

Background Research Material for Freight Facility Location Selection: A Guide for Public Officials (NCFRP Report 13)

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NCFRP

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Background Research Material for Freight Facility Location Selection: A Guide for Public Officials (NCFRP Report 13)

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TRANSPORTATION RESEARCH BOARD
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Introduction

1.1 Background

Public agencies involved with land use planning, economic development, and transportation are certainly aware of the importance freight plays in the American economy. All goods purchased and sold in the United States may be considered freight at some point in the value chain. Still, the process by which companies move this freight and how they select locations for key freight facilities is less understood.

In many ways freight movement may be considered the lifeblood of our economy. Over 60 million tons of freight moves through the U.S. freight transportation system daily, representing roughly \$40 billion in goods. Efficient movement of freight (i.e., mode selection, routing, intermodal transfer, travel time) is necessary to make the best use of our transportation facilities, protect the environment, and reduce energy requirements, while keeping up with the ever-increasing demand for goods.

In addition, the freight environment continues to be a changing landscape. Trade is increasingly global, and manufacturing activity continues to expand offshore. Fuel prices fluctuate. Governments at all levels seek new ways of reducing carbon emissions, congestion, and pollution. These and other factors place increased importance on how we move raw materials and finished goods from place to place – from origin to ultimate destination. Increased emphasis on reliability and supply chain management increases the importance of efficient local and regional freight movement even if ultimate shipping destinations are across the nation or across the world.

The choices made about where these activities take place, and the choices made by the carriers who serve them, drive how transportation infrastructure is used. In addition, the location of freight facilities can have both positive and negative economic and social effects on local communities, regions and states. Maximizing the benefits while minimizing the negative impacts are sensible goals for public decision-making.

While public sector planners and policy-makers are vitally interested in balancing a wide range of public concerns, they also recognize that these kinds of “freight-intensive” facilities, in addition to their transportation role, can be important generators of economic activity for the community and region.

1.2 Purpose

Public agencies need to understand what drives the demand for and success of freight facilities in order to best respond to siting requests and proactively create and preserve opportunities for freight-intensive uses. A limited understanding of site-selection criteria and the dynamic supply chain logistics context can lead public officials to expend time and resources on flawed business attraction strategies and to incorrectly respond to facility proposals. Likewise, inadequate knowledge of the community’s place in the supply chain can lead to unsatisfactory choices for transportation and land use planning as well as economic development policy.

To adequately develop strategies for freight facilities, public sector decision-makers need a better understanding of drivers and impacts to ultimately understand the return on investment of public and public-private initiatives. This understanding also includes recognition of the different categories of freight facilities from inland ports and intermodal terminals to bulk and transload facilities, and warehouse and distribution center facilities. With this understanding of current trends and challenges, the objective of this research project is to develop a guide and research foundation that:

- Informs public sector decision makers on the key drivers that private sector entities use in siting logistics facilities;
- Informs the public sector about the complexity and interconnectedness of the various facility types and the role they play in goods movement and supply chain management; and
- Enhances the potential for successful projects.

1.3 Approach

This technical report and the accompanying guide were written with the goal of using the working knowledge of corporate real estate and supply chain executives as well as their service providers. This information provides the base of information needed to ensure that public officials can understand the issues, the process, and the drivers behind freight location decisions and to become more successful partners in the location process. Key elements of this research study included:

- **Review Existing Literature to Determine Current Environment** – Industry and professional press cover location decisions from a variety of perspectives, and each gives a different window into the location process. Likewise, some academic research has already assessed the impacts resulting from freight location decisions.
- **Web-Based Surveys of Public and Private Sector Professionals** – Baseline public sector knowledge varies from organization to organization. Likewise, the private sector’s perceptions of what the public sector understands are varied. A set of web-based surveys provided insight into the current state of knowledge.
- **Directed Interviews of Carriers, Shippers, and Other Freight Users** – The direct interview of a broad array of freight users provided insights into the location process, the key drivers, and the changing landscape of freight facility location strategy. This also allowed for an investigation of the similarities and differences between various facility types and in-depth case studies of actual freight facilities.
- **Presentation to Formal Review Panels and to Conference Audiences** – Providing the final guide to a geographically diverse set of economic development and regional planning officials allowed for an assessment of the usefulness of the information itself and how it was presented to the prospective audience. Panel members provided suggestions on how this information would be used by their organizations and how to improve overall distribution and effectiveness of the guide and its insights.

1.4 Organization

As noted earlier, NCFRP Project 23 called for two publications to be produced: This technical report, and a guide for public officials.

The Technical Report is organized as follows:

- **Section 2 – Literature Review**, provides an overview of the academic and industry press covering freight facility location decisions, the process and drivers behind them, and the role of the public sector.
- **Section 3 – Survey of Public and Private Perspectives**, contains both the survey instrument used and the results of the investigation into the current level of freight facility location knowledge of

various types of public officials. The private sector was also surveyed to ascertain perceptions of public sector knowledge.

- **Section 4 – Freight Logistics Facility Types**, provides an explanation of different freight facilities, and their unique roles in serving global, regional, and local supply chain markets and commodities.
- **Section 5 – The Location Selection Process**, describes the steps shippers and carriers take when they select locations for new or expanding freight facilities.
- **Section 6 – Key Criteria and Data Requirements for Facility Location Decisions**, catalogs both the key data points used in the location selection process and shows how these can vary by freight facility type.
- **Section 7 – Current Dynamics Impacting Facility Location Decisions**, explores how various global dynamics are affecting shipper and carrier location decisions.
- **Section 8 – Case Studies of Freight Logistics Facilities**, provides an examination of actual freight facility location decisions as well as the impacts each had upon the affected community.
- **Section 9 – The Critical Roles of Groundwork and Collaboration**, offers suggestions to the public sector on how to examine freight uses and how these interact with the community. Guidance is also provided on business attraction and planning strategies for freight facilities.

The guide, **Freight Facility Location Selection: A Guide for Public Officials** is available separately from the Transportation Research Board.

Literature Review

2.1 Overview

This literature review begins the process of providing insight on location decisions for transportation facilities and suggesting best practices for transportation, land use, economic development, and regional partnerships. Public agencies require a full understanding of the dynamics of freight movement and the impact on location decisions in order to successfully plan for, attract, and work with freight-related activities.

In order to adequately introduce both the topic, this chapter represents a sample of literature on:

- An overview of logistics and freight movement,
- An introduction to how site selection decisions are generally made,
- Trends affecting the freight and logistics industry,
- How these drivers and trends currently impact the location decisions process, and
- Implications for local and regional economic development

Over 60 million tons of freight moves through the US freight transportation system daily, representing roughly \$40 billion in goods (1). Trade has become increasingly globalized and manufacturing continues to move offshore. Fuel prices continue to fluctuate. Governments continue to seek ways of reducing carbon emissions, congestion, and pollution. These and other trends place new importance on how we move raw materials and finished goods from shipper to receiver.

As one of the reports referenced in our research (2) notes, in the future:

- “Speed, cost and reliability will continue to characterize transportation needs factors, with increasing emphasis on reliability and management of supply chains.
- The increased emphasis on reliability and supply chain management is increasing the importance of efficient local and regional movement of goods even if ultimate shipping destinations are across the nation or overseas.
- ...It will continue to be important to provide transportation linkages to all areas of the state in order to allow those areas to take advantage of economic opportunities...”

Economic development, planning, and government agencies recognize that employment and investment opportunities result from trade and freight activity and have increasingly sought new strategies for attracting freight-related activities to their communities. Somewhat less well-explored are how transportation and freight facilities interact with other economic factors in impacting corporations’ location decisions.

Our review includes academic studies which have begun to examine the relationship between intermodal freight facilities and corporate location decisions. We examine both:

- Freight transportation facilities (public and private) that handle freight distribution such as intermodal rail, transload, and ports; and
- Private sector freight-intensive business operations such as distribution centers and warehouses.

We also review how freight transportation facilities (the first item above) influence private sector siting decisions (the second) and the opportunity for freight transportation facilities to act as catalysts for economic development and private investment.

This literature review also includes significant research performed by periodicals such as *Site Selection* and *Area Development* magazines, which are marketed to and read by economic development practitioners. Through these channels, we are better able to discern the current understanding and trends for siting freight facilities.

Economic development agencies have seen transportation infrastructure as a key driver to some location decisions. They have also read about the success stories of intermodal sites like the Columbus (OH) Inland Port and the Alliance Global Logistics Hub in Texas and these communities' ability to attract new business (3). Less known is how the combination of transportation, economic, and other location drivers make them successful attractors of business and investment. Academic research has begun to explore some thoughts regarding optimal distribution networks and – in particular – how intermodal nodes might improve functioning. Still, if the reader seeks a practical guide to understanding how to work with freight facilities, no comprehensive source exists.

Industry press, such as *Area Development Magazine*, *Site Selection Magazine*, and *the Journal of Commerce* examine freight facility location trends more directly, and in three major aspects – what trends are likely to occur in the industry, how these will impact corporate location decisions, and how these present economic development opportunities. While these publications are not explicitly research literature, their writers have examined the dynamics and outcomes in the logistics industry and have produced a considerable amount of documentation reporting on – and influencing – the existing level of knowledge on what drives decisions to locate for intermodal facilities and corporate freight handling facilities.

2.2 Introduction to Site Selection

Research Results Digest 327 (4) provides an excellent introduction to the literature available on both the economic and transportation drivers for site selection decisions. The report – an excerpt from NCHRP Project 20-05 reviews economic development trends, site selection decisions, and how transportation relates to these. The review in Digest 327 focuses on the practical expertise related by current professionals in freight-related industries such as distribution, warehousing, and manufacturing.

In particular, the report provides an excellent review of how companies actually make site location decisions. Location decisions are made based upon the business objectives of individual companies, and thus depend upon the specific situations and goals of each company and function. We will discuss the process in more detail in Chapter 4 of this report, but Digest 327 summarizes how site selection decisions typically involve at least the following four steps:

1. Defining the company's business strategy and the success parameters for the new (or relocated) facility;
2. Developing the site selection criteria, usually phased in such a way as to allow a progressive evaluation from broad to specific, country to region to community;
3. Examining the communities and sites directly on-site; and
4. Involving three to four sites and communities in detailed discussions and negotiations.

The progressive nature of the location screening is important, and factors will vary in importance throughout the process. For example, access to specific markets, general cost drivers, and population trends may drive early stages. A secondary screening may involve examining highway and rail networks to determine areas

with service advantages. The third screening may balance total costs of operations in the final candidates. The final stage may then involve more site-specific issues such as specific facilities and the labor available in a particular community.

Recently, the relative importance of factors shifted yet again (5), with primary importance placed upon labor costs, and followed by highway accessibility, tax exemptions, and energy availability/costs.

Any survey of site selection criteria must be approached with a note of caution, however, as the term means different things to different responders. Surveys such as that used by *Area Development* ask respondents to identify the most critical items in selecting “sites”. The term “site” can be used to narrowly refer to the selection of a specific plot of land or facility. Alternatively, the term “site selection” or “site selection process” can broadly refer to finding new business locations with all the attendant concerns, both strategic and tactical. Hence, while issues such as tax incentives and/or highway access may drive the selection of a final site, they may not be materially important in the initial, strategic phases of the selection process. In these phases, strategic advantage and total cost of operations play a much more important role in the process (4).

This NCHRP study (20-05) also notes two new and important trends in how companies make site selection decisions. First, the internet and standardization of demographic and socioeconomic information have accelerated the site selection process. Collection of data takes much less time than it had in the past, and the greater number of sources allows for corroboration of data. Second, and possibly because of the availability of this data, companies have increasingly used consultants and their analytical tools to support the site selection process.

Both the *Area Development* survey from 2003 noted in NCHRP and the most recent survey from 2009 included items such as “highway access,” “access to international airport,” and “waterway or oceanport accessibility” in their lists of most important factors. This underscores the continuing importance of transportation in the site selection process, especially for freight-intensive businesses. However – as noted earlier – every site selection decision is different, and the consolidating and averaging nature of surveys will tend to mask the relative importance of factors. This is especially the case when freight facility factors are examined in the same study with corporate headquarters, research and development, and backoffice operations. Transportation linkages are downplayed, but overall cost concerns remain critical.

2.3 Freight and Logistics Trends

Time to market and total costs of operation drive most logistics costs and hence most (if not all) logistics location decisions. Both of these are further impacted by such factors as labor, regulation, infrastructure availability, capacity, and other considerations.

However, change and dynamism underpin all current literature on supply chain management and – by extension – underpin the siting and use of freight facilities. Fuel costs, modal shifts, and the changing nature of globalization all force companies to re-assess their distribution networks on a regular basis (6). For example, Kraft cut 50 million truck miles from its global supply chain through shifting traffic to rail and waterways (7). This reduced fuel costs and also improved the company’s overall carbon footprint.

A study performed by Cushman & Wakefield (a global real estate services firm) for the NAIOP (formerly the National Association of Industrial and Office Properties) Research Foundation in 2009 (8) pointed to both the causes of and the real estate responses to these dynamics. First, changes over the past 20 years to the global movement of goods – and for regional trade into and within the Americas in particular – have fundamentally changed how the warehousing and distribution functions operate. Central American Free

Trade Agreement (CAFTA) and North American Free Trade Agreement (NAFTA) have resulted in more emphasis on border-area distribution developments, for example.

The Cushman & Wakefield report also notes that other incipient changes may have impacts on the logistics industry – and the communities that house it – beyond what we have experienced over the previous two to three decades. In particular, Just-In-Time (J.I.T.) manufacturing and distribution strategies may no longer be as cost effective as fuel costs increase.

This could result in two major changes: First, industries may experience a sacrifice in the timing of shipments, a movement of manufacturing closer to the consumer, more inventories being held locally to satisfy prospective customer needs, or a mix of all three. Second, there could be a shift away from consolidating distribution activity in one or two national mega centers and then delivering to the local market by truck at the last moment. Instead, these inventories may be moved to a greater number of smaller, regional distributions centers throughout the nation. These could be served by a mix of modes (in particular, rail and truck) for inbound shipments with delivery to final customers typically by truck. Roadway traffic congestion and overall transportation system capacity constraints could also drive the movement towards smaller, locally-held inventory to satisfy demand.

Freight facilities currently face at least four major challenges and trends:

1. Companies are using their distribution strategies to gain competitive advantage through flexibility.
2. Distribution is a vital component in the on-demand nature of the economy.
3. Some distribution centers now house functions such as assembly and light manufacturing to add value during the distribution process.
4. Even though manufacturing continues to move offshore, products must still be distributed in the United States (9).

Preferences and shares of transportation modes may also change over time, forcing changes to infrastructure. For example, increased overseas trade in the early 2000s drove increased capacity growth for (and development of) port and airport facilities (10).

Increased fuel costs and more concerns about the movement of goods within the nation may force more attention to rail, short sea shipping, and short-haul truck intermodal opportunities. Some (e.g. 11) have even noted that fuel costs and overseas wage inflation have forced some companies to re-think earlier offshoring decisions (although this has yet to result in any significant return of manufacturing to the United States). Other sources list exchange rate shifts, rising transportation costs, and older facilities unable to adapt to current and projected future needs as the main criteria driving change in corporate logistics networks in the United States (12). New regulatory pressures on trucking companies also reduce the overall availability of drivers, which in turn means that valuable truck time should not be wasted waiting for loads to arrive or be unloaded (13). This will likely result in changes to the layout and siting of truck-dependent freight facilities.

These and related trends have caused more companies to examine and request rail access when considering expansions and relocations – even if they do not immediately use it. In making the case for expansion of short-line rail as an economic development tool in rural areas, one source notes:

1. Demands on both surface roads and rail are high and have been growing. Rail operators, however, have been more successful in concentrating trains and creating higher efficiencies from their rail networks.

2. There is little highway capacity remaining in many parts of the US to carry additional loads. The Federal Highway Administration estimated in 2002 that the volume of freight moving within the US will double between 2000 and 2020, compared to a highway capacity increase of about 1% over the same period.
3. As fuel prices resume their upward climb (due to both supply constraints and increased global demand), rail's energy efficiency could start to outweigh convenience factors in measuring the total cost to move goods.
4. Increasingly stringent regional environmental regulations will force governments to cut back on overall emissions. While some efforts will be made to reduce auto (passenger) motor vehicle miles, the bulk of the impact will likely be felt by trucking.
5. Each of the above arguments have resulted in a better business case for governments to engage in public-private partnerships for expanding railroad infrastructure in selected cases (14).

The American Planning Association (APA) also notes these dynamics, and further understands the direct interface between transportation networks and land use (15). While building the argument for reauthorizing the Intermodal Surface Transportation Efficiency Act, the APA noted that most transportation efforts in the early part of the 20th century had focused on highway capacity and efficiency. They then moved on to advocate the creation of a more integrated system that would allow for less congestion, higher rates of movement, more efficient use of land, and reduced emissions. Two of the more significant policy arguments put forth were to:

- Place more emphasis of facilitating connections between modes (both for freight and passenger transportation) throughout the system; and
- Renew attention to the critical function of freight movement alongside passenger movement, and how this is essential to the economic functioning of the country.

Other external forces may force reconfiguration in the current freight network. The addition of a third set of locks on the Panama Canal is causing ports in the Gulf of Mexico to expect more containerized traffic after completion in 2014. Port Manatee (FL) for example, has worked with county government to establish a 3,700 acre zone with intermodal rail capability just outside of the port to attract distribution, assembly, and warehouse functions to the area. Re-distributed container traffic from facilities like this will spur the need for additional intermodal nodes elsewhere in the system (16).

However, logistics networks themselves are difficult to optimize on a regular basis due to the rigidity of real estate leases and other contracts. A study performed cooperatively by CoreNet Global and Grubb & Ellis noted that while companies on the whole generally understand the importance of transportation costs as the main driver in overall supply chain costs, significant disconnects remain between logistics and real estate managers in addressing current and expected economic challenges. Particularly, logistics managers have begun to push for more distributed logistics models, allowing for better customer service and reduced exposure to oil price fluctuation. Real estate managers, however, have pushed for reducing cost through reducing footprint – consolidating to *fewer* sites (11).

Interestingly, the CoreNet survey noted that neither of the corporate functions had yet expressed any significant preference for multi-modal development as a strategy for addressing the need for flexibility. Both did cite access to robust transportation infrastructure however, which could push long-term preferences towards intermodal. Regulatory pressures, long-term capacity for trucking, and improved intermodal services also strengthen the operational case for intermodal freight transportation (17).

Several international trends are driving carriers (rail and ocean carriers in particular) to aggregate freight demand in key markets along their supply chains. This strategy ensures that the rail or water-borne carrier operates as full as possible, and bypasses areas which generate little volume on their own. These “key markets” are highly dependent on individual manufacturer and distributor strategies – which port they favor, their final consumer markets, and their domestic distribution center strategy (centralized or regional) (18). This finding also fits with observations that Class I¹ railroads continue to view themselves as “wholesalers” of capacity, preferring to take large volumes of similar product from one location to another location. Such a strategy explicitly requires a facility at either end for consolidating and dispersing volume (14).

Fuel costs may also drive changes in the supply chain which will pose opportunities for communities with intermodal terminals. As of 2008 (when oil prices peaked at \$140 per barrel), an increasing volume of goods was shifting from all truck to all rail, or a combination of truck and rail. This was found to be true not only for long haul (greater than 600 miles), but also for shorter goods movement (200 miles) if intermodal aggregation points were available along the supply chain. Short sea shipping was discussed as a possible solution as well (19).

Others (e.g., 20) suggest that the current down economy is a key opportunity for manufacturing and distribution companies to adjust their warehouse strategies to better take advantage of intermodal facilities. In this case, the strategy carries with it a measure of risk management. Location at or near an intermodal facility gives any company a choice of modes in shipping raw materials and end product, allowing the company to trade off time to market and fuel cost as this calculus changes over time. Feemster (20) proposes a best practice in which companies build networks with node locations that provide options for a variety of modes at each location. Each location needs to operate both as an optimal transportation hub under the current environment and also provide options in the case of change.

It’s also worthwhile to examine the differing drivers for warehouses and distribution centers by the type of owner and user. While most Fortune 200 companies still operate their own supply chains, data points to the increased use of outsourced third-party logistics firms (3PL’s). From 1992 to 2002, market penetration of 3PL’s grew from 2.7 percent of all distribution and logistics services to roughly 10 percent (21). This resulted in increased flexibility for the corporate client, and also allowed them to reduce their overall real estate portfolio.

3PL’s such as FedEx, UPS, TNT Logistics and JB Hunt must also be included in any understanding of corporate logistics facility strategy. As with the other Class I railroads, Norfolk Southern has made significant investments in smoothing its access from ports to major production, distribution, and consumption zones within the United States with the use of 3PL’s. JB Hunt has already made arrangements with Norfolk Southern (22) that encourage both to increase their intermodal volume through these connections. Coupled with JB Hunt’s commitment to reduce their fleet of long-haul tractors, this strategy points to the increasing importance of intermodal hubs and may also point to new opportunities for the communities that house them.

This reflects other trends in 3PL decision-making. For example, truck-only deliveries arranged by intermodal marketing companies have fallen over the past several quarters (23). In fact, all container volumes dropped as

¹ Class I - A major railroad with annual carrier operating revenues of \$250 million or more. There are seven Class I railroads in the US and Canada: Burlington Northern Santa Fe (BNSF), Canadian National (CN), Canadian Pacific (CP), CSX, Kansas City Southern (KCS), Norfolk Southern (NS), and Union Pacific (UP). A full glossary of terms may be found in the appendix

the economy fell into recession. However, the decline was less severe for rail shipments than for truck, resulting in a relative increase in share (24). 3PL's in particular began to more explicitly shift the long-haul section of their trip from truck to rail. This is in line with other data that shows revenue per container growing faster for those shipped by rail than by truck.

The literature tends to suggest a need for more overall flexibility in the supply chain. Other sources (25) reported this same observation in reviewing the impacts of terrorism, labor actions, and natural disasters on the supply chain. Business needs drive the end location decision, and the ability to bring a product to market reliably at the lowest cost will determine where facilities are located. The factors shown above (fuel and regulatory pressures) provide much the same impact. According to interviews with freight system users, suppliers, and planners (1), speed and reliability have both deteriorated for all freight-transportation modes. Since congestion and inefficient transfer are noted as key issues in the system, improving the overall efficiency of the US freight system has been advanced as one possible solution for a well-functioning intermodal network.

An official from the Institute for Trade and Transportation Studies (12) notes that all emerging and successful hubs have both a local political structure willing to execute, and a business base committed to using the facility. In the same article, Dan Hertwig, president of CSX Intermodal emphasizes the importance of freight hubs and freight distribution facilities: “As our nation faces combined pressures from an increasingly globalized economy and deteriorating transportation infrastructure, it is critical that we work together to bolster this pillar of our national economy.”

2.4 Corporate Location Trends for Freight-Intensive Businesses

The prime drivers for any logistics-related facility are access to markets and the total cost of operation – driven mainly by the cost of transportation to and from the facility. While the exact impact of transportation on site selection – as compared to labor availability and cost, facility cost, and regulatory exposure – will vary with the type of use (bulk, container, integrated assembly, etc), it will likely drive the location decision more than any other factor. In fact, transportation costs far outweigh real estate costs, and often make tax credits and other incentives meaningless in the overall cost analysis (6). Other sources (26) reinforce this concept, noting that proximity to the customer base remains the key factor in site selection decisions – both by corporations and by logistics providers. Likewise, the key decision factors for shipping companies such as Uline and UPS Logistics were both access to their end users and to airports and seaports (13).

There is something of a chicken and egg phenomenon, however. Does the proximity to freight infrastructure and supporting facilities drive corporate location decisions, or does access to major customers drive the decision to establish freight infrastructure? This is a common issue in the linkage between transportation and economic development and the reality may be somewhere in between and also depends on the entity in question. Existing logistics activity tends to attract more logistics investment, especially when capacity can keep pace. Memphis, for example, continues to attract investment due to infrastructure investments like the CN-CSXI Memphis Super Terminal (10).

However, more and more corporate users cite access to these facilities – and the entry into the global logistics networks they represent – as a paramount driver. Lenovo's selection of Guilford County, NC for a warehouse and assembly operation was based on a requirement for access to a global intermodal facility. This was not the only factor considered, but intermodal capability was a required factor for site consideration (27).

Freight facility location and function has also been examined in the academic setting. For example, Racunica and Wynter developed a model that they used to identify optimal locations in Europe for intermodal freight

hubs (28). In this case, the hub and spoke model familiar to airline and telecommunications experts was superimposed over a theoretical rail network which would allow for superefficient freight moves by rail. However, the discussion was based on determining a more efficient network, not on determining who would likely use the network, nor on what companies would look to locate at or near a hub.

Likewise, Bergqvist and Tornberg (29) identify intermodal facility site selection as a crucial component in planning sustainable transportation systems. While their work focuses on research performed for centers in Scandinavia, they note that the public and private realms may have different perspectives in selecting locations for intermodal sites. The private realm may emphasize operational and transportation cost, while the public sector may tend to emphasize factors less easily translated to cost, such as sustainability, and environmental quality.

Bergqvist and Tornberg developed a geographically based (GIS) model that integrates economic, environmental, and quality aspects for all parties. They then test this model for a region of Sweden to determine applicability.

The modeling approaches discussed above limited themselves to analysis of intermodal siting decisions within metropolitan areas. Nonetheless, industry press shows that the intersection of economic, environmental, and quality factors represents a strong portion of the formula for good location strategy decisions for the facilities. Left unresolved is how these then act as an attractor for other economic activity and corporate site selection.

3PL's will generally have different location requirements than other corporate real estate users. These firms may not be as willing to place bets on emerging hubs, as investments in more established markets may carry a higher price tag (and thus return on investment) if the company needs to sell at a later date. Established ports may also provide a better return for these users as they afford greater cross-linkages with other established logistics providers (12).

Real estate markets have responded to these changes as well. NAIOP – the industry group aligned with both real estate developers and brokerage professionals – has been tracking the trends towards inland ports, for example (30). The discussion of congestion at the coastal ports at the same time import growth has accelerated presents new opportunities for developing inland distribution points (intermodal centers) away from the ports, but closer to points of consumption and interactions of multiple modes. Many of the best prospective markets for new inland port development are also the same areas which are expected to experience the greatest increase in population over the next 10-20 years. (The same source also notes that some companies are forgoing the supply chain management aspect of their business entirely, outsourcing the entire function to 3PL's such as DHL.)

As an example of how these dynamics play out in actual development, there were 58.4 million square feet of warehouse and distribution center construction starts in 2003, a year which was neither the peak nor the trough of the development cycle (13). Corporate tenants are also frequently seeking shorter and shorter lease terms in order to retain the ability to adjust their networks more frequently. The tradeoffs in real estate cost are more than made up in transportation savings and customer retention (21).

2.5 Economic Development Implications

Transportation influences economic development opportunities both directly and indirectly (31). Robust networks directly provide access to greater markets and indirectly impact the prices of commodities as choice increases. Transportation is not sufficient for economic growth on its own, but constraining goods

movement, such as through insufficient infrastructure that leads to congestion, is a barrier to economic activity. Having multiple modes for freight shipments provides some mitigation to these barriers.

Economic development organizations understand that there are employment and investment implications associated with intermodal freight terminals. For example, the President and CEO of the Columbus Regional Airport Authority expects 20,000 new jobs to be generated over 30 years as a direct result of the Rickenbacker Intermodal Terminal (19). Other sources (e.g., 32) note that communities of all sizes desire intermodal yards as they are seen as catalysts for jobs and economic growth.

Economic development agencies have specifically targeted larger freight users, especially when these can be used as an opportunity to agglomerate other suppliers and partner companies (4). Value-added distribution centers tend to create small clusters of activity, each carrying new investment and job creation opportunities. Importantly, these need to be located near the value-added centers for pure business reasons, and typically do not need to be solicited or incented to locate in the community.

Economic development agencies also see warehouse development as an opportunity for re-using older industrial sites previously used for manufacturing. This both leverages existing transportation and real estate infrastructure and may assist in alleviating “brownfield” or other development issues that may weigh down other community business attraction efforts. However, economic development agencies still often do not fully understand the role and function of these intermodal, warehouse, and distribution center facilities. One source notes an interviewee who does not know how to determine incentives for such facilities as they are unable to determine the economic impact to the community (4).

This lack of understanding can confound other business attraction efforts. For example, a public-led initiative to establish a truck to rail intermodal park will not necessarily ensure that new firms will choose to locate in or near that park. An intermodal facility can only drive employment and investment – and project profitability – if there is demand for the service (33). Inappropriate location selection (both regionally and locally), unrealistic planning, and under- or over-sizing the project can all spell failure.

Also, not every freight-related function needs heavy transportation infrastructure. In one study examining four major distribution center location decisions in the State of New York (Kmart, Target, Gap, and Wal-Mart), none looked at transportation factors beyond road access to major markets. Trucking cost to the store network scored highest, followed by factors such as labor availability and cost, training, utilities, and public-sector funding assistance. The retailer’s culture – urban, suburban, or rural market preference – also made a significant impact on the ultimate location decision (34). This should be balanced with others’ view (14) that – due to roadway congestion, fuel costs, and the shortage of long-haul drivers – rail (and intermodal by extension) will play an increasingly important role in even retail distribution center site selection.

Intermodal facilities (which move goods between rail and truck, usually by container) operate within a larger geographic transportation network, and therefore have very different requirements. Warren (32) puts forth the minimum business case for a successful intermodal facility:

1. Ample businesses within a reasonable distance willing to use the service.
2. Proximity to multiple origin and destination markets with robust transportation infrastructure between markets.
3. Volumes balanced between inbound and outbound freight.
4. A reasonable, longer-run distance between intermodal centers (i.e., diminishing returns to adding more facilities close together).

Bruns (27) quotes Burlington Northern-Santa Fe (BNSF) in extending this list. A successful site for intermodal use must have:

1. Class I mainline track,
2. At least two miles of railroad frontage, and
3. Large tracts of adjacent, entitled land for development by both carriers and customers.

Arend, Bruns, and McCurry (10) explored the complexities as applied to a specific facility – the Pittsburgh International Airport (PIT). At the time, the airport was one of two regional passenger hubs for US Airways, and, given the possible threat of downgrading passenger service, PIT was looking to upgrade its cargo capacity. This was seen as a possible way of heading off any negative economic impact of losing the passenger traffic. The article cites significant complexity in adapting existing infrastructure to meet the needs of multimodal transportation. Complicating the matter even further, there was significant skepticism that there would not be enough demand at that location to support an air-truck intermodal facility. The development has not yet progressed to the point where results may be identified.

State economic development agencies also implicitly understand there is a linkage between transportation systems capacity and corporate location decisions (2). Less well understood is the nature of this linkage and how best to plan for it. Oregon, for example, explicitly leaves the siting decisions to local and regional jurisdictions, while retaining the transportation planning capability at the state level. Less apparent is the level of feedback and coordination on these specific points.

The Oregon report does make an important observation: As with facilities, building transportation infrastructure on its own will not necessarily bring new economic development. Instead, public agencies need to understand which industries and uses will benefit from these investments, and what connections they need to make.

Many communities emerging as preeminent transportation and logistics centers (such as Mobile, Savannah, Memphis, and Kansas City) have already forged trade relationships with other hubs, particularly port hubs in Canada and Mexico (12), to create these connections. These international connections increase the speed with which goods from overseas can move to key consumption markets. Ideally, the reverse may happen as well, providing an outlet for goods moving from American production centers to international gateways.

While transportation connections are important for all forms of freight facilities, it is difficult to ascertain their impact on siting decisions, increased employment, and inward investment. Handbooks for new economic development directors (35) point out the link between airports and container ports and the ability to attract business, but does not develop any further analysis of which businesses, with what proclivity to invest, and using which kinds of facilities. A Ports of Indiana analysis states that an intermodal rail facility can spur \$800 million in additional development, a 16,000 rise in employment, a significant number of short-term construction jobs, and \$27 million in property tax income (9). The analysis does not indicate what other conditions are necessary to ensure this level of employment and investment growth.

Other groups explicitly question these estimated outcomes. For example RailSolutions, a grassroots organization in the American Southeast advocating for a balanced surface transportation policy, agrees with the Norfolk Southern's push for more rail infrastructure supporting intermodal transportation, but feels that the data provided in support of the public investment is "robustly described, but poorly quantified (36)." While they note that the Norfolk Southern does not provide an explanation for how their economic impact and truck mile reduction figures are computed, current practices for Transportation Investment Generating

Economic Recovery (TIGER) grant applications do require detail on how fuel savings were calculated. There is also still a lack of understanding of how much private competitive advantage the railroads gain from these public investments.

In short, RailSolutions feels that these improvements do benefit the public, but that the NS is attempting to use these arguments to gain public funding for investments that the railroad would likely elect to make on its own if public funds were otherwise unavailable. In practice, it is likely that at the very least public funding of private rail infrastructure accelerates investment and improvement in rail capacity.

The literature does suggest best practices for informing all parties and for arriving at solutions that benefit all stakeholders. Mullen (37) points out both the positive impacts and the need for real communications among all stakeholders when planning for intermodal freight facilities. In his write-up of the events that led to the construction of the Centerpoint Intermodal Center at the former Joliet Arsenal outside of Chicago, Mullen notes that the public initially opposed the construction of the yards, viewing them as heavy industrial uses that would increase local truck traffic and negatively impact the adjoining Midewin Tallgrass Prairie and Abraham Lincoln Veterans Cemetery. After significant interaction, community outreach and co-development, the public has supported the development. The Center is now expected to generate over 20,000 construction jobs and create more than 8,000 new permanent full-time jobs at the full-operational yard and surrounding industrial park.

Sternberg and Banks (14) also point to some of the other difficulties facing a truly multi-modal economic development policy and – by extension – suggest best practices as well. In addition to understanding freight's drivers, such policies involve significant coordination among land use, transportation, and economic development policy. It is not enough to rely upon rail and other infrastructure which may have been put in place in the 19th century. For example, even a medium sized railyard requires: a mile's length; up to six hundred feet in width; a flat, dry site devoid of road crossings; *and* to have room for ancillary industrial development. Other literature (38) also notes that transportation projects, facilities, and land use policy are often developed in isolation, with little regard for how these facilities and networks will work together as an overall system. Coordination is required for the system to work well and for all public goals to be met.

In an example of this, Norfolk Southern is current pursuing an explicit strategy of forging public-private partnerships based upon the expected public returns on intermodal investment. The railroad's Crescent Corridor is expected to be funded through a public-private partnership between the railroad, the federal government (they received \$105 million in TIGER stimulus funds) and the five states directly impacted by the line. Six existing intermodal terminals along the line will be expanded, and another five will be constructed new. The railroad and the governments involved have estimated that roughly 47,000 jobs could be created by these investments by 2020. Ancillary benefits could include 170 million gallons less of fuel use, 2 million tons less of carbon emissions, and an increase of \$326 million in tax revenue (39).

When best planned, parks such as Centerpoint at Joliet Arsenal allow the public and private sectors to both cluster industrial development and leverage high-capacity transportation infrastructure. The key to successful implementation usually includes:

1. Careful understanding of origins and destinations of goods.
2. Development of connections between key transportation infrastructure channels.
3. An understanding of whether and how these developments can impact economic development.
4. Land use regulation that allows for proper use of transportation infrastructure and supporting businesses.

5. Public willingness to support these projects (37).

As is the case with new trends, the articles and studies examined for this review generally focused on a prospective look at intermodal developments and facilities; they examine the expected results. Less information is yet available examining these investments in hindsight to see which have actually realized their prospective claims of increased job creation, reduced emissions, and accretive economic benefits to the community and region (see Chapter 8 for specific case study findings).

2.6 Summary

Multiple articles and studies (2, 32, 40, 41, etc.) point to cost efficient links between suppliers and markets as being key to corporate facility location success. Bergqvist and Tornberg (29) further note that "...close cooperation between private and public actors would improve the interconnections of layer in the transportation system.... The community as such, including both public and private actors, would benefit if infrastructure would correspond better to private needs and market development at the same time as sustainability is ensured."

Left open for discussion is just how much these connections interact with other economic and demographic factors to impact location decisions.

This review is not exhaustive and does not include every source on the topic of freight facility site selection and strategy. Instead, the preceding narrative provides a baseline understanding of the freight and logistics world. The research that follows will build on this to provide the reader with greater insights on how these decisions are made and how public and community officials sector can help build more effective partnerships with this important sector.

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Survey of Public and Private Perspectives

3.1 Overview and Key Findings

The research team developed and executed two structured data collection instruments (DCI) to gauge public and private sector perspectives on issues associated with the siting of freight facilities. This chapter summarizes the information collected through the use of DCIs. This information helps to identify the gaps in knowledge and understanding that are addressed in subsequent chapters of the report and companion guide. This chapter establishes:

- A baseline of knowledge on what the public and private sectors each do and do not understand about each other's key issues regarding site freight facilities; and
- Identifies the most important factors and challenges regarding siting freight facilities from public and private sector perspectives.

This baseline understanding is required as while freight facilities are typically privately owned, the public sector is often involved in helping to attract/develop facilities. Likewise there are inherent challenges to locating large-scale freight facilities that can result in public/private "conflict" in terms of finding sites, environmental considerations, local truck traffic, nearby land use conflicts, etc. The public sector is a key partner in the freight network as a result, whether it is actively aware of its role or not.

Major findings from the information collection task include:

- Public sector officials see great importance in the ability of their municipalities to attract and retain intermodal freight facilities and in the ability of their municipalities to help determine where these facilities will be located.
- While public sector respondents generally said their municipalities provide some forms of guidance and consider freight logistics issues in certain planning activities, very few believe that public officials are adequately concerned or knowledgeable about these issues.
- Few respondents believe that public officials in their municipalities have an adequate understanding of either freight operations or the business drivers associated with warehouse/distribution facility operators' development needs.
- Most private respondents noted they have dropped communities from consideration for siting of freight facilities because the communities did not adequately plan for or invest in related transportation infrastructure, or their policies did not adequately accommodate freight facilities.
- While three-quarters of the public sector respondents said their communities consider the needs of freight logistics in the planning process, fewer than half were aware whether their municipalities had received/pursued freight facility development applications. In addition, public officials do not know whether their municipalities' planning and zoning regulations included provisions specifically related to freight facility development and siting.

3.2 Methodology

The research team developed structured questions for both public and private stakeholders in the form of a survey instrument. The questions were designed to gauge these sectors' current understanding of the site selection process for freight facilities. Appendix A contains a full list of the questions used in the information collection effort.

The research team used a variety of means to identify a set of potential respondents from the public and private sectors. The organizations and channels providing contacts are listed below:

Public Sector:

- Association of Metropolitan Planning Organizations (AMPO) – An association of the nation’s metropolitan planning organizations (MPO) that provided access to local and regional planning staff.
- International Economic Development Council (IEDC) – An association of economic development and business attraction professionals who identified state and regional economic development executives.

Private Sector:

- CoreNet – An industry group for corporate real estate executives and service providers who identified both public and private respondents.
- Industrial Asset Management Council (IAMC) – Another industry group for corporate real estate executives who identified private companies that are heavy users of multiple transportation modes.
- Council of Supply Chain Management Professionals (CSCMP) – Provided officers from regional roundtables on supply chain management from across the nation.
- We also included selected Class 1 Railroad contacts to enhance the amount of private sector information we could obtain.

Based on the recommendations of these groups, sixty-six (66) individuals representing these types of organizations received personalized emails from the consultant team explaining the purpose of the study and the related DCI. Each email included a hyperlink to a secure website at which the respondent would complete the DCI. Each respondent was assigned a unique code to enable the tracking of responses and organize the collected data by respondent type. Twenty-four (24) individuals completed the DCIs from the public (13) and private (11) sectors. The response rate (36%) was adequate to analyze the collected data for the purpose of this task. The statistical package SPSS (v. 15) was used to analyze those data.

3.3 Public Sector Responses

Even while allowing that the survey population may not be a fully representative sample, all of the public sector respondents believed that it is very important (81%) or important (19%) for their municipalities to attract and retain intermodal freight facilities. Furthermore, the majority of the public sector respondents noted that his/her municipality considered the needs and growth of freight facilities in the planning processes, land use regulation, and/or development regulatory processes to either a great extent (44%) or to some extent (31%). However, 19% of public sector respondents said that their municipalities’ planning and regulatory processes do not account for the needs and growth of these facilities.

Only 25% of public sector respondents believed that public officials in their community or jurisdiction have an adequate understanding of freight operators or warehouse/distribution facility operators’ business dynamics and development needs. Thirty-eight percent (38%) of respondents believed that public officials generally do not have an adequate understanding and another 38% were uncertain whether the public had an adequate understanding. Respondents who did not think there is a good public understanding of these issues said that: (1) the average person does not make a connection between freight and global economic competitiveness; and (2) public officials do not appear to understand the reasons behind site selection decisions.

The DCI asked respondents to rate what they thought intermodal freight facility owners considered to be important factors in site-selection decision-making. Table 3-1 below provides a summary of these responses. Overall, public sector respondents believed that facility owners are most concerned about “taxation and business environment” and “proximity to major highways.”

Table 3-1: Summary of Public Sector Respondents’ Perceptions of Facility Owner Concerns Regarding Site Selection Decision-making

Site Selection Decision-making	Percent of Public Sector Respondents Believing Factor is:		
	Important	Unimportant	Neither Important or Unimportant
Taxation and business environment	81%	19%	--
Proximity to major highways (Interstates, freeways, etc.)	81%	19%	--
The proximity of customers, shippers and/or receivers of goods	75%	25%	--
Connectivity to other modes	75%	19%	6%
Labor skills and costs	75%	19%	6%
Permitting and regulation	69%	25%	6%
Shovel-ready building sites	63%	25%	12%
Other operating costs	62%	19%	19%
The ability to operate on a 365/24/7 basis	56%	31%	13%

-- = No Response

The DCI asked public sector respondents to rate the importance of certain issues to groups of key stakeholders in relation to the siting of a proposed freight facility. The public sector respondents regard themselves as the group most concerned about the environment and community and quality of life issues, while they see the business community as being relatively uninterested in the environment and quality of life relative to siting proposed freight facilities. Public sector respondents regard residents as the group most concerned with quality of life issues, while these respondents view the business community as most concerned with economic development and jobs and highway congestion.

Some public sector respondents (38%) noted that their municipalities’ planning and zoning regulations do not include provisions specifically related to freight facility development and siting. Half (50%) of the public sector respondents were not certain whether their own municipalities included such provisions in their planning and zoning rules. Only 13% said their municipalities had specific provisions for developing and siting freight facilities, including city zoning requirements for new air cargo facilities at airports and regulations for siting new intermodal facilities.

The DCI asked public sector respondents to identify the type of site selection guidance or support they offered to those seeking to develop freight facilities. Table 3-2 below provides a summary of all responses from the public sector. The most common site selection guidance was helping to inventory industrial sites. “Other” responses included the identification of desired facility expansions in long range plans.

Table 3-2: Public Sector Responses Regarding the Type of Site Selection Guidance or Support Provided to Facility Developers

Percentage	Type of Site Selection Guidance
59%	Inventory of industrial sites
40%	State/local tax incentives for freight distribution businesses (e.g., property tax
32%	Industrial rail access program
32%	Technical development guidance/one-stop shopping
23%	Expedited permitting processes
14%	Other financing mechanisms
5%	Other

The majority of public respondents (69%) said that their municipalities have encountered compatibility issues in siting freight logistics facilities near other land uses (commercial, residential, recreation, etc.). Several reasons were provided for the compatibility issues. These include concerns about the impact on other kinds of development (residential and commercial), the impact of increased truck traffic, increased noise and truck storage on local roads. One public sector respondent noted that “resolving the conflict between freight facilities and other land uses has been an issue the entire region has been unsuccessfully dealing with over the years.” Only 19% of public respondents claimed that compatibility issues did not occur when siting new freight logistic facilities.

Table 3-3: Summary of Public Sector Respondents’ Perceptions of the Importance of Key Issues to Stakeholder Groups in Relation to Siting Freight Facilities

Stakeholder Group	Key Issues (Percentage important to each stakeholder group)				
	Maintaining Community Safety	Highway Congestion	Economic Development & Jobs	Environmental Impacts	Community Quality of Life (e.g., noise, light, etc.)
Residents	36%	36%	27%	9%	41%
Elected Officials	27%	23%	64%	18%	32%
Planning and Regulatory Officials	23%	32%	22%	41%	59%
Business Community	18%	55%	64%	9%	5%

The majority of public sector respondents (69%) were aware of “clusters” of related freight facilities in their municipality, where related businesses have located near each other to facilitate manufacturing, provide access to suppliers and/or market, and assembly or packaging processes. This is often influenced by zoning and the location of industrial parks and related infrastructure. Cluster descriptions provided by respondents include:

- Fruit/meat packing with refrigeration
- Rail with cocoa/sugar
- Industrial parks

- Marine industry - barge and rail access
- Airport cargo, rail intermodal facility, direct rail, highway, and warehousing all in one development
- Industrial Complex - includes many different warehouse-type tenants, has excellent rail and highway access, and can be considered a true “freight village”
- Intermodal facilities organized around the automobile industry

The majority (62%) of public respondents noted that their municipalities have pursued or received interest in development applications for new or expanded freight facilities within the last five years. Only 6% said that they had not pursued or received interest in development applications and 32% said they were uncertain if they had. Respondents also noted the competitive advantages and disadvantages of their municipalities. Perceived advantages include access to a Class I railroad; access to Interstate highways; “pro-business” environment; access to urban population and consumer markets; low shipping costs; robust intermodal transportation infrastructure; and availability of publicly-endorsed industrial lands. Public sector respondents noted that the factors that have limited their municipality’s participation in these development applications include the poor economy (at the time of the survey) and local concerns about congestion and noise.

3.4 Private Sector Responses

Overwhelmingly, private sector respondents believe that access to freight facilities was very important (63%) or important (25%) for successful business operations.

Three-quarters (75%) of private respondents said they have removed municipalities from consideration for site selection because the municipalities did not adequately plan for or invest in facilities of this type, or their policies were not accommodating to freight facilities. Respondents noted the following specific reasons for removing communities from consideration when siting facilities: a municipality’s demonstrated lack of vision; lack of reasonably priced storage; lack of compatible zoning; lack of rail access; and perceived difficulty in obtaining required permits.

The DCI asked private sector respondents what type of site selection guidance or support they would recommend that municipalities offer to those seeking to develop freight facilities. Table 3-4 displays the types of guidance/support suggested by respondents and the percent of respondents that would recommend each type. Three-quarters of private respondents said they would recommend guidance in the form of inventories of industrial sites; tax incentives for freight distribution businesses; industrial rail access programs; and expedited permitting processes. “Other” guidance included assistance coordinating with rail providers; helping to establish freight compatible zoning; and tax incentives to convert from truck-only freight facilities to intermodal facilities with two or more connecting modes.

Table 3-4: Summary of Private Sector Respondents’ Perceptions of the Type of Site Selection Guidance Municipalities Should Offer

Percentage	Type of Site Selection Guidance
75%	Inventory of industrial sites
75%	State/local tax incentives for freight distribution businesses (e.g., property tax
75%	Industrial rail access program
75%	Expedited permitting processes
50%	Technical development guidance/one-stop shopping
50%	Other financing mechanisms
38%	Other

The DCI also asked private sector respondents to rate the importance of various factors in freight facility users' site selection decision-making process. Whereas Table 2-4 lists those tools available to the public sector, Table 3-5 provides a summary of the perceived importance of all factors involved in the location decision. Respondents believed the most important factors in site selection are permitting and regulations; taxation and business environment; the ability to operate on a 365/24/7 basis; and the proximity to major highways.

Table 3-5: Summary of Private Sector Respondents' Perceptions of the Importance of Key Factors in the Site Selection Decision-Making Process

Site Selection Decision-making Factors	Percent of Private Sector Respondents Believing Factor is:		
	Important	Unimportant	Neither Important or Unimportant
Permitting and regulation	63%	37%	--
Taxation and business environment	63%	37%	--
The ability to operate on a 365/24/7 basis	62%	38%	--
Proximity to major highways (Interstates, freeways, etc.)	62%	38%	--
The proximity of customers, shippers and/or receivers of goods	50%	37%	13%
Other operating costs	50%	37%	13%
Connectivity to other modes	50%	37%	13%
Workforce availability and labor	50%	38%	12%
Shovel-ready building sites	37%	50%	13%
Quality of labor skills	37%	38%	25%

-- = No Response

Almost all private sector respondents (88%) believe that a municipality's planning and zoning regulations should include provisions specifically related to freight facility development and siting. These respondents noted that provisions should include: comprehensive freight plans and the inclusion of freight in long range plans and travel forecasts; a clear understanding of the connection between freight movement and economic prosperity; specific zoning that allows for designated intermodal and container storage areas; and specific conditions for rail access.

The DCI also asked private sector respondents to rate their perceived importance of key issues to stakeholder groups regarding the siting of freight facilities. Table 3-6 summarizes these private sector perceptions for the following stakeholder groups: residents, elected officials, planning and regulatory officials, and the business community. Private sector respondents regard residents as being most concerned with safety and highway congestion issues; elected officials most concerned with economic development; planning and regulatory officials most concerned with highway congestion; and the business community most concerned with economic development.

Table 3-6: Summary of Private Sector Respondents' Perceptions of the Importance of Key Issues to Various Stakeholder Groups in Relation to Siting Freight Facilities

Stakeholder Group	Private Sector Perception of Importance of Key Issues to Stakeholder Groups (percent of respondents indicating issue is important to particular stakeholder group)				
	Maintaining Community Safety	Highway Congestion	Economic Development & Jobs	Environmental Impacts	Community Quality of Life (e.g., noise, light, etc.)
Residents	63%	63%	50%	50%	38%
Elected Officials	50%	50%	100%	25%	13%
Planning and Regulatory Officials	38%	75%	38%	38%	25%
Business Community	38%	63%	100%	13%	0%

Private sector respondents provided suggestions and recommendations directed at municipalities that they believe should be considered in updates of land use and transportation plans/zoning:

- Sites offering flexibility for sales, leasing, and storage
- Full consultation well in advance for all parties
- Corridors for heavy container transport
- Industry representation on public decision-making bodies
- Ability to “think long-term” and insulate the process from local land developers with short term financial interests
- Traffic impact studies to determine the potential roadway congestion impacts on local communities
- Designated development sites with adequate space for parking and storage

Thirty-seven percent of private sector respondents were aware of “clusters” of related freight facilities in their municipality, where related businesses have located near each other to facilitate manufacturing, provide access to suppliers and/or markets, and assembly or packaging processes. Examples of emerging clusters include the Global One and Global Two projects by the Union Pacific Railroad; a Burlington Northern Santa Fe rail facility outside of Chicago; a CSX facility in Selkirk (Albany), NY; and the Norfolk Southern/Pan Am Railways’ facilities in the Mechanicville (Albany), NY area.

3.5 Conclusion

Generally, the public and private sectors are aware of key issues associated with the siting of freight facilities. Importantly, however, public sector officials are less aware of specific facility-siting activities and issues. Respondents from both sectors acknowledge that more action needs to be taken by the public sector to better coordinate and support these processes, including:

- Increasing the extent to which freight is considered in the local planning process;
- Developing additional guidance for and coordination with the private sector;

- Creating enhanced awareness by public officials; and
- Writing specific public policies and regulations that support the development and siting of freight facilities.

While the DCI questions differed slightly between the public and private respondents, some comparison can be made between the two sectors. Both the private and public sector respondents rated similar factors as being important for the site selection process. The most important factors for each group were taxation/business environment; permitting and regulations; and proximity to highways. However, public sector respondents underestimated the importance of facility operators' ability to have 365/24/7 operations. Public sector respondents also rated the importance of connectivity to other modes higher than the private sector did. Likewise, the public sector placed more importance on late-stage criteria such as the availability of "shovel-ready" sites than the private sector did.

Furthermore, the respondents from the two sectors differed in how they perceived the importance of issues to key stakeholder groups (residents, elected officials, planners, and the business community). Key differences between sector responses are that the public sector believes residents are most concerned with quality of life, whereas the private sector thought that residents were least concerned with quality of life. Public sector respondents also believe that planners regard quality of life as the most important issue while the private respondents believe that planners regard traffic congestion as most important.

Freight Logistics Facility Types

4.1 Overview

There are multiple classes of facilities which interact with freight at multiple points along the supply chain. Each of these fulfills a different role in moving goods from the point of production through final distribution to the consumer. Since each of these have different location needs and development issues, it is worthwhile to understand the functions housed in each, and the role that it performs in the supply chain. The following discussion thus provides a typology of freight logistics facilities with sub-classes of freight facilities highlighted. These represent facilities whose primary purpose is freight logistics rather than all generators of goods movement (which would also include manufacturing companies, for example).

Information for this chapter was gained through interviews with private freight facility owners, users, and their consultants.

4.2 Distribution Centers (DC)

Distribution Centers take several forms, but all fill the role of storing and facilitating the movement of goods to their final consumption zones. They are owned, developed and operated by private sector firms.

A distribution center is a large, specialized facility, often with refrigeration or air conditioning, where products (goods) are held and assembled into deliveries to retailers, wholesalers or directly to consumers. A distribution center is a principal part, the "order processing" element, of the entire "order fulfillment" process, and as such some major firms (such as eRetailers) refer to them as "fulfillment centers." Frequently operated by a single company as a point in its supply chain, most DCs are linked to a geographic service region but some have custom purposes, such as the handling of urgent goods or imports. DCs perform staging, consolidation, and unitizing functions, can be involved in final stage manufacturing (such as packaging and labeling of goods), and may double as an operating terminal for an associated truck fleet.

- **Warehouse** - In contemporary parlance, warehouses are a less elaborate form of distribution center, focused simply on the storage of goods or merchandise. They may be multiuser facilities owned by a third party with portions leased by supply chain customers (who may then view their portions as DCs), or places for storage services offered by truck lines or household goods carriers, or inventory holding points for manufacturers or traders.
- **Cross-Dock** – A staging facility where inbound items are not received into stock, but rather are prepared for shipment to another location or to retail stores. Cross docking bypasses put-away and retrieval steps, dispenses with storage, and focuses on reconfiguration and consolidation of goods for further distribution (e.g., from a container to small-medium sized truck shipments). It also can create a pivot point for changing the specific destination of goods in transit. In foreign trade, cross-docks may involve container loading or stripping.

4.3 Port

Ports and their subtypes form key centers for the importing and exporting of goods via air or water and provide interfaces to rail and road. Ports are often developed and operated by a mix of public, quasi-public and private sector organizations.

A port is a place serving as a harbor, airport, or point of entry and exit for incoming and outgoing shipments. Most commonly referring to air and seaports engaged in foreign and domestic trade, the term also embraces

points along rivers, canals and lakes, as well as land gateways straddling national borders. Ports may have berths or hangars for vessels or aircraft, terminals and warehouses for the management of goods, staging and access areas, and Customs facilities for the handling of foreign trade. Ports may specialize in certain types of cargo, such as containers, petroleum, bulk products, or automobiles, and they may also be military facilities. A load center is a seaport engaged in container trade that acts as a high volume transfer point for goods moving long distances inland, as well providing service to its regional hinterland.

Two sub-categories of ports include:

- **Foreign Trade Zone (FTZ)** – A geographic area, in or adjacent to international ports, where commercial merchandise receives the same Customs treatment it would if it were outside the commerce of the United States. FTZs are designed to lower the costs of U.S.-based operations engaged in international trade and thereby create and retain opportunities that result from those operations. Typically containing warehouses and/or distribution centers, they operate under the supervision of the U.S. Customs and Border Protection agency.
- **Inland Port** - A physical site located away from traditional coastal or land borders with the purpose of facilitating and processing international trade through multi-modal transportation assets and typically offering value-added services as goods movement through the supply chain. Inland ports may feature FTZs, accommodating shipments moved inland in bond. They are often developed inland on large-scale properties responding to congestion and scarcity of land near coastal ports.

4.4 Intermodal Terminals

Intermodal terminals – in the purest definition – include freight facilities that allow for the movement of truck trailers and marine or air containers between modes (e.g., road and rail, rail and maritime, road and air). They exist either because of physical requirements, such as the need to transfer between ocean-going vessels and inland transport, or to take advantage of the service, economic or environmental efficiencies of one mode for long haul movement, and the speed and reach of trucks for local pick-up and delivery. Perhaps most commonly, intermodal terminals refer to rail-owned facilities for rail-truck interface of containers. Increasingly, the public sector is becoming a participant in the funding and/or development of intermodal terminals.

4.5 Bulk or Transload Terminal

A receiving and distributing facility for lumber, grain, concrete, petroleum, aggregates and other products is referred to as a bulk or transload facility. These support the direct or indirect transfer of goods between the carrying equipment of different modes. Transload terminals are distinguished because of their transfer of the goods themselves rather than of the equipment that bears them. Physical features may include storage tanks and areas, cranes or bulk transfer machinery, warehouses, railroad sidings, truck loading racks, and related elements. These freight facilities are typically owned, developed and operated by private sector freight businesses such as railroads and often involve the transfer of bulk goods from rail cars to trucks.

- **Auto Terminal** – A transload facility for finished motor vehicles moving between ocean-going vessels, railcars, and truck trailers. Vehicles are driven under their own power between carrier equipment, and thus the goods themselves are the objects of intermodal transfer. Facilities typically require substantial amounts of parking and movement space for the storage and safe staging of vehicles, and have particularly high security requirements.

4.6 Integrated Logistics Center (ILC)

A relatively new development type, Integrated Logistics Centers are industrial parks specifically constructed around high performance freight servicing facilities. Known also as freight villages, there is frequently substantial multi-modal freight infrastructure at these facilities such as an intermodal or hub terminal at their heart. ILCs include a full portfolio of activities relating to transport, logistics and the distribution of goods, both for national and international transit, offered by various operators. Assembly and manufacturing operations are accommodated alongside distribution, and the latter may include such specialized functions as parts banks, that require immediate access to non-stop linehaul transport. ILCs are claimed as examples of “Smart Growth” for manufacturing and logistics, because their economies of density and scope support precise and efficient logistics within a concise community and environmental footprint.

4.7 Hub Terminal

Hub terminals are carrier operating facilities whose principal function is the intramodal resorting and reconsolidation of inbound into outbound load sets for continuation in intercity linehaul. Hubs are central points, marshalling volumes to and from city terminals in a home region, and between hubs in other regions. They are typically large acreage facilities processing a high number of vehicles, and in the case of national hubs (as are used in air freight) the land and building requirements are very extensive. In Less Than Truckload (LTL) trucking, a hub is a cross dock operation transferring goods from trailers at inbound dock doors to others at outbound doors. In small package trucking and mail, sorting and conveyor machinery are used in the transfer; a comparable sorting system is used in air freight, except that aircraft and air containers take the place of trailers. In railroading, the terminal is called a classification yard, the yard consists of sets of inbound and outbound tracks, and the transfer is of railcars from arriving to departing road trains. For intermodal trains, the transfer can be of trailers and containers from a railcar on one train to that on another, as well as of railcars between trains. Hubs may also serve a city terminal function for local freight, and may incorporate dispatch, driver services, equipment maintenance, and equipment storage.

4.8 City Terminal

A city terminal is a carrier operating facility whose chief functions are:

- Intramodal sorting and consolidation of load sets between intercity linehaul and local pickup and delivery, and
- Management of pickup and delivery services to customers.

City terminals are end points handling traffic within a metropolitan area and between that area and its hub. Acreage and vehicle volumes for most facilities are moderate but correspond to market size; carriers in big cities may have one major terminal or a few smaller ones. In LTL carriage, the operations involve cross dock transfers, at varying scales, of goods between smaller city and larger linehaul trucks; for small package and mail, sorting equipment may be utilized; and in air freight, the transfers are between city vehicles and air containers carried inside trucks. In railroading, the terminal is called an industrial yard, and the transfer is of railcars between tracks for local and intercity road trains. Management by local dispatching of pickup and delivery to customers and of related equipment pools is a crucial role that causes city terminals to be sometimes called service centers. Private truck fleets frequently perform this function out of their parent company’s distribution centers, where the load assembly is performed as part of customer order fulfillment (and the principal service is limited to delivery, not pickup). Bulk truck fleets rarely use city terminals for load transfer and instead utilize them for customer service and the cleaning and maintenance of equipment between loads. Equipment storage and maintenance are common at city terminals, as are driver services and

a usually limited amount of goods and load storage for customer and operating convenience. Finally, city terminals occasionally have a mixed character: some act as mini-hubs, staging loads between small town terminals and major hubs, and others located on airport property act as intermodal terminals, transferring containers to and from aircraft.

- **Drop Yard** - A site used by carriers for equipment storage and load staging, but with no transfer of goods. A less elaborate form of city terminal and sometimes with lighter security requirements, a drop yard can be as simple as a fenced parking lot with perhaps an office trailer. Used by truckload carriers, they are handoff points between local and intercity drivers – ordinarily to improve scheduling efficiency – and are servicing points for customer equipment pools. Used by overseas shipping lines, railroads and equipment owners, they are called container yards and fulfill two purposes: the storage and management of containers and chassis, and staging between vessels, trains, and groundside customers. Yards may have local dispatching and some driver services, and may offer or support equipment maintenance.

4.9 Facility Type and Siting Decisions

Freight logistics facilities of each type tend to be established and utilized by one of two principal parties in logistics operations: either the supply chain company (commonly referred to as a shipper, although they also or instead may be a receiver of goods), or the freight carrier. The preceding description of types discussed the chief parties involved and the purposes the facility serves for them. The table “Site Selectors by Facility Type” summarizes this information and serves two purposes: it identifies the kind of logistics company that will drive the site location decision for each form of facility, and it identifies the forms of facility each kind of logistics company will use. The categories “shipper” and “carrier” are broad, and there are several nuances that should be highlighted:

- Many shippers – especially those engaged in or serving the retail trade – are operators of private truck fleets (and occasionally other fleet modes). In the table, they are carriers in this respect and the facilities they establish facilitate this carriage. In practice, these facilities may serve dual purposes: as noted above, the city terminal for a private fleet may be run out of the parent company’s distribution center.
- Warehouses may be erected and run by private developers, who lease their properties to supply chain companies. In the table, these companies are functioning as shippers, because their facilities are designed to meet needs in the supply chain market. Similarly, a third party logistics company (3PL) that makes distribution decisions on behalf of a supply chain client is acting as a shipper.
- Most ports have arisen as a consequence of natural geography. “New” ones mainly are larger developments constructed on an existing site. For these facilities, it is less a question of where to put them as which ones to invest in and use. The port itself typically is a public entity that either may operate or (more commonly) lease out the terminal logistics functions. However, like a property developer hoping to appeal to shippers, the port is appealing to its customers, and the “site” selection equates to a decision by customers to use it. Thus in the table, the decision makers are the shippers and carriers (such as a ship line) who elect to utilize the facility. Inland ports and FTZs are subject to greater choice in location, yet they usually involve public entities cooperating with private ones, and their purpose is to appeal to users.

- Integrated Logistics Centers (ILCs) are hybrid developments, surrounding a core transportation terminal with industrial facilities. Consequently, they are designed for and are selected by both carriers and shippers.

Table 4-1: Typical Operators by Facility Type

Facility Type	Shipper	Carrier
	Supply chain economy in service to market	Network economy in service to shipper
Distribution Center	<input checked="" type="checkbox"/>	
Port	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Intermodal Terminal		<input checked="" type="checkbox"/>
Transload terminal		<input checked="" type="checkbox"/>
ILC	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Hub Terminal		<input checked="" type="checkbox"/>
City Terminal		<input checked="" type="checkbox"/>

The operating mission that drives site selection for both shippers and carriers first and foremost provides service to clientele: for shippers, they are customers in the market for goods, and for carriers, the clientele are the shippers themselves. In the provision of service, both parties also are intent on economical design in their operating systems, assuring high performance at low cost. The decision factors they then employ to determine site preferences are complex, and priorities differ by the kind of facility. The table “Site Selection Criteria by Facility Type” identifies such differences across ten components to the location decision. These components and the process that utilizes them are examined in the next chapter.

The Location Selection Process

5.1 Overview

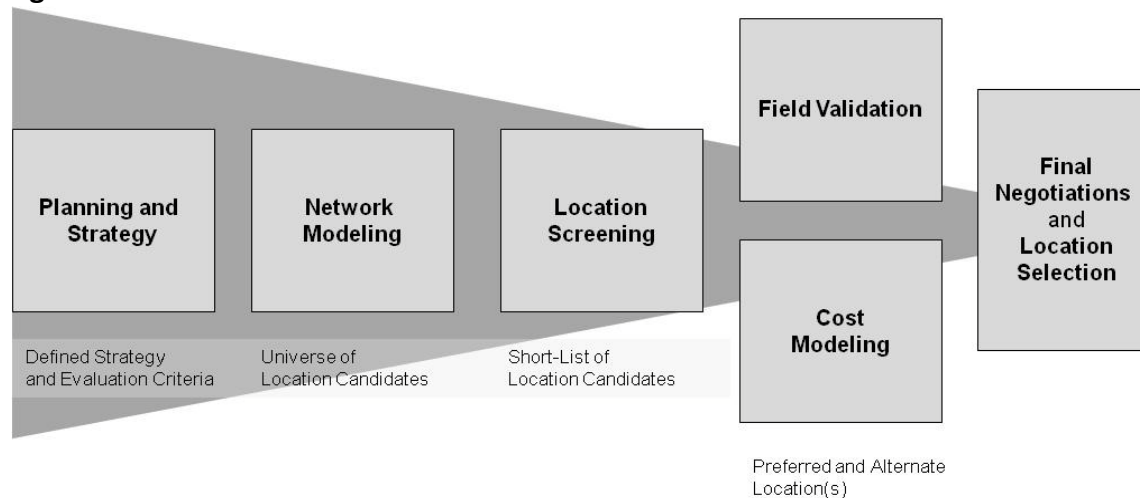
A comprehensive site selection process for freight facilities systematically translates the strategic goals of the company into a business plan for a new operation, and continues the process of identifying appropriate candidate areas, evaluating those areas, determining the financial impacts of the move, and implementing any resulting decisions. Many corporate officials have a stake in the process, and each shapes the process and the relative importance of key factors at different stages in the decision.

While some small or regional companies will make location decisions based upon the idiosyncratic market and supply chain knowledge of specific individuals, many others construct a more robust site selection process that will result in the application of analytic discipline to the stated business need. Such a process explicitly identifies the key success factors for the new facility, meets the operational requirements, verifies financial payback and, ultimately, supports the executive decision-making process.

This chapter explores the most common approaches to site selection while noting differences and alterations that sometimes occur for differing facility or company types. Some entities enter and exit the process at different points, and some approach the process with more or less information. Each company brings its own culture and method based on its own situation. Freight carriers and their clients (retailers, manufacturers, and others) also view the process somewhat differently, and we will describe these variances as well. Likewise, location selection for large super-regional facilities such as ports and inland ports are subject to more idiosyncratic processes.

The current section and the following section regarding key dynamics were developed through in-depth interviews with corporate executives in freight-intensive businesses (such as manufacturing and retailers) as well as with freight carriers, location consultants, and real estate professionals. A full list of interviewees may be found in Appendix B.

The location process typically begins with an examination of the overall business needs for the distribution network as a whole, or for the new facility in isolation, and then follows a process similar to that shown below to narrow the range of alternatives.

Figure 5-1: Examination Process

While these steps are shown above as a sequence, stages often overlap and may flow in somewhat different order. For example, some organizations combine the network modeling and location screening stages. Others develop a cost model early in the project to determine overall feasibility and then refine this based upon knowledge gained throughout the process.

5.2 Planning and Strategy

The location selection process for any facility begins with the identification of a need. This need may arise from the desire to serve a new market, to merge facilities acquired from another company, or to respond to a change in market conditions. Regardless of the presenting issue, the location team needs to understand the strategic context for this new facility or set of facilities.

In the case of most freight facilities, the presenting cause for a site selection process will be to:

- **Expand:** A need to service a new market due to expansion.
- **Contract:** The company or carrier may wish to rationalize a distribution network into a smaller number of facilities, or to merge two networks into one.
- **Change:** The company's market or method of servicing the customer has changed in some way making the current facility or distribution network either inefficient or obsolete.

However – more than other industries – freight facilities are inextricably linked into distribution networks and cannot be wholly viewed in isolation. A change at one node in the network may have implications up and down the entire supply chain. As a result, companies will usually take some time at the beginning of the project to revisit the goals and business context for the distribution network as a whole. This will include asking and answering a variety of business questions, which may include the following:

- How far into the future can we plan?
- How much of the supply chain do we wish to control ourselves, and how much of it do we wish to contract to a 3PL, vendor, or set of vendors?
- How might our business change over the coming years in terms of customer base, product mix, and service delivery?
- How are our customers' needs changing? Does this present us with new opportunities?

- Is our goal to optimize cost or reduce time to market? How best can the company balance its customer service goals?
- How capital and labor intensive are our preferred operating strategies?
- What is our overall workforce strategy? How do we want our staff to interact with and manage the supply chain?
- How do our total material and operating costs compare to those of our competitors?
- What are our overall sources (and costs) of capital to invest in this facility or network?
- What other outside events (e.g. fuel costs, global sourcing of goods, network congestion) might impact our decision making?
- How will we evaluate and adjust our decisions as time goes by? How often will this be accomplished?

The answers to these questions will provide the general planning framework for the organization, forms the basis for planning the facility or network, and illuminates the changes needed to the distribution system.

The team tasked with answering these and subsequent location questions can be small or quite large, depending on the size, sophistication and complexity of the organization. Members of the team may include:

- Business Unit management and staff – including representatives from the affected business unit(s)
- Operations – including supply chain, logistics, and transportation managers
- Finance – the chief financial officer, controller or members of their staff
- Real estate and facilities – the corporate real estate or facilities department or industrial development representatives
- Administrative functions – particularly legal, tax, and human resources professionals
- Outside service providers – which may include consultants, brokers, engineers, and architects

Any form of advance planning involves a calculated risk. Unforeseen business events, market changes, and other outside factors introduce the risk of significant error into any planning, and the margin of variance increases the further out the plan is built. Nonetheless, any network or facility plan usually adheres to the rules of thumb for planning horizons from early stage planning to project implementation and operations:

Table 5-1: Rules of thumb for planning horizons

Facility Characteristics	Planning Horizon
Significant infrastructure investment (as for a port or intermodal facility)	20+ years
Capital or machinery intensive investment	7-10 years minimum
Commodity based or non-capital intensive	3-5 years

The planning timeframe will then indicate the remaining strategic considerations. This will include projecting or forecasting the following:

- Sales and/or freight volume
- Demand points or markets to be served
- Product sourcing
- Product categories

- Number of end (or source) points to be serviced by the facility
- Freight pricing (including variability by mode)
- Facility ownership or leasing plan
- Any likely exit plan for the facility

This establishes the overall need requirement to be satisfied by the new facility or network. This framework allows the project team to set overall parameters for the following:

- Proximity or access to key markets
- Transportation network requirements
 - Access to key transportation corridors
 - Ability to balance modes
- Labor and workforce needs and costs
- Tax and regulatory requirements
- Utility requirements, including information technology considerations
- Real estate and facility requirements (including specific building design and engineering requirements)
- As a subset of the above, can the company move into an existing facility, or will it need to build a customized facility
- Overall costs to establish and operate the facility or network
- Incentives or other public sector assistance

Each of the above can either be a gateway or a screening criterion. **Gateway criteria** are those factors which must be in place for a location or community to even be placed on the candidate list. This can include access to a key mode of transportation, such as a seaport or airport. It may also include the ability to serve a key market within a defined period of time, such as a requirement to serve markets X, Y, and Z within a one-day out and back truck trip.

Screening criteria are factors which are important to the overall success of the facility but which may be traded off against other operational requirements

This structured approach to developing the strategy accomplishes several aims. First, it allows the company to logically define the most critical elements for the facility type or network being planned. The key criteria are defined, measurable data points are established for those criteria, and the criteria themselves are ranked in order of relative importance. This relative weighting will be used later to rank the candidate sites or scenarios.

Second, this structured approach ensures early stakeholder buy-in and ensures that the solution is grounded in a consensus on the importance of the key drivers. This provides decision support to the corporate officers, reduces parochial infighting, and minimizes the emotional component of the decision process.

5.3 Network Modeling

Time to market and overall logistics costs drive many if not most freight facility location decisions. As a result, the first stage for locating a freight facility of almost any form examines the interplay between location and freight costs.

Network modeling involves determining the number, size, and broad regional location of facilities required to service customer needs in a cost effective manner. This analysis usually involves some form of computerized modeling of total shipping cost and time to market for a set of scenarios. Programs such as ILOG,

Computer Aided Planning and Scheduling (CAPS), and ZALES allow the user to input customer or store locations, sourcing points, freight loads, fuel costs, facility operating costs, and modal choices to develop idealized distribution center networks. Similar modeling capabilities are provided by the larger third party logistics (3PL) firms for their customers and the very large firms such as UPS maintain their own internal systems for this purpose. The same modeling can be used for larger facilities (such as intermodal, bulk, or others) which will be used to feed smaller regional distribution centers.

The network analysis phase is designed to determine:

- Where freight will be originating from
- The destinations where freight will be sent to from the facility or facilities
- The types and number of follow-on stores, distribution centers, or other operations which will be served by each facility
- How to best align the facility locations with customer markets
- The preferred mode or modes by which freight is to enter and leave the facility or facilities
- Tradeoffs between centralized operations (fewer facilities, but longer delivery distances) and dispersed operations (more facilities, but shorter delivery distances)
- How to build flexibility into the network to respond to changes in fuel costs, market changes, and the relative advantages of each transportation mode

These models are run through a variety of scenarios, examining the sensitivity of the optimal network to issues such as freight volume, population growth, customer change, sourcing, operations costs, and fuel costs. While the company may use its own historical data as a baseline, it is important to test this against a range of possible outcomes to determine the breaking point between feasibility and infeasibility for each scenario. The scenarios may then be adjusted with regards to number of facilities, facility capabilities (size, modal choice), or position on various transportation networks.

Companies perform a conscious tradeoff among cost, performance, and resiliency and build a network which meets their goals for each. This idealized network is then compared against the company's current network to both benchmark the accuracy of the model and to identify gaps in the network. This highlights areas which require changes, additions, or deletions and also provides an indication of where change is most required.

This analysis of linkages and infrastructure must be compared against real-world data with regards to actual conditions. Network models are typically limited with their ability to incorporate such issues as congestion in transportation channels or changes to the transportation network itself, except as this may be incorporated into transit time costs passed onto the customer. An ideal network based on this kind of modeling may be significantly compromised by issues such as congestion and traffic on roadways, or through having passenger traffic take precedence over freight on rail networks. Companies need to make off-line adjustments to the network models to accommodate for these intangibles.

Network models do not provide final sites, but only show recommended areas where nodes ought to exist for optimal network performance for the parameters fed into the model. According to interviews, supply chain companies typically use this as a starting point, and attempt to find sites within a specified radius of these recommendations. This radius may be larger (50 miles) or smaller (10 miles or less) depending on the nature of the network under consideration.

5.4 Location Screening

The site selection team also gathers data which relates to non-transportation factors such as workforce, regulatory environment, utilities, and the cost of real estate. These factors impact overall business success, but must be evaluated using different methods from those of network analysis. The main challenges for the team are threefold:

1. Finding data which appropriately measures or predicts the dynamics for each major business driver
2. Developing some method for reconciling the relative importance of each data item or business driver
3. Following a process for gaining acceptance of the results of steps 1 and 2 among the other corporate executives

In order to address these challenges, the team will typically construct either a grid or a weighting and ranking model which uses demographic, socio-economic, workforce, tax, regulatory, utility, and other data to determine how each candidate community matches the company's goals relative to the others in consideration.

The team collects data from various public and private sources and may also submit a request for information (RFI) to individual community economic development agencies if the team needs more specialized information. Ideally, the team will review information from more than one source for critical items to ensure accuracy. This data can include:

- Availability and cost of skilled workforce
- Education system performance and presence of key training programs
- Unionization and union activity
- Electric, water, sewer, and gas utility availability, capacity, and cost
- Availability of adequate sites or facilities
- Rent, occupancy and construction costs by acre or square foot
- Income, inventory, sales, property and other taxes
- Other regulatory concerns
- General information on credits, grants, incentives or other public sector assistance
- Climate and natural hazard information
- Quality of life (if key personnel are to be transferred to the new site)

The team constructs its evaluation matrix or model using this data. By applying a weighting scheme developed in the strategic planning phase, the team objectively tests how well each of the candidate communities or sites matches the company's needs. The team can evaluate a variety of alternative scenarios to reflect changing priorities. The team will also examine how the community or site's location impacts operating and cost considerations as compared to the network model's ideal location. Communities which score well for the team's identified priorities and which can also adapt to alternative outcomes are retained for field analysis.

5.5 Field and Site Analysis

After the project team identifies its preferred short list of communities and gains the acceptance of any other corporate stakeholders, the location team performs on-site verification of the analysis performed above and further evaluates specific sites or facilities within the community. This process also assists in interpreting the objective data on workforce and other areas from earlier screening stages.

This is a stage in the process where the location team may seek the assistance of local government or economic development officials in various areas, including:

- Meeting with companies who have similar operating profiles
- Discussing permitting and regulatory assistance
- Incentives, grants, credits, and other public assistance
- Identifying any appropriate sites which may not have been uncovered in earlier due diligence
- Working with local utility officials to discuss load requirements and other considerations
- Other meetings and connections as appropriate

All of the above allow for a better understanding of the actual operating environment in the community and also begins the negotiation process for land, facilities, and public assistance where appropriate.

Discussions with land or facility owners on selected properties begin to evaluate each property's:

- Match to company requirements for size, configuration, or permitting ability to construct on the site
- Ability to grow or otherwise adapt to future requirements
- Ease of access to and distance from key transportation points (highway ramps, switching yards, intermodal facilities, etc.)
- Cross dock, ceiling height, maximum floor weight, number of loading dock, rail access and other materials movement requirements
- Utility feeds and redundancy to the facility
- Other site engineering considerations
- Environmental considerations
- Rent, purchase, and operating costs
- Employee commuting patterns
- Crime, safety, and security

This information, coupled with the financial analysis described below, allows the team to further refine the location recommendations.

5.6 Cost Modeling

The team constructs a full financial analysis of the various location and network scenarios to evaluate the feasibility and the relative financial merits of each option. These cost models may be designed to evaluate the Net Present Value (NPR), Internal Rate of Return (IRR), payback period or other similar financial metrics. Each scenario may be compared to the current state, a defined base case, to the alternative scenarios, or all of these. Different entities use different investment feasibility criteria including a project hurdle rate, the corporate borrow rate, or the company's weighted average cost of capital (WACC) depending on corporate philosophy. The cost model may include any or all of the following:

- Start up costs
 - Land or facility purchase (if applicable)
 - Construction and fit-out costs
 - Recruiting, hiring, and training
 - Relocation expenses
 - Equipment and furniture purchases
 - Sales tax

- Recurring costs
 - Ongoing inbound and outbound transportation costs
 - Transportation network service performance (such as traffic and congestion delays)
 - Rent (if applicable)
 - Building and equipment depreciation (if applicable)
 - Maintenance, repairs and other occupancy costs
 - Staffing and labor costs
 - Benefits and recurring training
 - Utilities
 - Property and income taxes
- Exit costs

These models may or may not include revenue projections and full tax impacts for the location scenarios depending on the sophistication of the project team and overall project goals.

Cost models provide critical information regarding how well each scenario and/or location provides an economic payback for the proposed location or network investment. The amount of time required for the company to recoup its initial investment and the rate of return must be compared against other operational investments the company might consider in order to prioritize such investments.

Likewise, the cost model provides a sensitivity analysis for the network or site for measuring the impact of changing cost environments for fuel, labor, network service performance, revenues, and tax exposure. A network or location's ability to successfully address a variety of possible operating situations provides the company with strategic flexibility which substantially increases the chances that the location or scenario will be chosen. These analyses therefore result in a determination of both absolute and relative feasibility for the options under consideration.

Cost models also play an important part in identifying any up-front or ongoing cost barriers which may be addressed through partnership with the public sector through the use of incentives, credits, grants, or other financing options.

5.7 Incentives Negotiations

Project teams may also work to identify, negotiate, and secure incentives from local or regional governments to address any perceived shortcoming of the location or to help offset costs and improve feasibility.

Other programs or incentives may be devised to solve a particular location problem or hurdle expected by the company in question.

The project team will take extreme care to ensure that any action taken by the team, the company, or its partners is not construed as a firm commitment to any community under investigation. Any such premature commitment can eliminate the possibility for securing financial incentives and inducements. On the other hand, public sector agencies involved in these kinds of negotiations increasingly are seeking some form of "claw back" such that the public incentives or subsidies are contingent upon the private company delivering on job creation and sustained activity.

5.8 Final Selection

At the completion of the cost model, site analysis and negotiations, and the negotiations for public incentives, the project team re-assembles the corporate stakeholders to present their findings and recommendations. The company then decides on a course of action, instructing their partners to complete negotiations and implement the new location strategy.

Key Criteria and Data Requirements for Facility Location Decisions

6.1 Overview

Companies and carriers both work through various categories of objective and subjective data as they make location decisions for freight facilities. Whether the facility is to be a retail distribution center, a railroad intermodal facility, or an intermediate logistics center for a manufacturer, the data are similar. The fundamental objective is to arrange the supply chain or service network that is able to deliver competitive performance at the lowest cost, and individual facilities are system components designed for this larger purpose. The importance of specific items will differ, but each new location decision usually involves an examination of issues such as:

- Ability to access key markets
- Interaction with the transportation network
- Modal choice
- Labor and workforce
- Total cost environment
- Utilities
- Availability of suitable facilities
- Permitting and regulation
- Tax environment
- Public assistance and incentives
- Climate and natural hazards

In addition to the criteria gathered for each candidate site, several outside factors influence how decisions are made. These include:

- Who within the organization has responsibility for choosing facility locations and how that individual's performance is measured.
- The reliance on and sophistication of network computer models.
- The dynamic nature of the global supply chain, especially as regards to favored sources of origin and production.
- Fuel costs and the resulting choices for transportation mode.
- Congestion and capacity issues within key transportation nodes.

This chapter will first examine the key criteria used in the location selection process and then discuss several of the key outside factors that currently impact location decisions for freight facilities. As with the previous section, the data gathered on key criteria and dynamics was gained through interviews with corporate executives within freight-intensive businesses (such as manufacturing and retailers) as well as with freight carriers, location consultants, and real estate professionals. A full list of interviewees may be found in Appendix B.

6.2 Ability to Access Key Markets or Customers

Freight facilities exist solely to facilitate the processing and movement of goods from an origin to a destination. The point of origin may be a source for raw materials, a manufacturing plant, or an intermediate

point. The destination may be the ultimate consumer or a staging station along the way. Regardless, freight facilities typically chose locations which allow them to most directly and efficiently access these origin and destination points. Access is expected to accomplish two things: 1) perform delivery service with speed and precision that matches or exceeds the competitive standards in the market; and 2) establish a set of logistics costs that will prove as low as possible within the delivery standards. Implicit in the location decision is a service performance threshold that the facility is designed to meet (e.g., containers handled per hour, inbound truck shipment capacity per day).

As an example, retail distribution networks are often founded on a concept of overlapping circles each with a radius of 500-miles. Beginning with the factory, this builds a supply chain which allows for a one-day drive to the regional distribution center, then the local distribution center, and finally to stores (which are located in major consumption areas).

The ability to service a particular customer within a one-day drive is a common service expectation and location consideration. This consideration requires both physical proximity to the customer and a location within the transportation network which permits ready movement to the customer's facilities. (Indeed, the location of a freight facility can in some cases be directly specified by the customer.) For a city terminal operated for pickup and delivery by a truck fleet, the customer proximity requirement is substantially shorter and the density of customers in the region is greater. In these cases, the number of customers that can be reached within fixed time schedules affects the quality of service and the necessary investment in trucks as well as terminals. These facilities are situated to minimize total miles within a few hour service radius.

Intermodal facilities and freight rail terminals also locate themselves proximate to major consumption zones, but due to their size and need for access to multiple customers, tend to locate at the outskirts of major metropolitan areas. Additionally, these facilities need to be located at points where they can generate large loads of freight which need to be shipped long distances. For example, a freight rail terminal can require almost 100,000 carloads of freight per year moving from one point to one other point up to 2,000 miles to be financially feasible. Intermodal facilities servicing containers and truck trailers have similar requirements. In such cases, the carrier will attempt to locate near a market that either generates this volume or where they can collect freight from a short distance to create the volume required to support feasibility.

Sources for market data include the US Census, the US Department of Commerce (Bureau of Economic Analysis, International Trade Administration), US Bureau of Labor Statistics, and commercial software and data packages such as Nielsen Claritas, who build projections and analyses from publicly available data. Companies also rely on internal data about their customers and business trends.

6.3 Interaction with Transportation Network

In addition to proximity and access to customers and markets, the facility needs to have an efficient interface with the transportation network. The nature of this interface depends on the facility type and the markets to be served, and may require access to more than one mode of transportation. At the time they are seeking sites, companies normally have a modal plan in place consistent with their performance and cost requirements, and they are thus looking for locations that will help them execute it. Communities which tend to attract freight facilities have a logical connection with points of production or port of entry; proximity to consumer markets; and the infrastructure to allow an efficient means of connecting the two.

Specifically, freight facilities locate near key interface points on and between transportation channels. This includes:

- Areas or sites on major highways
- Areas where multiple interstate highways converge
- Railroad terminals at the edges of their network or at key consumption markets
- Major sea and airports

These are site-level considerations in addition to those at the market-level. A site might be set in precisely the right position in the transportation network, but site or community issues can prevent the effective use of the site.

Considerations by mode will vary widely depending on the type of company and the good being shipped, but can include a few modal considerations.

Road and Truck

Full-load and long-haul trucking requires quick access to major highways. Additional time on local roads, with delays due to local congestion and traffic lights adds to logistics costs, conflict with the public sector, and operational difficulties. A site within ¼ mile of a highway and no traffic lights will represent a significant annual logistics cost savings when compared to a site two miles from a highway. Companies also consider whether the roads they will use have tolls. Tolls represent additional cost both in terms of direct fees and lost time on the road and can be significant in overall cost of operations.

Parcel, less-than-load, and many private carriers view access to the local road network as more critical because of their requirement to make multiple stops in relatively short sequence. Even in these cases, however, the less impeded the access to a major artery and the faster its connection to the metropolitan highway network, the better.

Rail

Companies shipping bulk products, or large amounts of goods over longer distances may choose to do so via rail. Increasingly, this also includes products that are shipped via intermodal container. The use of rail varies regionally as the viable rail shipping distance is somewhat shorter in the eastern United States than in the west, due to fewer miles between cities and fewer options for carriers to relegate capacity to higher revenue, long haul freight. The unit of production in railroading is the train, so access to Class I carriage is frequently a matter of assembling trainload volumes. This can be accomplished by very large shippers (like an ocean carrier or a coal-fired utility), or by consolidation at an intermodal or transfer terminal, or by a short line railroad combining the traffic of many shippers.

Rail access also looks for aligning shipments in such a way that the equipment is efficiently used for all legs of transit. For example, a company shipping consumer goods to the Pacific Northwest may attempt to ship 60 foot boxcars together with a lumber company, reload these cars with paper at the destination to ship this back to the original site. Rail is also a natural solution in supply chains that combine a west coast port of entry and east coast consumption zones.

Access to the rail network is concentrated at terminal facilities. Terminal facilities themselves locate at key origin and destination points for freight and are constructed with the capabilities to move bulk freight, intermodal containers, liquids, or other materials between mainline rail and either other forms of transportation or shunted to the user.

These terminals are designed to allow for the most efficient interface with mainline rail. Class I railroads plan for their trains to run on mainline rail at operating speeds. Slowing and accelerating sidings are constructed at key interchange points and allow for trains to enter or leave the mainline without disrupting the efficiency of the mainline.

Such a facility might require a minimum volume of 150,000-200,000 individual freight or container movements to approach financial and operating feasibility. As a result, railroads attempt to encourage the co-location of rail-based freight users at these interchange points to both maximize the efficiency of these interchanges and also to generate critical freight mass. Additionally, railroads have very specific criteria for new facilities coming online for how the tracks are laid out.

Class I long-haul railroads will typically only deliver and pick up cars, leaving switching to be done by either a switching railroad or by the user.

Water

High bulk goods, liquids, and containers moving internationally require water access. In these cases, the port – the interface between water and any overland transportation network – must provide the infrastructure to load and unload shipping and have the ability to transfer freight to other modes of transport. Additionally, the facility will likely require space for sorting, storing and assembling shipments, and may also require customs and safety screening for international shipments.

Air

Freight carriers' requirements for air transportation increase for high-value, quick response, low bulk items. This is the case for medical devices, some biotech products, electronics, and similar items. A secondary consideration can be back-up access to high speed transportation, for companies carrying very low inventories. More broadly, air freight also an important role for freight forwarders as their cargo is subject to a wide variety of time requirements.

Interestingly, many freight users will include proximity to a hub airport as an evaluation criterion for freight facilities which will not themselves be shipping anything by air. In these cases, the cause may be accommodation of company management or partners who wish to visit the facility and will require means of accessing the region through commercial air travel.

In many cases, there may not be specific discussions with the airports during the site selection, but the company may investigate the carriers using the airport and examine how active the facilities are.

Third-Party Shippers

Instead of co-locating or locating near specific freight infrastructure, some freight businesses will rely upon and perhaps locate near third-party shippers or third-party logistics companies (3PL's). This is the case for large retailers who will ship most of their own merchandise through their distribution centers but who will rely upon FedEx or UPS to ship small packages such as jewelry directly from central distribution to the stores.

6.4 Labor and Workforce

While each facility type has different requirements, labor skills, costs, and the overall workforce environment play a key role in location selection for freight facilities.

At the most basic level, labor and workforce correspond to the availability of suitable personnel to be able to staff a facility. However, freight facilities can require a wide variety of talents depending upon the exact nature of the facility. Skills required may include forklift operators, assemblers, truck drivers, machinists, mechanics, technicians, material handling specialists, and engineers in addition to unskilled labor.

In evaluating locations, companies often examine data from the US Bureau of Labor Statistics and Bureau of Economic Analysis regarding overall employment for a region or community first. This information indicates the overall labor market health of the community and may also give indications as to the general level of labor costs as well as data on occupations and industry-specific information. Companies also request this data and local salary surveys directly from local economic development agencies.

Lastly, companies will also speak directly with peer companies in the local market to determine their experiences with labor in the region. They will attempt to discover local salary trends, best practices for attracting and retaining key talent, and determine unionization trends.

Companies will also examine the education infrastructure of the area. This is both to determine the base educational attainment of the population and also to ascertain the availability of follow-on training programs to fill specific requirements. Educational attainment data is typically available through the US Census and updates are performed by private data suppliers. The company will collect data on educational institutions from the Internet or from published sources. The company may also request specific education and training information from the local government or economic development agency.

Union presence and activity can be a factor for site attractiveness, but may be viewed either positively or negatively. Some companies view the presence of a union as beneficial, as specific industries already expect to work with unionized labor, the union provides training and some support to the local labor force, and also acts as an easily identifiable party that can readily represent labor in negotiations. Other companies work actively to avoid unionization and will use their location as part of an overall strategy to lessen the risk of their becoming organized. Data on unionization trends is readily available from the National Labor Relations Board.

6.5 Total Cost Environment

As noted in the chapter on the Location Process, companies will develop a set of relatively comprehensive cost models to estimate the relative costs of doing business in each candidate location or scenario. These are also used to evaluate the sensitivity of each scenario's relative feasibility to changes in factors such as fuel costs, product mix, labor costs, tax exposure, product sourcing, or other key inputs.

The total cost of doing business in each location not only provides information to be balanced against other operational factors, but also informs the incentive negotiation process with the local government or economic development agency.

Examples of data sources for key cost assumptions are as follows:

- Freight and logistics costs
 - Previous company performance
 - Freight carriers
 - Industry association data
- Labor costs
 - Bureau of Labor Statistics

- Local salary and benefit surveys
- Utilities
 - Local requests for information
 - Edison Institute for private electric utilities
 - Building Owners and Managers Association (BOMA) guide
- Facilities Costs
 - Local brokerage firms
 - Building Owners and Managers Association (BOMA) guide
 - Marshall & Swift (construction costs)
- Taxes
 - Professional accounting firm guides
 - Requests for information to local tax assessor office

6.6 Availability and Cost of Suitable Facilities

Real estate availability and cost are typically not prime drivers for the location decision process, but an optimal facility in the right location can help enable selection decisions once the site satisfies other key strategic criteria. For example, the availability of well-planned warehouse space at a regional airport might allow for a faster decision, if that airport also has good highway and rail access and at a location which allows unimpeded service to consumption areas. Likewise, the lack of suitable facilities can impede progress or remove a community from consideration. This is also the case for a community who does not have land zoned for industrial or commercial uses near key infrastructure access points. Finally, it is common for carriers siting city terminals to limit their search to existing facilities because of the cost of new construction and community resistance. Properties of this sort may be handed from operator to operator as leases expire and lessors grow, consolidate, or fail.

The freight user will investigate the availability of buildings of a particular size envelope, layout, ceiling height, number of loading docks, floor loading limits, utility feeds, refrigerated space, purchase, rent and operating costs, and other attributes depending upon their specific requirements. Alternatively, companies may search for land near specific transportation points or other partners. They will determine plot size, possible layouts, price, geology, soils, hydrology, and other requirements and seek parcels meeting these needs.

Companies will also investigate the availability of nearby operations to support their own freight activities. Operations such as bulk and transload facilities allow for consolidation and access to modes of transportation such as rail and port where the single users' activities are not sufficient to support service.

Site availability will differ based on the type of freight logistics facility. For example, siting an inland port, integrated logistics center, or intermodal rail terminal will typically require larger sites than small to medium-sized distribution centers, warehouses, and city/hub terminals. Identifying and preserving large sites to meet these requirements can be a challenge in more fully developed, built-out urban areas.

Interface points to the transportation network – rail terminals, intermodal facilities, ports and the like – are valuable in that they allow for flexibility in choice of how to move goods. Some companies acknowledged the discussion of integrated logistics centers as one real estate solution which allows communities to provide adequate land and facilities at a point which also concentrates freight movement away from other community activities (residential, recreational, retail, etc.).

Initial data on regional costs may be obtained through reports from national real estate service providers. The company will then seek market and building specifics either from their own real estate service firm or through the local economic development agency.

6.7 Utilities

While electric, water and sewer capacity does not drive warehouse, distribution center, and intermodal facility location strategy as much as for other uses (e.g., data center and manufacturing), the company making the location decision will still wish to ensure that capacity exists, is reliable and is cost-effective.

Power reliability can be as important as power cost. Some facilities, such as those using heavy lift capability or automated warehouses which are highly reliant on computerized machinery, will pay even more attention to the issue and may even use access to uninterrupted power as a gating issue in the site selection process. Note also that freight facilities often include assembly or light manufacturing operations in addition to freight movement. In these cases, the utility requirements of the ancillary functions may significantly impact location needs.

Local utility availability and costs are usually determined through conversations with the local economic development agencies and utility providers.

6.8 Permitting and Regulation

Local, state and federal permitting and regulations impact how a company can implement their plans for a particular site and can also impact their timeline.² Experience with a similar facility type in the community and an existing permitting process can be seen as a location positive. For example, a community which already houses a bulk terminal will be familiar with the impacts that these might have upon the community and will have a clear process in place for permitting additional facilities using bulk freight. Other communities who do not have this experience might exhibit confusion and delay in responding to the company's permit applications.

Fire codes, land use regulations, traffic regulations, zoning, and hours of operation regulations can all significantly impact the feasibility of a freight facility location. The interpretation of codes and regulations by officials such as fire marshals can have a decisive effect on the ability of a facility to function as planned. Ideally, a community positioning itself for freight uses will have developed land use, transportation and zoning plans which explicitly permit and support these facilities and which allow for round-the clock operation. This also means that such plans will have been developed in such a way that freight uses are not in conflict with other community uses and residential neighborhoods. This can be a particular challenge when freight facilities are established at the edges of towns and the neighboring communities have differing views on which uses ought to be provided for.

Communities and regions can also help significantly in the process by proactively managing the interaction with the broader public. Government and appointed officials can work with local interests to keep everyone coordinated. For example, they can ameliorate community concerns first by acknowledging impacts on local traffic, then also educating the public on the benefits that development will bring to the community at large,

² If a freight facility and related infrastructure investment is large enough, it could trigger a formal environmental review process such as an Environmental Impact Statement (EIS) or Environmental Review (EA). This is more common for intermodal rail terminals, inland ports, and other large-scale freight facilities.

and demonstrating how the community will work with the new company to reduce the impact on residents to the extent possible.

Companies also view a community or region's willingness to provide a clear permitting and regulatory path as an amenity or incentive. By providing the company with a reliable picture of what obligations the company needs to meet, which permits it needs to obtain, and a clear timeframe for when these hurdles may be met, the company can more clearly budget when the facility will be able to enter the supply chain and generate returns on investment.

6.9 Tax Environment

Income, sales, real estate, and property taxes can all significantly affect the cost environment for freight facilities. Chief among these is property taxes. Real estate taxes can be high on urban facilities on land which might otherwise be used for high-density development. Over time, higher real estate property taxes may drive these parcels into non-freight development and freight facilities will relocate to the urban fringe.

Personal property taxes can also be a concern. At least one interviewee spoke of an experience where inventory in one location was taxed as personal property. The company responded to this challenge by removing all inventory from the facility and essentially decommissioning it approximately one week before the community's annual tax assessment day. Inventory was then returned to the facility several days after the assessment was completed. The interviewee asserted that had the company been aware of the issue beforehand, this facility would not have been located where it was.

6.10 Public Sector Assistance and Incentives

Public sector assistance in the forms of tax credits, grants, low-cost loans, training programs, utility discounts, and infrastructure development can address specific location shortcomings and are often used to close the gap between a location and its competition. Broadly, incentives do not drive location decisions at the strategic level. Companies understand that incentives usually do not substantially impact the overall feasibility of a site, nor can they ameliorate serious community shortcomings. In short, they rarely make a "bad" location into a "good" one. Therefore, incentives are not a first or second order decision factor, but may be a decision maker once the list is reduced to 2-3 candidate sites.

Companies and location consultants have a wide range of perspectives regarding the role and use of public incentives. Some companies view the incentives process as asking the community for handouts and are not willing to ask for any assistance beyond that available as-of-right. Others view them as a critical partnership between company and community to reduce the one-time and operating costs of freight facilities to the point where success may be gained for both sides.

As mentioned in the previous chapter, specific incentive programs can include:

- Tax concessions or exemptions
- Loans and loan guarantees
- Employee tax credits
- Wage subsidies
- Land subsidies or grants
- Cash grants
- Property tax abatements
- Utility rate reductions

- Infrastructure grants
- Enterprise Zones
- Foreign Trade Zones (FTZ)
- Tax Increment Financing (TIF)
- Inventory tax reduction
- Expedited permitting and approvals

Overall, freight users prefer to work with communities that understand the competitive landscape that freight users operate in. In these cases, communities come to the table with an understanding of the company's goals, how the company and community's goals align, and suggest proposals to help reduce initial investment costs and barriers for long-term benefits to the company and community.

Companies begin discussions with government and economic development at various levels depending on the stage of the location process. The more certain the company is with regards to where they wish to be, the more likely it is that they will directly contact the local level first (county, city, other) and encourage them to draw on higher level services to pull the team together. If the search is regional, then the company may decide instead to speak with state or regional economic development officials.

Freight companies and carriers alike also expressed that local strategies of building speculative infrastructure, public terminals, and warehouses cannot work without an understanding of how these directly address operating economics and forecasted market demand. Freight location decisions rarely respond to a "build it and they will come" approach on the part of the public sector. Rather, successful freight facilities are often driven by partnerships with and commitments from railroads, truck companies, etc.

A common form of commitment for freight facilities is public funding and construction of connecting infrastructure such as local access roads, water/sewer, or rail spurs. As an example, Massachusetts strongly favors this form of incentive as it produces a tangible and lasting infrastructure benefit even if the private sector venture is unsuccessful.

Other incentives which the public sector may offer to freight facilities include acting as a clearinghouse for information on back-haul and other freight-leveling opportunities. Some companies expressed that it would be helpful for them to be able to obtain information on local freight movement the same way they can for electric, utilities, workforce, and soils. By coordinating this information, the community can ensure that local carriers and freight users run closer to capacity on a more regular basis, providing a strategic advantage.

Communities can also provide tangible incentives without subsidy by shortening or expediting the permitting timeframe. Communities that understand the company's process and drivers can smooth the permitting process and provide clarity in terms of expectations for the company and the regulatory agencies, resulting in a better defined process and a shorter time to implementation. Through this approach, communities can present this confidence as a strategic advantage of the location.

6.11 Climate and Natural Hazards

In order to understand business interruption risks, companies will collect data on the region's climate, natural hazards, and historic information on how these have impacted business closures in past years. No area is without some form of natural hazard risk, and companies will compile data on excessive heat, cold, rain, snowfall, earthquake, wildfire, tornado, hurricane, or other relevant data to develop appropriate mitigation (and recovery) plans.

Data on climate and natural hazards is available from the National Oceanic and Atmospheric Administration (NOAA) and the National Weather Service in addition to other providers.

Table 6-1: Site Selection Criteria by Facility Type

Location Criteria	Type of Logistics Facility						
	Distribution Center	Port	Intermodal Terminal	Transload Terminal	ILC	Hub Terminal	City Terminal
Ability to Access Key Markets or Customers	●	◐	●	●	●	◐	●
Interaction with Transportation Network	●	●	●	●	●	●	●
Labor and Workforce	◐	●	◐	◐	◐	◐	◐
Total Cost Environment	◐	●	◐	◐	◐	●	◐
Availability and Cost of Suitable Facilities	○	○	○	◐	○	◐	●
Utilities	○	○	○	○	◐	○	○
Permitting and Regulation	○	○	◐	◐	○	○	○
Tax Environment	○	◐	○	○	○	○	○
Public Sector Assistance and Incentives	○	○	○	○	◐	○	○
Climate and Natural Hazards	○	◐	○	○	○	◐	○

Key**Priority of Criteria:**

● Primary Factor

◐ Important Factor

○ Lesser Factor

Current Dynamics Impacting Facility Location Decisions

Freight is dynamic by its very nature. As a result, the context in which the process and drivers outlined above are applied changes over time. Some of the more prominent factors currently affecting freight facility location trends are as follows.

7.1 Changing Role of the Freight Facility

Transportation and logistics are dynamic by their very nature. Freight is in motion, and the means of accommodating this motion evolve constantly.

Primarily, interviewees noted an ever-increasing emphasis on “goods in motion”. This term signifies the supply chain ideal of goods delivered at the moment of need straight from production. Logistics facilities are used for modal transfer, consolidation, deconsolidation, and redirection - not storage - and it results, for example, in more crossdocking, and concern about the fluidity of ports of entry. Distribution centers may be reducing in size for some users, but increasing in number and situating closer to markets. Orders should be filled from goods already on the way, and this will result in smaller static inventories. Technologies to enable this approach will continue to improve.

Companies noted that the freight facility has become a key link in goods production, and has acquired the role of final stage manufacturing - conducting customized kitting, assembly, packaging and labeling of goods for local use. This can reduce transportation costs, but also provide the ability to have market level modifications and add value close to the market, point of sale, and consumption. As an example, some retail interviewees noted that as much as 65% of the inventory moving through the distribution center must be assembled as it moves through the facility. This can be very labor intensive and influences the location requirements accordingly.

7.2 Organizational Factors and Comprehensiveness

Complicating the approach shown in the preceding chapter, companies approach the location selection process with varying levels of sophistication and integration of functional units. Put another way, in some cases either the real estate department or the logistics department will run the location process, with little input from other portions of the company. In these cases, rent and occupancy might take more precedence in the location selection than would otherwise be the case. Likewise the presence of a specific 3PL partner might dictate a location which otherwise does not meet objective strategic goals.

This may reflect the larger corporate structure in many cases. Logistics and supply chain report through operations to the Chief Operating Officer, and real estate may report through finance to the Chief Financial Officer. Each division may have individual performance measurement criteria which do not adequately match combined goals. Integration of the two chains of command may not occur until the Chief Executive Officer is involved, who may or may not review the location decision and compel an optimum result.

Increasingly, the total operating costs of the supply chain are forcing a review of the decision making process, ensuring a more holistic approach across large companies. In these cases, competing goals and measures are being replaced with an initiative to minimize total landed cost and preserve future options for change. Even so, many companies still will retain networks whose legacy reflects some internal lack of coordination.

7.3 Computer Model Use and Sophistication

Interviewees noted both the use and limitations of computer models such as ILOG and CAPS, which optimize logistics costs within performance criteria. These models interactively simulate transportation linkages across modes and can determine the sensitivity of operations cost against changes across the operating environment. They are able to evaluate huge numbers of scenarios, allowing corporations to determine the ideal number, size, and location for distribution centers and cross-dock facilities.

However, respondents noted that while these models are precise and can allow for the manipulation of huge amounts of data, they are limited in that they can't accurately represent on-the-ground local details such as traffic or inefficient highway interchanges or transfer points between modes. Additionally, these models are largely static and cannot easily incorporate future changes to the network or its capacity. As an example, a one-hour drive-time analysis for a site on the outskirts of a major metropolitan area will usually show that a truck can travel just as far into and through the city as outward from the city. Anyone who uses this same roadway network during the morning or evening commute might suggest that travel in one direction can be easier in one direction and considerably more difficult in the other.

As such, interviewees noted that computer models are powerful, useful, and that their sensitivity is increasing. They are not yet (nor are they likely to be) a practical substitute for local knowledge of actual conditions. Nevertheless, they are widely applied and tend to govern decisions in the initial planning stage, meaning that the large scale design of supply chains is determined by the factors they consider or omit, and the methods they employ.

7.4 Changes in Global Sourcing

Interviewees noted that the trend towards freer trade and the corresponding global sourcing of products has likely had the largest single impact on their freight facilities and distribution networks. This has resulted in new growth at and near ports on both the west and the east coast, and has forced the realization that locations in the hinterland have to be strategically located at multi-modal infrastructure and commercial interchanges in order to make intermodal and DC concentrations work.

Leading into the current environment, manufacturing in the Pacific Rim coupled with major consumption zones on both American coasts, in the growing Sunbelt and in the Midwest, had forced a reconsideration of logistics networks. Manufacturing in Asia naturally resulted in additional port activity at Pacific ports, particularly in Los Angeles and Long Beach. Distribution networks were then designed to efficiently move these goods across the country and disperse to the consumption centers of the United States.

Increasing volumes and resulting congestion at these ports and risk management by supply chain operators has led to consideration of alternative ports on the west coast or longer waterborne trips to the Gulf and east coast. For example, some traffic now comes to North America in the opposite direction by way of the Suez Canal. This resulted in new expansion in Norfolk and Savannah, which those authorities took particular steps to encourage (such as providing nearby sites for freight distribution companies). Growth of the Gulf and Atlantic ports is expected to continue as the Panama Canal expansion is completed in 2014, as this will allow fast, all-water routes to more major consumption zones.

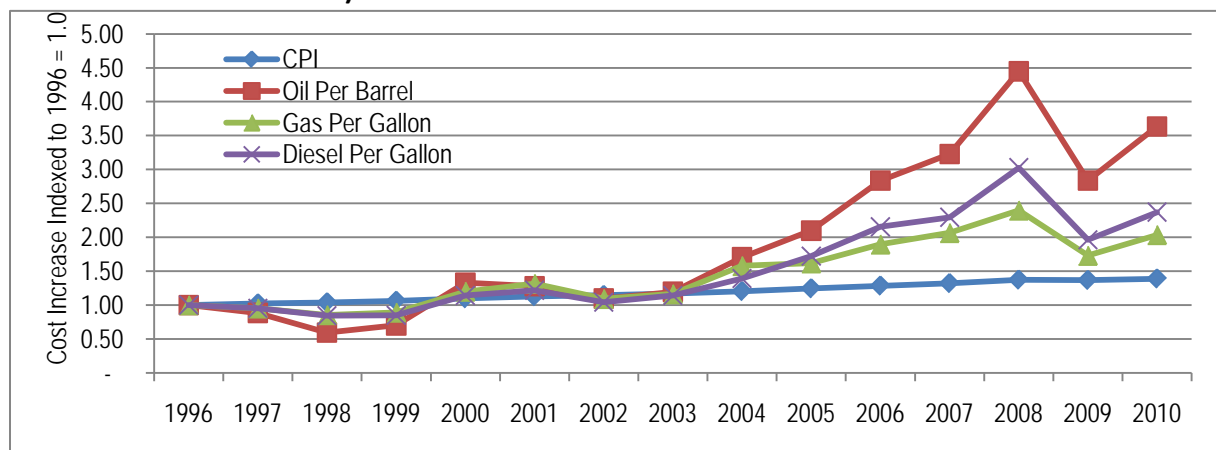
Sourcing decisions in today's economic and political environment are in flux. Overseas production seems unlikely to fall away - at least one interviewee speculated that the American transformation to a knowledge economy necessarily results in knowledge workers who demand high-quality, low-cost products from global sources. Nevertheless, the rise of production in locations like Brazil and India suggests diversity, and the

Obama administration goals for doubling the volume of American exports combined with a lower US dollar exchange rate could support domestic manufacturing and agriculture production. The growing concern for fuel and carbon costs (explored below) could indicate nearshoring for certain products, and a shortening of some supply chains. For purposes of this research, these issues do not need to be settled (and aren't likely to be for some time – in the words of one respondent, there is “no one trend”.) Instead, change should be expected as the status quo, and facility usage will follow.

7.5 Fuel Costs and Environmental Factors

Starting in the early 2000s, fuel costs grew up to 5-6 times faster than the overall rate of inflation (as measured by the consumer price index). Gasoline and diesel prices peaked in the \$4.50 per gallon range, and many truck-reliant freight businesses spent their entire forecasted annual fuel budgets by midway through 2008.

Figure 7-1: Fuel Cost Increases Relative to CPI, 1996-2010 (Energy Information Administration, Bureau of Labor Statistics)



At about the same time, consumers and state governments began to look more closely at how transportation was impacting the environment at large. In the case of consumers, a push began to try to understand the overall carbon footprint of the good they purchased. Governments – in an attempt to curb both pollution and congestion – began to look at ways to reduce truck trips and miles traveled.

Both factors have had an impact on the location selection and distribution network equation. There is a general tradeoff between the cost of having more facilities and the cost of shipping goods longer distances. Put another way, it becomes more efficient to consolidate warehouse and distribution operations when fuel costs are low and the cost to ship goods long distance by truck is relatively inexpensive. However, higher fuel costs have pushed some freight-dependent companies to investigate more dispersed distribution networks, with larger numbers of smaller facilities. These facilities reduce distances from the centers to the final delivery points, which are the most dispersed and truck dependent, and allow consolidated carriage inbound to the DCs by a relatively smaller number of long-haul trucks, or by rail. This method trims transportation costs while boosting facility expenses. During the fuel spike in 2008, supply chain designers are reported to have been considering “Urban Distribution Centers” in line with this model, which are larger number of smaller footprint facilities situated close to big cities, preferably with high ceilings and high degrees of automation, offering short commutes to labor and short distances to product delivery.

The same set of behaviors also tends to reduce environmental impacts, because fuel efficiency and carbon efficiency are positively correlated. This is important as the current focus is starting to heavily weight green/carbon factors. According to one respondent, approximately one-third to one-half of his customers are requesting measurement of green and/or carbon footprint data. Rail companies such as BNSF and intermodal operators like JB Hunt now provide their clients with internet based “carbon calculators” to estimate the impacts of specific shipping decisions, underscoring the fuel consumption and carbon emission advantage of long-haul rail. While a different respondent described customer attitudes to greening as mostly “wait and see”, with an influential company like Wal-Mart³ now expecting carbon reductions from its vendors, the requirement is likely to spread. Interviews confirmed that the effect of carbon monetization on supply chain design would be identical to that of higher fuel prices – but also emphasized that monetization is essential, because then carbon becomes a “real cost”.

7.6 Network Congestion

Interviewees noted that network congestion for all modes impacts their location decisions. Each mode has at least one identified choke point or bottleneck in the national freight system. Containerized ocean shipping views the southern California ports as a concern. Freight travelling by rail experiences difficulty in major urban areas, at the interface point between Class I railroads, or between Class I railroads and short line carriers. Truck carriers experience difficulty in any number of urban markets.

Unfortunately, almost all of the interviewees noted the lack of readily available data specific to congestion in their distribution networks. All have experienced it and understand where it is, but have difficulty using this information in a meaningful way in simulating distribution networks. Real-time highway data on congestion is a growing area of intelligent transportation systems (ITS). As an example, the I-95 Corridor Coalition has been advancing this kind of information for trucking over the past decade.

Interviewees also noted an increasing level of competition for capacity between freight and passenger movement on both road and rail infrastructure.

7.7 Competition with Other Development Types

Freight users in some cases are prohibited from locating in ideal freight locations either due to land use prohibitions or due to conflicts with surrounding uses. In many cases, land that had previously been used for freight movement has now been converted to commercial, retail, or even residential use. The developable industrial land that remains now is subject to increased limitations due to conflict with the new land uses.

One example of this trend is the US Government’s decision to expand military and associated operations at the Aberdeen Proving Ground and Ft. Meade in Maryland as a result of BRAC activity. In consequence, land which had previously been used or permitted as warehouse and industrial space along the key East Coast distribution corridor of Interstate 95 will now be converted to office development instead of a freight-related use. The opportunity to implement Urban Distribution Centers – with their clear advantages for fuel and carbon efficiency and truck VMT reduction – is dependent on suitable sites, most likely on Brownfield properties with established but perhaps dormant industrial designation. The risk to such properties from land use conflicts could reduce supply chain performance by social as well as commercial and economic measures.

³ “Wal-Mart Unveils Plan to Make Supply Chain Greener”, The New York Times, 2/26/10.

Case Studies of Freight Logistics Facilities

This chapter is focused on detailed case studies of the categories of freight facilities identified in Chapter 3 and includes the following sub-sections:

- A framework to assess the economic and transportation impacts of freight facilities;
- An introduction to the case studies including information on how the case studies were selected;
- Seven detailed case studies of freight facilities; and
- Summary findings of the case studies with a comparison with the key site selection factors identified in Chapter 5.

Part 1: Framework for Assessing the Economic and Transportation Impacts of Freight Facilities

This section provides a comprehensive evaluation framework of benefits, costs, and economic impacts of freight logistics. The objective is to increase the public understanding of the impacts of different types of freight logistics facilities and provide an analytical framework to clearly account for the key impacts.

It is important to keep in mind that the overarching private sector objective in the location of freight facilities is to reduce costs and increase productivity and efficiency for freight logistics companies and carriers. The broader transportation, economic and societal effects of freight facilities will vary depending on the type of facility, the modes used at the facility, and the geographic perspective of stakeholders (local, regional, state, national).

In order to quantify and analyze the impacts of a freight transportation project, including freight facilities, the US Department of Transportation⁴ outlines a five-step analytical process. These steps are to: 1) define the project type and its expected transportation impacts, 2) define the expected economic impacts, 3) determine the transportation impact tools to measure modal and performance impacts, 4) define the economic impact tools to measure economic impacts and incidence, and 5) determine the decision methods to portray benefits and costs. This framework is designed to assist in the completion of this five-step process to analyze the economic and transportation impacts of freight facilities.

Impacts of freight facilities fall into several different categories and, while there are a large number of potential impacts, not all of them will apply to each type of logistics center. The major impact categories include:

- Transportation Impacts – including mode choice & traffic volumes, direct travel impacts, supply chain logistics impacts, environmental impacts, and safety/security impacts; and
- Economic Impacts – including construction impacts, direct economic activity, multiplier effects, and economic development/business attraction.

Importantly, this evaluation framework is more focused on measuring the categories of impacts of freight facilities rather than focusing on a formal benefit-cost analysis framework. One reason for this is that the costs of a freight facility are often led by private sector freight companies (e.g., trucking, rail and distribution

⁴ “Guide to Quantifying the Economic Impacts of Federal Investments in Large-Scale Freight Transportation Projects,” Office of the Secretary of Transportation, US Department of Transportation, August 2006.

companies). And the impacts or benefits of a facility will vary greatly depending on geographic perspective. For example, because benefit-cost analysis is most frequently conducted from a national or societal perspective, it typically does not include economic impacts from building or operating a facility (as those impacts would likely occur somewhere else in the US). However, from a local perspective, the private sector investment in buildings and equipment as well as permanent jobs at a facility are a very real economic gain for a city or county. It is completely feasible to conduct a benefit-cost analysis of freight facilities, especially if public dollars are helping to develop a freight facility, but the analyst is cautioned to carefully consider the incidence of benefits and costs to properly match up impacts to their geographic or jurisdictional perspective.

As mentioned above, while impacts occur primarily to the freight provider and in the area immediately surrounding the facility, impacts often extend to the state and nation given the long-distance nature of goods movement. For example, a warehouse is located in a specific town. The town will feel the impact in terms of potential jobs and employment, as well as additional traffic servicing the warehouse with the inbound goods necessary for inventory and the outbound transport of goods to receivers and final users. In addition, the region or metropolitan area surrounding the town will also feel the impact, as there will be better access to goods through the distribution center, and closer proximity to the retail outlets may have impacts such as potentially lowering costs due to the reduction in transportation costs. Moreover, the state and the rest of the country will also be impacted, but to a lesser extent based on how this facility impacts shipping routes, traffic volumes on trade corridors and modal choice. The presence of a new facility generally signifies the market demand for more goods movement and distribution.

It is possible for some benefits to be negative or not applicable to a particular type of freight facility. Primary cost categories when discussing freight logistics facilities relate to capital for facilities, connecting infrastructure, and operations/maintenance.

In order to measure the impacts of a freight facility, there must be a comparison between a scenario with the facility and a baseline with current conditions where the facility is not built. The challenge is that this “no build” condition is not always easily defined, especially in terms of the transportation logistics that would occur without a facility. For example, a new intermodal rail facility may help increase the share of goods arriving to a region by rail with short-distance truck trips (dray) to final destinations. The “no build” condition would likely result in more freight shipped by truck longer distances (either from shipper to receiver or from a more distance intermodal facility). As another example, an analysis of a new Dollar General warehouse in Tampa, Florida would examine transportation costs both with and without the newest facility. This would include examining transportation impacts associated with moving products to the new distribution center and to the final retail outlet as compared to moving to the closest existing distribution center and the retail outlets that would be served by the alternative distribution center site.

8.1 Transportation Impacts⁵

These impacts relate specifically to the transportation aspect of the logistics facility and those impacts that accrue from changes in the movement of goods. These impacts include the benefits from modal shifts due to

⁵ Concepts for the impacts and benefits are taken from the following studies: “Development of an Integrated Logistics Center in Winter Haven, Florida” for CSX Real Property, Inc., Prepared by HDR | HLB Decision Economics, Inc.; “Economic Assessment of A Roanoke Region Intermodal Facility” Prepared by HDR for Virginia DRPT, November 2007; “South Sound Logistics Center Market Analysis” Prepared by Chabin Concepts Team for the Port of Tacoma and Port of Olympia, December 2007; “Socioeconomic Conditions Technical Report: Proposed Gardener Intermodal Facility, Johnson, Kansas” for BNSF Railway, June 2008.

a new facility, including reduction in truck vehicles miles traveled (VMT). In situations where no modal shift occurs, it is also possible that the new facility will reduce the travel time or distance trucks need to travel to deliver the goods to their final destination.

Mode Choice and Traffic Volumes

Mode choice and traffic volume related impacts reflect changes – increases or decreases – in truck, rail, ship, and air volumes due to the selection of transportation mode. The primary impact tends to be to highways as most freight travels by truck for at least a portion of their trip. The following subcategories reflect the impacts of mode choice and traffic volumes:

- **Traffic** – The location of the facility will change traffic patterns in the immediately surrounding area. This may result in increased truck traffic to/from the facility, though the impacts vary greatly depending on highway access and local traffic patterns and access. Facilities that promote the use of other modes, may help keep longer distance trips on more efficient and cost-effective modes thus reducing overall truck VMT on local, regional and national highways. Reducing truck VMT can reduce travel time, and a modal shift and/or reduction in traffic could also increase reliability which offers congestion relief benefits.
- **Vehicle Miles Traveled (VMT)** – if the facility is set in an ideal location to improve transportation connectivity, there will be a reduction in the distance traveled for delivery. For example, the siting of a new warehouse or distribution facility near an expanding population center will reduce the distance merchandise must travel to the new store locations. Also, a modal shift to non-highway modes will result in a decrease in truck VMT and thus reduce vehicle operating costs. An example of this would be the location of an intermodal facility closer to a population center that would bring in goods by rail where they would otherwise be shipped by truck. Fewer truck miles traveled also lead to a reduction in highway pavement maintenance costs.

Direct Travel Costs

Direct travel costs are those costs that are incurred from the actual movement of the goods, based on the distance of travel and factors that may delay or otherwise impact delivery of a product. The following reflect direct costs:

- **Mileage-based costs** – depending on the length of the trip for freight, costs will vary. Additional miles travelled create additional costs for vehicles – in terms of fuel, oil, maintenance and repair, and depreciation. And the per ton mile costs of shipping also vary so that freight facilities that influence the use of modes will impact shipping costs. For example, per ton mile costs by rail and barge are generally lower than by truck.
- **Congestion** – congestion on roads, rails, air and sea can cause delay in goods reaching their destination – be it an intermodal facility, warehouse, distribution center, or final retail outlet. When congestion causes vehicles to move slower than they otherwise would, this delays the delivery of goods and also has financial impacts, potentially increasing shipping costs.
- **Time** – the time spent moving freight has a direct cost in terms of labor, inventory, insurance and equipment costs. The time spent in transit or storage may impact the value of the good (e.g., perishables with a short shelf-life).

Supply Chain Logistics (Production Process)

These impacts relate to production efficiencies gained when a freight facility is physically located in an area that offers the opportunity to:

- **Optimize volumes** – A well-located facility maximizes the volume of freight handled by a facility, and increases operational efficiency, allowing for larger volumes;
- **Reduce logistics costs** – The properly situated facility will reduce logistics costs for the company beyond direct travel costs. This includes reduced inventory costs due to larger regional distribution hubs which are a benefit to just-in-time shippers; and
- **Improve Market Accessibility** – A well situated facility will improve market access to suppliers and final shipments for the company/companies located there, thus leading to a potential expansion of operations at these facilities and increased economic competitiveness.

Environment, Emissions and Energy

These impacts relate to changes in pollution that occur with freight facilities that change the distance traveled and/or the modes used for transport. Changes in fuel consumption and emissions levels, as well as noise and vibration changes, are the most commonly measured environmental impacts.

- **Fuel Consumption (Energy Intensity)** – Shorter trips and less congestion means improved fuel efficiency and lower levels of fuel consumption. Additionally, energy consumption per ton-mile varies by mode, with air having the highest consumption and maritime the lowest.⁶ A modal shift away from highways also reduces the gallons of truck fuel consumed.
- **Air Quality** – When freight trips are shorter, fewer pollutants (NO₂, CO, CO₂, NO_X, SO₂, PM, VOC) are released into the atmosphere, as emissions are a product of mode and distance travelled. Additionally, modal shifts (e.g., truck to rail via an intermodal terminal, or an increase in the distance on rail versus truck) would also result in a change in emissions. Further, newer intermodal facilities are often equipped with technology improvements to reduce truck idling and this can lead to further emissions reductions.

Safety and Security

These impacts include the reduction in accidents due to changes in truck VMT, as well as a change in criminal activities in a secure facility.

- **Safety** – Changes in the number of trucks on the road and or the distance they travel leads to changes in accidents typically grouped into property damage, injury and fatal accidents. This impact is typically considered a societal or welfare effect based on valuations of life and other factors.
- **Security** – Logistics centers can reduce criminal acts and smuggling with security and other measures. These efforts reduce losses to shippers and receivers and provide a higher level of security in the area around the facility. While this can be an important benefit, it is not frequently quantified.

8.2 Economic Impacts

Economic impacts include jobs, income, wages, and property value and are often estimated in terms of direct, indirect and induced effects of a facility. The economic impacts typically vary based on short-term

⁶ “The Geography of Transport Systems,”
http://people.hofstra.edu/geotrans/eng/ch8en/conc8en/energy_freight.html

construction effects and long-term operations and the potential to attract other businesses near a freight facility. Direct effects are those that are directly related to the facility, including short-term construction activity when the facility is built and long-term operations once the facility is up and running. Indirect effects are those that result from purchases by local firms that supply the companies that are directly affected. Induced effects are changes in local consumer spending activity resulting from increased jobs and income in the area. The US DOT guide on economic impacts of freight investments (cited earlier) provides much greater detail on these categories of economic multiplier effects.

Near-Term Construction Effects

Building the facility and necessary infrastructure connections requires short-term construction activity with both direct effects and broader multiplier effects. These impacts are commonly measured using input-output models, such as IMPLAN or RIMS II, based on allocating construction spending to relevant industry categories. Economic metrics often include:

- **Business output** – This measures the increase in total sales by industries at the local, state and national level;
- **Employment** – The creation of the new facility will generate direct, indirect and induced employment related to construction and operation;
- **Value added** – This is a measure of the contribution to GDP by an individual producer, industry, or sector. It is measured as the difference between the total output and the cost of intermediate goods for the industry or establishment;
- **Labor Income** – Measures the labor income, comprised of wages, benefits and proprietor income, resulting from direct, indirect and induced jobs related to the facility; and
- **Tax Revenue** – The construction of the facility will generate direct and indirect tax revenue from property taxes, sales tax and income tax, both during construction and due to the operation of the facility.

Direct Economic Activity at the Freight Facility

Direct economic activity relates to the direct impacts caused by the new freight facility. This includes the number of people employed at the facility, their wages and salaries, changes in revenue (business output) due to the facility, and any developments directly related to the facility.

Multiplier Effects of the Freight Facility Operations

Multiplier effects are impacts that extend beyond the impact of the actual facility itself. These impacts are a result of the revenue change caused by the facility. For example, an employee at the new warehouse receives wages that he otherwise would not have received. These wages are spent on goods that he otherwise would not have purchased, from which the retailer uses the revenue to purchase further goods or services in the area, and the impact of the facility thus expands into the community, state and country.

Economic Development/Business Attraction

Freight facilities can be a catalyst for economic development, as seen in case studies for the Virginia Inland Port, Alliance, Texas, and others. These benefits include the economic growth related to redevelopment of existing properties, as well as the economic benefits from the location of new businesses and new residential development. As exemplified by the case studies, these economic development impacts can be far greater than the direct activity at freight facilities. The size and timing of economic development/business attraction effects can vary greatly by facility based on local land use and zoning policies, economic development

incentives and marketing, transportation connectivity benefits, etc. Economic development and business attraction effects include:

- **Redevelopment** – Economic and financial gains from redevelopment of existing underutilized land, including additional job creation and increases in property value.
- **New Businesses** – The economic and financial gain of locating new businesses on previously undeveloped land; and
- **Residential Properties** – This includes the addition of new houses and the benefits of increased population.

8.3 Costs

When evaluating the full impact of a freight facility, the costs must also be considered in order to fully assess whether the location is ideal. As described earlier, the costs of freight facilities are often borne primarily by the private sector owner of freight logistics facilities though it is increasingly common for public-private partnerships to help fund facilities and connecting infrastructure. The three main categories of cost are: capital for the facility, connecting infrastructure, and operating/maintenance costs.

- **Capital** – Capital costs are those costs that occur when building the facility itself, including design and construction. These costs are typically incurred up-front before the facility is opened.
- **Infrastructure** – Infrastructure costs are those costs that are necessary to improve the road or rail network surrounding the facility in order to fully accommodate the increased volume of shipments.
- **Operating and Maintenance** – These costs are incurred on an annual basis in order to keep the facility up and running. They include utilities, wages, repairs, and other similar costs.

While all of these measures may not be applicable to every freight facility, Table 8-1 indicates these components that should be considered in undertaking an assessment of the economic and transportation impacts of freight facilities. The table below summarizes measures that should be examined.

Table 8-1: Components to be Considered in an Assessment

Impacts		Costs
Transportation	Economic	
Traffic volumes by mode Direct travel costs Supply chain logistics Environment, emissions and energy Safety and security	Construction Direct economic activity at the facility Multiplier effects Economic Development / business attraction	Capital Infrastructure Operating and Maintenance

Part 2: Introduction to the Case Studies

For each freight facility class that was identified in Chapter 3, a case study was identified to provide a “real world” example of this facility type and its related site selection factors as well as its estimated economic and transportation impacts. Case studies were selected based on the following general criteria:

- In general, an attempt was made to make sure that there was a balance in the geographic representation of the case studies across the U.S.

- We selected facilities and projects that showed a range of project development, from projects that have been in operation for many years to facilities that are in the final stages of development.
- The Team selected facilities that included multi-modal transportation issues.
- The Team selected facilities where there was sufficient publicly available information available and project participants who were willing to share information as part of a publicly available research project.
- All of the case studies that were chosen are generally considered to be successful freight facilities. By selecting successful projects, the information described pertaining to site selection criteria and transportation/economic impacts provides greater value than if projects were selected that were not developed or had not been successful with their implementation.

Table 8-2: Seven Case Studies

Facility Type	Case Study
Inland Port	Virginia Inland Port (Front Royal, VA)
Intermodal Terminal	Rickenbacker Intermodal Terminal (Columbus, OH)
Bulk or Transload Terminal	Savage Safe Handling (Auburn, ME)
Distribution Center	Family Dollar (Numerous Facilities)
Warehouse	Murphy Warehouses (Numerous Facilities)
Integrated Logistics Center	AllianceTexas (Fort Worth, TX)
Hub Terminal	Old Dominion (Morristown, TN)

The following sections present the results of seven case studies that were completed for each of the major freight facility class identified in Chapter 4.

8.4 Virginia Inland Port Case Study

Introduction

Facility Type: Inland Port

The operations of Virginia Inland Port (VIP) are handled by a private company, Virginia International Terminals Incorporated (VIT). VIT was created by the Virginia General Assembly in 1983 to operate all of Virginia Port Authority's marine terminals. VIT currently operates VIP, along with Virginia's marine terminals, covering all costs from terminal earnings. The VIP began operations in 1989 and over time freight activity has expanded significantly as distribution centers have located nearby facilities to access the transportation and logistics services at the VIP.

VIP is located in Front Royal, VA approximately 70 miles west of Washington DC, and is generally recognized as America's first successful inland port. As described in other chapters, inland ports redistribute cargo handling functions and activities from congested ports to inland locations where land is more available and cheaper, and the transportation network is less constrained⁷. Services at VIP include: stuffing/stripping of containers, dispatch and arrange trucking, warehouse facilities, mechanical repairs, U.S. Department of

⁷ "Commission Briefing Paper 4L-01: Evaluation of Core Capacity Deficiencies' Impact on Crowding out Economic Growth and on Shifting Economic Growth into Outlying Areas" Transportation for Tomorrow, Wilbur Smith Associates.

Agriculture inspections, pool chassis, generator sets for refrigeration units, and power hook-ups. The VIP facility is a U.S. Customs designated port of entry and has full range of Customs functions available including Foreign Trade Zone (FTZ). Despite all of these services, VIP's primary role is transferring both inbound and outbound freight from truck to rail and vice versa. The wide range of services, port connectivity and complimentary private sector facilities make VIP an attractive intermodal transfer hub for inland freight shipments to and from the Port of Norfolk's International Terminal (NIT). International freight imports from NIT are shipped via rail to VIP, and then trucked from VIP to inland distribution centers. Conversely, freight exports are trucked to VIP and then shipped via rail to NIT and loaded onto cargo vessels for international shipments.

The Need for the New Facility

History and development of VIP came from the prior consolidation of Norfolk, Newport, and Portsmouth ports under the Virginia Port Authority (VPA). Of the three ports, the Norfolk terminal was the only port at the time with on-dock rail, which could have placed Norfolk at a competitive advantage against the other two ports in utilizing the proposed VIP facility. Newport News Marine Terminal (NNMT) now has direct rail access with break-bulk rail service provided by CSX. Additionally, VPA provides drayage from Portsmouth to Norfolk to shift freight to the on-dock rail facility. Initially, the plan for the inland port was to absorb some of the freight at the Port of Baltimore through capturing truck freight traveling to and from the Ohio Valley and Pennsylvania to the Port of Baltimore. Carriers could reduce truck trips and labor costs by transporting freight to VIP, and sending freight via rail to port of Norfolk instead of Baltimore. The effectiveness of this strategy is hard to quantify as freight volumes were on the rise at VPA ports during that period and it is difficult to isolate freight that was diverted.

Site Selection Factors and Facility Characteristics

Physical Characteristics of the Site

VIP is on a 161-acre site and has over 17,000 feet of rail tracks. Among other facilities on site, VIP also has a three-door cross-dock warehouse. Recently, VIP added 7 acres of pavement to the existing 40 acres to increase terminal capacity to 47 acres for container storage and vehicles. In addition to VIP's facilities, there are 24 distributors surrounding VIP, which provide over 8.5 million square feet of space. The terrain was previously rural land with a large number of acres available. Table 8-3 shows some of the physical characteristics of VIP.

Table 8-3: VIP Facilities

	Size	Detail
VIP	161 Acres	Rail – 3 door cross-dock, access to Class 1 Railroad Truck – 1 mile from I-66 and 5 miles from I-81

Source: Interview & Bray, Robert "Virginia Inland Port: The Case for Moving a Marine Terminal to an Inland Location"

The initial site selection for VIP focused on a few key parameters. First, VPA wanted a facility in close proximity (within 200 miles) to the seaport to provide intermodal transfers and create the opportunity to move port transfer facilities outside of the seaport. The location of an inland port should also have adjacent or nearby parcels available for distribution centers and other 3rd party logistics firms. During the site selection process, VPA worked with the railroads, which initially wanted a longer rail haul from the Norfolk International Terminal (NIT), but settled on Front Royal due to transportation access and availability of inexpensive land. The 200 mile short haul from NIT to VIP was somewhat unique at the time, but was economically feasible due to the combination of available land, access to highway interchanges, existing rail

infrastructure, and competitive shipping rates. The partnership between Norfolk Southern (NS) and VPA made the development possible and operations economically feasible. The state of Virginia and VPA covered the capital costs of expanding rail spur and provided labor at both NIT and VIP, while NS provided rail service.

If VIP were developed with the knowledge that the Virginia Port Authority has today, the layout and configurations would be different to strategically plan parcels. Land requirements would be expanded to 1,000 acres with greater emphasis on smart growth for supporting freight facilities. Strategic smart growth would entail planning to incorporate:

- Zoning and land use for supporting facilities (3PL, distribution centers);
- Emphasis on freight and mobility;
- Shared utilities; and
- Buffer residential development from freight activity.

Since VIP's actual development was sporadic with little zoning, contiguous development didn't account for the growth and operations existing today. The golf course development across from VIP, which hinders further industrial development, is emblematic of the need for greater planning for future inland port developments. New developments would also need to be adjacent to existing rail lines. While the physical requirements detailed above are essential for the physical freight operations, Public Private Partnerships (PPP) between VPA, the railroads, local communities, and economic development agencies will ensure the inland port is economically feasible and successful.

Transportation Access

Norfolk Southern provides rail service five days a week between VIP and NIT only; the trip to NIT is 220 miles from VIP by rail. VIP is located close to two major highways. Interstate 66 is less than a mile from VIP and provides east-west service towards the Washington, DC metropolitan area, I-95 and the east coast. Interstate 81 is within 5 miles and provides north-south highway connections along a major trade corridor. To the west of I-81, the highway becomes mostly a two-lane facility heading into West Virginia and the Appalachian region. This route is planned for upgrade as Corridor H of the Appalachian Development Highway System, connecting to I-79 but completion of this highway upgrade will likely take a number of years. Additionally, Routes 340 and 522 provide local north-south access. The map below shows VIP's connecting highways and nearby ports.

Commodities and Shipping Patterns

All freight at VIP is international, with an approximately equal split of imports and exports. Exports are typically agricultural and natural resource products, while retail products are a majority of imports. The key commodities shipped through VIP include: poultry, logs and lumber, paper products, auto-parts, rubber, plastics, and retail items. Poultry, logs, and lumber are a major part of VIP's export business. Poultry is a significant export business line, with VIP moving 2,500 poultry containers annually. With the weakening of the dollar in the 2000s, exports of both lumber and poultry from West Virginia through VIP have increased significantly.

Figure 8-1: Map of VIP, Connecting Highways, and Nearby Ports



Source: Google Maps

Currently, the per box flat rate charge to VIT is \$278 per box loaded and \$193 unloaded plus a 24 percent fuel surcharge. Additional fees include containerizing logs at \$192 per container, with an additional charge of \$1 for each log over 60, for shipment⁸. However, moving containerized freight remains the largest portion of revenue generated by VIP.

Freight Facility Development Conditions

Local support for the development of VIP was positive, as the area was previously undeveloped rural farm land. Operations at VIP took a while to become economically viable due to competition from the Port of Baltimore and the lack of supporting industries in the area. Port officials speculate that local and state economic development agencies improved and accelerated development of private distribution centers through organizing and supporting growth around VIP. Potential for economic development paired with competitive transportation costs, low-cost available land, and easy access to both domestic and international markets were the primary elements that made the initial development of VIP economically viable.

Development strategies evolved with time. Initially, the developers of VIP had intended to compete with freight activities at the Port of Baltimore, however now VIP is primarily supporting the Norfolk International Terminal. The Richmond Area MPO support currently subsidizes weekly container on barge service from Port of Richmond to NIT. Containers can then be loaded and sent to VIP via rail.

All incentives within the Front Royal area have been provided to supporting private industry and distributors in the area. These incentives came from the state or county economic development organization (EDOs), and are not unique to transportation or VIP (incentives are available statewide). Virginia has a number of incentive programs available through the state and county EDOs, which provide low interest loans, tax exemptions, or grants. Some programs currently available from the state include: Bond Financing, Virginia Jobs Investment Program (VJP), Virginia Investment Partnership Act, Sales and Use Tax exemptions, and Foreign Trade Zones. For any new inland port developments, PPPs will be essential between the port authority, railroad, and EDOs to foster local support and split operational and development costs.

⁸ "SCAG Inland Port Case Studies" Tioga Group, 2006

Summary of Location Factors

In summary, the primary location factors (as described/defined in Chapter 5) that were most important to the siting and development of the VIP were as follows:

- **Ability to Access Key Markets or Customers:** As evidenced by VPA's requirement to be located within 200 miles of the seaport. The fact that numerous distribution centers have been developed in the area immediately surrounding VIP shows the success of the development and choice of site location of the facility.
- **Public Sector Assistance and Incentives:** The public assistance provided by the State of Virginia, which included a cost sharing of the expanded rail spur, was a key factor in the development and siting of VIP along with the active participation of Norfolk Southern in this public-private initiative.

Economic Development and Transportation Impacts

Economic Activity of the Freight Facility

VIP's development has leveraged numerous private distribution centers to locate in Front Royal. Development in the last 21 years surrounding VIP has been significant, as 39 major companies have located near VIP investing over \$747 million and developing over 8.5 million square feet of space. This activity has created over 8,000 jobs. In comparison, VIP directly employs only 17 people. Therefore, VIP has been an enormous economic catalyst for Front Royal, attracting numerous freight-related businesses. Businesses take advantage of the location and direct access to the port through VIP for import distribution, resulting in reduced truck hauls and congestion. Since becoming operational in 1989, VIP's focus has shifted to reducing congestion at nearby coastal ports in Virginia and supporting local freight movements. As VIP's services grew in the early 1990s, large importers began developing facilities in the Front Royal area near VIP. Current large customers include: Worldwide Auto, Rubbermaid Commercial, Pilgrim's Pride Poultry, Family Dollar, DuPont, Red Bull, Coors, and Home Depot.

Future opportunities for VIP are contingent upon other strategic transportation infrastructure improvements. One of these improvements is developing a corridor connection with Washington-Dulles Airport in an effort to capture a larger share of international and domestic air cargo from the airport. This potential connection would facilitate more efficient transportation movements and utilize VIP as the main distribution center for Washington-Dulles Airport.

Costs of Facility

The initial land purchase and development of VIP was \$13.3 million in 1987. The land purchase was \$7.3 million and site development costs were approximately \$5.7 million. Rocky terrain and issues with soil conditions increased the site development costs beyond original cost estimates⁹. The land acquisition and development costs of the facility were covered through the Virginia Transportation Trust Fund. The Transportation Trust Fund provided adequate funding, avoiding the state of Virginia going into debt for the development of VIP¹⁰. The facility, operated by VIT, has generated a net profit since 1994 covering the costs of operating and maintaining all facilities at VIP through collecting fees on a per-container basis. The specific costs of operating VIP were unavailable.

⁹ Bray, Robert "Virginia Inland Port: The Case for Moving a Marine Terminal to an Inland Location."

¹⁰ "SCAG Inland Port Case Studies" Tioga Group, 2006.

Transportation Impacts

VIP's total throughput in 2009 was approximately 24,500 international containers, a fairly significant reduction from the prior year when VIP handled 33,600 containers. This drop in trade activity was consistent with the global economic recession and is expected to rebound as world trade increases. Rail haul distances from VIP to NIT are 220 miles, as seen in Table 2. All freight from NIT that travels to VIP via rail is then distributed inland by truck, and conversely any inland freight travels to VIP via truck and is transloaded to rail. All freight traveling via rail originate and terminate at VIP and NIT only. Average truck haul length from VIP is 100 miles typically heading towards Fredericksburg MD, Central Pennsylvania, or Pittsburgh, PA; while freight traveling to NIT via VIP is trucked to VIP from West Virginia, Pennsylvania, and Ohio. It is only cost-effective for freight traveling from the Ports of Portsmouth or Norfolk to use VIP if freight is traveling more than 200 miles inland from these ports. For 2009, container traffic from the ports to VIP reduced truck vehicle miles of travel (VMT)¹¹ in Virginia by approximately 5.4 million, which in turn reduced highway maintenance and repair costs and provided environmental benefits to Virginia through reduced truck emissions. Reducing truck traffic could reduce CO₂ emissions as much as 3,100 tons annually, which in monetary terms equates to approximately \$105,000. Additionally, VIP's rail connection significantly reduces physical stress on the highway system, as heavier loads can now be placed on rail to and from marine ports. These heavy loads can then be repacked at VIP to reduce the volume of heavier/overweight truckloads on the highway network.

Table 8-4: Railroad and Truck Freight Transportation

	Containers per Year	Average Length of Haul
Railroad	24,500	220
Truck	24,500	100 + miles

An Environmental Impact Statement (EIS) was conducted prior to the development of VIP. As the EIS was completed over 20 years ago, it is not available in electronic format. The EIS is a federally mandated assessment of the potential negative and positive impacts for decision making of an action or development; in this case the EIS would provide information on the environmental impacts of the facility development. Currently, there are no major environmental concerns regarding VIP aside from the typical truck idling concerns that will occur with all intermodal facilities.

¹¹ Annual truck trips were calculated for each facility based on tonnage at that facility and Federal Highway Administration (FHWA) guidelines on tons shipped per truck. Assumptions were made related to the average haul length for trucks and/or rail operating at that facility, based on the 2007 Commodity Flow Survey or firsthand knowledge obtained from the facility representative. This information was then combined to calculate VMT. Monetary savings associated with reduced vehicle emissions, reduced pavement wear and tear, and decreased accidents were estimated using US Department of Transportation 2009 Transportation Investment Generating Economic Recovery (TIGER) guidelines, and the VMT calculations.

8.5 Rickenbacker Intermodal Rail Facility – Columbus, Ohio

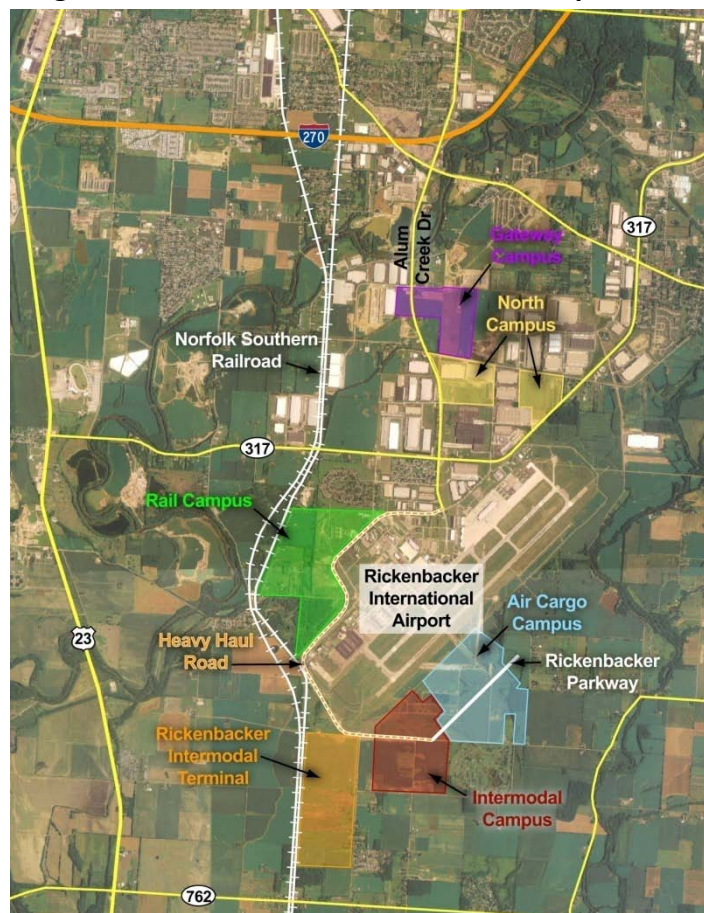
Introduction

Facility Type: Intermodal Facility

Rickenbacker Intermodal Rail Facility is an intermodal terminal operated by Norfolk Southern Railroad (NS). The Terminal opened in March 2008 and is located adjacent to the Rickenbacker International Airport, approximately 15 miles south of Columbus, Ohio.

Norfolk Southern, a Class 1 Railroad, previously operated the Discovery Park intermodal facility nearby, but the facility had exceeded its capacity and a new site was necessary to accommodate expected growth. Due to operating above capacity NS had to turn away domestic rail business, which at the time accounted for 20% of all traffic at the facility. This lack of capacity was detrimental to both NS and the Columbus region. Thus, a search for a new, larger location took place and Norfolk Southern selected the Rickenbacker site with operations initiated in 2006.

Figure 8-2 Rickenbacker International Airport



The Need for the New Facility

As noted above, increased demand for intermodal services Norfolk Southern was forced to operate beyond capacity at the Discovery Park site – with approximately 200,000 annual containers through a facility designed for 125,000. The search for a new location quickened as business demand exceeded capacity.

The announcement of the site selection was made in September 2004, but initial construction of the new replacement terminal was delayed by a year until September 2006 due to setbacks in funding and permitting.

The railroad established the following key requirements for the new site:

- A site allowing for quick development and commissioning of the first phase of development;
- Location on the same rail line that the previous facility was serving; and
- Ability to handle existing capacity as well as expansion and growth. NS had experienced approximately 15 percent growth in intermodal demand each year for several years and expects that trend to continue.

The site is expected to also handle increased freight traffic originating from the Port of Norfolk due to the expansion of the Panama Canal, expected to be completed in 2012. Consideration was also given to finding a

site which would allow for expansion by the railroad itself as well as for attracting other companies to co-locate at the site. Such development would allow for these shipping and warehousing companies to operate more closely (and efficiently) with the railroad's intermodal operations.

One key factor in the location of the new facility was the location along the "Heartland Corridor" Route. The Heartland Corridor is a project undertaken by Norfolk Southern and the Federal Highway Administration to improve double-stack capacity to carry intermodal rail cars more efficiently along a more direct route between the east coast ports and inland demand centers. The project will reduce rail shipping distance by up to 200 miles and travel time by up to one day for commodities moving from the Norfolk region to Chicago. By eliminating the longer routes through Rutherford, PA and south through Kentucky, freight can move from Norfolk to Rickenbacker in one day and from Norfolk to Chicago in two days.

The new intermodal terminal in Columbus was necessary due to the increased volume anticipated along the improved Heartland Corridor in addition to the current facility being over capacity as previously stated. Double-stacking of containers allows for more efficient use of the rail line, removes trucks from the road, and makes the transition between modes such as rail to highway more efficient. Rickenbacker can handle both Trailer on Flat Cars (TOFC) and Container on Flat Cars (COFC).

Given the existing facility in the Columbus region and established customers, Norfolk Southern began the site selection process by establishing that the new facility needed to be in the Columbus area, relatively close to the existing facility and served by the same rail line. This was required to ensure that the facility could continue serving existing domestic and international customers, handle additional capacity upon completion of the Heartland Corridor improvements, have access to sufficient road infrastructure for truck movement, and handle additional industrial and population growth in the region.

Once initial sites were identified, each was reviewed with regards to:

- Environmental mitigation obstacles
- Time required to build facility
- Expansion capabilities

The Rickenbacker Airport site was not the only option identified in this process. Another site option was a former military landfill location that had more environmental and permitting challenges than the chosen site.

The land on the Rickenbacker site was a mix of privately held land and airport land. NS eventually selected and purchased the privately owned land and is leasing the airport owned land at Rickenbacker. The railroad plans to eventually purchase this additional airport land.

Site Selection Factors and Facility Characteristics

Physical Characteristics of the Site

The initial phase of the facility includes 175 acres and has the capacity to handle in excess of 250,000 containers and trailers annually. The proximity to the airport allows for expansion opportunities for customers that may wish to use air, rail, and truck for their transportation needs.

There is significant capacity for future expansion — up to 125 additional acres and a total of 500,000 containers and trailers per year. The Rickenbacker facility is currently the third largest intermodal terminal in the nation, averaging more than 400 trucks daily and serving key markets in Ohio and the Midwest, including

the central rail hub of Chicago, which is important for rail movements of international shipments from the West Coast of the United States.

Environmental and acquisition considerations for development of the facility included the habitat of the Indiana bat and ensuring that this species would not be negatively impacted. The location of the intermodal facility within an existing freight and industrial park at Rickenbacker ensured that the land was already zoned industrial and had relatively good infrastructure connections.

Transportation Access

The Rickenbacker Intermodal Facility is located within the Rickenbacker Global Logistics Park, which is a collaborative effort between the Columbus Regional Airport Authority and Duke Realty. The Global Logistics Park can accommodate up to 29 million square feet of development.

Rickenbacker Intermodal Facility is strategically located in the Columbus metropolitan area, and is within a one day drive of more than fifty percent of the population of North America, and over 60% of US manufacturing production. The current rail operations at the facility include service by NS and CSX (another Class 1 Railroad).

Current NS service includes four daily trains between Chicago and the facility and two daily trains to Norfolk, VA. While there is no close access to a seaport, the rail connections to several ports, via the connection with NS, make the Rickenbacker Intermodal Facility a competitive inland distribution point for international freight that needs to cross the country from either the east or west coast to its final destination. The Port of Norfolk has direct overnight rail access to the Rickenbacker facility. It is also the deepest east coast port and – through Rickenbacker and the Heartland Corridor - provides opportunities for increased container traffic to the central US area.

The site provides access to air, rail, and highways as well as a Foreign Trade Zone for ease of international trade. The Rickenbacker Airport, which is also located within the Global Logistics Park, provides air freight services for the Rickenbacker Intermodal Facility users. Rickenbacker International Airport is a cargo airport, owned and operated by Columbus Regional Airport Authority and is a primary port of entry for textiles in the United States. It is a former Army Air Base that has been repurposed for use primarily as a freight facility with limited passenger activity. Because of the potential synergies between a cargo airport, existing freight customers, and an intermodal facility, the Columbus Regional Airport Authority played a critical role in siting the Rickenbacker Intermodal Facility.

The facility is also located in close proximity to several major highway routes in the Columbus area – Interstates 270, 71 and 70 as well as highways 23 and 33.

Commodities and Shipping Patterns

The types of freight handled at the facility are primarily intermodal containers and trailers coming from seaports, with 95 percent of the freight at Rickenbacker international containers. The majority of the freight that comes through the facility currently arrives from west coast ports such as Los Angeles/Long Beach and Seattle for distribution in the Midwest. Additionally, the intermodal facility handles containers from the port of Norfolk, Virginia and – as noted above – this activity is expected to grow to become a primary focus for the facility in the future.

The intermodal containers are generally filled with a broad variety of consumer goods and move from ocean to rail to truck within the same container, improving the overall efficiency and transport costs. The improvements to the Heartland Corridor will also allow for more double-stacked trains to pass through the Rickenbacker facility.

Since Rickenbacker operates as an intermodal facility, most of the freight is either moving into or through the facility. However, it is anticipated that more freight will originate in the facility as manufacturing and assembly business operations are expanded as the Global Logistics Park continues to develop.

While the terminal is served primarily by NS and CSX, some of the freight moving through Rickenbacker may have been transferred by other railroads, with this interchange primarily occurring in Chicago.

Freight Facility Development Conditions

The Columbus Regional Airport Authority (CRAA) management was the driving agency behind the relocation of the NS intermodal facility, helping to facilitate the location of the Intermodal Terminal and generate interest in the public-private partnership to assist in generation of funding in an attempt to accelerate development of an integrated logistics center. CRAA executives believed that it was important to get the public engaged in the development of this project. Therefore, they took legislators and potential stakeholders on a site visit to the AllianceTexas Global Logistics Hub to increase public awareness of the importance and benefits of freight logistics (see below for the case study on Alliance in Texas). CRAA executives recognized that this awareness and support would be instrumental in the process of obtaining public transportation funding.

This intermodal terminal was made possible by a public-private partnership between NS, the CRAA, the city of Columbus, and the state of Ohio. A total of slightly more than \$112 million in funding was assembled from several sources for construction of the rail facility and access roads, including \$33 million from NS, \$28.9 million in Federal funding, \$14.3 million from the CRAA, and funds from State General Revenue, the City of Columbus, the Mid-Ohio Regional Planning Commission (MORPC), and Earnhart-Hill Water & Sewer District for the completion of the facility and its access roads. There was also state and local interest, support and financial contributions including \$0.8 million from the Ohio Rail Development Commission Grant for assistance with the Heartland Corridor Project.

Highway congestion and bottleneck concerns are prevalent in the area due to initial construction of roads as generally two-lane, low speed rural highways. The public-private partnership has worked together to secure both state and federal funding for infrastructure improvements to remedy this and allow for improved movement of the increased volume of trucks. Funding was successfully secured in 2008 from the Alum Creek Drive/Groveport Road intersection and for the I-270 interchange. Most recently, the state of Ohio applied \$14 million in ARRA funds to allow for the widening of Rickenbacker Parkway in support of safer and quicker movement of trucks in and around the airport and intermodal terminal.

Summary of Location Factors

In summary, the primary location factors (as described/defined in Chapter 5) that were most important to the siting and development of the Rickenbacker facility were as follows:

- **Interaction with Transportation Network:** As described above, one of Norfolk Southern's key requirements for the new site was that the facility be located on the same rail line that the previous

facility was served on (including the Heartland Corridor). Similarly, the proximity to the airport allows for intermodal expansion opportunities and was another important factor in site selection.

- **Ability to Access Key Markets or Customers:** The fact that the Rickenbacker facility is located within a one day drive of more than 50% of the population of North America was a primary location factor for this intermodal facility.
- **Public Sector Assistance and Incentives:** Over \$28 million in Federal funding and additional funding from the state of Ohio, the City of Columbus and other public agencies were significant factors in the decision-making for site selection.

Economic Development and Transportation Impacts

Economic Activity of the Freight Facility

Direct employment at the Rickenbacker intermodal rail facility is estimated to be approximately 150 jobs. Additional freight facilities attracted to the area by the Rickenbacker facility are expected to generate approximately 20,000 jobs over the next 30 years, including multiplier effects.¹² A major driver of the development and future potential is the Heartland Corridor project. Additionally, the facility will increase the use of rail for goods movement and thus reduce pollutants due as goods travelling more frequently by rail rather than truck.

In addition to the job generation, the region expects an additional 34 million square feet of industrial development surrounding the intermodal facility. The region estimates economic activity generated at Rickenbacker to include \$1.2 billion in building construction, and expects a total economic impact of \$15.1 billion over the next 30 years. Tax revenues are expected to be nearly \$2 billion. While these impacts are primarily indirect, nearly \$800 million of direct local, state, and school district revenue is included in this sum.

The Global Logistics Park, of which the Intermodal Facility is a part, is already home to several businesses, including Whirlpool, which has built a direct rail spur to their building. The Global Logistics Park is also home to several freight-forwarders, including: Kuehne + Nagel, DB Schenker, Hellmann Worldwide Logistics, and Freight Expeditors, Inc. Many of these companies have located at the facility due to its central location to freight activity in the United States as well as the proximity and access to a wide variety of transportation modes.

Transportation Impacts

Annual transportation impacts after ten years of intermodal operation are expected to include \$660 million in shipper transportation cost savings of rail shipping (compared to truck), 49 million fewer truck miles in Ohio, \$2 million in reduced pavement damage, \$2.45 million in reduced accidents.¹³ Because the relocation is relatively recent, no data related to annual tonnage are available. As a result, it was not possible to calculate VMT and the associated transportation impacts directly.

The incremental environmental and neighborhood impacts are not expected to be significant as this facility was located within an existing freight and industrial park, A Level 4 Categorical Exclusion was completed by the Ohio Department of Transportation meaning that the new facility will not have a significant effect on the

¹² Based on studies by the CRAA on economic and transportation impacts.

¹³ Shipper cost savings and truck VMT reductions calculated by the CRAA; benefits from reduced pavement damage and accidents estimated by HDR Decision Economics based on reduced truck VMT.

human environment and therefore the project does not require an environmental assessment (EA) or environmental impact statement (EIS).¹⁴

8.6 Savage Safe Handling Case Study

Introduction

Facility Type: Bulk Transload Facility

Savage Safe Handling, Inc. is a full-service, bulk product transportation and chemical transloading/processing company. The company operates the largest rail-to-truck transloading facilities in New England and Western Pennsylvania. Savage Safe Handling offers toll processing, which is bulk chemical mixing, dispersing, slurring, dissolving, blending and diluting for chemical producers.

Savage Safe Handling has two locations: Auburn, Maine, and New Stanton, Pennsylvania. At the end of 2009, Savage Services Corporation acquired the assets, terminals and services business of Savage Safe Handling, Inc. Savage owns 150 of its own facilities and the two Safe Handling companies. Currently, Savage Safe Handling is considering the expansion of sites in Wisconsin, Georgia and Oregon.

Figure 8-3: Savage Safe Handling Bulk Transload Facility Auburn, ME



The Need for the New Facility

Maine's history with the paper industry was a major factor in Safe Handling's decision to locate a transload intermodal facility in the state. At the time, Safe Handling perceived a need in Maine for the transportation of hazardous and quality sensitive bulk materials for the paper industry and other businesses. No terminal in the region had specialized in this transportation service.

Prior to Safe Handling's facility being developed, paper plants were receiving their chemical shipments from the southern United States. In an effort to minimize shipping costs, Safe Handling was interested in accessing Canada for the inputs required by the paper plants. The St. Lawrence & Atlantic (SLA) Railroad was operating in Maine and was able to offer this access to Canadian industries and markets.

Once Safe Handling decided to locate a facility in Maine, Auburn became a logical choice. First, it is centrally located within a cluster of paper plants in Maine. Second, Safe Handling felt comfortable that there would be limited environmental risk associated with locating on this industrially zoned site in Auburn. Finally, SLA was accessible in Auburn, provided Canadian access through its connection with Canadian National Railway (CN), and the highway infrastructure connections were strong.

¹⁴ See FHWA's web site on categorical exclusions: <http://environment.fhwa.dot.gov/projdev/docuce.asp>.

To finance development, Safe Handling secured a low-interest loan from the Auburn Business Development Corporation (ABDC) for land acquisition, equipment, and working capital. One of Safe Handling's first contracts was with LePage Bakeries to handle several rail cars of flour a month. Lumber, bricks, chemicals, and other products followed.

Site Selection Factors and Facility Characteristics

Physical Characteristics of the Site

This case study is based on the Savage Safe Handling bulk transload operation located in Auburn, Maine. It consists of two separate facilities that are connected by rail and are approximately 1.5 miles apart.

The main facility houses the administration building, a large plastics manufacturing building, and a large rail yard that provides bulk and transload services. The second location for facilities is at the "Port of Auburn" which consists of five tracks, one of which is partially dedicated to ethanol transload operations. Overall, the Savage Safe Handling facility encompasses 200 acres.



Figure 8-4: Main Yard, Auburn, ME

Some of the services Savage Safe Handling's Auburn warehouse provides are storage, chemical manufacturing, and truck washing. When considering new sites, Savage Safe Handling seeks properties where they can build a warehouse or redevelop an existing space that provides a minimum of 25,000 square feet of warehousing. The ability to potentially expand this warehousing capability is an important and related consideration.

The Auburn warehouse building is 90,000 square feet in size and offers a variety of services, as shown in Table 1. The manufacturing facilities at the site offer 74,000 square feet of space. Six rail-to-truck transloading gantries are also available.

Table 8-5: Savage Safe Handling Auburn Property and Facilities

	Size	Detail
Auburn Savage Safe Handling Property	210 acres	Rail – 5 tracks, access to Class 1 Railroad Truck – 3 miles from Maine Turnpike; 30 miles from Port of Portland, Portland International Jetport, City of Portland.
Auburn Savage Safe Handling Facilities		
Warehouse	90,000 sf	Temperature-controlled; 24-foot clear stackable height; 8 truck dock doors; 4 indoor rail car spots for box car or tanker cars; fire suppression for flammables storage and internal spill collection & containment storage

Central Manufacturing Facility	65,000 sf	Used for Chemical Manufacturing
Standalone Manufacturing Facility	9,000 sf	Used for Chemical Manufacturing
Rail-to-truck Transloading Gantries		Six gantries available

Source: Savage Safe Handling Website

The Auburn site is large enough to store several hundred rail cars. This capability was expanded after the site was originally established. The ability to store at least 50 rail cars, as well as the potential for rail storage expansion is a key site selection criterion for Savage Safe Handling. Currently, Auburn’s main facility stores 130 rail cars and the adjacent Port of Auburn location stores another 90 rail cars. In addition, Safe Handling anticipated transport of hazardous materials at the site. The Auburn site was flat, well-drained, and had a clay layer located close to the ground surface. These factors made the surface impervious and well-suited for hazardous material handling. The location of the site in the center of Maine’s industrial activity was also an advantage.

Savage Safe Handling also prefers sites that offer an element that may provide a competitive advantage. One example is a site that contained a grandfathered wastewater treatment plant associated with an old industrial site. Similarly, designation as a Foreign Trade Zone (FTZ) is a unique characteristic that the company considers valuable. The Auburn, Maine facility is designated as an FTZ. An FTZ is an area within or adjacent to U.S. Customs and Border Patrol Ports of Entry where commercial merchandise is treated as though it was located outside of the U.S. Freight that travels to and from an FTZ is not subject to Customs duties or taxes. FTZs are supervised by U.S. Customs officials. The Auburn facility is one of only three locations in Maine designated as an FTZ. Because of this status, importers from Asia and Europe (primarily chemical importers) can delay import duties. For example, if the material is stored at the FTZ and then moves to Canada, import duties are completely eliminated.

The importance of utilities was not highlighted as a key criterion for site consideration, although electric, water, sewer, gas and telephone utilities are available at the Auburn facility. In addition, terrain considerations were not mentioned. As described later in the case study, “uniqueness” of potential sites is important to Savage. For example, a brownfield site would be of interest to the company because it offers a unique site development opportunity.

Transportation Access

The main facility, which houses the administration building, a large plastics manufacturing building, and a large rail yard where many products are transloaded/handled, is connected via rail to the Port of Auburn. The Port of Auburn consists of five tracks and is owned by Savage Safe Handling and is switched/serviced seven days per week by the St. Lawrence & Atlantic Railway (SLA), a shortline railroad. The Auburn site also has access to the SLA, which has a shortline haulage agreement with Canadian National Railway (CN), which is a Class 1 railroad. This arrangement makes it possible for Savage Safe Handling to ship and receive freight by rail from both U.S. and Canadian locations.

Figure 8-5: Liquid Fuel Transloading at Auburn, ME Facility



Access to a Class 1 railroad is considered the most important consideration in Savage Safe Handling's site selection. In part, this relates to the company's preference for fuel-efficient transportation and its interest in keeping transportation costs down. Greater detail related to the environmental impact of the facility is described later in the case study.

Highway access is another important consideration in the company's site selection, and the company owns its own trucking fleet. The Auburn facility is located three miles off the Maine Turnpike, which is the 109-mile toll highway running from Kittery in the south to Augusta in the north. Interstate 95 follows the Maine Turnpike between exits 3 and 109.

The facility is also 30 miles from the City of Portland. Although the Auburn facility is located relatively close to both the Port of Portland and the Portland International Jetport, access to these facilities is not critical to the operations of the Auburn facility nor is access to an airport/seaport a significant priority in the evaluation of a prospective site.

Commodities and Shipping Patterns

The Savage Safe Handling facility operates on a hub and spoke distribution model. In general, rail brings the freight inbound and trucks take it outbound. Trucks generally travel within 300 miles of the site, and rail typically handles the longer haul shipments.

Freight handling includes bulk, container, truckloads, rail cars and warehousing. Eighty percent of the freight that is moved through the facility is domestic and 20 percent is international. Savage Safe Handling primarily transports raw materials to Maine's industrial plants and is willing to handle any bulk raw materials that are not explosive. Primary commodities include: baking flour, plastic pellets, fuels, and liquid chemicals.

Freight Facility Development Conditions

Savage Safe Handling views railroads and the public sector as their partners. Gaining local support for proposed sites is important to the company and financial incentives (e.g., matching grants) have been provided for previous sites. Detail on the specific financing arrangements of particular sites was not provided.

Information gaps regarding site selection criteria of the Savage Safe Handling facility includes specific financing arrangements for Savage Safe Handling's sites.

Summary of Location Factors

In summary, the primary location factors (as described/defined in Chapter 5) that were most important to the siting and development of the Savage Safe Handling facility were as follows:

- **Ability to Access Key Markets or Customers:** A primary site selection factor was the significant number of paper plants in the area that would be ideal customers for the transloading capabilities at the Safe Handling facility.
- **Permitting and Regulation:** Another primary factor in site selection was the fact that Safe Handling was comfortable that there would be limited environmental risk with the location chosen because of the local regulatory environment.
- **Interaction with Transportation Network:** Rail and highway access were critical factors in site selection for Safe Handling. The ability of the SLA to efficiently access the Canadian rail network has provided a competitive advantage for Safe Handling to access the Canadian market for products to support the paper industry and other related industries.

Economic Development and Transportation Impacts

Economic Activity of the Freight Facility

When Safe Handling was first established in Auburn, they estimated 17 new jobs would be generated. With the assistance of Auburn Business Development Corporation (ABDC) loans, 34 total new jobs were ultimately associated with the new facility. The Auburn Savage Safe Handling combined facilities employ 100 people currently, and the average wage is \$15 to \$25 per hour for many of the employees. Drivers for Savage Safe Handling are paid a minimum of \$60,000 annually. It is estimated that \$250,000 is paid in annual property taxes by the facility.

Safe Handling's end users are typically within 200 miles of the Auburn facility, but additional information about these customers was not available due to confidentiality concerns. The extent of the indirect impact in terms of jobs, wages and property taxes has not been estimated, although Savage Safe Handling does help to sustain the paper mills in the area. At this time, it is estimated that 200-300 jobs are associated with paper mills in this region of Maine. In addition, the St. Lawrence and Atlantic executive offices moved to Auburn five years after Safe Handling established the facility. Finally, Superior Carriers trucking relocated from Portland to Auburn after Safe Handling was established in Auburn.

Costs of Facility

The current facility was vacant at the time of development and over a period of 20 years, \$15 million has been invested in the site. Safe Handling received some federal and state grants for rail and transportation improvements. Specifically, they received gap financing of approximately \$300,000 in loans through ABDC to cover 25 percent of the total costs of the initial investment. In addition, the State of Maine provided Industrial Rail Access Program (IRAP) funds to Safe Handling to cover the costs of building side rails for car storage. The total amount was not available, but Safe Handling obtained IRAP funding on multiple occasions.

Transportation Impacts

Every year, Savage Safe Handling handles 500,000 tons of freight coming in by rail and leaving by truck.¹⁵ The facility transloads/handles 5,000 rail cars per year, with one rail car generally moved into four truckloads upon arrival at the facility.

Table 8-6: Railroad and Truck Freight Transportation

	Railcar/Trucks per Year	Average Length of Haul	Annual Tonnage
Railroad	5,000	n/a	500,000 tons
Truck	20,000	150 miles	500,000 tons

Source: Interview with Savage Safe Handling and website

Savage Safe Handling indicated that they make a concerted effort to choose transportation options that are more “green” than others. Because rail is more fuel efficient than truck, Savage Safe Handling uses rail when possible to reduce its overall transportation impact. By using rail, rather than truck, for its inbound shipments, \$619,500 in accident reduction and approximately \$506,000 in pavement expenditures are saved each year. Choosing rail over truck saves an additional \$463,499 in emissions costs. Other efforts to reduce their transportation impact include shipping chemicals in dry form and then reconstituting them into a liquid slurry closer to point-of-use, rather than shipping liquid chemicals long distances by truck.

Information gaps on the Transportation and Economic Impacts of the Savage Safe Handling Facility include the indirect impact in terms of jobs, wages, and property taxes. Cost information was not available for the Auburn site and the amount of the public investments in the facility was not made available. Additionally, information regarding customers of the facility was not available due to confidentiality concerns.

8.7 Family Dollar Distribution Center – Marianna, Florida

Introduction

Facility Type: Distribution Center

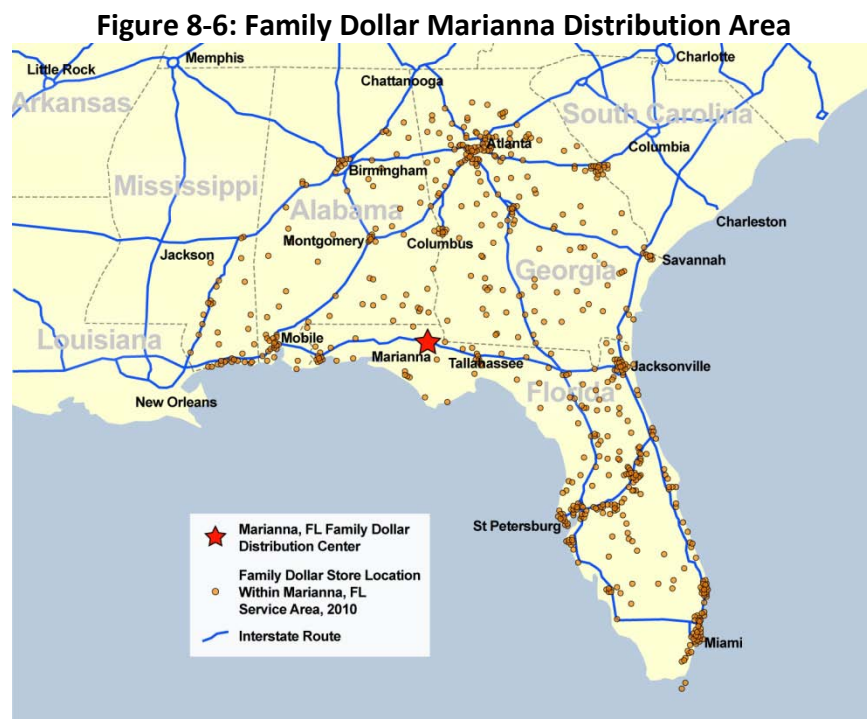
Family Dollar is a consumer goods retailer with 5,908 stores in 44 states. This discount retailer offers convenience products and a wide range of consumer goods in addition to some basic food items, including a refrigerated section. The company operates ten (10) distribution centers around the United States. The Marianna, Florida facility opened in January 2005 and was the 8th distribution center (DC) facility developed by the company. The closest facilities are in Charlotte, NC and Memphis, TN.

The Need for the New Facility

Family Dollar has needed to increase the number and coverage of distribution center facilities as they have expanded its number of stores throughout the country. Their retail DC business model has evolved to focus on the ability to reach a large number of stores within a roundtrip truck trip. In other words, the company designs its network to gain supply chain efficiencies by locating DC facilities so that trucks can make deliveries and return back to the DC within the same day. DC operations are relatively straight-forward as goods and supplies to their retail stores are shipped by truck to the DC and then consolidated and re-packaged into Family Dollar trucks for customized truck deliveries to retail stores.

¹⁵ Savage Safe Handling website.

Due to the configuration of the store network, the siting and need for this new facility was concentrated on serving markets in Florida, the southern half of Georgia and Alabama as well as southeastern Mississippi.



As Family Dollar began their site selection process, there were 118 potential communities in the target region for the new facility. This long list was narrowed through the company's site selection process that focused on highway access, market reach, cost of land, public support for infrastructure improvements to the site, and workforce availability. The process narrowed potential locations to 6 communities, then 3 and then a final competition of two possible locations: Cordele, Georgia and Marianna, Florida. The key selection factors that weighed in favor of the Marianna site included:

- Direct on-ramp access to Interstate 10 with public funding to help expand the north-south Route 276 from two to four lanes;
- Ability to serve all of Florida's markets as well as key markets in Georgia, Alabama, and Mississippi;
- Development of a new distribution center park in Marianna as public officials created a new distribution park with multiple sites and a commitment to help develop the supporting infrastructure;
- Strong public support from the Governor's office to the state and local economic development officials, including significant incentives, workforce training, and tax abatements; and
- A strong available workforce which can be a constraint or concern in rural markets.

Site Selection Factors and Facility Characteristics

Physical Characteristics of the Site

The Family Dollar distribution center is the centerpiece of a larger distribution park with direct access to the east-west I-10 and a three lane internal roadway. The Family Dollar building was sited so that it is half in the city of Marianna and half in Jackson County and thus able to receive public funding from both communities.

The Family Dollar distribution center is a 75-acre site within the larger 351-acre distribution park. The DC building has 26 acres of space under the roof with 1.1 million in square feet, has 32 foot high ceilings and 250,000 of the square feet are in mezzanine.

Key elements of the site preparation work included:

- Leveling the land – a considerable portion of the upfront development cost borne by Family Dollar was used to adjust the land for the building, parking, and roadway facilities.
- Adding all the utilities to the site – water, sewer, electricity, and natural gas.
- Creating new truck lanes and turning lanes in the park with access to I-10 and Route 276.
- Removing water as the initial evaluation did not reveal the full extent of the water table level.
- Adding a water tank and stormwater retention pond for better management of water.
- Adding a new electric power unit and a second fire station facility.

There were no other significant environmental concerns at the site. Very few residential properties are located near the distribution park, minimizing “not in my backyard” concerns or conflicts between passenger and freight trips.

Transportation Access

The Family Dollar distribution center is serviced entirely by trucks for both inbound and outbound goods and Interstate highway access was a critical aspect of siting this facility as a result. The facility provides a direct three lane access road to an existing interchange on Interstate 10. Route 276 is contiguous to the site, providing a north-south connection. Based on local traffic experiences with other DC facilities, such as Charlotte, Family Dollar learned that a direct ramp to the Interstate can be a large benefit by eliminating local traffic concerns.

The facility is approximately 5 miles from Marianna Municipal Airport and 14 miles from Lawrence Airport in Grand Ridge, Florida. The nearest cargo airport is Dothan Regional airport, located 40 miles away in Dothan, Alabama. Jackson County has also developed an intermodal rail facility and has relatively good connections to ports in Panama City and Pensacola. These multi-modal connections, while strong, are not currently relevant to Family Dollar’s operations.

Commodities and Shipping Patterns

As described above, product suppliers deliver goods to Family Dollar DCs and those goods are then re-packaged into Family Dollar trucks for customized deliveries to their retail stores.

Many Family Dollar products are manufactured in China and shipped to major United States seaports such as Los Angeles/Long Beach and Savannah, Georgia. These goods are then sent by rail and/or truck to the suppliers, such as Proctor and Gamble. The suppliers then deliver their products to the Family Dollar distribution facilities. The company strategy plans for consumer products to ship from the Family Dollar distribution center by truck to the store locations and have the trucks return to the DC facility within the same day. This is a relatively common practice for retail distribution centers.

The Marianna facility serves the major metropolitan areas of Tallahassee, Jacksonville, Orlando, Tampa, and Miami in Florida as well as Montgomery and Mobile, Alabama and Atlanta and Savannah, Georgia.

Freight Facility Development Conditions

As noted above, one of the key elements of the Marianna site selection was the strong local, regional and state-level support for this rural development projects. In particular, the public commitment to develop a distribution park facility with multiple large-site parcels helped ensure that this effort would produce a development impact beyond the Family Dollar facility. The project was called “Project Raven” (the codename assigned by the company and site selection team) within Florida and the key partners included all relevant jurisdictions:

- Governor Jeb Bush and the Office of Trade, Tourism and Economic Development;
- US and state legislative support;
- Enterprise Florida – the state’s economic development agency;
- Jackson County Development Council;
- City of Marianna;
- Jackson County Board of County Commissions;
- Other state agencies such as Workforce Florida, Florida Department of Transportation, Florida Department of Community Affairs, and Florida Department of Revenue;
- U.S. Economic Development Administration (EDA); and
- Regional agencies such as Florida’s Great Northwest, Opportunity Florida, and the Chipola Regional Workforce Development Board.

Strong local support was a driving factor in the company’s decision to site the facility in Marianna over Cordele, Georgia. Family Dollar was impressed by the support of all parties involved and the region’s commitment to economic development and growth according to Family Dollar President and COO David Alexander.

Multiple development incentives were provided to Family Dollar at the local, state, and federal levels amounting to a total of \$24.2 million. Key elements of this development incentive package included:

- 75 acres donated by the City and County as well as a 90 acre “public buffer”;
- 10 year ad valorem tax exemption worth approximately \$4.7 million in lower taxes;
- State Economic Development Transportation Fund Grant of \$2 million;
- Florida’s Qualified Target Industry Tax Refund Program valued at about \$2.5 million when including state and local matching funds;
- Workforce training grants such as the state’s Quick Response Training grant of \$850,000 and support from the Chipola Regional Workforce Development;
- State Rural Enterprise Zone Incentives including \$5.3 million in jobs tax credit for two years and a \$1.3 million business equipment sales tax refund;
- \$2 million U.S. EDA grant; and
- County and City Community Development Block Grants (CDBG) totaling over \$1.4 million.

Workforce availability and capabilities were very important to the siting decision. 6,000 residents applied for the 515 jobs at the distribution center. Family Dollar has been very happy with the performance of the workforce, and provides training for unskilled workers to meet specific needs (such as forklift operations).

Local support for new development opportunities and jobs was very positive as there were very few homes near the site, so there were no “NIMBY” (not in my backyard) issues. Local officials even assert that the new facility and related economic development may have actually raised the land value for nearby residential areas.

Summary of Location Factors

In summary, the primary location factors (as described/defined in Chapter 5) that were most important to the siting and development of the Family Dollar facility were as follows:

- **Interaction with Transportation Network:** One of the primary factors in regards to locating the site in Marianna, Florida was that this location allowed Family Dollar to gain supply chain efficiencies with its other DC facilities, allowing trucks to make deliveries and return back to the DC within the same day. The site also presented a direct exit ramp to/from Interstate 10 to avoid local traffic problems.
- **Labor and Workforce:** Family Dollar chose the Marianna facility over the location in Georgia largely because of the existing capable and cost-effective workforce as well as support from the Governor’s office to provide workforce training.
- **Public Sector Assistance and Incentives:** As described above, there was significant local, regional and state-level support for this development; this public sector assistance was a key factor in site location.

Economic Development and Transportation Impacts

Economic Activity of the Freight Facility

Direct economic activity at the Family Dollar DC includes 515 net new jobs with an average wage of approximately \$13 per hour. The Family Dollar distribution center has also acted as a catalyst for development by attracting other businesses to the Distribution Park. As an example, Arizona Chemical built a 120,000 square foot distribution center and employs 45 people as a result of the elevated profile of the area. Another business that has been drawn to the distribution park is Old Castle, a pre-cast concrete pipe company that has located a manufacturing and distribution facility with 110 employees on an additional 110 acres of land and an adjacent construction services park. The distribution park has additional parcels available for development.

The Family Dollar facility generates \$300,000 a year in property tax revenue, but has a ten-year tax exemption on ad valorem revenues from the City and County. The value of the ad valorem tax exemptions is estimated to be \$3.7 million by the County and \$0.9 million by the City. There are five years of tax abatement remaining as the facility was opened in 2005.

Costs of Facility

Family Dollar invested \$55 million to the construction and improvement of the facility, coupled with \$6 million in publicly-funded infrastructure investments. Most of the public cost went to the development of the distribution park. This had public support as it allows for multiple future development projects (as contrasted to site improvements for a single business).

Transportation Impacts

Family Dollar handles approximately 90 trucks per day in and out of the facility. Because the facility has direct ramp access to I-10, there are virtually no local traffic concerns. While figures were not available for annual

truck trips or truck vehicles miles of travel (VMT), the following estimates provide an approximation of total truck trips and VMT on the Florida and national highway system:

- Assuming 300 working days per year, and counting both inbound and outbound trips, that equates to 54,000 annual truck trips related to the Family Dollar distribution facility; and
- Assuming an average of 300 miles for inbound and outbound shipments, truck VMT is approximately 16.2 million miles per year.

8.8 Murphy Warehouses Case Study

Introduction

Facility Type: Distribution Center - Warehousing

Murphy Warehouses owns and operates a network of warehouses in the Minneapolis-Saint Paul (MSP), region in Minnesota with facilities that process, consolidate, and store freight for customers. Murphy Warehouses provides warehousing and trucking services focused on the Twin Cities and the Midwestern U.S. markets, including Michigan and Wisconsin. Their trucking services ship products nationwide. The map below shows the locations of Murphy Warehouses' nine major facilities within the MSP area.

The Need for the New Facility

When Murphy Warehouses requires another facility either due to new customers or an increase in warehouse and distribution demand, the following are key requirements for purchasing another existing facility:

- Facility must have access to Interstate or major highway interchanges (within 3 miles)
- Facility must have on-site access to rail
- Facility must be between 150,000 to 200,000 square feet
- Real estate taxes in community must be reasonable
- Preference towards energy-efficient facilities
- Facility must be in good structural condition including: docks, steel joists, roof, and floors
- Stormwater handled onsite, or readily capable pending regulatory controls

The new site should have access to the markets served and located within the metropolitan area. Land prices and development costs that would go into refurbishing the existing facility would also factor into location decisions. Any facilities considered would have to be sound real estate investments and considered sellable in the future.

Figure 8-7: Map of Murphy Warehouses Facilities within MSP Region



Site Selection Factors and Facility Characteristics

Physical Characteristics of the Site

Murphy Warehouses owns and operates nine facilities within the MSP region, and six of these are either on or adjacent to rail sidings. In total, these nine facilities consist of approximately 2.4 million square feet of warehousing space. The average size of the rail-served facilities is 250,000 square feet and the average size of the non-rail warehouse facilities is 300,000 square feet. In terms of overall land footprint, one facility sits on a 22-acre plot. Warehouse locations are typically in industrially zoned areas with access to major utilities. One facility has been located on a former Brownfields site. Table 7-7 shows the detailed physical characteristics of existing Murphy Warehouse's facilities, including details on rail warehouse capacity and services offered.

Table 8-7: Murphy Warehouse Characteristics

	Size	Detail
Murphy Warehouses Facilities		6 Facilities with Rail Access 25 Truck Fleet
All Warehouses	2.4 million Sq Feet	Temperature-controlled; 32-foot clear stackable height
Warehouses with Rail	1.5 million Sq Feet	24 indoor and 4 outdoor rail docks
Services		Cross-dock, U.S. Customs Examination Station (CES), Free Trade Zone (FTZ), and Container freight station

Murphy Warehouse facilities are located close to the market and customer, typically requiring 150,000 to 200,000 square feet for mixed use. However, the facility size requirements fluctuate based upon the characteristics and needs of the customer; for example, a planned use facility for a single client could be as small as 50,000 square feet in the MSP region. Alternatively, market size can influence facility size as warehouse operators in larger markets may have minimum facility requirements of 500,000 square feet or more.

Transportation Access

Each of Murphy Warehouses' warehousing and logistics facilities is within 3 miles to major highway interchanges or beltways in the Twin Cities including: I-94, I-35, I-494, and I-694 and as well as State Routes, such as 10, 100, and 169. Additionally, most warehouse facilities are within 15 miles of Minneapolis-St. Paul International Airport. Proximity to customers and infrastructure has become more important due to Just-In-Time (JIT) distribution. JIT distribution is a large component of regional business for Murphy Warehouses in MSP, and therefore warehouse facilities are required to be easily accessible to customers and markets served.

Each of the six rail-served facilities is served by Class 1 railroads including: Burlington Northern Santa Fe (BNSF) Railways, Canadian National (CN) Railways, Union Pacific (UP) Railroad, and Canadian Pacific (CP) Railways. Rail facilities can accommodate up to 18 rail cars indoors at a single facility. Smaller facilities can house 12, 6, or 4 rail cars indoors, with the remaining two rail facilities operating outdoors. A corporate decision was made in the 1980s to obtain and preserve facilities with rail connections, which has become a competitive advantage for Murphy Warehouses. Consequently, this has become a locating requirement for facilities.

Commodities and Shipping Patterns

Murphy Warehouses handles over 10,000 rail carloads a year at their six rail-served facilities, and over 76,000 truckloads. Smaller facilities can accept up to 15 carloads a week, while larger facilities can receive over 80 carloads a week. Across all nine facilities, Murphy Warehouses handles 3.4 billion pounds of product. The major commodities Murphy Warehouses distributes are: food and beverages, paper, plastics, recyclables, medical equipment, transportation equipment, as well as forest products such as pulp, building materials, roll and flat stock, folded product packaging, raw fibers in sheets, and panel board. Since a large portion of Murphy's facilities are temperature controlled, food and beverage commodities account for a significant portion of commodities shipped including: salts, beer, canned goods, sugar, and other Consumer Packed Goods (CPG).

While most of Murphy Warehouses' customers are relatively local (MSP), 60 percent of their warehousing and distribution activity is nationwide with the remaining 40 percent serving Minnesota and the Midwestern U.S. Murphy Warehouses operates a Foreign Trade Zone (FTZ) at one of its facilities offering special customs procedures for international customers. Within MSP, only Minneapolis Saint Paul Airport and the Murphy Warehouses facilities have this FTZ designation. While Murphy does have capacity and the ability to serve international customers, international freight service accounts for less than 10 percent of all warehouse services. A specific breakdown of inbound and outbound freight volumes was unavailable due to confidentiality.

Overall, costs are the primary driver for location decisions of warehouses and distribution centers. Facilities located closer to customers reduce wait times for trucks and reduce costs associated with travel time and congestion. Since many of Murphy Warehouses customers are located in the urban core, the facilities are located throughout the MSP region. University research has aided warehouse and distribution center location decisions through modifying criteria based upon results from distribution and location freight models, which evaluate the effectiveness and costs of operating facilities. Such models take into account multiple freight modes, network congestion, and operating costs.

Facility Development Conditions

Murphy Warehouses does not typically have issues with local acceptance of their facilities due to the fact that most of their operations occur indoors. Additionally, Murphy Warehouses often site their facilities within freight-oriented industrial parks, which are usually located in industrial areas that are buffered from residential areas.

It is rare for warehouse and distribution facilities to be eligible for state or local incentive programs in Minnesota, as these incentive programs typically require an employee per square foot ratio much greater than the industry standard for warehousing and distribution. Warehouse and distribution centers are more capital-intensive than labor-intensive resulting in relatively low employees per square foot. Unless a warehouse or distribution center is paired with a manufacturing facility, the threshold employee per square foot will typically not be met to qualify for most state or local incentives. Due to this, incentives typically do not play a significant role in Murphy Warehouses' location selection process.

Murphy Warehouses has received Tax Increment Financing (TIF) Funds in one instance to develop a warehouse facility on a contaminated Brownfields site. TIF funds are an economic development mechanism created by states to improve infrastructure and preserve existing structures within specified redevelopment

zones with funding based on the incremental increase in property value. The development turned a contaminated site into taxable real estate with growth in property value.

Summary of Location Factors

In summary, the primary location factors (as described/defined in Chapter 5) that were most important to the siting and development of the Murphy Warehouse facilities were as follows:

- **Interaction with Transportation Network:** One of the primary location factors for Murphy Warehouses is access within 3 miles of major highways as well as a new requirement for on-site rail access to each warehouse facility.
- **Tax Environment:** Murphy Warehouses indicated that reasonable real estate taxes are an important factor in choosing one location over another.
- **Availability and Cost of Suitable Facilities:** Many of the locations where Murphy Warehouses develops its facilities have existing structures/facilities. Murphy Warehouses identified the need for these facilities to be in good structural condition as a key selection criteria.

Economic Development and Transportation Impacts

Economic Activity of Distribution Centers

In the distribution/warehousing industry, employees per square foot can range from one employee per 2,000 to over 5,000 square feet. Across all nine of their facilities, Murphy Warehouses employs 184 people with an average of 20 employees per facility. The current ratio of management to hourly employees is a ratio of 20 to 1. Wages were indicated as above industry average, but actual amounts were not disclosed. According to the Bureau of Labor Statistics (BLS), average weekly wages for transportation and warehousing within the MSP region are \$1,178.

Costs of Distribution Centers

Many of Murphy Warehouses existing facilities were built over 30 years ago and thus capital cost data on the investment needed to construct and operationalize these facilities is generally not available. Recent capital investments into facilities have been focused on energy saving retrofits and operational improvements. Operationally, some facilities ceilings were raised from 18 to 34 feet at one facility to accommodate larger rail cars. Energy saving retrofits included upgrading two existing facilities to Leadership in Energy and Environmental Design (LEED) gold certified status.¹⁶ Another investment in 2008 was a stormwater retention system to capture and filter stormwater from a 22 acre site. The system is estimated to generate a return on investment in less than 10 years by eliminating a \$68,000 annual stormwater assessment from the city, reducing overall operating costs. The precise operations and maintenance cost per facility were unavailable due to confidentiality.

Transportation Impacts

Murphy Warehouses handles over 10,000 carloads a year throughout this network of facilities. Additionally Murphy Warehouses owns a small vehicle fleet of 25 trucks, and receives over 76,000 truckloads annually, or just fewer than 300 trucks daily. Applying the average trip length by mode from the 2007 Commodity Flow Survey to the freight activity at Murphy Warehouses produces the following estimated transportation impacts.

¹⁶ LEED certification is an internationally recognized green building classification system verified by a third party, confirming that the building was designed (or improved) using strategies to reduce CO2 emissions, energy usage, and water use. See the U.S. Green Building Council (USGBC) for more information on LEED: www.usgbc.org/leed/.

- By transporting freight via rail rather than truck, they reduce truck mileage by approximately 852 miles per truckload.¹⁷
- If freight were to switch from rail to truck mode, the 10,000 rail cars would equate to roughly 27,400 trucks.¹⁸
- Freight traveling by rail reduces truck VMT annually by approximately: 1.3 million VMT.¹⁹
- Freight traveling by rail reduces greenhouse gasses by 6,730 tons annually.

8.9 AllianceTexas Global Logistics Hub – Fort Worth, Texas

Introduction

Facility Type: Integrated Logistics Center

AllianceTexas is a 17,000-acre master-planned community in north Fort Worth, Texas, with three separate development components — a global logistics hub, corporate center, and residential community. The centerpiece is the 11,600 acre integrated logistics center (ILC) known as Alliance Global Logistics, and the community also includes the Circle T Ranch corporate center and Heritage residential community. Within the ILC are an airport, an intermodal terminal, access to two Class I railroads, highway access, a foreign trade zone, and logistics and industrial companies. The ILC began with the opening of Fort Worth Alliance Airport in December 1989 as the first purely industrial airport in the world. Development continued in the 1990s with the construction of the Burlington Northern Santa Fe (BNSF) Alliance Intermodal facility and a new highway – Texas Highway 170.

The Need for the New Facility

H. Ross Perot, Jr. made a determination in the early 1980's, that the northwest corner of the Fort Worth Metroplex area was underdeveloped and offered significant potential for real estate development, and thus began purchasing sizable amounts of real estate in the area. The primary reason for the lack of development was that the area was prone to unpleasant odors because of the prevailing winds from the famed Fort Worth stockyards livestock market. The stockyards had been closed since the 1960's and the odors were long gone, though the stigma remained.

At the same time that Mr. Perot was considering the best use for the undeveloped land, the Federal Aviation Administration (FAA) conducted an analysis of the Dallas-Fort Worth Airport operations to determine the future aviation needs of the region. This study and another one conducted by the North Central Texas Council of Governments determined that the growing amount of air traffic from the Dallas-Fort Worth airport would result in over-congestion in the near future if nothing was done. In order to curtail this and future congestion, the FAA made the decision to locate a reliever airport for general aviation in each of the four corners of the Metroplex.

One of the pieces of land that Mr. Perot had purchased was a long, narrow parcel that would be ideal for an airport. Knowing that general aviation is generally not profitable, Mr. Perot agreed to donate the land only if the FAA would designate the airport as a cargo/industrial airport. The airport thus had potential to generate

¹⁷ 2007 “Commodity Flow Survey” Bureau of Transportation Statistics.

¹⁸ Ratio of rail carloads to truckloads was developed using FHWA's Freight Analysis Framework (FAF2).

¹⁹ Calculation differentiates between truck and private truck, based on 2007 “Commodity Flow Survey” Bureau of Transportation Statistics.

significant revenue through the movement of cargo and manufactured goods. The FAA agreed, and thus begun the public-private partnership between the FAA, Fort Worth, and Hillwood — Mr. Perot's company.

As part of the public-private partnership, the city of Fort Worth was required to put up 10 percent equity to the FAA, so Hillwood donated the land to Fort Worth to be used as the 10 percent equity, and Fort Worth provided the water, sewer and infrastructure to support the airport. The airport was the first step in the generation of the ILC with other modal infrastructure and private sector location decisions following.

When the airport opened in December 1989, Hillwood already had arrangements for the BNSF intermodal offloading facility and the American Airlines Maintenance and Engineering facility. The presence of these two major facilities set the stage for further industrial growth in the area. Another public-private partnership between Hillwood and the State of Texas to build a new state highway — State Highway 170 — with access to Dallas-Fort Worth International Airport further improved the viability of the facility.

Other major anchors of the initial facility included the American Airlines Maintenance and Engineering facility, and within three years of this opening, FedEx announced that they would move their Southern Sorting Facility to AllianceTexas. The American Airlines Maintenance Facility opened in January 1992, and is the primary maintenance facility for the B767 and B777 aircraft as well as the Rolls Royce engines operated by American. American's parent company is also headquartered in the Fort Worth area.

The Alliance Air Trade Center is a 99,000 square foot facility located within the Global Logistics Hub, with capabilities of handling all air cargo needs. It has direct access to the Fort Worth Alliance Airport runway, the ability to directly serve Asia, and an on-site Customs facility. This facility provides strategic advantages for air cargo customers.

Site Selection Factors and Facility Characteristics

Physical Characteristics of the Site

The location for the ILC and broader community complex was primarily chosen due to the availability of these large tracts of undeveloped land proximate to the Fort Worth Metroplex. Much of the rest of the Metroplex area was overdeveloped, and the site which eventually became the AllianceTexas facility provided an opportunity for new development on large parcels of low cost land. Additionally, the location in the south-central part of the United States provided proximity to the large markets in the Dallas-Fort Worth area as well as access to most major US and Mexican cities within one day air travel time.

Alliance Global Logistics Hub is subdivided into different sections catering to different market segments. The five divisions (described below) are: Alliance Gateway, Westport at Alliance, Alliance Center, Commerce Center, and Alliance Crossing.

Alliance Gateway is the large-scale distribution, manufacturing and industrial segment, and covers approximately 2,400 acres. This area is in the eastern section of the Alliance property, with direct access to Texas Highway 170 and is two miles from Texas 114, less than 4 miles from US 377, and less than five miles from Interstate 35W. This area also has access to Union Pacific Rail and contains several directly rail-served facilities.

Westport at Alliance is located on the western edge of the development and has space for approximately 3,500 acres of industrial and distribution facilities. Located between the intermodal rail facility and the airport with good highway access, it is targeted to companies with multi-modal requirements. This section of Alliance

is directly accessible to the BNSF Alliance Intermodal facility, the BNSF rail line, Fort Worth Alliance Airport, and I-35W. It is also less than two miles from Texas Highways 170 and 114. Planned future developments include transload facilities and a container yard to allow for future growth and help maintain the competitive position as a top inland port.

Alliance Center is a 2,600 acre business park located in the area directly surrounding Fort Worth Alliance Airport. Many of the building sites have direct taxiway access, allowing planes to travel directly from the building to the runway. This area is served by the Alliance Air Trade Center, and is also home to the Heritage Commons office park. Additionally, this area is served by BNSF Railway and has direct access to I-35W.

Commerce center is a 300 acre business park located in the northern section of Alliance. Over time, this park is may accommodate up to 1.7 million square feet of distribution, light manufacturing, high-tech and aviation support activity. This area has direct access to I-35W and is at the north edge of the property, within one-half mile of the Airport as well.

Alliance Crossing is the retail and small office section of the community, designed by Hillwood to serve the corporate residents of the broader development. It is located at the entrance to Fort Worth Alliance Airport, with direct access to/from I-35W. This area contains more than 75,000 square feet of retail, restaurant and office space.

As former agriculture land, all new infrastructure had to be developed for the property. Hillwood developers worked with the City of Fort Worth to annex the land and install all of the gas, electric, water, and sewer infrastructure. There were no environmental concerns beyond the initial fear of odor.

Transportation Access

There are two airports within 15 miles of the Alliance ILC. The closest is Fort Worth Alliance, located within the ILC. This airport, opened in late 1989, is the first 100 percent cargo airport in the world. Fort Worth Alliance has two runways with 24-hour per day operations and is capable of handling any cargo aircraft. Additionally, Dallas-Fort Worth International Airport — one of the largest airports in the U.S. and a hub for American Airlines — is located fifteen miles southeast of the facility.

The Alliance ILC is directly served by two Class I Railroads — Union Pacific (UP) and Burlington Northern Santa Fe (BNSF). UP provides direct rail access to (but not within) the facility. BNSF not only provides direct rail access to many locations within the park but also has their largest intermodal yard at AllianceTexas, servicing 12 daily trains. The facility handles a large variety of commodities, including electronic parts, automobiles, and intermodal containers. The major access to seaports from the facility is via rail, with most maritime containers coming from the Ports of Los Angeles and Long Beach.

The facility provides access to the major east-west and north-south highway corridors in the region, with quick access to I-35W and State Highways 114 and 170. Distance from the highway varies from less than one to nearly five miles depending on the building location within the park. Other facilities and capabilities of the ILC include on-site U.S. Customs and Centralized Examination Station, Triple Freeport Inventory Tax Exemption, and Foreign Trade Zone (FTZ) #196. These capabilities can be a positive factor in the attraction of private sector freight-related businesses to the ILC. Additionally, AllianceTexas is home of the FedEx Southwest Region Sort Hub and FedEx Service Center.

Commodities and Shipping Patterns

A large variety of freight moves through the AllianceTexas facilities. The largest commodities by value are consumer electronics, including phones, televisions and DVDs. These goods primarily enter the facility by truck from Mexico or in intermodal containers via rail from Asia, and leave the facility by air as they tend to be low-weight/high-value.

Bulk intermodal cargo also makes up a key portion of the facility's cargo. The intermodal terminal currently handles 600,000 lifts, and has the capacity to handle 2 million. Lift volume is already projected to increase to 1 million annual lifts in the next few years. This freight is primarily hauled in by rail, often processed or re-loaded at the ILC and then transported by truck or rail to its final destination.

AllianceTexas primarily serves the Dallas-Fort Worth Metroplex area, followed in turn by areas within 500 miles, the United States as a whole, and finally international markets. Inbound freight to the facility is originates internationally in approximately 80 percent of cases, and freight moving outbound from the facility is approximately 80 to 90 percent domestic. Inbound freight primarily comes from Asian markets, often via container ship then rail from the Ports of Los Angeles and Long Beach, as well as via truck from Monterey and Guadalajara, Mexico. Outbound shipments are mostly shipped within a 500 miles radius by truck.

Transload goods movement activity is increasing dramatically at the facility, and is expected to continue growing in the near future. More freight moves out of the facility than into it, due to on-site manufacturing production.

In regards to the general size of shipments, most inbound freight consists of bulk commodities such as electronic parts for assembly of manufactured goods and most of the outbound freight is smaller packages of finished goods for delivery to retail markets. As regards mode, inbound freight arrives primarily via intermodal container, followed by air and truck. Outbound shipments are mostly by truck, followed by rail and then air. Outbound rail volumes are increasing as containers are starting to be used to ship cotton outbound from the area to regions outside of the MetroPlex.

Freight Facility Development Conditions

The citizens of Fort Worth were initially hesitant to accept the proposal for the new facility, as the city would be financing some of the infrastructure improvements with public funds, with significant uncertainty on the return on this public investment. However, there has been a vast improvement in the level of public support in the region as the planned community has gained success over time and generated significant economic activity, jobs and property tax revenue.

There was a significant period of negotiations to develop the site and infrastructure improvements between the state, Fort Worth, and the property manager, Hillwood. The facility has a tax exemption from the Texas inventory tax, called the Triple Freeport Tax Exemption.

Hillwood (the developers of the facility) also applied for and received Foreign Trade Zone status from the federal government. This has been a significant amenity for the facility and it allows companies at the facility to hire U.S. workers to assemble the foreign products that are distributed domestically from facilities located at the ILC. For example, if the FTZ was not present, Motorola, which employs 2,500 people at an average wage rate of \$15-20 per hour, would most likely move their operations offshore to reduce labor costs.

The FTZ exempts resident companies from inverted tariffs, and manufacturers also avoid paying duty on products imported for manufacturing. This significantly reduces the costs of production.

Summary of Location Factors

In summary, the primary location factors (as described/defined in Chapter 5) that were most important to the siting and development of the AllianceTexas facility were as follows:

- **Interaction with Transportation Network:** One of the primary location factors for the AllianceTexas facility was the proximity to the Fort Worth Alliance Airport, access to the rail systems of BNSF and UP as well as access to a major highway system.
- **Ability to Access Key Markets or Customers:** Another major location factor was the ability to both efficiently receive freight and distribute the freight to customers. Most inbound freight at AllianceTexas is received via rail from the Ports of Los Angeles and Long Beach and is then transported via truck within a 500 mile radius to several of the largest population centers in the US.
- **Public Sector Assistance and Incentives:** Key to the project location decision was significant public support and funding for the AllianceTexas facility, as described in detail above.

Economic Development and Transportation Impacts

Economic Activity of the Freight Facility

The facility is currently home to more than 230 corporate businesses, 14 of them international, with 60 companies listed in the Fortune 500, Global 500, or Forbes' List of Top Private Companies. There is a large diversity of industries including telecommunications, pharmaceutical/life sciences, financial services, aerospace, aviation, automotive and logistics, all located within the ILC. There are also several major 3PL/Freight Forwarders located within the facility. In total, corporate and freight distribution activity at the ILC directly employed 28,000 people as of 2008.

The AllianceTexas ILC is 40 percent developed after twenty years in operation, with a forty (40) year planned build-out. To date, the facility has generated a \$36.4 billion economic impact on North Texas measured in business sales, with a \$2.53 billion annual economic impact in 2008. In all, 31.2 million square feet of space have been developed with 25 million square feet in industrial building space with 13.6 million square feet constructed by the Hillwood Company. The ILC and property development generated \$105 million in tax revenue in 2008. In addition to the growth within the facility, there have also been other businesses attracted to the region beyond the ILC facilities, though it is difficult to quantify these impacts.

Costs of Facility

Total investment in the AllianceTexas Global Logistics Hub was \$7.2 billion from 1990 to 2008. Nearly all of the investment has been private, with 94.6 percent (\$6.8 billion) put forth by Hillwood and its partners and \$387.5 million, or just over 5 percent, coming from public resources for roads, infrastructure and schools.

Hillwood charges a Common Area Maintenance (CAM) fee to each building of approximately \$1 or 2 per square foot for overall maintenance costs.

Transportation Impacts

The intermodal terminal handles 600,000 lifts annually, approximately 60 percent of which have destinations within a 500 mile radius. –However, as each company conducts its own business - it is difficult to measure the total volume of freight in and out of the community. Similarly, because Alliance is a conglomeration of

smaller businesses, none of which are required to submit activity data to the owner, aggregate tonnage figures were not available. This precluded independently estimating VMT and no figures were available directly from the facility.

As far as environmental impacts are concerned, Hillwood has yet to do any mitigation, but they do pride themselves on being excellent stewards of the land and have recently opened a facility called Independent Water in 2009 to re-use water. The goal is to save potable water for drinking uses, and to capture rainwater and purchase waste water and recycle water to use for drilling gas wells. In the past, drilling has been a very large user of potable water, but the recycling of waste and rain water allows the potable water to be preserved for other uses.

8.10 Old Dominion Freight Line, Inc. – Morristown, Tennessee

Introduction

Facility Type: Regional Hub

Old Dominion Freight Line, Inc. is a nationally-recognized LTL national carrier. Founded in 1934 in Richmond, Virginia, the company provides complete nationwide coverage of the United States. Through its marketing and carrier relationships, Old Dominion offers door-to-door international freight services between North America, Central America, South America and the Far East. The company serves more than 48,000 direct points with its 5,513 tractors, 15,694 pup trailers, and 5,655 vans.²⁰ Old Dominion employs 10,737 people company-wide and is non-union.

Operations are conducted through 210 service center locations, of which 125 are company-owned and 85 leased. There are eight (8) inter-regional and 12 regional hub service centers in the company's network. Of these, nine (9) are breakbulk facilities located at the company's major inter-regional hubs and the Salt Lake City, Utah, regional hub.

Each of the company's service centers picks up and delivers freight within its service area, loading outbound freight by destination the day it is picked up. All inbound freight received by the service center in the evening or during the night is scheduled for local delivery the next business day, unless a different delivery schedule is requested by the customer.²¹

²⁰ Old Dominion Freight Line, Inc., website - www.odfl.com

²¹ Reuters Company Profile of Old Dominion Freight Line, Inc.

Old Dominion has 12 regional hubs located across the United States as far east as Jersey City, New Jersey, and as far west as Salt Lake City, Utah. In addition, the company has eight inter-regional hubs, which are located in the larger metropolitan areas of Atlanta; Dallas; Greensboro, North Carolina; Harrisburg, Pennsylvania; Indianapolis; Memphis; and Rialto, California.

Inter-Regional Hub Service Centers	
Morristown, TN	Atlanta, GA
Dallas, TX	Greensboro, NC
Harrisburg, PA	Indianapolis, IN
Memphis, TN	Rialto, CA

The company also has a hub in Morristown, Tennessee - unique in Old Dominion's system by not being located in a large metropolitan area.

The current case study focuses on this Morristown inter-regional hub, which was built in 2000. Because it is a relatively new facility, information related to the site selection process was readily available. It is also considered a successful hub by Old Dominion, and the company is likely to expand the facility in the next few years.

The Need for the New Facility

The company's inter-regional and regional hubs serve two purposes within the Old Dominion network. First, they consolidate shipments from various locations and redistribute to the end-of-the-line terminals within the network. Second, they pick up and deliver to local customers.

Because of increased demand for Old Dominion's trucking services, the company knew that it needed to build a new regional hub. The company was particularly interested in establishing a regional hub located along Old Dominion's major east/west corridor. Two cities in Tennessee met this criterion, Nashville and Morristown. Morristown offered another advantage; it is located on Interstate-81, which is a major north/south corridor served by Old Dominion.

Regional Hub Service Centers	
Albany, NY	Fort Wayne, IN
Birmingham, AL	Jackson, MS
Chicago, IL	Jersey City, NJ
Columbus, OH	Kansas City, KS
Denver, CO	Parsons, KS
Des Moines, IA	Salt Lake City, UT

Several locations in the Nashville area were considered, but only the current Morristown location was evaluated during the site selection process. The following were the key requirements considered by Old Dominion in assessing the suitability of these sites:

- Population
- Geography
- Location of site in the middle of their major regional network

Although both Tennessee cities generally met the three key requirements, the Morristown site was ultimately chosen based on a strong available workforce and Old Dominion was able to find adequate property at a reasonable price. Regarding the available workforce, the Morristown area of Tennessee has a strong furniture manufacturing history, and at the time that Old Dominion was considering developing a regional hub, furniture manufacturing was decreasing in the area and moving overseas. This left a large pool of former manufacturing employees who were available and trainable for employment at the new distribution center. This available workforce was one of the reasons that Old Dominion chose the Morristown site for its new hub. In addition, the company already had success in operating a smaller facility located about a mile from the proposed site, and the Morristown community was very supportive of the possibility of the company's expansion.

Site Selection Factors and Facility Characteristics

Physical Characteristics of the Site

The Morristown area of Tennessee is in the Appalachian region with hilly terrain, and Old Dominion invested a significant amount in site work to flatten and level the 65 acre property to make it suitable for their operations. Not all 65+ acres are being utilized by the company, although capacity at this hub is steadily being reached and the company has plans to further expand its operation.

The Morristown property did not have any access to basic utilities prior to selection by Old Dominion. Everything needed to be brought in, and Old Dominion worked closely with the utilities and municipalities in this effort. There were no zoning or environmental issues associated with the proposed site and the fact that Old Dominion had a smaller facility a mile away (with which the community was already well acquainted), helped make the development of this site run very smoothly.

General commodities are shipped by truck into and out of the Morristown hub. Although highway access is important to Old Dominion's operations, proximity to airports, seaports, or railroads were not important considerations in the selection of the Morristown site.

Transportation Access

The Morristown, Tennessee inter-regional hub is in eastern Tennessee, less than 40 miles from Knoxville, approximately 200 miles from Nashville, and about 400 miles from Memphis.

The Morristown hub is a 100% trucking facility. Consequently, highway access is very important and the facility is situated on a property which directly borders Interstate 81 (I-81). This highway is a major corridor into the eastern part of the United States, which is one of the largest markets served by Old Dominion. The company's trucks travel from Dallas, throughout the southeast (Georgia, Tennessee, Mississippi, Louisiana, Texas, Arkansas) and into Morristown. The company consolidates shipments at the site and redistributes these to trucks, which then travel to major destinations in the northeast (Baltimore, Metro Jersey City, Providence, Boston) or to local destinations.

Commodities and Shipping Patterns

According to Old Dominion, nearly every type of commodity is handled at the Morristown facility. Walmart has several distribution centers in the area, and as a result anything this retailer might sell could potentially be handled at the Old Dominion facility. One large customer in the area ships cash register paper, and therefore paper represents another significant commodity for the hub. Other commodities include clothing, tires,

chemicals, and groceries. Shipping generally originates as far south as Dallas, heads to Morristown and then goes into the larger metropolitan areas of the northeast.

Nearly all of the freight handled in Morristown is domestic. Only 2-3% of the freight at this inter-regional hub is international. More freight is generally shipped to the north than to the south, primarily due to higher population densities and consumption patterns in the north.

The average haul length for the company is 950 miles, but haul length information is not collected by the company at the hub level.

Freight Facility Development Conditions

The Morristown community made Old Dominion exceedingly “welcome” throughout the site selection process. Details were not available on the incentives offered to Old Dominion to encourage site development, but some tax advantages were provided to the company.

Summary of Location Factors

In summary, the primary location factors (as described/defined in Chapter 5) that were most important to the siting and development of the Old Dominion facilities were as follows:

- **Interaction with Transportation Network:** One of the primary location factors for Old Dominion is the need to interface with its existing inter-regional and regional hubs. Direct access to I-81 helps to facilitate all truck flows for this regional hub.
- **Labor and Workforce:** A key location selection criterion of the Morristown site was the strong available and cost-effective workforce.

Economic Development and Transportation Impacts

Economic Activity of the Freight Facility

The Morristown inter-regional hub employs approximately 750 employees. Fifty of these positions are city drivers and more than 300 are road drivers, most of whom are trained by Old Dominion. City drivers typically make roundtrip deliveries in one day or less, while road drivers operate in a variety of ways:

- **Team Drivers:** These drivers typically run to and from the west coast, each driving 11 hours while the other sleeps.
- **Bag Drivers:** These drivers travel from Morristown to their destination and then take time off before going to another facility for their next job. Bag drivers operate in this way for a week or more before returning to Morristown.
- **Schedule Drivers:** These drivers run 10 or 11 hours for a delivery, sleep overnight and then return to Morristown.
- **Drivers Operating on “Turns”:** Drivers travel five hours in one direction from Morristown, pick up a load, and then return to Morristown.

The remaining employees are generally platform workers who transfer product from an inbound trucking unit to an outbound one. City drivers make \$22 per hour at the Morristown hub. Road drivers are paid differently than city drivers and receive \$.50 per mile traveled. The hourly rate for platform workers is \$16 to \$19.

It is not clear if Old Dominion's presence in the area has attracted additional businesses to the Morristown area. There is a Walmart Distribution Center located in the area; one in Shelbyville is approximately 20 miles away from Old Dominion's hub. The Walmart facility was mentioned during the case study interview.

Because it was uncertain whether businesses had made their site decisions based on the presence of Old Dominion's hub, no information related to indirect economic impacts was available. Additionally, information related to property and other taxes was not available.

Costs of Facility

The Morristown facility was built in 2000 entirely using private funds. Using public funds, a water tank was built for the entire exit located near the facility, but it was not offered specifically as a site location incentive to Old Dominion. It was intended to improve the entire intersection. The total cost of the facility is estimated to be \$10 million. No information was available for operating or maintenance costs.

Transportation Impacts

This regional hub handles 1,250 to 1,500 tons of freight per day, all by truck. The company-wide average haul length is 950 miles, and it is estimated that between 75 and 90 trucks per day travel in and out of the Morristown facility. This means that this facility contributes to between 71,970 and 86,364 vehicle miles traveled (VMT) daily.

Table 8-8: Truck Freight Transportation

	Average Length of Haul	Daily Tons Handled
Truck	950 miles	1,250-1,500 tons

Source: Interview with Old Dominion

8.11 Summary of Case Study Findings

Table 8-9 below summarizes the site characteristics and transportation access parameters for each of the facilities evaluated in the case studies.

Table 8-9: Case Study Site Characteristics and Transportation Access

Facility Type	Case Study	Size	Transportation Access	Freight Handled
Inland Port	Virginia Inland Port (Front Royal, VA)	161 acres	One Class 1 Railroad (NS), within 5 miles of I-66 and I-81	Intermodal containers
Intermodal Terminal	Rickenbacker Intermodal Terminal (Columbus, OH)	175 acres	Two Class 1 Railroads (NS & CSX), within 5 miles of I-270 and Highways 23 and 33, Airport within 1 mile	Primarily intermodal containers
Bulk or Transload Terminal	Savage Safe Handling (Auburn, ME)	210 acres	One Shortline Railroad (SLA), within 3 miles of I-95	Chemicals, plastic pellets, liquid fuels

Distribution Center	Family Dollar	75 acres, 1.2 million sq ft for buildings	Direct ramp to I-10 Highway	Consumer retail goods
Warehouse	Murphy Warehouses	Average 250,000 to 300,000 sq ft for buildings	Rail, Interstate highways	Food, beverages, paper, plastics
Integrated Logistics Center	AllianceTexas (Fort Worth, TX)	11,600 acres	Two Class 1 Railroads (BNSF & UP), I-35W, Rtes 170 & 114 within 1 mile, Cargo Airport on-site	Primarily intermodal containers
Hub Terminal	Old Dominion (Morristown, TN)	65 acres	Adjacent to I-81	Consumer retail goods

Each case study also examines the transportation and economic impacts for each project, but a summary of the impacts is shown below. The number of direct jobs ranged from under 20 for Virginia Inland Port and Murphy Warehouses to over 28,000 direct jobs at AllianceTexas.

While the direct employment at Virginia Inland Port is relatively low, there are approximately 8,000 indirect jobs related to this facility as the Inland Port has attracted a large number of freight and distribution businesses. Similarly, the Rickenbacker Intermodal Facility employs about 150 people directly but the industrial park that surrounds the Intermodal Facility is projected to employ over 20,000 in the next 10 years.

These facilities also generate significant transportation impacts. Several of these facilities ship and receive freight via rail over long-distance hauls thus reducing freight travel by truck resulting in significant truck vehicle miles travel (VMT) reductions. The truck VMT reductions from the Case Studies range from 1 million to almost 50 million annually. Table 8-10 below provides a summary of both the transportation and economic impacts for the Case Studies.

Table 8-10: Economic and Transportation Impacts of Freight Facility Case Studies

Facility Type	Case Study	Direct & Indirect Jobs	Freight Volume	Transportation Impacts
Inland Port	Virginia Inland Port (Front Royal, VA)	17 direct jobs, catalyst to another 8,000 jobs ²²	33,600 containers (2008)	5.4 million VMT reduction, \$105,000 greenhouse gas emission savings
Intermodal Terminal	Rickenbacker Intermodal Terminal (Columbus, OH)	Approximately 150 direct jobs at Intermodal facility, projection of 20,000 jobs at freight industrial park ²³	250,000 annual “lifts”	49 million fewer truck miles in Ohio in 10 years - \$2 M in pavement maintenance savings, \$2,45 M in accident reductions
Bulk or Transload Terminal	Savage Safe Handling (Auburn, ME)	100 direct jobs ²⁴ with other businesses attracted nearby	500,000 tons per year – 5,000 railcars per year	\$619,500 accident reduction, \$506,000 pavement maintenance from using rail over truck
Distribution Center	Family Dollar (Marianna, FL)	515 direct jobs; catalyst to another 155 jobs ²⁵	90 trucks/day – 32,000 trucks per year	16.2 million in truck VMT per year
Warehouse	Murphy Warehouses	20 direct jobs per warehouse facility (9 facilities in region) ²⁶	10,000+ carloads per year	1.3 million VMT reduced annually. 6,730 fewer greenhouse gas tons emitted
Integrated Logistics Center	AllianceTexas (Fort Worth, TX)	28,000 direct jobs ; catalyst to another 63,388 jobs ²⁷	600,000 intermodal rail lifts per year	N/A
Hub Terminal	Old Dominion (Morristown, TN)	750 direct jobs ²⁸	75 to 90 trucks per day	21.5 million to 25.9 million truck VMT per year

Planning and Strategy

Companies most often locate new facilities to expand, contract or change their market position, as discussed elsewhere in this report. Of the case studies evaluated, most companies were establishing the facilities in order to expand their capabilities in an existing market or expand into new markets. Virginia Inland Port

²² Edwards, Greg “The Virginia Inland Port: Commonwealth Transportation Board” [Presentation] Norfolk, VA: Virginia Port Authority, November 7, 2007.

²³ Information provided by facility representative based on an independent study conducted by the Rickenbacker facility.

²⁴ Information obtained from Savage Safe Handling current and former facility representatives.

²⁵ Information obtained from a Family Dollar representative and presentation.

²⁶ Murphy Warehouse “Company Profile” [website]. Minneapolis, MN. <http://www.murphywarehouse.com/> (Accessed May 2010).

²⁷ Hillwood Development Co., LLC, and <http://www.alliancetexas.com/Research/AllianceTexasFacts/EconomicImpact/tabid/202/Default.aspx>.

²⁸ Information obtained from Old Dominion facility representative.

(VIP) and Rickenbacker were both developed to address capacity concerns in existing facilities. In the case of VIP it was the ports of Norfolk, Newport and Portsmouth that were in the need of additional intermodal capacity. The Discovery Park intermodal facility had reached its capacity creating the need for the Rickenbacker facility. Savage Safe Handling, on the other hand, identified an opportunity to enter an existing market and compete based on the ability to provide materials more efficiently.

Key Site Selection Criteria

Chapter 6 provides an overview of the key criteria and data requirements to be considered when companies make site selection decisions. In developing the case studies, many of these criteria were cited as factors that drove the companies to site their facilities in the locations that were selected.

It is worth emphasizing that proximity and/or access to markets, especially as it related to business supply chain networks, was almost universally the strategic, high-level driving factor to determine the local or regional area to site a freight facility. Most of the other site selection factors were then used to refine the site selection process to specific, sometime competing sites.

Proximity or Access to Key Markets

The ability to access key markets was the most important element in most of the companies' decision making for site selection. Savage Safe Handling located in Auburn, Maine primarily due to the close proximity to the paper plants that would purchase their chemicals and other related products. Companies such as the LTL operation of Old Dominion or the truck-based distribution of Family Dollar based their site selections on serving specific markets within their company's established supply chain logistics model. Large facilities such as Alliance or Rickenbacker - which have a wide range of modal options and service offerings - are able to partially drive the market to utilize their services and provide a range of distribution, consolidation, and assembly services to handle major national freight flows.

Interaction with Transportation Network

The ability of the company to access specific transportation network capabilities also critically impacted location decisions. Proximity to highway ramps was a primary criterion for some companies, such as Old Dominion and Family Dollar. Class 1 rail access was critical for site selection of rail-dependent facilities such as Rickenbacker and Alliance. In other cases, the access needs have been more dynamic. Rail access was not originally a requirement for Murphy Warehouses, but in recent years, they have made sites with rail access (e.g., a rail siding) a priority allow for multi-modal shipping options.

Some companies, such as Family Dollar and Old Dominion, site facilities based on their own internal transportation network. In the case of Old Dominion, their Morristown, Tennessee facility was developed primarily because of Old Dominion's existing east/west corridor of similar facilities in this region. Other facilities, such as the Rickenbacker Intermodal Facility, were located largely due to their position along the Heartland Corridor, providing greatly improved double-stack rail service for Norfolk Southern between the east coast and Chicago.

Even though the Alliance facility handles more freight volume in tonnage by rail and truck, the original development of the ILC began with the air cargo facilities at Alliance. Access to the nearby cargo airports provides Alliance and Rickenbacker with another mode of transport for freight, specifically high value, low weight freight. The presence of an airport allows these facilities to provide full-service freight movement opportunities to shippers.

Public Sector Assistance and Incentives

As noted elsewhere in this report, public incentives do not drive location decisions at the strategic level. However, incentives become a potentially differentiating factor as companies narrow their list of potential sites. This was evident with the Family Dollar Case Study after the company had narrowed their site candidates to Cordele, Georgia and Marianna, Florida. The local, county and State support for the Marianna location, which included donation of land, tax exemptions, matching infrastructure funding and several State grants, played a major role in Family Dollar's selection of this site.

The Alliance facility provides another example of proactive public assistance, wherein a public-private partnership was developed between the FAA, the city of Fort Worth and the private development company (Hillwood). The public contribution included land donations as well as construction of utilities, such as water and sewer, and highway infrastructure.

Foreign Trade Zones - another form of public incentive programs – played a part in some decision making. Savage Safe Handling, Virginia Inland Port, Rickenbacker, Alliance and Murphy Warehouses all have Foreign Trade Zone designation as part of their sites.

Labor and Workforce

Labor and workforce availability was not a primary driver for strategic site selection. However, as with public assistance and incentives, this factor often played a role in selecting one site over another within a selected region. An example of this includes Family Dollar, which partially selected their site based on the availability of the workforce in and around Marianna, Florida. Family Dollar received over 6,000 applications for the 515 available jobs at the retail distribution center. Similarly, in the case of Old Dominion, the Morristown, Tennessee site was chosen over the Nashville site primarily because of the greater availability of the workforce in Morristown.

Total Cost Environment

Not all projects provided cost information. However, for those who did, total costs ranged from \$10 million to develop the Old Dominion hub terminal in Morristown, TN to over \$7 billion to develop the Alliance Texas ILC in Fort Worth, TX. There was a wide range of funding scenarios, with Old Dominion providing all of the funding privately, while funding for Rickenbacker and Family Dollar was accomplished through public-private partnerships. The \$112 million development costs of the Rickenbacker facility included \$33 million from Norfolk Southern Railway, \$28.9 million of Federal funding, \$14.3 million from State and regional planning commissions. Family Dollar contributed \$55 million for the construction of their Marianna distribution center and the public commitment has been over \$24 million, in the form of land donations, grants and tax credits.

The \$7.2 billion total investment in the AllianceTexas ILC has been funded primarily with private funds. Just over 5% has come from public sources for roads and other infrastructure. As discussed in the AllianceTexas Case Study, Hillwood has various revenue streams in order to pay back its investment, including a Common Area Maintenance Fee to each building on a per square foot basis.

Limited information regarding payback expectations or results is available as most of the companies are private corporations. This information is however available for the Virginia Inland Port, given that it is owned by a quasi-public entity. VIP was constructed in 1987 and began turning a profit seven years later, in 1994.

In addition to the capital costs of developing these facilities, the total cost environment criteria also considers operating costs, such as labor costs, tax exposure or fuel costs. Companies that rely primarily on truck transportation place particular emphasis on fuel and operating costs. This was shown clearly with the Family Dollar case study, whereby one of their primary site selection criteria was the ability for their trucks that move consumer goods to their store locations to be able to go out, deliver and return in the same day. Similar to fuel costs, labor costs were identified as a critical site selection criterion for Old Dominion. As mentioned in the case study, the eastern part of Tennessee had lost many manufacturing jobs because of the relocation of furniture production facilities, so therefore there was a large available workforce.

Availability and Cost of Suitable Facilities

The availability of suitable facilities was particularly important for the companies whose business model involves purchasing existing warehousing facilities. This was the case for both Murphy Warehouses and Savage Safe Handling. Because of their experience owning and operating many facilities, Murphy Warehouses has specific criteria for potential facilities to acquire; including a minimum size requirement of 150,000 square feet of warehousing.

In addition to facilities, the availability of low cost land and large parcels impacted location decisions, particularly for large intermodal facilities such as Rickenbacker and Alliance. In the case of Alliance, much of the area surrounding Fort Worth had been developed and the tract of land purchased by Hillwood was relatively inexpensive and not yet developed because the area was prone to unpleasant odors because of prevailing winds from a long-defunct nearby livestock market. While the stockyards had long been gone, the stigma remained. This allowed for large parcels of inexpensive land to be purchased and utilized for industrial development.

The case of VIP provides a lesson in ensuring that sites are selected with proper consideration for expansion potential. VIP's development was sporadic with minimal zoning, and therefore there are not as many opportunities for contiguous growth. As mentioned in the case study, the location of the golf course adjacent to VIP is a prime example of this as it hinders further growth.

Utilities

Most of the studied facilities needed to add utilities or capacity to their site as part of the development. The ability to "tie-in" at a close proximity to the site was an important, but not essential criterion for most facilities. Some or all of the costs of the utility services were typically provided by the public as part of the public participation and incentive programs. This was the case with AllianceTexas, as the city of Fort Worth provided the water, sewer and other utilities to support the airport (the airport being the first step in the generation of the ILC).

Permitting and Regulation

Because Savage Safe Handling transloads various chemical and other potentially hazardous materials, it was critical in their location selection that a site was zoned Industrial and that the host city would be amenable to the proposed use of the facility. The developers of the Savage Safe Handling facility in Maine had previous experience with the City of Auburn and were comfortable that City regulators understood the planned operation of Savage Safe Handling. To ease the Family Dollar siting and permitting, Marianna, Florida developed an industrially-zoned distribution park with multiple parcels permitted for freight logistics uses.

Tax Environment

The tax environment was not often cited as a primary site selection criterion. If mentioned as part of the site location decision, it was related to tax incentives. This was the case with Family Dollar with the significant package of tax abatements for developing the facility:

- Ad valorem tax exemptions by the city and county for ten years
- Florida Qualified Target Industry Tax Refund Program
- Florida Rural Jobs Tax Credit of \$1000 per job
- State Rural Enterprise Zone incentives in the form of 2 years worth of Jobs Tax Credits,
- Building Materials Tax Refunds
- Business Equipment Sales Tax Refunds

The Critical Roles of Groundwork and Collaboration

Freight facility developers generally prefer to work with communities that understand the competitive landscape of the freight industry. These communities come to the table with an understanding of the company's goals, as well as how the company and community's goals align. They are able to suggest proposals to help reduce initial investment or operating expense or at least to knowledgeably demonstrate the benefits of specific sites. This provides the most amenable environment for a win-win outcome. Such communities recognize that alignment of public and private sector goals yield benefits for both long into the future.

Companies begin discussions with government and economic development organizations at various times depending on their stage in the location process. The more certain the company is about the location, the more likely they will directly contact officials at the local level (county, city, other) and begin feasibility discussions. If the search is regional (or at an early stage), then the company may decide instead to speak with state or regional officials.

Ideally, a community positioning itself for freight uses (i.e., industrial or freight facility development) will have developed a vision, economic development strategy, land use plan, transportation plan, and zoning regulations which explicitly permit and support these facilities in a variety of ways. Designated areas for freight use should not conflict with other community uses and residential neighborhoods. If any conflicts exist they should be identified with a proposed mitigation strategy. We refer to this type of preparation as "laying the groundwork".

Proactive collaboration through communities and regions can aid in the industrial or freight facility development process through interaction with stakeholders and the public. We refer to these activities as "collaboration". Government and appointed officials can work with local interests to keep everyone informed, involved, and coordinated. For example, they can ameliorate community concerns by ensuring that the community has a broad vision, has been developed in a collaborative way, and calls for land use development that supports the necessary tax base. Such a vision and plans will also transparently acknowledge potential impacts and suggest ways to avoid or mitigate those impacts. Proactive planning will educate the public on the benefits the development can bring to the community, and demonstrate how the community can work to reduce the impact on residents to the greatest extent possible.

Proactive planning and targeting of specific freight facility development provides stronger conditions to be successful at locating freight facilities that can balance the benefits of jobs and tax base while mitigating traffic and other land use development issues. There are many issues on which residents or others may oppose such a development, not the least of which are NIMBY concerns. However, such opposition is less likely to develop traction if the community has already established a transparent process and a sense of trust, during which the public has become aware of the benefits and trade-offs of freight facility development.

Companies view a community's or region's willingness to provide a clear path through the permitting and regulatory process as an amenity or incentive. By providing the company with a reliable picture of what obligations the company needs to meet, which permits it needs to obtain, and a clear timeframe for when these hurdles must be met, the company can more clearly define when the facility will be able to enter the supply chain and generate returns on investment.

9.1 Laying the Groundwork

Laying the groundwork for industrial and/or freight facility development may consist of any or all of the following:

- Prior development of community vision, goals and comprehensive plan
- Education and inclusion of community stakeholders
- Amenable transportation network
- Clearly defined economic development strategy
- Clear and consistent zoning regulations and permitting requirements
- Public utility capacity
- An amenable tax environment
- Public sector incentives

Preparation for successful freight facility development begins with a clear developed vision and set of goals, and the logical steps that the community needs to take to achieve its goals. A vision is not just words on paper, but clear understanding, developed in a collaborative process, of how the community sees itself in the future. This can relate to all types of characteristics, including quality-of-life, economic viability, sustainability, and infrastructure. Relevant to the topic of freight facilities, the vision should include identification of areas for freight and industrial activities along with connections to transportation infrastructure. It should also help identify areas to limit or not allow significant freight activity.

A comprehensive plan, whether at the local, regional or state level, can be an indication that the community has taken responsible charge of its own direction. If well prepared, a comprehensive plan will define community goals for development, as well as the specific transportation, land use, and open space requirements and projects to bring about its goals. When a community is actively seeking or speaking with a potential freight facility or industrial developer, the greatest opportunity for success will come from extensive collaboration and communication. Planners, local elected officials, economic development agencies, regulatory agencies, transportation planners and others, need to be brought into the process so that they can express their concerns and those concerns can be addressed. The same goes for the general public, most specifically those living, working or commuting in proximity to the proposed facility.

In order for the comprehensive plan and vision to be implemented, a community must have sound land-use regulations in place, including zoning regulations, building codes, transportation facility guidelines, and others. Those regulations impact how a company can implement their plans for a particular site and can also give some indication as to how compliance will impact their project development timeline. Knowledge that a community is already familiar with a facility type and has a process in place can be seen as a “location positive”. For example, a community which already houses a bulk terminal will be familiar with the impacts that these might have upon the community and will have a clear process in place for permitting additional facilities using bulk freight. Other communities which do not have this experience might exhibit confusion and delay in responding to the company’s permit applications if they do not have an understanding of a company’s business needs.

Fire codes, land use regulations, traffic regulations, zoning, and hours of operation regulations can all significantly impact the feasibility of a freight facility location. The interpretation of codes and regulations by officials such as fire marshals can have a decisive effect on the ability of a facility to function as planned. Ideally, a community positioning itself for freight uses will have developed land use, transportation and

zoning plans which explicitly permit and support these facilities and which, in some cases, allow for round-the-clock operation. As an aside, development of regulations that are amenable for desired development and which also support community goals and values can be a particular challenge when freight facilities are established at the edges of towns and the neighboring communities have differing views on which uses ought to be provided for and what standards to impose.

The availability of public utilities, such as water and sewer, can be a critical element in site selection. The amount of lead time to develop this infrastructure may end up being prohibitive if they are not already available. Public utility availability and costs are usually investigated through conversations with local economic development agencies and utility providers. Municipalities need to be aware of freight facilities' utility needs and of the capacity that exists to accommodate those utilities.

9.2 Public Sector Assistance and Incentives

The public sector assistance in the forms of tax credits, grants, low-cost loans, training programs, utility discounts, and infrastructure development (referenced earlier in this report) can address specific location shortcomings and are often used to close the gap between a location and its competition. Broadly speaking, incentives do not drive location decisions in the early stages of facility planning. Incentives do not substantially impact the overall feasibility of a site, nor can they ameliorate serious shortcomings. In short, they cannot make a “bad” location into a “good” one. Therefore, incentives are not an early decision factor, but may be a significant factor once the list is reduced to 2-3 candidate sites.

Companies and location consultants have a wide range of perspectives regarding the role and use of public incentives. Some companies view the incentives process as asking the community for handouts and are not willing to ask for any assistance beyond that available as-of-right (e.g., benefits defined by legislation if companies achieve preset hiring or investment targets). Some may even forego incentive offers due to concerns over public perception or future “claw-back” provisions requiring the company to return any benefits if they don't hit agreed-upon benchmarks.

However, many others view incentives as a means for building a critical partnership between company and community to reduce the one-time and operating costs of freight facilities to the point where success may be gained for both sides.

The public sector may also be able to offer information to freight facilities on back-haul and other freight-leveling opportunities. Some companies would find it helpful to obtain information on local freight movement the same way they can for electric, utilities, workforce, and soils. By coordinating this information, the community can ensure that local carriers and freight users run closer to capacity on a more regular basis, providing a strategic advantage. This is the type of informed partnership the public sector can provide may make a difference in ultimate site selection.

Communities can also provide tangible incentives without subsidy by shortening or expediting the permitting timeframe. Communities that understand the company's process and drivers can smooth the permitting process and provide clarity in terms of expectations for the company and the regulatory agencies, resulting in a better defined process and a shorter time to implementation. Income, sales, real estate, and property taxes can all significantly affect the cost environment for freight facilities. Chief among these is property taxes. Real estate taxes can be high on urban facilities on land which might otherwise be used for high-density development. Over time, higher real estate property taxes may drive these parcels into non-freight development and freight facilities will relocate to the urban fringe.

While incentives are often very useful tools, it should be noted that local strategies of building speculative infrastructure, public terminals, and warehouses are unlikely to be successful without a thorough understanding of how these directly address operating economics and forecasted market demand. Freight location decisions rarely respond to a “build it and they will come” approach on the part of the public sector.

This chapter touches on a number of topics that are covered in the companion Guide to Siting Freight Facilities. That document was developed in parallel to this report and can also be obtained through the Transportation Research Board.

NCFRP 23 – Glossary of Terms

Auto terminal. A transload facility for finished motor vehicles moving variously between ocean-going vessels, railcars, and truck trailers.

Backhaul. The process of a transportation vehicle (typically a truck) returning from the original destination point to the point of origin. A backhaul can be with a full or partially loaded trailer, and contrasts to an empty movement.

Barge. The cargo-carrying vehicle that inland water carriers primarily use. Basic barges have open tops, but there are covered barges for both dry and liquid cargoes.

Bottleneck. A section of a highway or rail network that experiences operational problems such as congestion. Bottlenecks may result from factors such as reduced roadway width or steep freeway grades that can slow trucks.

Boxcar. An enclosed railcar, typically 40 or more feet long, used for packaged freight and some bulk commodities.

Breakbulk Cargo. Cargo of non-uniform sizes, often transported on pallets, sacks, drums, or bags. These cargoes require labor-intensive loading and unloading processes. Examples of breakbulk cargo include coffee beans, logs, or pulp.

Bulk Cargo. Cargo that is unbound as loaded; it is without count in a loose unpackaged form. Examples of bulk cargo include coal, grain, and petroleum products.

Bulk Terminal. See “**Transload Terminal**”

Capacity. The physical facilities, personnel and process available to meet the product of service needs of the customers. Capacity generally refers to the maximum output or producing ability of a machine, a person, a process, a factory, a product, or a service. In regards to the transportation system, this term references the ability of the transportation infrastructure to accommodate traffic flow.

Carload. Quantity of freight (in tons) required to fill a railcar; amount normally required to qualify for a carload rate.

Carrier. A firm which transports goods or people via land, sea or air.

City terminal. A carrier operating facility whose chief functions are the intramodal sorting and consolidation of load sets between intercity linehaul and local pickup and delivery; and the management of pickup and delivery services to customers.

Chassis. A trailer-type device with wheels constructed to accommodate containers, which are lifted on and off.

Class I Railroad. A major railroad with annual carrier operating revenues of \$250 million or more. There are seven Class I railroads in the US and Canada: Burlington Northern Santa Fe (BNSF), Canadian National (CN), Canadian Pacific (CP), CSX, Kansas City Southern (KCS), Norfolk Southern (NS), and Union Pacific (UP)

Classification Yard. A railroad terminal area where railcars are grouped together to form train units.

Coastal Shipping. See “Short Sea Shipping”

Contract Carrier. A carrier that does not serve the general public, but provides transportation for hire for one or a limited number of shippers under a specific contract.

Commodity. An Item that is traded in commerce. The term usually implies an undifferentiated product competing primarily on price and availability.

Common Carrier. Any carrier engaged in the interstate transportation of persons/property on a regular schedule at published rates, whose services are for hire to the general public.

Container. A "box", typically ten to forty feet long, which is used primarily for ocean freight shipment. Containers are designed to be moved with common handling equipment, functioning as the transfer unit between modes rather than the cargo itself. For travel to and from ports, containers are loaded onto truck chassis' or on railroad flatcars.

Containerization. A shipment method in which commodities are placed in containers, and after initial loading, the commodities per se are not rehandled in shipment until they are unloaded at destination.

Containerized Cargo. Cargo that is transported in containers that can be transferred easily from one transportation mode to another.

Contract Carrier. Carrier engaged in interstate transportation of persons/property by motor vehicle on a for-hire basis, but under continuing contract with one or a limited number of customers to meet specific needs.

Cross dock facility. A staging facility where inbound items are not received into stock, but are prepared for shipment to another location or for retail stores.

Distribution Center (DC). The warehouse facility which holds inventory from manufacturing pending distribution to the appropriate stores.

Dock. A space used or receiving merchandise at a freight terminal.

Double-stack. Railcar movement of containers stacked two high.

Drayage. Transporting of air, rail or ocean freight by truck to an intermediate or final destination; typically a charge for pickup/delivery of goods moving short distances (e.g., from marine terminal to warehouse).

Drop Yard. A situation in which an equipment operator deposits a trailer or boxcar at a facility at which it is to be loaded or unloaded.

Durable Goods. Generally, any goods whose continuous serviceability is likely to exceed three years.

Flatbed. A trailer without sides used for hauling machinery or other bulky items.

Freight Forwarder. A person whose business is to act as an agent on behalf of a shipper. A freight forwarder frequently consolidates shipments from several shippers and coordinates booking reservations.

Freight Village. See “**Integrated Logistics Center**”

Foreign Trade Zone (FTZ). An area or zone set aside at or near a port or airport, under the control of the U.S. Customs Service, for holding goods duty-free pending customs clearance.

Geographic Information Systems (GIS). An information system that integrates, stores, edits, analyzes, shares, and displays geographic or spatial information for analysis and decision making

Hub. A common connection point for devices in a network. Referenced for a transportation network, as in "hub and spoke," which is common in the airline and trucking industries.

Hub terminal. Carrier operating facility whose principal function is the intramodal resorting and reconsolidation of inbound into outbound load sets for continuation in intercity linehaul

Inbound Logistics. The movement of materials from shippers and vendors into production processes or storage facilities.

Industrial yard. A railroad city terminal permitting the transfer is of railcars between tracks for local and intercity road trains

Inland Port. A physical site located away from traditional coastal or land borders with the purpose of facilitating and processing international trade through multi-modal transportation assets and typically offering value-added services as goods move through the supply chain

Integrated Logistics Center. A clustering of activities related to transport, logistics and the distribution of goods, for domestic and/or international are carried out by various operators. Also known as a “freight village”

Interline Freight. Freight moving from point of origin to destination over the lines of two or more transportation companies.

Intermodal Transportation. Transporting freight by using two or more transportation modes such as by truck and rail or truck and oceangoing vessel. For example, a shipment moved over 1000 miles could travel by truck for one portion of the trip, and then transfer to rail at a designated terminal.

Intermodal Terminal. A location where links between different transportation modes and networks connect.

Inventory. The number of units and/or value of the stock of goods (raw materials, in-process, finished goods) a company holds.

Just-in-Time (JIT). An inventory control system that controls material flow into assembly and manufacturing plants by coordinating demand and supply to the point where desired materials arrive just in time for use. An inventory reduction strategy that feed production lines with products delivered "just-in-time".

Lead-time. The total time that elapses between an order's placement and it receipt. It includes the time required for order transmittal, order processing, order preparation, and transit.

Less-Than-Containerload/Less-Than-Truckload (LCL/LTL). A container or trailer loaded with cargo from more than one shipper; loads that do not by themselves meet the container load or truckload requirements.

Level of Service (LOS). A qualitative assessment of a road's operating conditions. For local government comprehensive planning purposes, level of service means an indicator of the extent or degree of service provided by, or proposed to be provided by, a facility based on and related to the operational characteristics of the facility. Level of service indicates the capacity per unit of demand for each public facility.

Line Haul. The intercity movement of freight over the road/rail from origin terminal or market to destination terminal or market, often over long distances.

Load Center. A seaport engaged in container trade that acts as a high volume transfer point for goods moving long distances inland, as well providing service to its regional hinterland

Logistics. All activities involved in the management of product movement; delivering the right product from the right origin to the right destination, with the right quality and quantity, at the right schedule and price.

Node. A fixed point in a firm's logistics system where goods come to rest; includes plants, warehouses, supply sources, and markets.

Outbound Logistics. The process related to the movement and storage of products from the end of the production line to the end user.

Port (sea and air). A place serving as a harbor, airport, or point of entry and exit for incoming and outgoing shipments

Post-Panamax. Refers to ships that are too large to pass through the Panama Canal, such as contemporary supertankers and the largest container ships.

Piggyback. A rail/truck service. A shipper loads a highway trailer, and a carrier drives it to a rail terminal and loads it on a flatcar; the railroad moves the trailer-on-flatcar combination to the destination terminal, where the carrier offloads the trailer and delivers it to the consignee.

Pool/Drop Trailers. Trailers that are staged at facilities for preloading purposes.

Private Carrier. A carrier that provides transportation service to the firm that owns or leases the vehicles and does not charge a fee.

Private Warehouse. A company owned warehouse.

Pull Logistics System. "Just in time" logistics system driven by customer demand and enabled by telecommunications and information systems rather than by manufacturing process and inventory stockpiling.

Purchase Order (PO). The purchaser's authorization used to formalize a purchase transaction with a supplier. The physical form or electronic transaction a buyer uses when placing an order for merchandise.

Push Logistics System. Inventory-based logistics system characterized by regularly scheduled flows of products and high inventory levels.

Rail Siding. A very short branch off a main railway line with only one point leading onto it. Sidings are used to allow faster trains to pass slower ones or to conduct maintenance.

Regional Railroad. Railroad defined as line-haul railroad operating at least 350 miles of track and/or earns revenue between \$40 million and \$272 million (2002).

Reverse logistics. A specialized segment of logistics focusing on the movement and management of products and resources after the sale and after delivery to the customer. Includes product returns and repair for credit.

Receiving. The function encompassing the physical receipt of material, the inspection of the shipment for conformance with the purchase order (quantity and damage), the identification and delivery to destination, and the preparation of receiving reports.

Radio Frequency (RFID). A form of wireless communication that lets users relay information via electronic energy waves from a terminal to a base station, which is linked in turn to a host computer. The terminals can be placed at a fixed station, mounted on a forklift truck, or carried in the worker's hand. The base station contains a transmitter and receiver for communication with the terminals. When combined with a bar-code system for identifying inventory items, a radio-frequency system can relay data instantly, thus updating inventory records in so-called "real time".

Seasonality. Repetitive pattern of demand from year to year (or other repeating time interval) with some periods considerably higher than others. Seasonality explains the fluctuation in demand for various recreational products, which are used during different seasons.

Shipper. Party that tenders goods for transportation. Often used loosely to mean any buyer of freight transportation services, whether shipping or receiving goods.

Shipping Manifest. A document that lists the pieces in a shipment.

Short line Railroad. Freight railroads that are not Class I or Regional Railroads, and that operate less than 350 miles of track and earn less than \$40 million.

Short-sea Shipping. Also known as coastal or coastwise shipping, describes marine shipping operations between ports along a single coast or involving a short sea crossing.

Stock Keeping Unit (SKU). A category of unit with unique combination of form, fit and function.

Switching and Terminal Railroad. Railroad that provides pick-up and delivery services to line-haul carriers.

Supply Chain. Starting with unprocessed raw materials and ending with final customer using the finished goods.

Third-party Logistics (3PL) Provider. A specialist in logistics who may provide a variety of transportation, warehousing, and logistics-related services to buyers or sellers. These tasks were previously performed in-house by the customer.

Throughput. A warehousing output measure that considers the volume (weight and number of units) of items stored during a given time period.

Ton-mile. A measure of output for freight transportation; reflects weight of shipment and the distance it is hauled; a multiplication of tons hauled by the distance traveled.

Transit time. The total time that elapses between a shipment's delivery and pickup.

Transload facility. A receiving and distributing facility for lumber, grain, concrete, petroleum, aggregates and other products.

Transloading. Transferring bulk shipments from the vehicle/container of one mode to that of another at a terminal interchange point.

Truckload (TL). Quantity of freight required to fill a truck, or at a minimum, the amount required to qualify for a truckload rate.

Twenty-foot Equivalent Unit (TEU). The 8-foot by 8-foot by 20-foot intermodal container is used as a basic measure in many statistics and is the standard measure used for containerized cargo.

Unit Train. A train of a specified number of railcars handling a single commodity type which remain as a unit for a designated destination or until a change in routing is made.

Vehicle Miles of Travel (VMT). A unit to measure vehicle travel made by a private vehicle, such as an automobile, van, pickup truck, or motorcycle.

Warehouse. Storage place for products. Principal warehouse activities include receipt of product, storage, shipment and order picking.

Sources

This glossary was assembled from a number of sources, including:

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Appendix A: Public and Private Sector Data Collection Instruments (DCI)

NCFRP Project 23

Economic and Transportation Drivers for Siting Freight

Questionnaire to Evaluate Current Public Understanding

BACKGROUND AND PURPOSE

The National Cooperative Freight Research Program (NCFRP), an initiative of the National Academy of Sciences' Transportation Research Board (TRB), is conducting a study entitled Economic and Transportation Drivers for Siting Freight Intermodal and Warehouse Distribution Facilities. The purpose of this study is to develop a guidebook to inform public policy makers about the complex issues surrounding the siting of intermodal freight facilities and distribution centers.

This web-based data collection instrument (DCI) is the first step in helping the public sector understand how private companies make logistics site selection decisions, understand the issues and constraints, and determine how they can more successfully participate in the process. Additional detail on these issues will be obtained through a literature review, stakeholder interviews and case studies of different types of freight logistics facilities over the next few months.

We are separately seeking input from the public sector – economic development staff, elected officials, planners, and private sector stakeholders – to gauge the current understanding of these issues. As a private sector stakeholder (business, trade organization). Your input is very important to the success of this research project and if you would like to suggest a case study for further study or would like to be contacted for a more detailed interview, please indicate that in the questionnaire.

Thank you for taking the time to answer the following questions. Please note that we will not publish any individually identifiable information without the respondent's written permission.

QUESTIONS FOR PRIVATE SECTOR FIRMS, STAKEHOLDERS AND ORGANIZATIONS

- How important is access to intermodal freight and/or distribution facilities in selecting a community for successful business operations?
 - Very Important
 - Important
 - Neither Important nor Unimportant
 - Unimportant
 - Very Unimportant

- How important are the public sector zoning and land use policies of a municipality (community, region) as part of the site selection process?
 - Very Important
 - Important
 - Neither Important nor Unimportant
 - Unimportant
 - Very Unimportant

3. Do you believe a municipality's (community, region) planning and zoning regulations should include provisions specifically related to intermodal freight and warehouse/distribution facility development and siting?
- Yes (explain):
 - No (explain):
 - Not certain
4. Have you ever removed communities from consideration because they did not adequately plan for or invest in facilities of this type? (Or their policies were not accommodating to freight facilities?)
- Yes (explain):
 - No (explain):
 - Not certain
5. In what ways would you recommend municipalities (communities, regions) support the development and siting of freight facilities?
- State/local tax incentives for freight distribution businesses (e.g., property tax abatement, training)
 - Inventory of industrial sites
 - Industrial rail access program
 - Expedited permitting processes
 - Technical development guidance/one-stop shopping
 - Other financing mechanisms
 - Other (explain)
6. To what extent are each of the following issues important factors in site selection decision-making by intermodal freight and warehouse/distribution facility users? (*scaled response, 1 to 5 scale*)
- 1 2 3 4 5 Proximity to major highways (Interstates, freeways, etc.)
 - 1 2 3 4 5 Shovel-ready building sites
 - 1 2 3 4 5 The ability to operate on a 365/24/7 basis
 - 1 2 3 4 5 The proximity of customers, shippers and/or receivers of goods and freight
 - 1 2 3 4 5 Connectivity to other modes (rail, sea, air)
 - 1 2 3 4 5 Available workforce and labor costs
 - 1 2 3 4 5 Quality of workforce and skills/education
 - 1 2 3 4 5 Taxation and business environment
 - 1 2 3 4 5 Permitting and regulation
 - 1 2 3 4 5 Other operating costs
 - 1 2 3 4 5 Other (describe):
7. When a major intermodal freight or warehouse/distribution facility is proposed for development within a municipality (community, region), what do you believe would be the most important concerns for each of the following groups? (Rank 1-5 for each group, with 1 being most important and 5 least important):

GROUP	POTENTIAL CONCERNS				
	Maintaining Community Safety	Highway Congestion	Economic Development & Jobs	Environmental Impacts	Community Quality of Life (e.g., noise, light, etc.)
Residents					
Elected Officials					
Planning and Regulatory Officials					
Business Community					

8. What types of suggestions/recommendations do you have for municipalities when considering updating land use and transportation plans/zoning (e.g. integrated freight zones, freight villages, overlay districts, etc)?
9. Are you aware of any “clusters” of related intermodal freight and/or warehouse/distribution facilities in your municipality (community, region), where related businesses have located near each other to facilitate manufacturing, provide access to suppliers and/or market, and assembly or packaging processes?
- Yes (please answer question 9.A below)
- No
- Not certain

9. A. If you answered “yes” to the above question, describe the situation(s) to the extent possible, including the types and/or names of the facilities, their locations, etc.:

10. Has your municipality (community, region) pursued or received interest in any development applications for new or expanded intermodal freight or warehouse/distribution facilities within the last 5 years?
- Yes (please answer question 10.A below)
- No (please answer question 10.B below)
- Not certain

10.A. As part of the development inquiry process for an intermodal freight or warehouse/distribution facility, what were the competitive advantages and disadvantages of your municipality (community, region)?

10.B. What are the competitive factors that have limited your municipality’s (community, region) participation in these development applications?

Questionnaire to Evaluate Current Private Understanding

BACKGROUND AND PURPOSE

The National Cooperative Freight Research Program (NCFRP), an initiative of the National Academy of Sciences' Transportation Research Board (TRB), is conducting a study entitled Economic and Transportation Drivers for Siting Freight Intermodal and Warehouse Distribution Facilities. The purpose of this study is to develop a guidebook to inform public policy makers about the complex issues surrounding the siting of intermodal freight facilities and distribution centers.

This web-based data collection instrument (DCI) is the first step in helping the public sector understand how private companies make logistics site selection decisions, understand the issues and constraints, and determine how they can more successfully participate in the process. Additional detail on these issues will be obtained through a literature review, stakeholder interviews and case studies of different types of freight logistics facilities over the next few months.

We are separately seeking input from the public sector – economic development staff, elected officials, planners, and private sector stakeholders – to gauge the current understanding of these issues. As a private sector stakeholder (business, trade organization). Your input is very important to the success of this research project and if you would like to suggest a case study for further study or would like to be contacted for a more detailed interview, please indicate that in the questionnaire.

Thank you for taking the time to answer the following questions. Please note that we will not publish any individually identifiable information without the respondent's written permission.

QUESTIONS FOR PRIVATE SECTOR FIRMS, STAKEHOLDERS AND ORGANIZATIONS

11. How important is access to intermodal freight and/or distribution facilities in selecting a community for successful business operations?
 - Very Important
 - Important
 - Neither Important nor Unimportant
 - Unimportant
 - Very Unimportant

12. How important are the public sector zoning and land use policies of a municipality (community, region) as part of the site selection process?
 - Very Important
 - Important
 - Neither Important nor Unimportant
 - Unimportant
 - Very Unimportant

13. Do you believe a municipality's (community, region) planning and zoning regulations should include provisions specifically related to intermodal freight and warehouse/distribution facility development and siting?
 - Yes (explain):
 - No (explain):
 - Not certain

14. Have you ever removed communities from consideration because they did not adequately plan for or invest in facilities of this type? (Or their policies were not accommodating to freight facilities?)

- Yes (explain):
- No (explain):
- Not certain

15. In what ways would you recommend municipalities (communities, regions) support the development and siting of freight facilities?

- State/local tax incentives for freight distribution businesses (e.g., property tax abatement, training)
- Inventory of industrial sites
- Industrial rail access program
- Expedited permitting processes
- Technical development guidance/one-stop shopping
- Other financing mechanisms
- Other (explain)

16. To what extent are each of the following issues important factors in site selection decision-making by intermodal freight and warehouse/distribution facility users? (*scaled response, 1 to 5 scale*)

1 2 3 4 5 Proximity to major highways (Interstates, freeways, etc.)

1 2 3 4 5 Shovel-ready building sites

1 2 3 4 5 The ability to operate on a 365/24/7 basis

1 2 3 4 5 The proximity of customers, shippers and/or receivers of goods and freight

1 2 3 4 5 Connectivity to other modes (rail, sea, air)

1 2 3 4 5 Available workforce and labor costs

1 2 3 4 5 Quality of workforce and skills/education

1 2 3 4 5 Taxation and business environment

1 2 3 4 5 Permitting and regulation

1 2 3 4 5 Other operating costs

1 2 3 4 5 Other (describe):

17. When a major intermodal freight or warehouse/distribution facility is proposed for development within a municipality (community, region), what do you believe would be the most important concerns for each of the following groups? (Rank 1-5 for each group, with 1 being most important and 5 least important):

GROUP	POTENTIAL CONCERNS				
	Maintaining Community Safety	Highway Congestion	Economic Development & Jobs	Environmental Impacts	Community Quality of Life (e.g., noise, light, etc.)
Residents					
Elected Officials					
Planning and Regulatory Officials					
Business Community					

18. What types of suggestions/recommendations do you have for municipalities when considering updating land use and transportation plans/zoning (e.g. integrated freight zones, freight villages, overlay districts, etc)?
19. Are you aware of municipalities, counties or regions that encourage/plan for “clustering” of related intermodal freight and/or warehouse/distribution facilities in which related businesses locate near each other to facilitate manufacturing, assembly or packaging processes? (Examples on a large scale are EU freight villages, Watsonville, Centerpoint, Alliance in Texas, wholesale food markets, etc.)
- Yes (*please answer question 9.A below*)
- No
- Not certain

19. A. If you answered “yes” to the above question, describe the situation(s) to the extent possible, including the location(s), types of facilities, etc.:

Appendix B: List of Interviews

Company	Role	Industry Type
Becton Dickinson (retired)	Shipper	Medical Devices Manufacturer
BNSF	Carrier	West Class I Railroad
Boeing	Shipper	Aircraft Manufacturer
CSX (retired)	Consultant	East Class I Railroad, Consultant
Cushman & Wakefield	Realty	Warehouse Real Estate
Diamond Head Associates	Consultant	Simulation Modeling
Food Marketing Group	Consultant	Food Logistics
Grubb & Ellis	Realty	Warehouse Real Estate
Housatonic RR/HRR Logistics	Carrier	Short-Line Railroad, Bulk Terminal
IBM Networks	Consultant	Software Services
Jack Kuchta Inc	Consultant	Supply Chain Design Consultants
Johns Hopkins University - Enterprise Development	Consultant	Education, Former Transportation Official
Murphy Warehouse Company	Shipper	3PL
Saia	Carrier	Less-Than-Load
Staples	Shipper	Big Box Retailer
Terminal Corp	Panel Member	Trucking and Warehousing
TJX	Shipper	Big Box Retailer
Tompkins Associates	Consultant	Supply Chain Design Consultants
Transplace	Shipper	3PL
WATCO	Carrier	Short-Line Railroad
Whirlpool	Shipper	White Goods Manufacturer