interests in transportation system safety/security/performance, equity of impact and benefit, need for funding, etc. • Seek to maximize transparency, openness, inclusiveness, and respect for divergent points of view in the freight planning process; but recognize that the ultimate goal is to make progress in meeting critical challenges, not to ‘talk the problem to death’.
#4: Opportunities for the creative financing and implementation of freight improvements	<ul style="list-style-type: none"> • Overall freight funding deficiencies 	<ul style="list-style-type: none"> • Maximize Federal assistance for regional freight projects through legislation. • Maximize other non-Federal (state, PANYNJ, private industry, etc.) assistance for regional freight projects, possibly through a dedicated freight funding pool associated with a statewide freight partnership. • Aggressively pursue innovative funding opportunities such as expanded Federal program eligibility, user-based financing, public-private partnerships, and tax credits/incentives.

Table 16. Interregional and Institutional Needs, Issues, and Strategies (continued)

Needs	Issues	Strategies
#5: Provide regional leadership to promote the exploration and implementation of needed freight improvements, possibly within new institutional structures.	<ul style="list-style-type: none"> • Division of powers • Need for effective regional leadership 	<ul style="list-style-type: none"> • As noted in #1 and #4, establish a formal working structure – a New Jersey Freight Partnership – to identify and coordinate freight projects, and consider a dedicated freight funding pool to be directed by same; the goal is not to usurp existing jurisdictional responsibilities and prerogatives, but to set an overall vision and to coordinate mutual efforts.

■ 4.4 Critical Path Action Items

Freight planning is a cross-cutting issue – it covers all modes, involves both transportation and economic components, and it addresses the overlapping roles and responsibilities of the public and private sectors. From the menu of potential strategies identified in this *Issues, Needs and Strategies Report*, several key opportunities have been identified as “critical path” items for near-term action.

NJTPA’s Freight Vision

To guide and support ongoing freight planning efforts, the following freight vision statement is suggested:

NJTPA recognizes that freight movement is critical to the economy of its member counties and the State of New Jersey, but also generates significant transportation and environmental challenges that become more critical each day. It is the policy of NJTPA to promote a safe, secure, efficient multimodal freight transportation system that minimizes the negative impacts of freight transportation and distributes them equitably, while maximizing the positive economic benefits accruing to the region. Furthermore, it is the policy of NJTPA to take a proactive role in identifying and facilitating multimodal freight improvements and strategies, particularly in the area of innovative approaches, and to coordinate effectively with public sector and private sector partners to achieve real and lasting benefit for the region’s residents and businesses.

Land Use and Economic Development Initiatives

- **Utilization of Freight Opportunity Sites.** NJTPA and NJIT have identified currently underutilized properties throughout the region that are highly suitable for freight-

related land uses, by virtue of their size, location, and transportation accessibility. NJTPA should continue to lead efforts to return these underutilized properties to productive use, as a means of generating economic benefits, and as a means of concentrating freight activity closer to the region's production, consumption, and transportation core.

- **Smart growth.** Building on the Freight Opportunities initiative, NJTPA should work closely with the NJ Office of Smart Growth to formulate goals and strategies to improve the coordination between land use and transportation components of freight movement. The goal is to maximize economic benefit while minimizing transportation investment needs and environmental impacts.
- **Empty containers.** NJTPA should assist the State in further exploration of empty container management issues.
- **Truck rest areas.** NJTPA should take a lead or co-lead role in examining emerging issues related to truck rest areas and support facilities.

Highways and Bridges

- **Critical corridors.** NJTPA should identify and designate 'critical corridors' for in-region and through-trucking, and take a lead or co-lead role in further examination of improvement strategies. Candidates include, but are not limited to, the routes identified previously in this document.
- **Time-shift, space-shift, and mode-shift strategies.** NJTPA should take a lead or co-lead role in exploring the potential to reduce highway impacts and infrastructure needs associated with truck operations by promoting off-peak operations, separation of trucks and autos, and the use of alternative modes in lieu of trucking where practical.
- **Goethals Bridge.** The Goethals is a critical link between the NJTPA region and Staten Island, and carries a substantial percentage of truck traffic, but with six narrow lanes it is substandard for truck operations. NJTPA should inform and support the PANYNJ-led study now underway.

Rail Initiatives

- **NJSSA operations.** Efforts to improve rail service, accessibility, and marketing to current and potential future rail customers should be jointly undertaken by NJTPA, the State of New Jersey, and the railroads.
- **Regional rail improvements.** NJTPA should coordinate with the various Class I and shortline system rail improvements developed by the PANYNJ, NJDOT, and others, and should identify gaps or further recommendations.

- **Multistate rail corridors.** NJTPA should monitor and coordinate planning with the MAROps and I-81 Corridor initiatives.
- **Short-haul opportunities.** NJTPA may take a lead or co-lead role in further exploration of the potential for short-haul rail service.
- **Cross-harbor rail issues.** NJTPA should continue to play an active role in review and comment on the ongoing Cross Harbor Freight Movement EIS, as well as the Access to the Region's Core passenger rail project, to identify appropriate options to accommodate increasing freight and passenger flows between the west of Hudson and east of Hudson regions.

Ports and Port Access Initiatives

- **PANYNJ expansion program for marine terminals, highway and rail access, and channel deepening.** NJTPA should monitor, inform, and support these ongoing efforts as needed.
- **Kapkowski Road, Portway Phase I Projects, Portway Extensions Program, and Liberty International Transportation Corridor program.** NJTPA should facilitate implementation of these needed projects and initiatives.
- **Innovative maritime strategies.** NJTPA should take a lead or co-lead role in exploring the potential for:
 - Inland Port development
 - Use of marine transportation in coastwise/short-sea shipping, in-region barge, and in-region ferry services
 - “Green Port” initiatives
- **Air draft improvements.** The Bayonne Bridge presents an “air draft” limitation for vessels navigating in the Kill van Kull, which needs to be addressed to accommodate the changing needs of the world shipping fleet. NJTPA should work with its bi-state partners on the appropriate next steps.

Air Cargo Initiatives

- **Air cargo-related warehouse/distribution facilities.** NJTPA should participate in planning for the expansion of these facilities, encouraging the use of Freight Opportunity Sites in the vicinity of EWR.

“Freight Impact Concept Area” Studies

As part of the Freight System Performance Assessment Study, NJTPA explored how these freight initiatives might be applied in practice. Five Freight Impact Concept Areas were studied:

- NJ 17 Corridor (Bergen County);
- NJ Turnpike Interchange 12/Tremley Point (Union County);
- Interstate 78/NJ 31 (Hunterdon County);
- Manville Yard and former Veterans Administration Supply Depot (Somerset County);
and
- Newark Liberty Airport and Port Newark/Elizabeth (Essex County).

These initial concept-level investigations identified opportunities for multimodal physical and operational improvements to enhance economic benefits and address transportation and community impacts. NJTPA should pursue more detailed follow-on study of these opportunities.

Institutional Initiatives

- **Prioritization, evaluation, and funding of freight projects.** NJTPA should work with its partner agencies to identify appropriate criteria and strategies for prioritizing freight projects within a multimodal investment framework, for evaluating the benefits and costs of such projects on a consistent and repeatable basis, and for identifying and securing non-traditional funding to fill the gaps in currently available sources. The possibility of a state-level funding set-aside for freight should be explored.
- **Leadership.** NJTPA should work with its partner agencies to establish an overall freight vision for the region, and to identify structures and mechanisms to streamline the planning, review, funding, and implementation of freight projects across public agency and private sector boundaries.

Outcomes

The results of these various freight initiatives, it is hoped, will include:

- The ability to handle projected increases in freight handling, and to secure the economic benefits associated with those increases, with reduced transportation system impacts and investments and reduced environmental and community impacts.
- A more effective and pro-active partnership among the diverse public and private stakeholders involved in freight movement in the NJTPA region.
- A stable platform for the implementation of projects currently on the drawing board, and for the effective planning of future projects to serve the region's growing freight needs, today and through the year 2030.

The foregoing assessments of issues, needs, and strategies are intended to guide and inform a full range of current and future freight planning initiatives. Substantive elements will be abstracted and incorporated into NJTPA's Regional Transportation Plan.