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The New Jersey Trucking Baseline Report: *A Reality Check*

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Executive Summary

Trucking activity in New Jersey is plentiful. Trucks handle most of the freight tonnage in New Jersey – 75% of the freight or more than 466 million tons moving into, out of, and through the State. Within New Jersey, trucks carry nearly all of the local freight movement.

Yet, trucking, perhaps more than any other method of moving freight, suffers from a persistently poor public perception, which has been sustained by sensationalized reports, press coverage, and, even, the occasional discomforting personal experience. Trucks are often depicted as threatening, the cause of congestion and accident-prone; in other words, emblematic of a deteriorating quality of life.

Public decision-makers, with scanty factual basis as to why so many trucks are moving in New Jersey, are susceptible to these negative perceptions and rarely convey sympathy for the industry's needs. Without a fact-based understanding of how goods move in our economy, what trucks are doing and for whom, why trucks move during certain portions of the day or on certain routes, and what the industry perceives as positive steps that could make it a better partner, our public officials risk making decisions that could unintentionally harm our economy and quality of life.

This report provides a fact-based foundation regarding trucking in the State of New Jersey. It is intended to promote objective discussion about the role and value of goods movement by trucking to our economy, the quality of our lives and the issues surrounding the ubiquity of trucks.

The facts include:

- Trucks are not the predominant source of congestion on the State's highways.
- Trucks are integral to freight movement. Without trucks, the State's goods movement industry – an industry that employs more than 500,000 workers – could not exist. In addition, trends in business logistics indicate that the goods movement industry will be even more dependent on trucks in the future.
- Trucks are a reflection of our quality of life, and analysts accord the value of time for a truck at five times that for personal travel. The goods moved by trucks reflect the way we purchase and receive products and how we conduct our businesses. Trucks move goods to stores and businesses, deliver Internet purchases to our homes, and haul away our wastes.
- Of the 315,400 accidents reported in 2005, 6,600 accidents involved a truck. Studies have shown more than 50% of car-truck accidents are the fault of the car.
- Highway congestion, lack of real-time traffic information, and a growing shortage of qualified truck drivers are just some of the issues facing the industry.

The issues vary tremendously by area, type of movement and type of truck. Nevertheless, with a factual foundation, the discussions can move forward fruitfully.

Several initiatives can emerge:

Better integrate truck movements and operations into planning. With the critical role played by trucks, it is important to ensure adequate roadway capacity, interfaces with other forms of freight conveyance, and facilities.

Assign a higher priority in land use and transportation planning at the state and local levels to the placement of truck terminals and rest areas.

Expand safety initiatives, focusing on public and private sector cooperative efforts to facilitate uniform and consistent enforcement of rules and regulations; increased education efforts through the Division of Highway Traffic Safety, such as USDOT's "No Zone" and the Motor Vehicle Commission's useful graphics in the driver's manual, that educate passenger vehicle drivers about safe interactions with trucks; road design and construction dollars to correct problematic engineering conditions, improved signage for truckers, and opportunities for truck/auto separation.

Encourage driver training programs. With the critical nature of trucking and the shortage of drivers, New Jersey can pursue programs to encourage workers to enter this field.

All of the data in this report is from governmental sources. In addition, the draft report was reviewed by staff of the North Jersey Transportation Planning Authority and the New Jersey Turnpike Authority. The authors thank the staff of these agencies for providing their comments and insights.

I. Introduction

This report provides a fact-based foundation regarding trucking in the State of New Jersey. It is intended to promote objective discussion about the role and value of goods movement by trucking to our economy, the quality of our lives and the issues surrounding the ubiquity of trucks.

Trucks play a crucial role in the delivery of goods and services throughout the State, supporting the functions of businesses and, directly and indirectly, meeting residents' needs. These truck deliveries are essential to maintaining the quality of life that we demand in New Jersey and to the operation of the overall global and domestic goods movement and distribution system that has emerged as a linchpin of the New Jersey economy.

Trucking activity in New Jersey is plentiful. Trucks handle most of the freight tonnage in New Jersey – trucks move 75% or more than 466 million tons moving into, out of, and through the State. Within New Jersey, trucks carry nearly all of the local freight movement.

Yet, trucking, perhaps more than any other method of moving freight, suffers from a persistently poor public perception, which has been sustained by sensationalized reports, press coverage, and, even reinforced by the occasional disconcerting personal experience. Trucks are often depicted as threatening, the cause of congestion and accident-prone; in other words, emblematic of a deteriorating quality of life.

Public decision-makers, with scanty factual basis as to why so many trucks are moving in New Jersey, are susceptible to these negative perceptions and rarely convey sympathy for the industry's needs and its positive effect on the economy. Without a fact-based understanding of how goods move in our economy, what trucks are doing and for whom, why trucks move during certain portions of the day or on certain routes, and what the industry perceives as positive steps that could make it a better partner, our public officials risk making decisions that could unintentionally harm our economy and quality of life.

This report summarizes:

- Current and projected truck volumes in New Jersey;
- The size of the trucking industry in New Jersey;
- The role of trucks in meeting the changing demands of New Jersey residents and businesses;
- The evolving role of trucking services within the global and domestic freight transportation system and the limited availability of alternatives; and
- The major challenges and initiatives involving trucking services.

All of the data in this report is from governmental sources. In addition, the draft report was reviewed by staff of the North Jersey Transportation Planning Authority and the New Jersey Turnpike Authority. The authors thank the staff of these agencies for providing their comments and insights.

II. Truck Movements in New Jersey

Trucks are in the public eye because of their apparent number on our roads. Millions of trucks move into, out of, within and through New Jersey annually. The State has nearly 36,000 miles of public highways, including 420 miles of the federal interstate system.¹ With 466 million tons of freight moving in New Jersey primarily by truck and the very visible profile of large trucks, some perceive that trucks overwhelm the State's roadway network and are a leading cause of congestion.

In reality, trucks do not represent a majority share of roadway traffic; passenger vehicles are, by far, the predominant users of the State's roadways. Those roadways with the greatest concentrations of truck traffic are generally associated with our essential goods movement routes; these can also be candidates for high priority freight movement improvements, if warranted. Further, when trucks are in neighborhoods, they are there to serve customers. Their presence reflects economic activity at the specific locations of their customers – retail stores, offices, warehouses, industry, port facilities, rail yards, air cargo facilities, and direct-to-the-door deliveries to residences.

This chapter, using data derived from the 2005 North Jersey Transportation Planning Authority's (NJTPA) *Freight System Performance Study*, examines truck traffic as a segment of overall roadway movements in New Jersey. The roadways in New Jersey include high volume mixed traffic highways (such as the New Jersey Turnpike and the Interstate System) that move goods long distance and between locations within the State; state and county roads more focused on movements within the region; and local roads that provide the final connections to customers. In general, the location of higher volume truck movements correlates with the higher volume roadways.

A. Current Truck Volumes

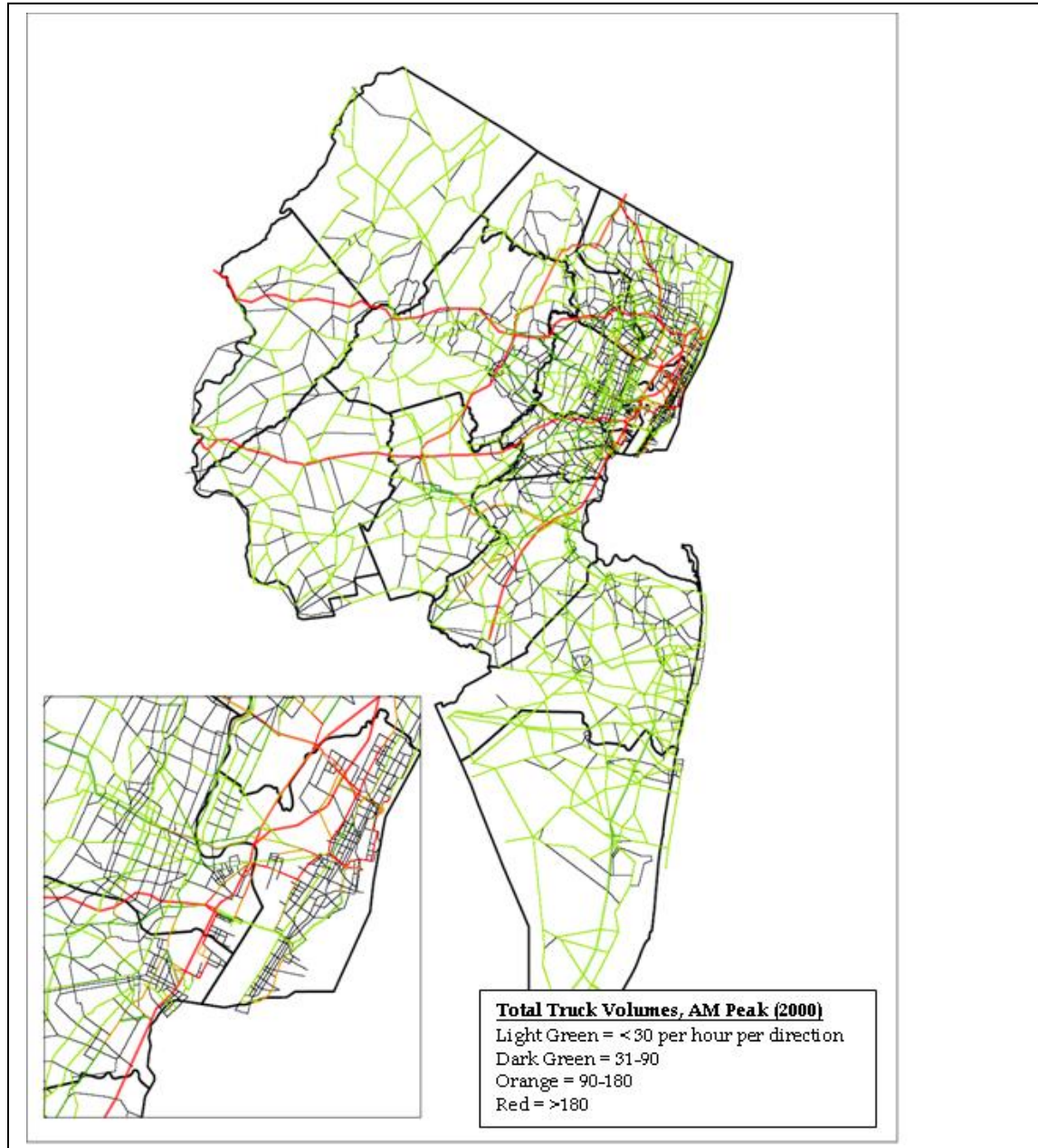
The 2005 NJTPA Study assessed total truck movements, as well as divided truck movements into two types – trucks hauling international maritime containers (which enter New Jersey through the ports and rail yards) and those trucks engaged in “non-container” movements.

1. Total Truck Movements

Figure II-1 shows total truck movements during the morning peak period in northern and central New Jersey. The NJTPA analysis found that the highest volume truck segments (consisting of more than 180 per hour per direction) in the region are found on:

¹ New Jersey Department of Transportation, *The Value of Freight to the State of New Jersey*, 2001, p. 4.

Figure II-1: Total Truck Volume in the NJTPA Region During the Morning Peak Period



Source: NJTPA, Freight System Performance Study, 2005

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

These locations are generally major highway corridors, linking customers within the State, linking New Jersey with origins and destinations in neighboring states, and major through routes for goods traveling through New Jersey.

Drilling down to more local origins and destinations for truck traffic (which, as discussed later in this report, includes port terminals, rail yards, warehouse nodes and key retail store concentrations), the NJTPA analysis found that other significant truck volume segments (with 91 to 180 per hour per direction) include:

- I-280 (Hudson and Essex)
- US 1&9 (Middlesex, Union, Essex, Hudson, Bergen)
- US 46 (Bergen, Passaic, Morris)
- US 202 (Passaic)
- NJ 3 (Bergen and Passaic)
- NJ 4 (Bergen)
- NJ 7 (Hudson)
- NJ 24 (Union)
- NJ 63 (Hudson)
- NJ 82 (Union)

Looking at the two NJTPA categories for trucks – container and non-container movements – further illustrates the linkages between truck movements and the State's goods movement, as well as the relative volume of truck activity on roads in comparison to other movements, such as passenger vehicles.

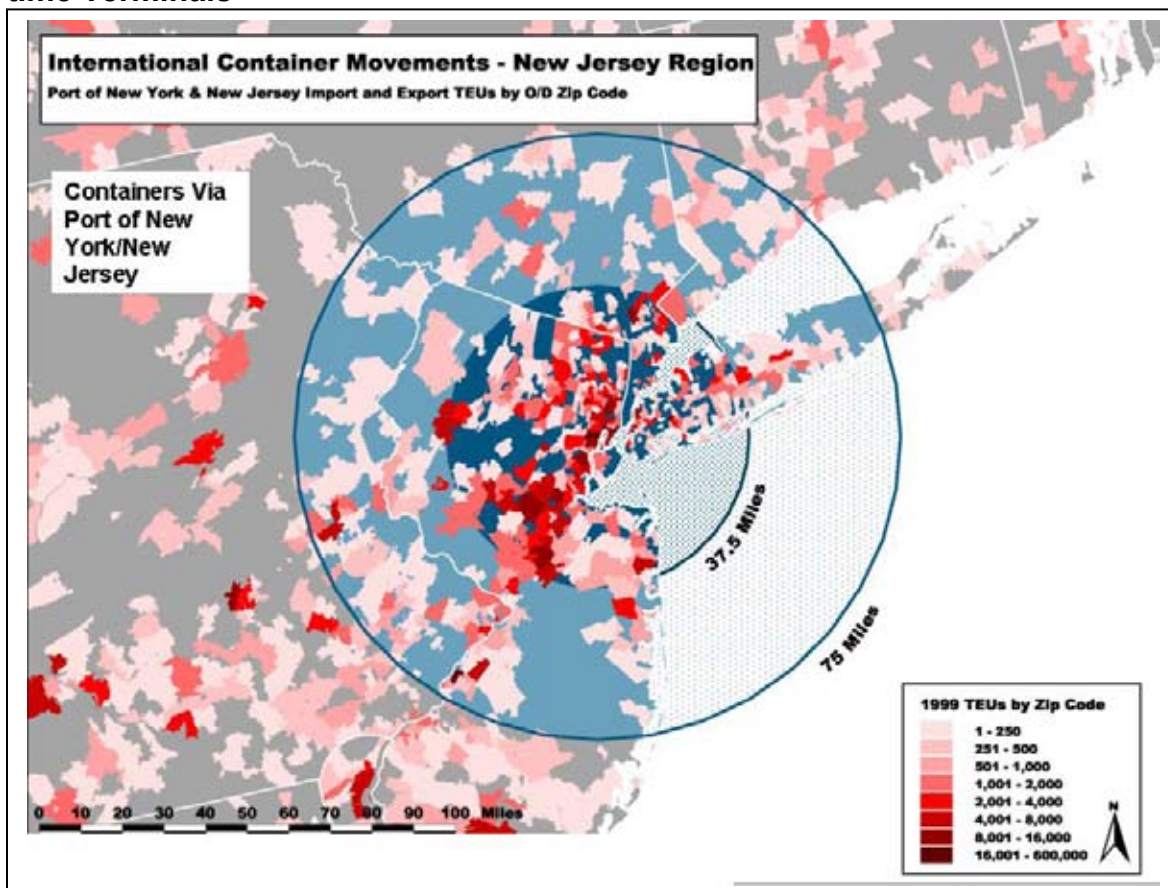
2. Container Movements

New Jersey is an international gateway for North America – receiving goods produced overseas and sending U.S. products to foreign customers. As discussed later in this

report, international maritime movements through the Port of New York and New Jersey, generally moved in containers, have grown rapidly. In addition to receiving products through the maritime terminals in the State, consumers and businesses in New Jersey also receive goods that arrive in the U.S. at West Coast ports and are sent by rail to terminals in and near the State. This coast-to-coast rail movement represents at least half of the international containers entering New Jersey.

Approximately 85 percent of the containers arriving at the maritime facilities in the northern portion of the State move to their first place of rest in North America via truck. (As indicated below, the Port Authority of New York & New Jersey is heavily investing to increase reliance on rail for the initial movement of a container after its arrival in the port.) All of the international maritime containers arriving in New Jersey from the West Coast via rail complete their local trips via trucks.

Figure II-2: Destination of International Containers Arriving at New Jersey Maritime Terminals



Source: New Jersey Department of Transportation, Portway Extensions Concept Study

The Portway Extensions Concept Study, conducted by the New Jersey Department of Transportation, identified that warehouses and distribution centers are generally the first place of rest for maritime containers. The vast majority of these warehouses are in New Jersey along the New Jersey Turnpike from Bergen to Mercer counties, although distribution centers are increasingly being developed in Pennsylvania along the Interstate 78 and 81 corridors. Figure II-2 illustrates the movement of containers associated with maritime terminals in northern New Jersey. The highest concentrations of container movement origins and destinations are generally arrayed along the New Jersey Turnpike spine.

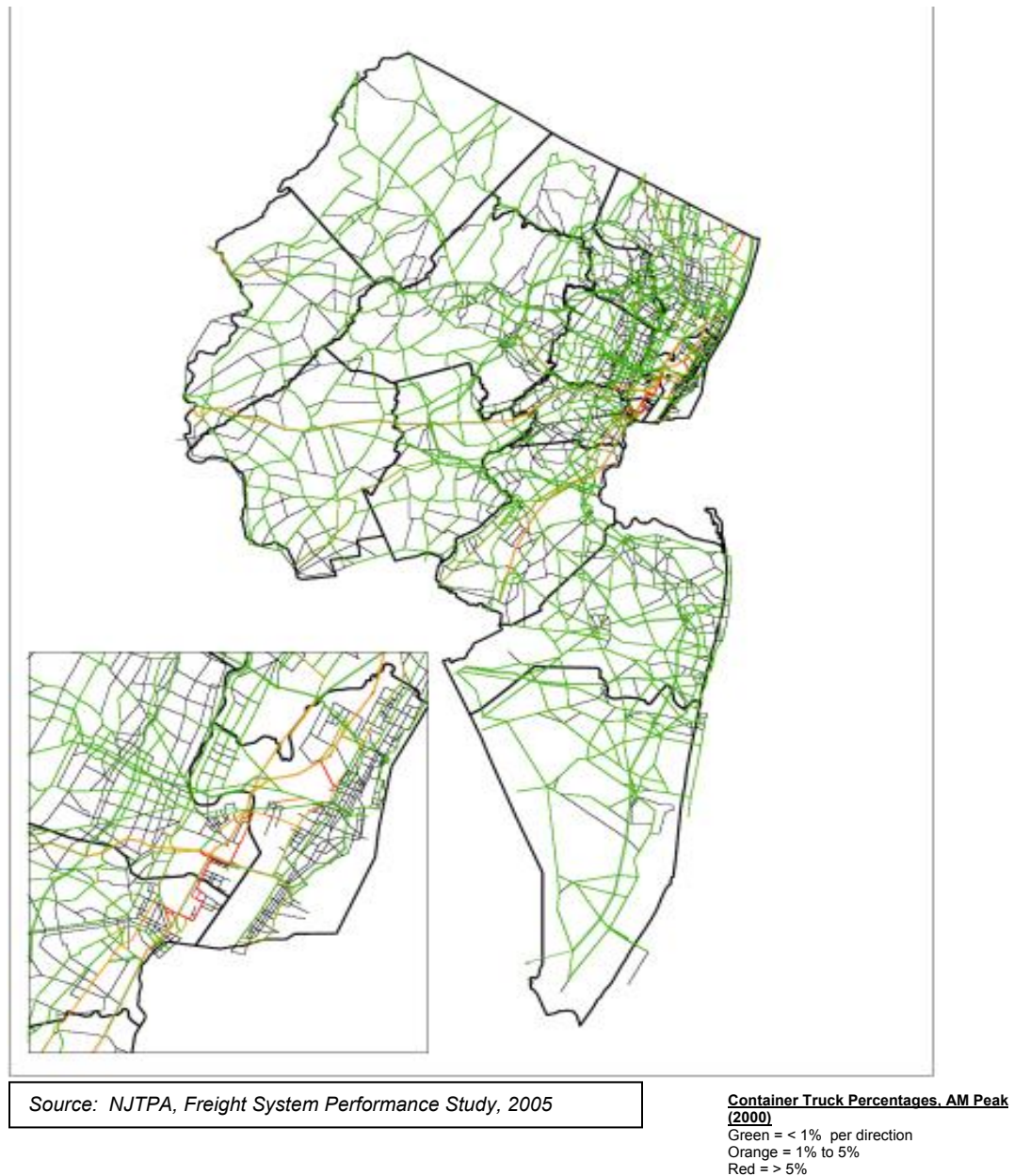
The NJTPA study showed that while nearly 5 million containers enter through New Jersey's maritime terminals alone, the main impact of the associated truck movements is largely concentrated on a few roadways near the Port and rail terminals in the State. In general, the movement of international containers does not exceed one percent of peak period traffic on most of the roadways in northern and central New Jersey (Figure II-3).

The roadways where trucks hauling international containers exceed one percent of total traffic include:

- Most of the New Jersey Turnpike, I-78, and NJ 17
- Most of the local roads in the vicinity of Port Newark/Elizabeth

All of these roadways are consistent with the location of warehouse and customer nodes within and outside New Jersey. NJ Route 17, for example, has increasingly emerged as a route between the New Jersey port terminals and Canada. Interstate 78 is used for container movements to and from warehouses and distribution centers in Pennsylvania.

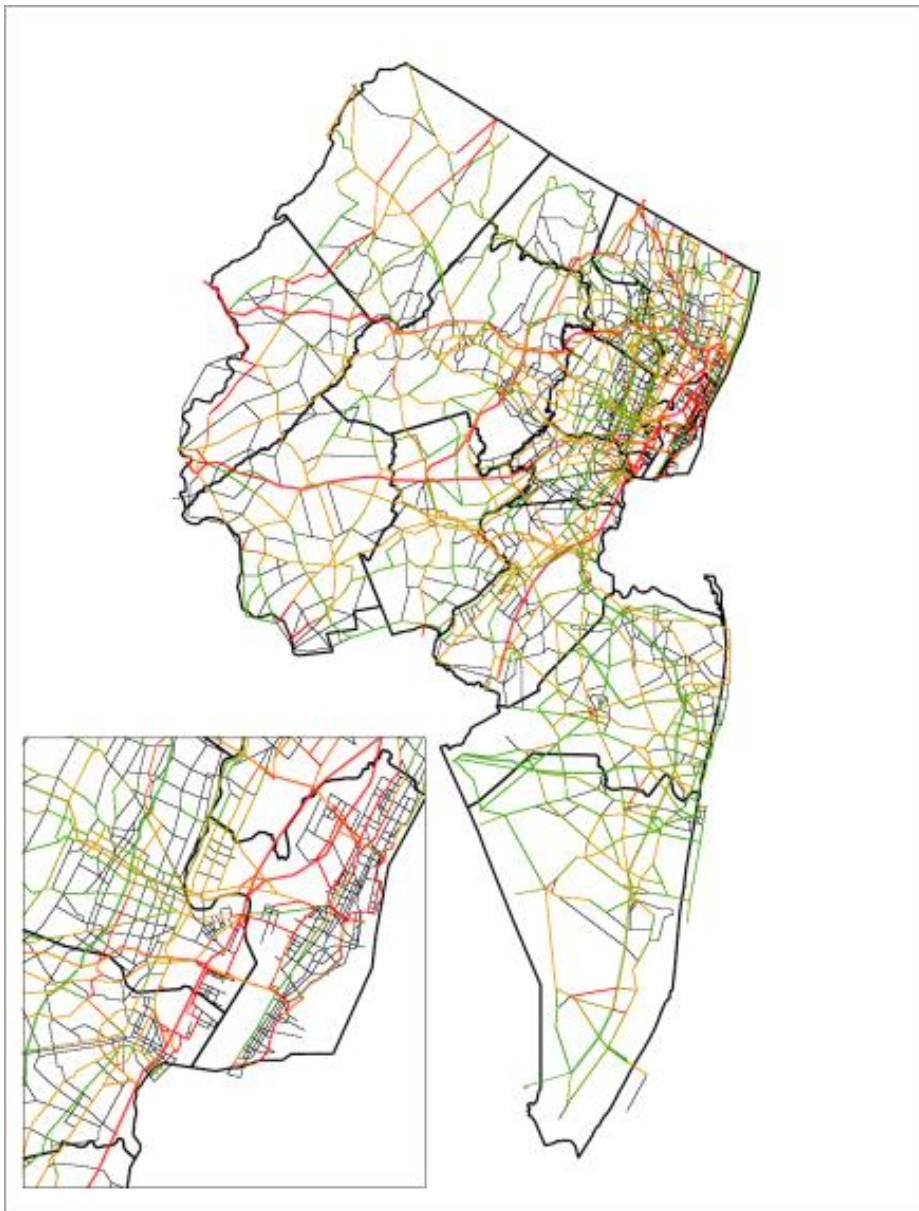
Figure II-3: Trucks Hauling International Containers as a Percentage of All Traffic on Northern and Central New Jersey Roads During Morning Peak Period



2. “Non-Container” Truck Movements

Non-container trucks cover the broad spectrum of freight movers associated with distribution from and to a variety of locations. (Figure II-4). There are many more of these trucks on New Jersey’s roads, consistent with the high level of demand for freight movement required by consumers and businesses in the region.

Figure II-4: “Non-Container” Trucks as a Percentage of All Traffic on Northern and Central New Jersey Roads During Morning Peak Period



Source: NJTPA, Freight System Performance Study, 2005

Non-Container Truck Percentages, AM Peak (2000)

Green = < 1% per direction

Orange = 1% to 5%

Red = > 5%

These trucks include goods moving from warehouses to retail stores, offices and other places of business, as well as those fanning out to deliver to residential addresses. The origins and destinations reflect the diversity of the locations. These trucks are generally serving the needs of the New York – North Jersey and Philadelphia- South Jersey metropolitan areas and are helping keep New Jersey's economic engines going.

B. Truck Movements and Their Relationship to Road Congestion

The NJTPA analysis indicates that, in general, trucks are not the source of congestion on the area's roadways. Rather, auto traffic is the leading source of congestion.

The Study reviewed the high volume truck roadway segments with regard to the performance levels of these segments and the locations of unacceptable levels of service. The Study's findings were:

- Some of these high-volume truck segments are not actually performing at poor to unacceptable levels of service, at least not yet; and
- Many of the segments showing unacceptable levels of service are not high-volume truck segments. Their unacceptable performance is primarily due to the high levels of peak period auto traffic they have to carry.
- Some perceive that it can take longer to clear a truck accident scene than an accident involving only passenger vehicles.

Moving into the future, the NJTPA analysis anticipates that truck volumes, measured in vehicles miles traveled (VMTs) are anticipated to grow more rapidly than passenger car movements because of the increasing demand for goods transport. However, NJTPA's projections show that in 2030, at a system-wide level, most of the deterioration in roadway performance is due to absolute increases in passenger VMTs, which are substantially higher than the absolute increases in truck VMTs. The increased number of trucks will result in an increased contribution to the congestion, but trucks will still not be the primary source of the problem.

III. Truck-Related Employment

The volume of truck movements reflects the industry's critical role in supporting businesses and residents. The industry, itself, is also a major economic contributor to the State.

The management and handling of freight is one of the largest industry clusters in New Jersey. Over 500,000 people work in warehouses, cargo handling and movement, and freight arrangement in the State, making goods movement a major economic engine for the State. Because of the critical role played by trucking in the freight transportation system, nearly all of these workers depend on the efficient movement of goods by trucks for their livelihood.

About 57,000 people work directly in the trucking industry in New Jersey, either employed by trucking firms or as independent drivers.² Employees in the more than 2,900 trucking firms in New Jersey earn an average of over \$47,000 annually.³ Independent truck drivers' earnings are more variable.

IV. Truck Activity in New Jersey is a Reflection of Our Consumers' Quality of Life

The movement of freight is driven by the needs of customers and the options available for moving shipments cost effectively. As a densely populated, affluent state, freight activity, and specifically trucking, inescapably serves the needs of New Jersey's residents

This chapter describes:

- The demographic and economic characteristics of New Jersey's residents;
- The types of freight services required by its residents; and
- The role of trucking in providing the required freight service.

A. An Affluent, Densely Packed Population

New Jersey's population has grown more or less steadily for almost 150 years to more than 8.4 million residents, according to the 2000 US Census, now the state with the ninth highest population in the US, (See population trends and projections in Figure IV-1.) Seven years later, New Jersey now has an estimated population approaching 8.7 million, and the U.S. Census Bureau projects, as further shown in Figure IV-1, the State to exceed 9.5 million by 2020. In addition, New Jersey has the highest population density in the U.S. with 1,134 people per square mile, compared to the U.S. average of 80 persons per square mile. New Jersey has held that rank since 1970.

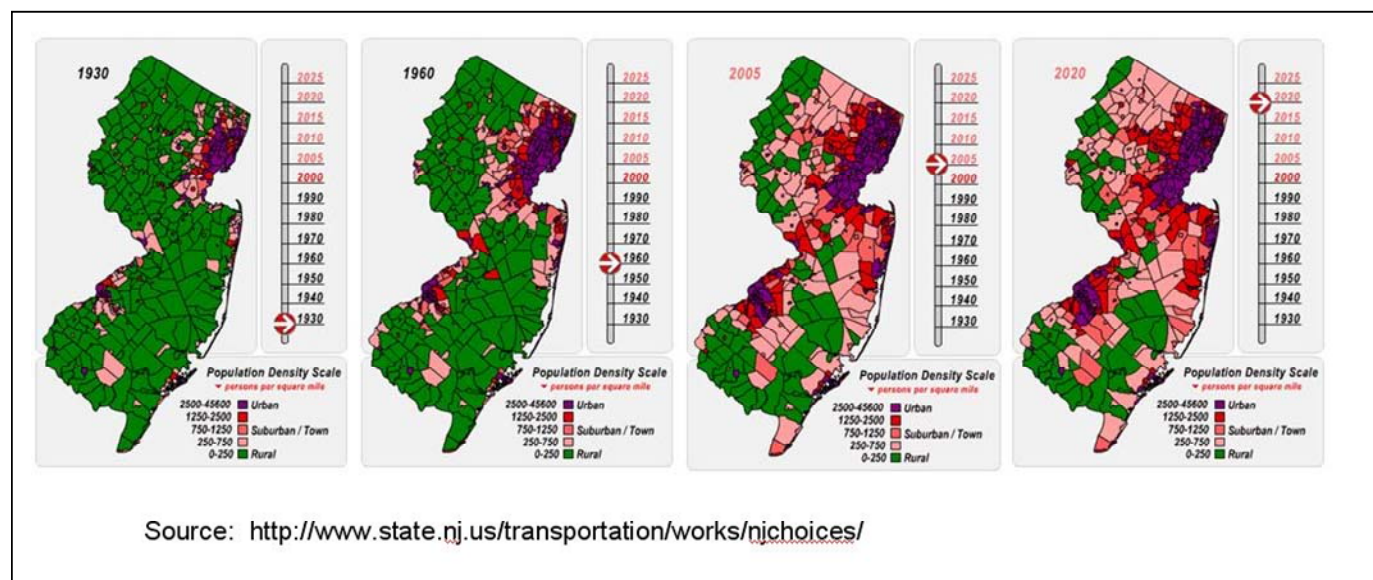
² Based on employment information reported to the New Jersey Department of Labor and an estimate of independent truck owners in the State provided by the Owner Operators Independent Drivers Association.

³ Source: New Jersey Department of Labor.

New Jersey also ranks among the most affluent states in the nation. The median household income in New Jersey in 1999 was \$55,146, compared to a national average of \$41,994.⁴ The surrounding States, including New York and Pennsylvania, also tend to be more affluent than other regions in the US. The high level of disposable income in the region also contributes to shopping being a significant part of people's lives and a significant factor in truck traffic for New Jersey for its own consumption as well as that of surrounding states.

Finally, New Jersey has followed the national trend of population dispersing from its urban areas, resulting in growth in suburban and formerly rural areas. Today's spatial pattern of residences, retail and service industries in the State varies significantly from the early decades of the 20th century, as shown in Figure IV-2, when New Jersey's population was concentrated in discrete urban centers, most notably in the Newark and Jersey City metro areas in the northern portion of the State and the Camden and Trenton metro areas in the southern portion of the State. As suburban development advanced, first along passenger rail lines and then along highways, population densities advanced throughout the State. This dispersal of location also dictates the practical choices for freight transport mode.

Figure IV-2: Evolving Population Densities in New Jersey – Becoming More Wide-spread and Dense Over Time



⁴ Source: US Census.

B. Translating Residents' Needs into Freight Movement

People generate freight movement requirements through their purchase of goods and removal of waste products. Retail purchases are made today through several channels:

- Traditional “brick and mortar” stores located in downtown areas, strip malls, larger malls and stand-alone operations.
- Internet purchasing and mail order catalogues, where shoppers select their products and have them delivered to their door.

Retail store locations tend to track closely with population densities and patterns. As the population of New Jersey dispersed from the urban cores, retail operations followed.

Each retail store must be supplied with products and consumers expect the goods they want to be available immediately at the best possible price. Hence, stores in dispersed locations must be supplied, sometimes daily, with stock.

The essentiality of freight movement to our quality of life is reflected in analysts' setting the value of truck travel at more than five times the hourly rate accorded to personal travel.⁵

In addition, consumer product preferences have changed. Consumers now seek a wider range of options, as well as more frequent changes in product features and options. This is evident in the varieties of fruits and vegetables available in most markets, the accelerated cycle patterns for introducing consumer electronics and inventory turn-overs in furniture, appliances and clothing. Mail order and internet purchases generally specify delivery to residences.

The spatial distribution and sheer quantity of potential destinations also affect the selection of the freight modes used. The resulting freight shipment characteristics include:

- The need to serve multiple, geographically dispersed destinations on a frequent basis; and
- Smaller shipment sizes, including mail order and Internet purchase shipments and more diverse products going to individual store locations.

The multiplicity of retail locations and residences are accessible through the State's roadway network, so trucks are the much-favored choice for the local portions of the move from origin to destination.

Rail freight, air cargo and ocean carriers can potentially all be used on the long distance portion of the movements from manufacture to consumer purchase. Rail service is most effective in moving large quantities long distances from one point to another, as discussed below, but rail direct service to retail locations is not feasible given the geographical distribution of locations, average shipment sizes and frequency of service requirements.

⁵ Texas Transportation Institute, Urban Mobility Report, September 2007.

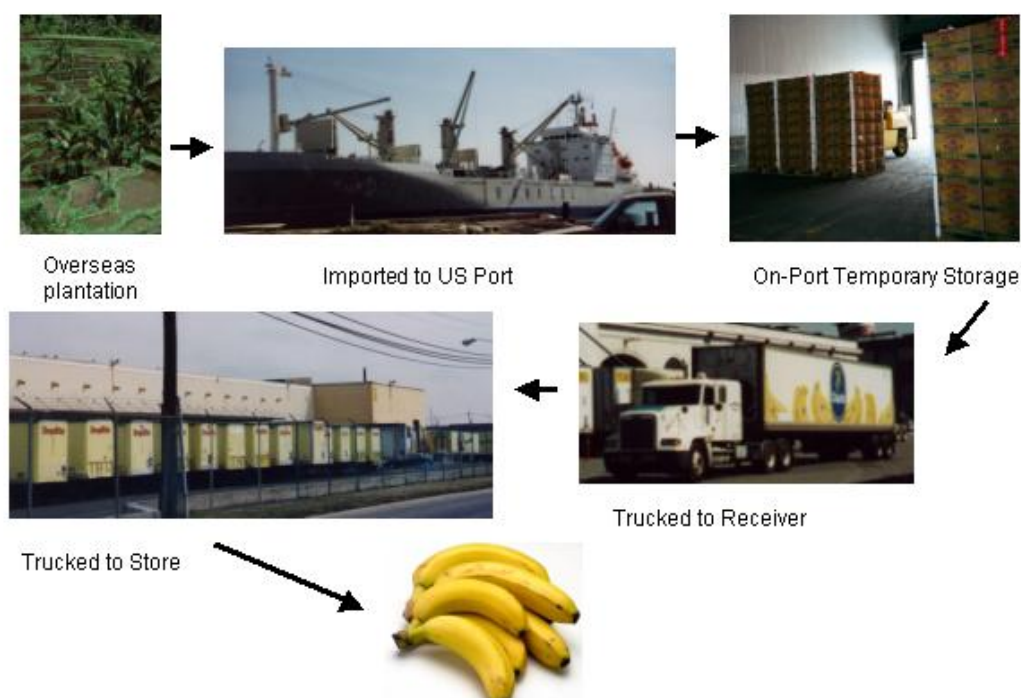
C. The Role of Trucks in Meeting Consumer Demand

As illustrated in the two examples below,, the role of trucks is integral in meeting consumer demand. Figure IV-3 summarizes the delivery of bananas, a popular consumer product. Figure IV-4 describes the freight modes used to fulfill a typical Internet purchase.

Bananas are the most popular fruit in the US, with the average American consuming about 33 pounds each year. As shown in Figure IV-3, bananas are imported from Central and South America. Ocean carriers handle the international movement. Vessels arrive weekly at maritime terminals in New Jersey, New York, Pennsylvania and Delaware with bananas for the regional market. Precise temperature control and delivery timing are required to ensure that the bananas arrive at supermarkets and restaurants in the desired condition. Trucks meet the delivery criteria for the domestic movements, first in transporting the bananas from warehouses at the maritime terminals to the customers' distribution centers and, then, from the distribution centers to the consumer outlets.

Figure IV-3:

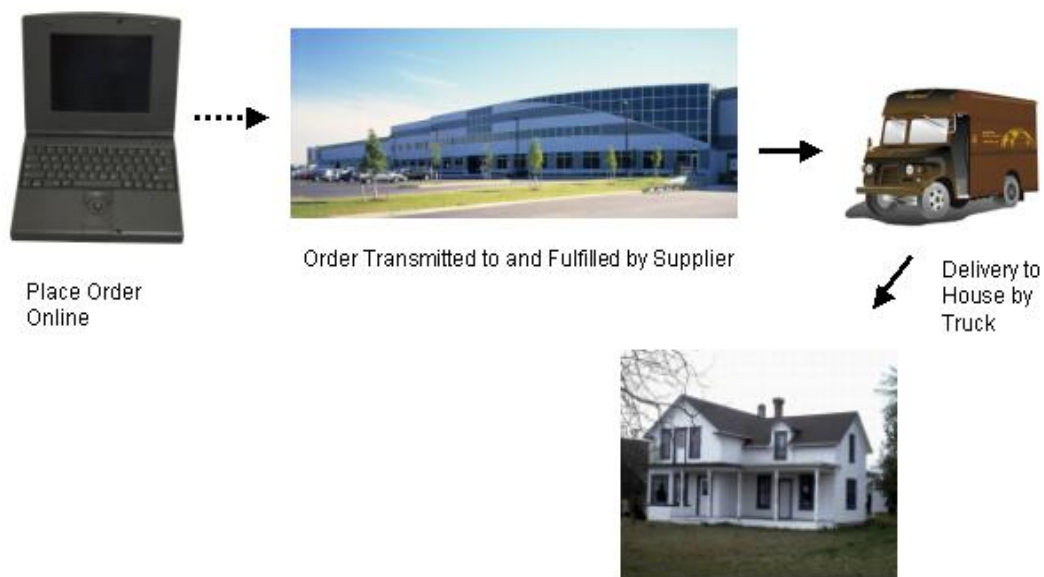
Fresh Produce to Market



Internet purchases, summarized in Figure IV-4, allow consumers to forgo traveling to stores and instead place their orders by computer from homes and offices. An order is electronically routed to the fulfillment warehouse. Once distribution center personnel have completed the order, it is placed with other orders for home delivery. The longer

distance portion of the movements may be handled partially by intermodal rail (e.g., UPS moves some trailers on rail flat cars) or by air cargo carriers (e.g., FedEx, UPS and DHL). In any event, given the vast array of destinations and shipment sizes, goods are ultimately delivered to the residence by truck, explaining why FedEx, UPS, DHL and US Postal Service delivery trucks are familiar fixtures in many neighborhoods.

Internet Shopping



V. Trucks' Role in Serving New Jersey's Businesses is Growing

New Jersey, similar to many other regions in the US, has transitioned from a manufacturing and production based economy to a service economy. The freight needs of businesses in the service sectors are radically different from the needs of production facilities. In addition, many New Jersey businesses acquire or sell goods in the global market place.

Current global supply chain and logistics practices stretch further geographically, require precision and timeliness, focus on the best combination of freight modes to meet customer requirements, and continue to seek the lowest possible costs.

These changes in logistics practices, combined with the change in composition of New Jersey's industrial base, translate into greater use of trucks.

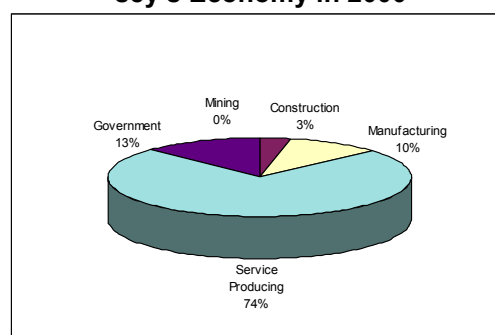
Figure V-1: New Jersey Economic Changes Over Time

	1900	1950	2000
NJ Manufacturing Employment	326,000	756,000	457,000
Manufacturing as a % of NJ Labor Force	35%	50%	10%

Source: *New Jersey Review and Economic Outlook for 2000-2001*, New Jersey Council of Economic Advisors.

As shown in Figure V-1, New Jersey had a large manufacturing base in 1900, along with its agricultural and other businesses. Towards its manufacturing peak in the 1950s, half of New Jersey's workforce, or nearly 800,000 people, worked in that field. By 2000, the State had transformed from being a manufacturing center to an economy largely focused on service industries (Figure V-2). In 2000, just 10 percent of the State's workforce worked in the manufacturing sector and 74% were employed in various service-producing industries. While the decline in manufacturing could lead to the conclusion that there would be a decline in the need for truck movements, the opposite is true. Other service-producing economic activities, including the retail, service and wholesale businesses, all require a substantial amount of trucking services.

Figure V-2: Composition of New Jersey's Economy in 2000



Source: *New Jersey Department of Labor*

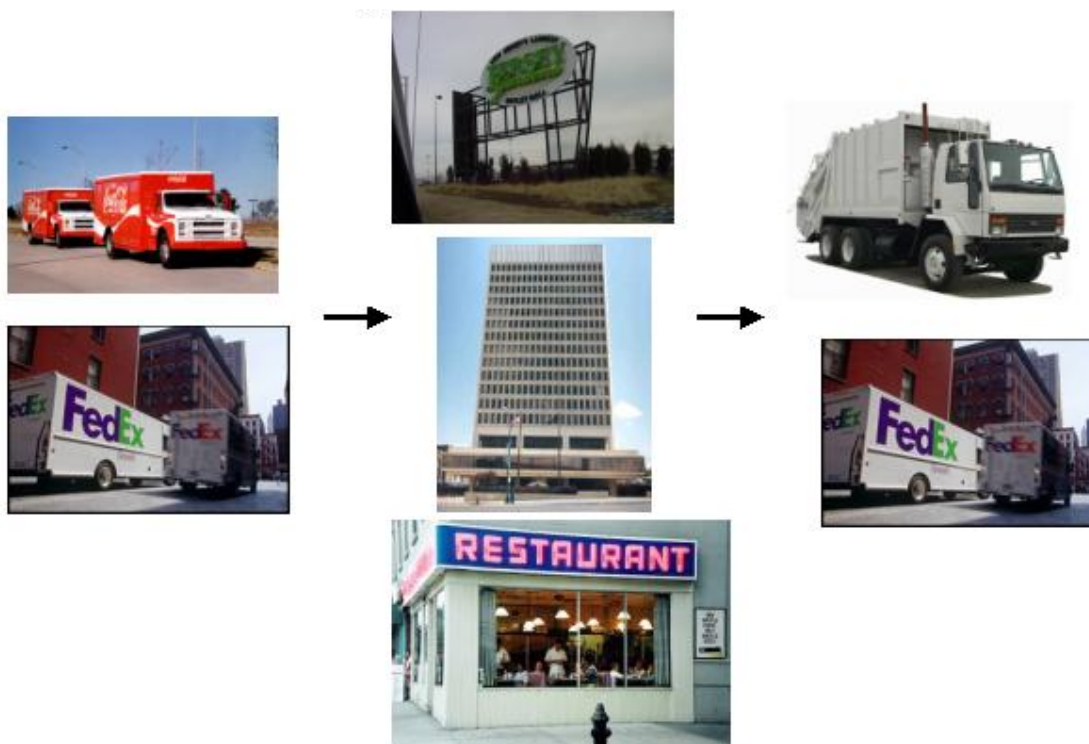
A. Service Industries – A Growing Business

Service establishments, the dominant component of New Jersey's economy today, include financial, insurance, real estate, business support and law firms; retail stores and malls; restaurants, hair salons and similar businesses. As shown in Figure V-3, service firms are often major users of trucks. Trucks are used because of the small size and high frequency of the shipments to and from these establishments. Restaurants receive daily deliveries of the goods needed to prepare meals. Free-standing stores and malls selling merchandise must have their stocks constantly replenished. Each store in a mall has its own frequent deliveries. Offices receive and ship documents, as well as receive supplies. Finally, all of the service firms generate waste, which is removed from the premises by truck.

The trucks delivering products to services businesses generally originate at warehouses and distribution centers. Although goods arriving at warehouses may have been picked up at intermodal rail yards, airports or port facilities, with rare exceptions, the delivery to warehouses and distribution centers is almost always via trucks. Note that some experts have proposed that a system of rail shuttles from portside or rail head to warehousing clusters be created as a way to reduce truck traffic now performing that role. Perhaps, a small percentage of such deliveries could be diverted to rail.

Figure V-3:

Serving the Service Base



From the warehouses and distribution centers, trucks make the final delivery to service businesses. These shipments are smaller, although large tractor-trailers can be used to replenish larger retail establishments and supermarkets or during deliveries to multiple business establishments along a route. As an example, beverage companies generally need to supply a diverse customer base in the service sectors, including restaurants, schools, hotels, supermarkets and other establishments. Consequently, beverage distributors establish routes to permit a truck to make deliveries to multiple customers in a geographical area.

B. Manufacturing – Demand for Freight Altering as the Industry Changes in New Jersey

New Jersey also retains a diversified and extensive manufacturing base, although the percentage of the State's workforce employed in these businesses has shrunk considerably. Further, the number of very large manufacturing operations continues to decline, most recently with the loss of the State's last two remaining auto production facilities, the Ford plant in Edison and the General Motors plant in Linden.

The products generated by New Jersey manufacturers have also shifted over the years (see Figure V-4 for change in composition of the state's manufacturing sectors). With it, the level, composition and type of freight demand has also shifted. Each industry sector can have different freight movement requirements, although trucking often plays a role in the receipt or shipment of goods in the manufacturing process.

Some business in today's leading manufacturing sectors, such as petroleum refineries, metal fabricators, news presses, plastics manufacturers and other users of bulk commodities, prefer to receive their products by rail. (Note that barges and pipelines may also be used to move products such as petrochemicals and natural gas.) When direct rail service is not available, these firms may receive product by truck from rail transload facilities. Transload operations are discussed further in the next chapter. Other businesses, requiring smaller quantities or more delicate and/or timely transport of goods, often use trucks for their receipt and shipment of goods.

Figure V-4: Comparison of the Top Manufacturing Sectors in New Jersey in 1900 and 2000

1900	2000
Copper Smelting/Refining	Chemicals
Silk & Silk Goods	Food
Foundry/Machine Shop Products	Petroleum/Coal
Slaughtering & Meat Packaging	Printing and Publishing
Woolen, Worsted & Felt Goods	Industrial Machinery
Wire	Electronic Equipment
Leather	Instruments
Tobacco Manufacture	Transportation Equipment
Electrical Machinery	Fabricated Metals
Chemicals	Paper

Source: *New Jersey Review and Economic Outlook for 2000-2001*, New Jersey Council of Economic Advisors

C. Warehousing – A Growing Industry and Truck Generator

Warehouses and distribution centers play a critical role in the movement of goods between production facilities and end users. Goods flow from production facilities located within the State, from elsewhere in North America or increasingly from overseas, to warehouses and then distributed to customers. The customers can be other production operations, retail and service operations, and consumers.

Warehouses and distribution centers increasingly include some value added activity. For retail stores and customers, many of these activities are forms of “shelf readiness” activities, that is, getting the products in the final shape for purchase and consumption. Examples of value added activities include:

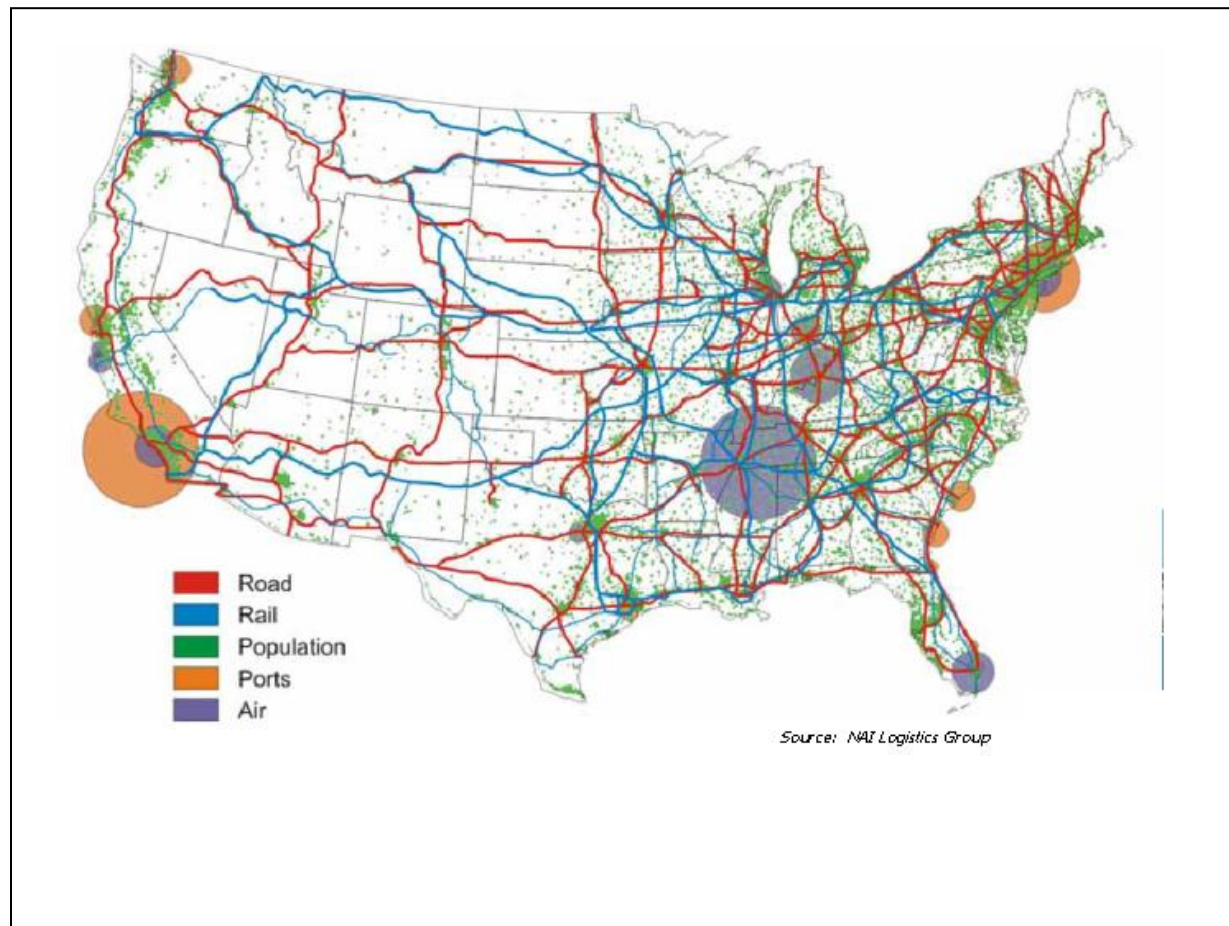
- Assembly and customization – assembly of knife sets from individual knives shipped in bulk to the warehouse; inflation of imported soccer balls, stuffing pillows and comforters, production of gourmet gift packages that combine products from multiple sources; assembly of product displays; and furniture assembly.
- Packaging and Ticketing – blister packing of kitchen gadgets; stuffing and preparation of handbags and luggage; individual book picking and packing to replenish stores and fill Internet orders; pressing and hanging of garments; and adding tickets and pricing labels to customer specifications.
- Product Repair – removing broken liquor bottles from cartons and removing damaged paper from the outer layers of paper rolls.

New Jersey is one of the leading nodes of warehouse activities in North America, with over 830 million square feet of space and an estimated 400,000 workers. Major ware-

house locations include Middlesex, Bergen, Essex, Union, Burlington, and Mercer Counties.

Distribution operations are drawn to this region by the proximity of the largest container port complex on the East Coast – the Port of New York and New Jersey, the rail heads of transcontinental railroads and the significant concentration of end users in the area. New Jersey is also proximate to the domestic and international air cargo complex at Newark Liberty and John F. Kennedy International Airports. The usual convergence of population and imports is shown in Figure V-5.

Figure V-5: An Unusual Convergence of International Port, Air Cargo and Population Concentrations Centers in New Jersey



Warehouses and distribution centers are generally served by trucks, both for their inbound and outbound movements and, thus, become major truck traffic generators. In New Jersey, much recent warehouse construction has located close to the New Jersey Turnpike to take advantage of its direct routes from the port and railheads and access to the northeast's interstate highway network. Depending on logistics practices, a few unique distribution centers do receive goods directly by carload rail. Examples include the Tropicana distribution center in Jersey City, which has dedicated "orange juice" trains coming from Florida via CSX, and a facility in Union County that receives Gallo brand wines in boxcars.

The almost total reliance on trucking at warehouses and distribution centers for both inbound and outbound movements should be considered by local officials in siting these buildings which are sought for economic development purposes. In some cases the local road infrastructure is inadequate to accommodate trucks and/or other adjacent land uses are incompatible with intense trucking activity.

VI. Trucks Play A Growing Role Within the US Freight System

The U.S. freight system, servicing expanding international trade, includes ports and waterways, air cargo operations, trucking and rail freight operations. Trucks play a crucial and growing role within the system:

- Trucks generally provide the local pick up and delivery for rail freight, port and air cargo operations, arriving in the region, often from overseas. Trucks may be the only freight mode actually seen by shippers and receivers, although several freight conveyances may have been used to move the shipment from origin to destination.
- Trucks have become a substitution for domestic air cargo operations. The reasons include the downsizing of aircraft and reduction in routes; customers, meanwhile, are willing to accept slightly longer delivery time frames to take advantage of significantly lower transport prices.
- Trucks are the safety valve for transcontinental transport. When the rail freight system became congested or capacity was not available, trucks provided an alternative method to transport goods over long distances.

This chapter looks at how trucks interact with ocean freight, rail and air cargo operations. In each case, the use of trucking has increased.

A. Ocean Freight

The most dynamic aspect of international goods movement is through the use of containerized cargo, particularly for consumer products, and the ports are the nation's gateways to international containerized commerce. As shown by Figure VI-1, the top 10 US importers of containerized cargo are companies with easily recognized names in most households.

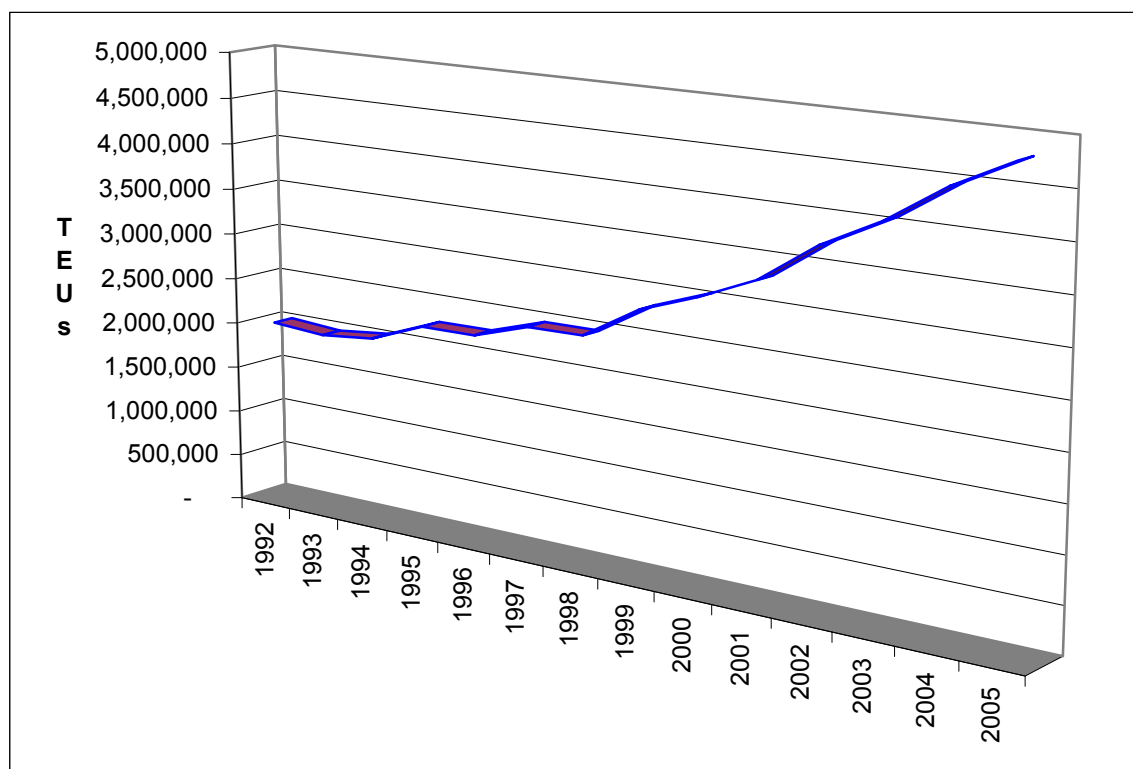
Figure VI-1: Top Ten Ocean Container Importers in 2004

<i>Im p o r t e r</i>	<i>20-Foot C o n t a i n e r s i n 2004</i>
W a l-M a r t S t o r e s	576,000
T h e H o m e D e p o t	301,200
T a r g e t	202,700
S e a r s	186,000
D o l e F o o d C o .	164,100
C h i q u i t a B r a n d s I n t e r n a t i o n a l	115,600
I k e a	100,000
L o w e s	100,000
H e i n e k e n	83,400
C o s t c o W h o l e s a l e	66,400

Source: Journal of Commerce

Maritime traffic has more than doubled through the Port of New York and New Jersey since 1992. As shown in Figure VI-2, the Port of New York and New Jersey continues to grow. In 2005, the Port handled over nearly 4.8 million twenty-foot equivalent containers (TEUs), up significantly from 2000. This growth is anticipated to continue with the expansion of the global economy. Even if the percentage moved inland by rail and barge doubled, the number of containers moving inland by truck will grow substantially.

Figure VI-2: Trends in Container Traffic through the Port of New York and New Jersey



Source: Port Authority of New York and New Jersey

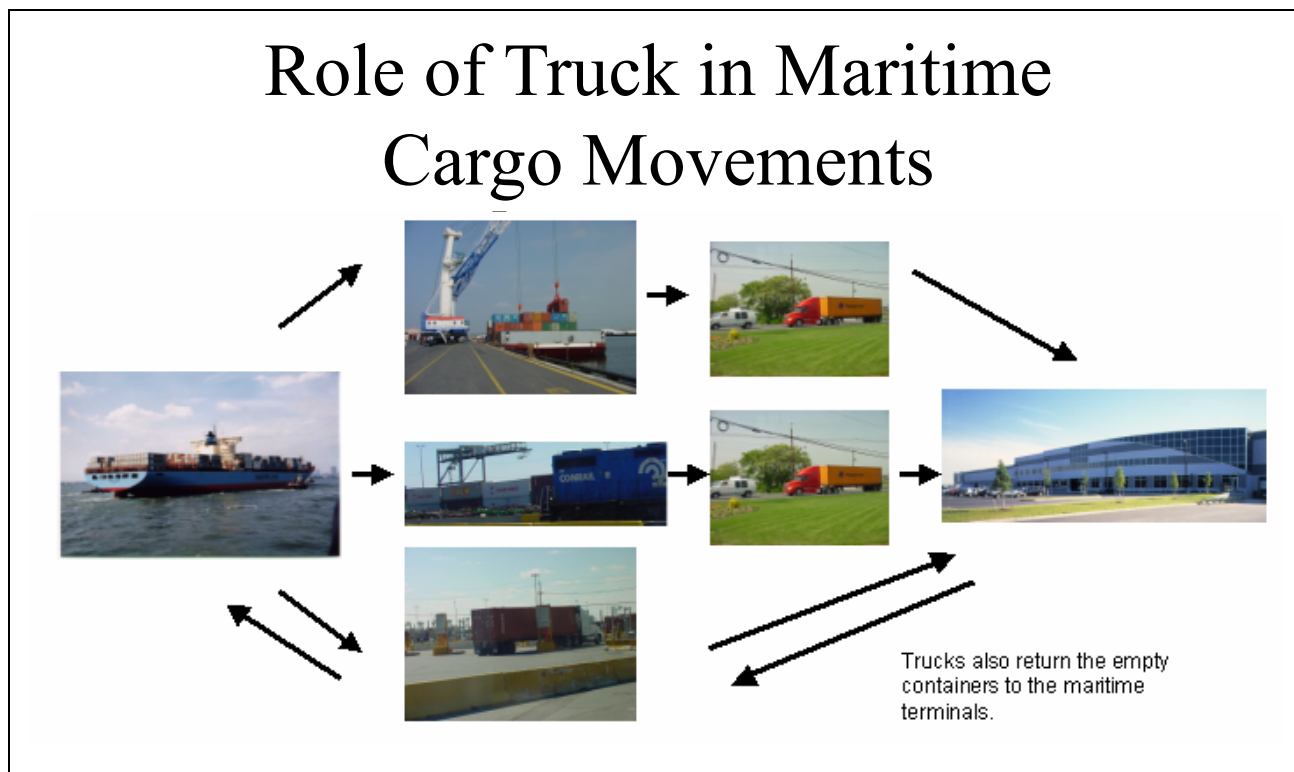
While ports are endeavoring to increase the amount of cargo moving inland by all modes – rail, truck and barge, New Jersey’s unique convergence of hub port, warehouses, and population concentration translates into a majority of containerized ocean freight shipments moving locally. At this time, the most efficient and economical method for these local port movements to the first place of rest involves trucks. Figure VI-3 summarizes the role of trucks in maritime cargo movements. The most common role for trucks is to move the loaded container from the port for the customer to its distribution center and hauling the empty container back to the port.

Intermodal movements involve the transfer of containers among different freight modes. As shown in Figure VI-3, the containers may be loaded at the port and then

moved by rail and barge. Then, as shown, the containers can be offloaded from the trains or barges and moved by truck to end users.

Rails offer cost advantages for longer distance inland movement of containers through the use of *doublestack trains*, with cars that can handle two or more stacked containers. The Port Authority of New York and New Jersey has embarked on a substantial investment program to improve the transfer from ocean vessel to rail. Barges also play a role in moving containers from the ports on longer distance moves.

Figure VI-3:



C. Air Cargo

Trucks play an integral role in air cargo operations, as well as act as a substitute for domestic movements. There are three types of air cargo carriers:

- *Integrated carriers* that handle shipments through their own network of trucks and aircraft from origin to destination. Examples of integrated carriers include FedEx, UPS and DHL. Fed EX is the dominant air cargo carrier at Newark Liberty International Airport (EWR)
- *All cargo carriers* that move shipments, generally of larger size, on dedicated cargo aircraft. Examples include Kitty Hawk and Astar
- *Passenger airlines with cargo operations.* Many passenger airlines generate revenue through the transport of cargo in the bellies of scheduled passenger aircraft. Some of these airlines also have small fleets of dedicated cargo aircraft for

international service. Examples of airlines with both belly and dedicated cargo aircraft include Lufthansa and Northwest Airlines. Examples of airlines with substantial air cargo operations include Continental, Virgin Atlantic and SAS, with Continental by far the largest at EWR.

Typical products moved by air include time sensitive documents, critical replacement parts, perishable goods (such as fish and flowers), and high end apparel and jewelry. Because of the value, size and urgency of air cargo shipments, trucks are used to pick up and deliver air cargo shipments from customers. Freight forwarders, customshouse brokers, air cargo consolidators and air cargo operators maintain facilities on or near the airport.

EWR is the largest air cargo operation located in New Jersey. In 2004, EWR handled nearly one million tons of freight. The airport is ranked 8th in the US and 20th in the world in terms of cargo handled. Total air cargo tonnage through Newark Liberty International Airport peaked in the late 1990s. Domestic cargo movements have remained about 100,000 tons lower than during the peak period, while international cargo movements continue to increase.

These trends are consistent with the growing substitution of trucking services for domestic air cargo operations and the increase in international air service from EWR. Truck substitution for domestic air cargo will continue to grow. Trucks will also be needed to handle the domestic portion of the international air cargo shipments at the Airport.

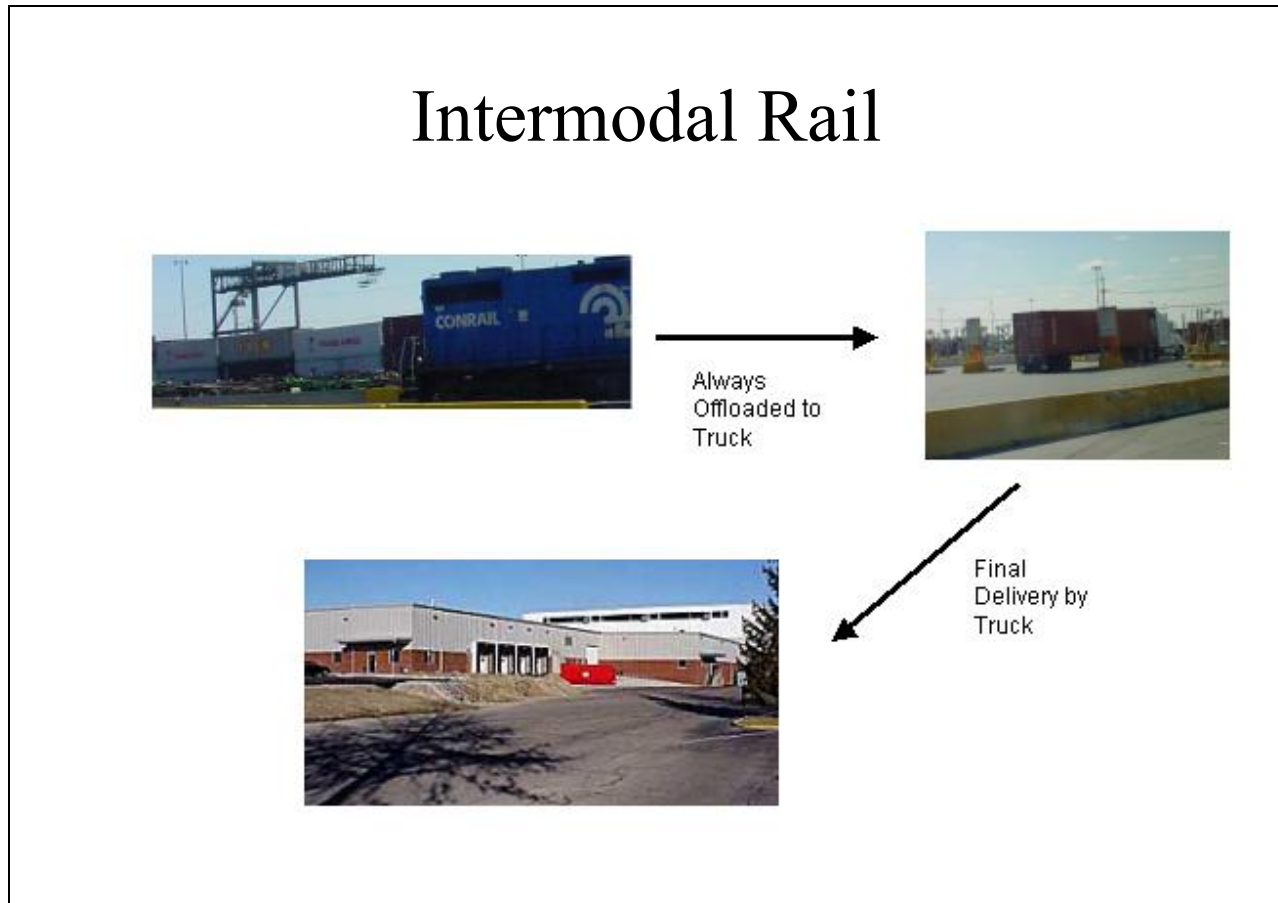
D. Trucks and Rail Freight – A Complex Relationship

Trucking plays several roles in the movement of goods by rail freight. There are two types of rail freight activity: intermodal movements and transload shipments.

Intermodal movements are the fastest growing segment of the rail freight industry. Intermodal movements involve moving containers or truck trailers on rail cars. International ocean containers, as well as domestic containers (which are lighter weight and have the equivalent capacity to truck trailers but are not designed to withstand the rigor of an ocean voyage), are generally moved via doublestack trains.

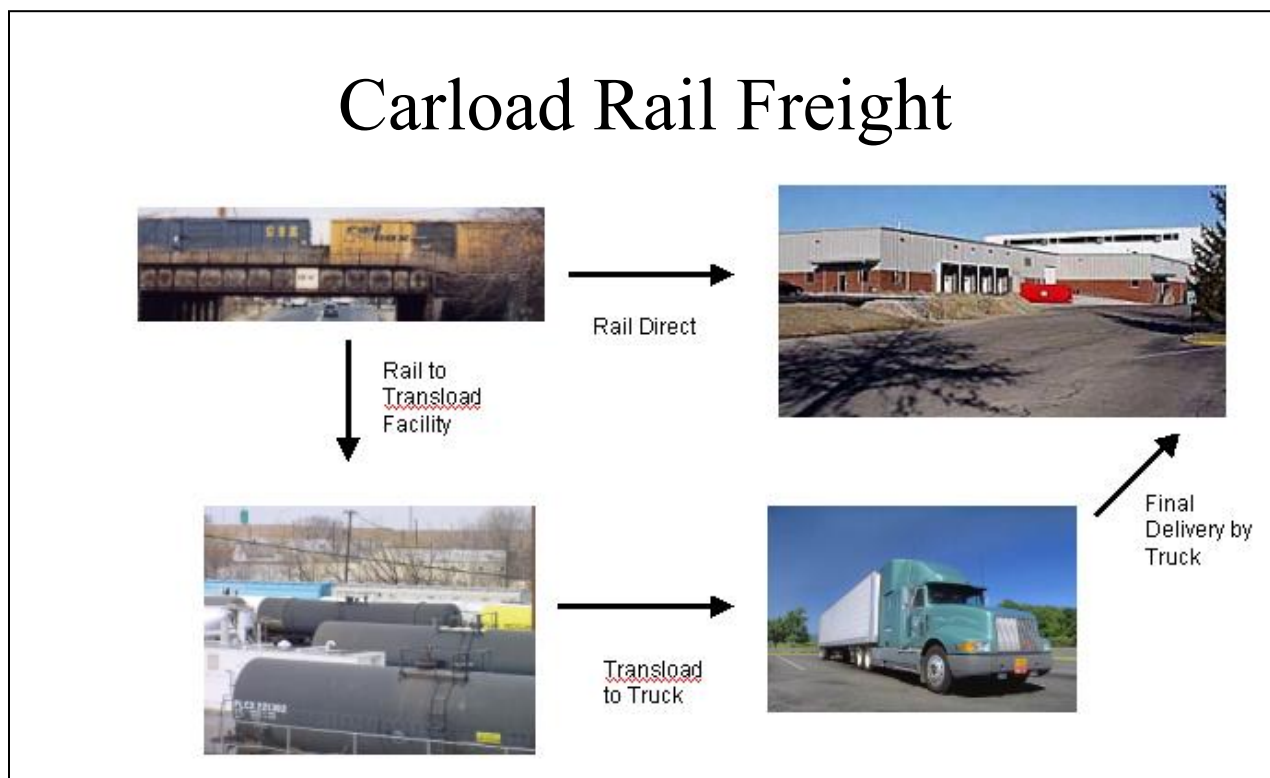
Intermodal trains combine the best of modes –rail for long distance movements and trucks for flexible local pick up and delivery. These trains are generally given priority handling status, allowing them to move faster than conventional rail freight trains. Figure VI-4 illustrates the role of trucks in intermodal rail freight operations. As noted previously, international containers may be loaded at the port (e.g., Long Beach/Los Angeles) onto rail cars. At the other end of the trip, for example, at a northern New Jersey rail head, the containers are transferred to trucks. In a domestic container move, trucks are used at both the origin and destination for the local movements between the shippers and the rail yard.

Figure VI-4:



Transload movements, an alternative to direct rail service (or carload) to customers, consist first of long distance movements by rail and then a shift of the goods at a strategically-placed location to trucks for final delivery. The use of trucks in carload and transload movements is summarized in Figure VI-5. Bulk items, such as plastic pellets, petroleum and corn syrup, are considered *transflow* operations, with hoses shifting the product. Commodities such as steel, paper and lumber are offloaded from rail cars and may be stored at the rail yard until trucks move the goods to customers.

Figure VI-5:



Two trends point to a greater use of trucks in substitution for, or in conjunction with, rail freight services in New Jersey

- A potential lack of rail freight capacity and service for New Jersey customers; and
- Increased emphasis on intermodal and transload rail freight services by the Class I railroads.

Rail Capacity and Service

While the use of rail freight as an alternative for truck movements is often postulated, the railroads may have neither the current capacity nor business interest in pursuing this cargo traffic. For many years, the State of New Jersey watched its rail freight infrastructure diminish through the bankruptcies of the railroads in the 1960s and 1970s and the system rationalizations carried out by Conrail, the successor to the bankrupt railroads. In addition, the growth of NJ TRANSIT's commuter rail service has further diminished the availability of track space for rail freight.

Efforts have been made recently to upgrade and augment at least some of the rail freight capacity within the State. Most of these efforts have focused on growing intermodal traffic in support of increased traffic through the Port of New York and New Jersey. These projects can attract local opposition, although one such project that would increase mainline freight capacity has overcome those obstacles and construction is complete.

Growth in Intermodal and Transload Marketing

Intermodal operations are considered the growth market for Class I railroads. These operations currently constitute about 40 percent of the rail freight tonnage moving in New Jersey and a much higher portion of the cargo value. In some respects, the growth of rail intermodal traffic can reduce truck activity (by providing improved direct access to and from the port connecting to the Midwest hinterland); growth in transcontinental and domestic intermodal traffic to railheads in New Jersey will probably more than offset this reduction and absolutely increase trucking activity within New Jersey.

The intermodal rail freight situation in New Jersey is further complicated by the development, , particularly by Norfolk Southern, one of the Class I railroads operating in the northeast, of large intermodal yards in Pennsylvania that serve the New Jersey marketplace... While the location of these yards in such places as Bethlehem, PA work for the railroad's operations and finance, they do generate additional truck miles traveled (VMTs) on some highways in New Jersey, because goods are intercepted there and sent by truck to consumers in the New Jersey – New York metropolitan region. Interstate 78 is one example of the roadways affected by Norfolk Southern's yard location strategy.

Increased truck involvement may also increase due to the Class I railroads' increased emphasis on encouraging transload options. While transload shipping increases the efficiencies and economies for the Class Is by creating critical masses of traffic to designated yards, often at the periphery of the metropolitan region, the practice also increases the distances trucks must traverse, into and within the metropolitan region, to haul the shipments to the end users . With three-to-five trucks needed to move one carload of rail freight traffic, this trend can also increase truck VMTs in New Jersey.

VII. Issues and Considerations

The trends and issues affecting the industry, both within the State and throughout North America, also inform discussions of trucking in New Jersey. A wide range of issues, including safety concerns, a growing driver shortage, new federal hours of service rules, environmental considerations and security issues, has buffeted the trucking industry.

A. Safety

Recent federal accident data indicate that New Jersey does have one of the highest number of crashes involving large trucks in the nation. In 2004 some 7,900 crashes involving large trucks occurred in New Jersey. The number declined in 2005 to 6,600.⁶ To put these figures in a broader perspective and contrary to reports that convey the impression that trucks are the leading form of accidents, in 2005, a total of 315,400 accidents occurred in New Jersey.⁷ Accordingly, trucks represented a fraction of the total vehicular accidents in the State.

The accidents generally correlated with the location of major interstate roadways (including the New Jersey Turnpike) and most densely developed portions of New Jersey (Figure VII-1). These statistics attest to the density of New Jersey's development and population, as well as the significant number of vehicles of all types on the State's roads.

Initiatives to reduce accidents can include improved training for all drivers – while truck drivers receive special training for their licenses, the general public receives minimum “on-the-road” instruction on interacting with trucks (although the New Jersey's Drivers' Manual does cover interaction with trucks extensively). The US Department of Transportation's “No Zone” program, for example, is designed to educate passenger vehicle drivers how to interact properly with trucks on highways.

Other initiatives could also include the separation of truck and passenger traffic, enactment of a move-over rule for minor accidents, and encouragement to the supply-chain system to operate earlier or later in the day to shift rush hour traffic.

B. Federal Hours of Service Regulations

The federal government strictly regulates the hours that truck drivers can work, an initiative designed partially to address safety concerns regarding truck driver fatigue. The current⁸ “Hours of Service” rules, adopted in 2005, include:⁹

⁶ Federal Motor Carrier Safety Administration.

⁷ New Jersey Department of Transportation

⁸ On July 24, 2007, the U.S. Court of Appeals for the District of Columbia voided the 11 hours of driving and the 34-hour restart on the grounds that the public didn't have adequate notice of the Federal Motor Carrier Administration's (FMCSA) methodology for analyzing crash risk. The Court has also decided to hold the current driver's hours of service regulations in place until December 27, 2007, to give the FMCSA time to consider changes in the rules in light of the court's decision.

⁹ Federal Motor Carrier Safety Administration web site.

- Drivers may drive a maximum of 11 hours after 10 consecutive hours off duty. Drive or on-duty time includes any time waiting at ports, warehouses, and other terminals.
- Drivers may not drive beyond the 14th hour after coming on duty, following 10 consecutive hours off duty.
- A driver may restart a 7/8 consecutive day period after taking 34 or more consecutive hours off duty.
- Commercial motor vehicle drivers using the sleeper berth in their cabs must take at least eight consecutive hours in the sleeper berth, plus two consecutive hours either in the sleeper berth, off duty, or any combination of the two.

Two consequences of these safety-oriented regulations have led to the need for more drivers (see below) and more rest areas. Off-duty times are strictly mandated, leading many drivers to have to pull to the side of roadways or seek other venues for the required rest periods. Trucks stopped on roadway shoulders and ramps can create traffic, safety, and security issues, as well as increased opportunities for theft.

Insufficient rest areas currently exist in New Jersey to address the new rules. Initiatives to increase truck rest areas have met with community resistance based on the perception that such facilities threaten property values and quality of life. Because rest areas, more so than ever before, can be important contributors to safety and traffic management, New Jersey needs to strategically increase its rest area inventory. Both the NJTPA and the New York Metropolitan Transportation Council (NYMTC) are conducting rest area evaluations.

C. A Growing Shortage of Drivers

In addition, at a time when the demand for trucking services is growing, the number of drivers available to the industry is shrinking. The causes include shifting demographics and the difficult working conditions in the industry (e.g., long hours away from families, lower pay, increased stress levels, lengthier processes for obtaining specialized licenses, and high fuel costs causing independents to exit the industry).

Moreover, new federal hours of service regulations, discussed earlier in this chapter, have also both increased the demand for drivers and increased stress levels. More drivers are needed to cover existing routes because of the continuous counting of time, including waiting periods at terminals and customers.

The aging of the driver population forecasts a shortfall recognized by numerous public and private organizations. Nationally, more than 200,000 current drivers are over 55, and they will soon need to be replaced. A report by Global Insight for the American Trucking Association indicated a current shortage of 20,000 drivers, with a potential rise in the annual shortage to 111,000 by 2014.¹⁰ While various public sector agencies and organizations have developed differing estimates of the actual shortage, all agree that a massive shortage is occurring and becoming acute.

¹⁰ Global Insight for American Trucking Association, *The U.S. Truck Driver Shortage: Analysis and Forecast*, May, 2005.

Potential solutions include enhanced recruitment efforts, restructuring routes to enable more drivers to return home at night, safe parking facilities, and increased pay.

D. Environmental Considerations

New technologies and federal mandates are reducing diesel emissions from on-road heavy-duty trucks. Major efforts underway to help improve air quality include:

- Alternatively fueled fleets. FedEx, Waste Management, UPS, and the US Postal Service are among the organizations actively supporting and purchasing alternatively fueled vehicles for their dedicated fleets. For example, FedEx is adding 75 diesel-electric hybrids as part of its initiative and Waste Management is working with three manufacturers to develop hybrid technology and alternative fuels for its 22,000 vehicles.¹¹ These companies, through their demand for such products, provide strong incentives for manufacturers to pursue new technologies and equipment.
- Improved diesel engines. Major manufacturers have already introduced and continue to develop engines for the industry with far lower emissions. In addition, engine designers continue to pursue hybrid and alternative fuel technologies.
- New low emission heavy-duty engines mandated. The US Environmental Protection Agency (EPA) has finalized the Heavy-Duty Highway Rule. Beginning in 2007, new diesel engines used primarily by over-the-road trucking companies will produce 90 percent fewer particulate matter emissions and 50% fewer NOx emissions than a similar engine built in the past. By 2010, NOx levels will be lowered by 90 percent.
- New mandated Ultra Low Sulfur Diesel Fuel (ULSDF). The U.S. Environmental Protection Agency also required U.S. refineries to start producing 80% ULSDF effective June 1, 2006 and have it available for sale at the pumps by October 15, 2006. The new sulfur standard for on-road diesel fuel has been lowered 97 percent from 500 parts per million (ppm) to 15 ppm. The new ULSDF is required to operate the new 2007 heavy-duty truck engines. ULSDF will be phased in between 2006 and 2010 and will eventually replace conventional Low Sulfur Diesel fuel.
- New Idling Reduction technologies. Drivers who rely on sleeper compartments in their cabs usually need to continue to run their engines to provide power for heating or air conditioning. Auxiliary Power Units (APU) and bunk heaters are becoming more broadly used. These units provide the driver with power and heat or air conditioning without requiring the engine to idle. Other technologies, such as *IdleAire*, provide an alternative in rest areas for these drivers. Through an inexpensive adapter for trucks and special hook-ups in rest areas, drivers can turn off their engines and draw power from the rest area's electrical system. An *IdleAire*

¹¹ Fredix, Emily (Associated Press), "Its still heavy, but it's a hybrid," *The Boston Globe*, May 28, 2006 (available online).

installation exists in New Jersey at the Travel Centers of America stop in Paulsboro, New Jersey. Two other installations exist in the NY-NJ metro region, one on the New York State Thruway and another at the Hunts Point Market in the Bronx.

- Idling reduction incentives. The New Jersey Department of Environmental Protection (NJDEP) received a \$750,000 grant from the federal Environmental Protection Agency for the purpose of establishing “The Truckers Challenge” grant program administered by the New Jersey Motor Truck Association. “The Trucker’s Challenge” helps truck owners purchase either an APU or bunk heater. Trucks have to operate at least 50 percent of their time in New Jersey and be owned by a New Jersey business.
- Industry-government partnerships. The SmartWay[®] Transport Partnership is a voluntary collaboration between U.S. EPA and the freight industry designed to increase energy efficiency while significantly reducing greenhouse gases and air pollution. The New Jersey Motor Truck Association (NJMTA) and many of its members are participants in the SmartWay[®] program. In 2006, NJMTA, along with New Jersey domiciled trucking companies NFI and New Century Transportation, received the EPA’s Environmental Excellence Award.

E. Security Issues

Since the inception of the trucking industry, trucks and their shipments have been targeted by criminal elements. As a result, most trucking companies have extensive plans and provide training for their drivers. While these plans and training initially related to reducing theft, they are also applicable to the national security issues that have now emerged, and have gained increasing importance, following the attacks on 9/11,

Hazardous materials can be a significant security threat. Under new rules from the U.S. Department of Transportation’s Research and Special Programs Administration (RSPA)¹², all drivers that haul hazardous materials must undergo security training (HM232 Training), and all trucking companies that haul hazardous materials must establish a security plan. Truck drivers who haul hazardous materials must obtain a Hazardous Materials Endorsement for their Commercial Drivers License (CDL). Under the U.S. Patriot Act, truck drivers that haul hazardous materials are also required to submit fingerprints for a national record check prior to obtaining a hazardous materials endorsement¹³. In New Jersey, drivers are charged \$94 for the security check in addition to the cost for their CDL.

¹² In February 2005 RSPA was incorporated into the newly formed Pipeline and Hazardous Materials Safety Administration (PHMSA)

¹³ The rules for obtaining a CDL require that individuals seeking to obtain a hazmat endorsement comply with TSA requirements codified in 49 CFR Part 1572, Credentialing and Background Checks for Land Transportation Security [49 CFR 283.71(a)(9)]. One component of the background checks is to determine whether the applicant has a “disqualifying criminal offense” that would prevent him or her from receiving a hazmat endorsement. Disqualifying criminal offenses can be either “permanent” or “interim” in nature, and are listed at 49 CFR 1572.103

Under the Maritime Transportation Security Act (MTSA) truck drivers servicing the ports with access to unsecured areas are required to obtain a Transportation Worker Identification Credential (TWIC). This will require a similar federal record check for drivers hauling hazardous materials and will include a photo and fingerprinting. The TWIC will cost drivers \$137.25 and, if they already have gone through the hazardous materials endorsement process, the fee will be \$105.25.

Additionally, there are similar truck security regulations for air cargo¹⁴ and border crossings between Canada and Mexico¹⁵.

The trucking industry is also an integral part of the Department of Homeland Security's (DHS) Highway Watch Program. If a truck driver sees an accident or an unsafe situation or observes suspicious behavior, that driver is trained to call 9-1-1 to be followed by a call to the national Highway Watch Call Center. Over 400,000 volunteer truck drivers have been trained nationwide. New Jersey Motor Truck Association (NJMTA), the state coordinator for Highway Watch, has trained over 6,800 volunteers to date.

¹⁴ 49 CFR 1548.15 Indirect Air Cargo Security

¹⁵ CFR Part 1572.201 Transportation of hazardous materials via commercial motor vehicle from Canada or Mexico to and within the United States.

VIII. Conclusions and Next Steps

The trucking industry plays a vital role in goods movement and the economic fabric of New Jersey. Truck movements reflect the needs of the State's businesses and the quality of life that we have come to expect. Yet, this very important industry is not well understood and is often perceived as a negative factor.

This report shows that truck volumes and tonnage are extensive in New Jersey. The report also shows that without these movements, the economy and well being of the State's residents would greatly suffer. Further, while truck volumes are high, they are not the leading cause of congestion or accidents in New Jersey.

With the factual foundation provided here, we can move forward to identify the pressing issues and potential solutions needed to ensure that goods movement is efficient, our quality of life is preserved and safety concerns are addressed.

Several initiatives can emerge:

- Better integrate truck movements and operations into planning. With the critical role played by trucks, it is important to ensure adequate roadway capacity, interfaces with other forms of freight conveyance, and facilities.
- Truck terminals and rest areas need to move up the priority list in land use and transportation planning at all levels of government.
- Expand safety initiatives, including uniform and consistent enforcement of rules and regulations; increased education efforts through the Division of Highway Traffic Safety, such as "No Zone," that educate passenger vehicle drivers about safe interactions with trucks, and road design and investment to correct problematic engineering conditions and to promote opportunities for truck/auto separation.
- Investigate driver training programs. With the critical nature of trucking and the shortage of drivers, New Jersey can pursue programs to encourage workers to enter this field.
- Improve signage and provide real-time traffic information

The issues vary tremendously by area, type of movement and type of truck. Nevertheless, with a factual foundation, the discussions can move forward fruitfully.

