

Jefferson County Ports

Phase I Feasibility Analysis

January 2010

Prepared for :
Jefferson County Port Authority

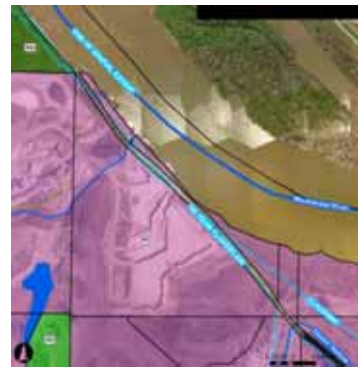


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Abbreviations and Acronyms

AAPA	American Association of Port Authorities
AOR	above the Ohio River
ARRA	American Recovery & Reinvestment Act
BNSF	Burlington Northern Railroad
COB	container-on-barge
EPA	Environmental Protection Agency
IP	identity preserved (grains)
MARAD	Maritime Administration
MoDOT	Missouri Department of Transportation
mph	miles per hour
MT	metric ton (2,204 pounds)
PMSL	Port of Metropolitan St. Louis
PSGP	Port Security Grant Program
RFA	Renewable Fuels Association
RFS	Renewable Fuel Standards
SEMO	Southeastern Missouri Regional Port Authority
SWOT	Strengths, Weaknesses, Opportunities, Threats
TEU	twenty-foot equivalent unit
ton	Short ton (2,000 pounds)
UPRR	Union Pacific Railroad
USACE	U.S. Army Corps of Engineers
VPPPA	Voluntary Property Purchase Plan Area

1 Introduction

1.1 Project Description

Jefferson County Port Authority, based in Hillsboro, Missouri, is a part of the economic development agency of Jefferson County that is seeking to develop one or more public port facilities within their jurisdiction. Jefferson County Port Authority does not currently operate or manage a specific port property. However, they are exploring land redevelopment opportunities for various sites on the Mississippi River with the objective of creating a cluster of public port facilities, private port and waterfront developments and public-private partnership land redevelopment and economic development opportunities. For this report, four sites are under consideration;

- Pevely Site
- Herculaneum Site
- Crystal City Site
- LaRoche Site

Two sites, Herculaneum and Crystal City, are potentially available for such use. The objective of this study will be to evaluate the suitability of those sites and to prepare a conceptual plan for site improvements. Based on the combined analysis of both sites, this report makes recommendations as to the possible uses of the sites, potential site layout and the conceptual development costs. A second phase of this study will include the work necessary to confirm land availability and suitability for port use as well as perform environmental, permitting and economic analysis of the project. The following provides a port feasibility analysis for multi-modal port operations (e.g., river, road, and rail).

Benchmarking the existing site conditions and cargo market in the greater St. Louis port region is the objective of this analysis to evaluate whether these parameters will support a river terminal development at the four sites. A further objective is to prepare a range of possible development options and refine those options into a recommended plan. To that end, Jefferson County Port Authority retained the transportation consulting firm of TranSystems to perform a two-phase port Master Plan. This report represents the product of Phase I of that analysis.

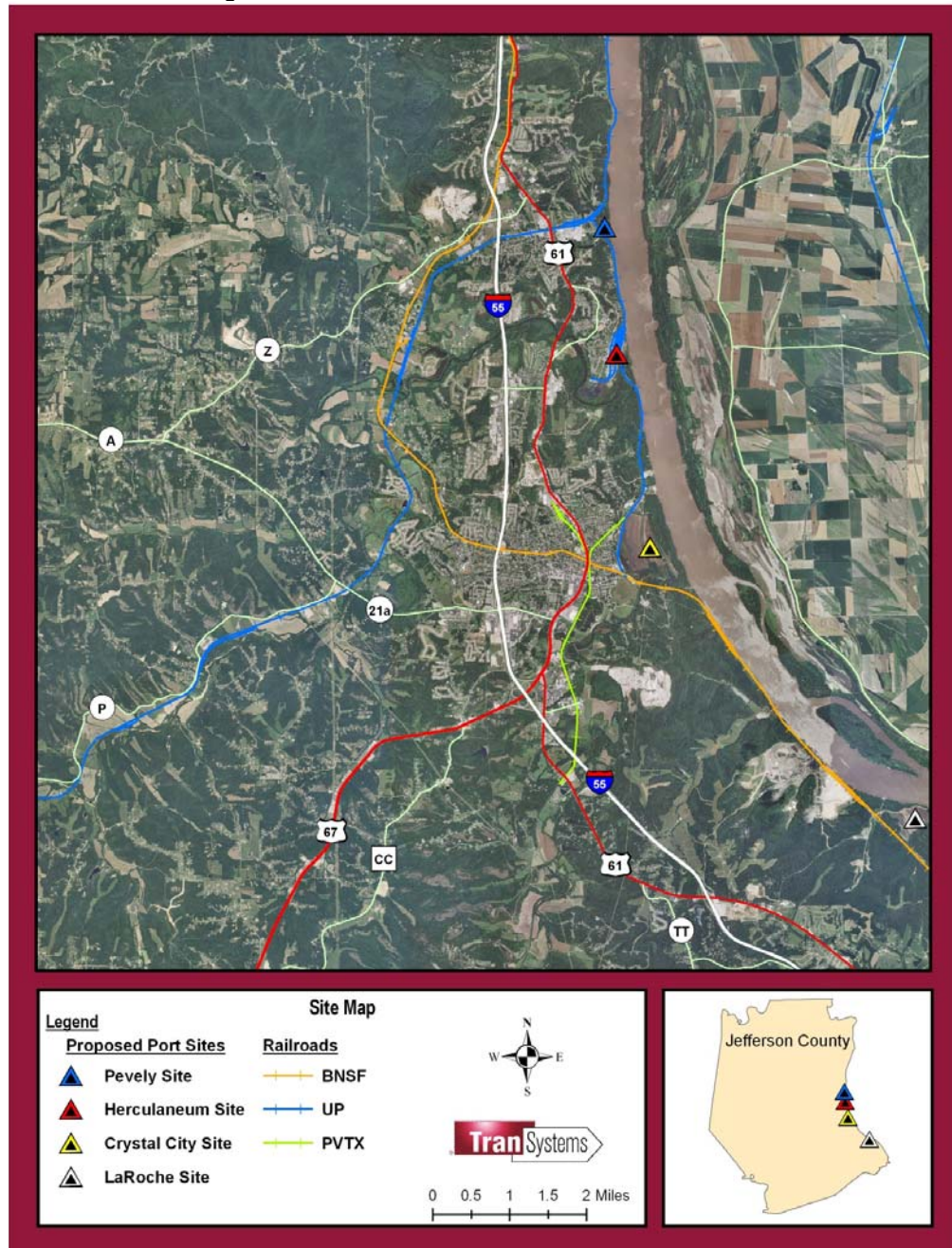
The scope of work that was used to prepare this report is summarized as follows:

- **Trade Background** - A review of total throughput and major commodities included corn, soybeans, by-products, fertilizers, steel and metal products, petroleum products, and ethanol. The historical throughput of the Port of St Louis Metropolitan Area was used as the regional benchmark, and the commodity flow through an area located on both banks of the Mississippi River from mile 138.8 through mile 208.8 above the Ohio River junction, was evaluated.
- **Analysis of Competitive Position for Local and Hub Traffic** - The nature and intensity of competition was evaluated for a number of factors including location of production or consumption, the relative cost and quality of transport links, and the availability of suitable handling and storage facilities.
- **Strategic Stakeholder Engagement** - A Port Study Committee has been established by initiating the engagement of strategic stakeholders including representation from the Port Authority, MoDOT, and City/County Administration.
- **Trade Level Forecasts** - Low, high and medium projections for significant cargos were quantified in forecasts for 10-year, 20-year and 30-year planning horizons.
- **Alternative Development Workshop** - A series of Alternatives Development Workshops were held to assess the opportunities and constraints within the study area and to evaluate future design guidelines.
- **Conceptual Development Alternatives** - Based on the findings of previous tasks, a suite of conceptual development alternatives were prepared for the Doe Run properties. These development alternatives were based on commodity type and the operational needs and include a conceptual development budget for estimating potential economic impacts.
- **Economic Modeling and Analysis** - The various reuse scenarios for the Herculaneum site were modeled to explore the potential impacts of industries and businesses that could utilize any or all types of port uses and other land uses. These impacts include such items as jobs created, salary, capital expenditure, and value of cargo data.

1.2 Site Description

This study area includes the integration and consideration of up to potentially four sites owned and/or adjacent to various public and private entities including Dow Chemical Company, Doe Run Company, successors to Pittsburg Plate Glass (PPG), and River Cement Company (formerly owned by LaRoche Industries, Inc.). Each of these entities have expressed interest in redevelopment or repurposing of a portion of their property. These four sites under consideration - Pevely Site, Herculaneum Site, Crystal City Site, and LaRoche Site - are within the boundaries of Jefferson County, Missouri approximately 20 to 30 miles south of St. Louis, and are identified in Figure 1-1.

Figure 1-1: Location of Four Sites for Consideration



They are all candidates for supporting a mix of upland commercial/industrial uses along with riverfront port activities. However, the primary attention of this report is given to the Herculaneum and Crystal City sites. These sites have the highest immediate potential for redevelopment and are expected to form the core nucleus of the Jefferson County port developments. As river port activity in Jefferson County grows, the other sites may be developed to fill the additional demand.

2 Existing Conditions

2.1 Site Assessment

The conditions present at the existing Herculaneum site and Crystal City site were evaluated in site meetings and subsequent discussions with Doe Run engineering staff, Crystal City planning staff, as well as Jefferson County planning and transportation staff. Key findings from these meetings include:

- Layout and assessment of areas included in the Doe Run smelter and lead processing plant including lead smelter repurposing schedule and objectives.
- Site assessment of river frontage available for port development in both Herculaneum and Crystal City
- Mapping and visual assessment of properties available for repurposing and port development
- Survey of Herculaneum properties to be retained or not currently available for development
- Review of current and planned roads and circulation patterns as well as evaluation of potential new intersection alignments and access road rights of way
- Review of current rail access configuration and use
- Introduction to land use patterns in the surrounding community

Findings of the site assessment are critical to establishing the initial land use priorities (Section 5) and identifying the areas that are best suited to port development. Specific *Key Findings* are discussed in detail in the following sections:

2.1.1 Existing Lead Smelter

Newly adopted emissions limits for SO₂ at Herculaneum and EPA's revised National Ambient Air Quality Standard for lead will require Doe Run to modify their existing smelting operations by 2016. Doe Run is evaluating all options to meet the new standards and has been actively involved in the Jefferson County Port initiative. In Phase II of the port study, Doe Run will continue to work with all stakeholders and support the potential port development.

2.1.2 Riverfront

Usable river frontage immediately adjacent to the site comprises approximately 1,700 feet to 1,900 feet between the bluffs to the north and Joachim Creek to the south. Beyond Joachim Creek to the south, there is another 18 acres of undeveloped land with an additional 1,900 feet of river frontage located to the east of the railroad tracks.

Figure 2-1: Doe Run Riverfront Facilities

Dry Bulk Float



Liquid Bulk Mooring



Water Intake

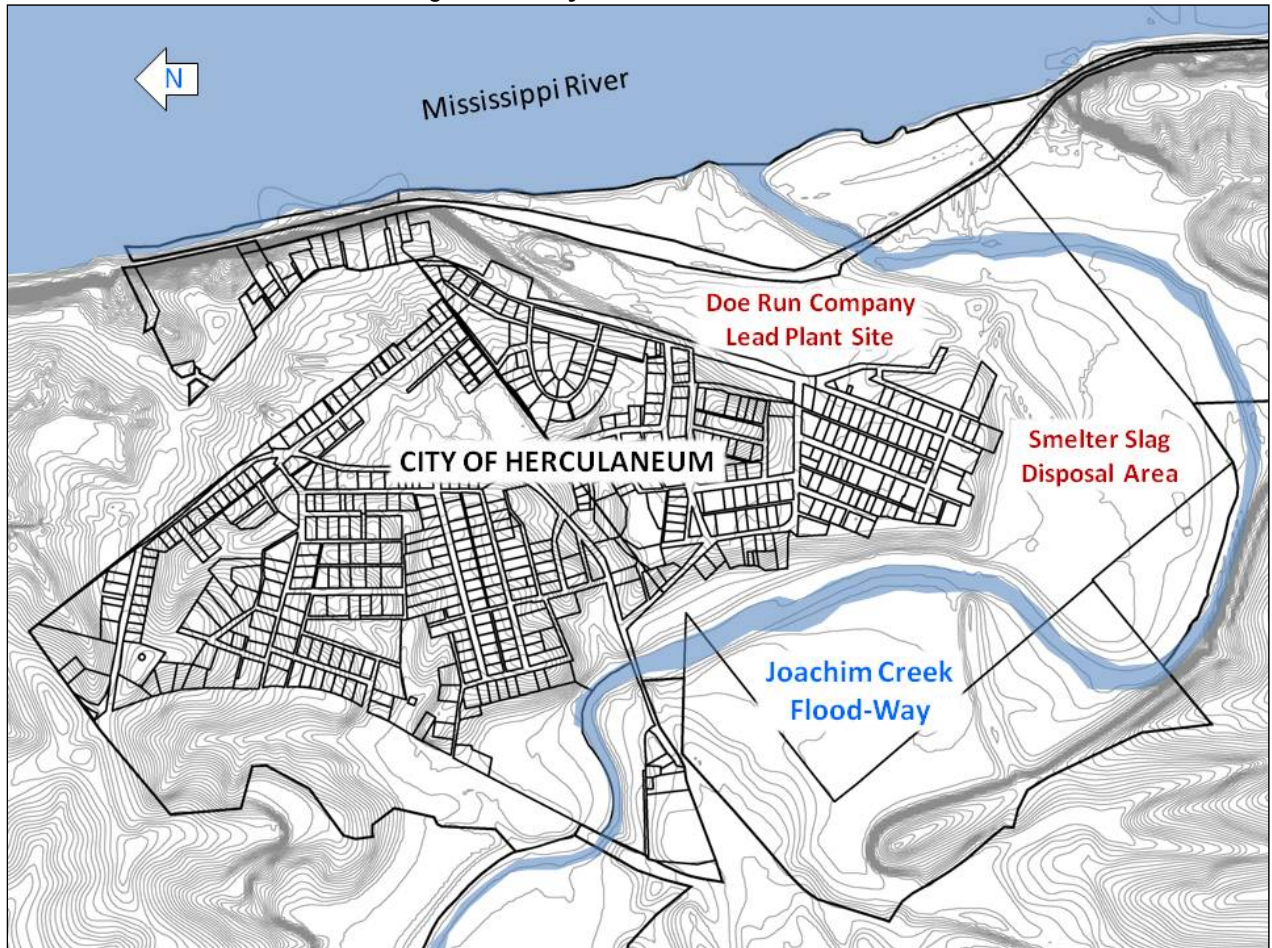


Doe Run Company currently maintains three existing waterfront facilities shown in **Figure 2-1** above; a dry bulk unloading float, caissons and conveyor; a liquid bulk unloading facility, caissons and pipeline; and a process water pumping station. The unloading float was originally designed to receive lead concentrate by barge for smelting at the plant. However, at this time it is not being used. The liquid bulk facility was for sulfuric acid used in the lead process. It is currently used infrequently. Process water is used at the plant, but use will be reduced significantly with closure of the smelting operation.

2.1.3 City of Herculanum Terrain

Bluffs and steep terrain are a prominent regional characteristic. However, the City of Herculanum and the Doe Run lead smelter are mostly located between the bluffs, on a terrace created by the confluence of Joachim Creek with the Mississippi River. The combination of Mississippi River frontage, low lying terrace land and Union Pacific Railroad (UPRR) access are the principal assets of the Herculanum site. However, the terrain also combines to limit the potential development of the site, with a significant slope break (Figure 2-2) and residential uplands on the north and south, along with the Joachim Creek floodway to the west. Within the Doe Run lead plant site and surrounding town, additional minor slope breaks create natural boundaries and potential barriers to construction.

Figure 2-2: City of Herculanum Terrain

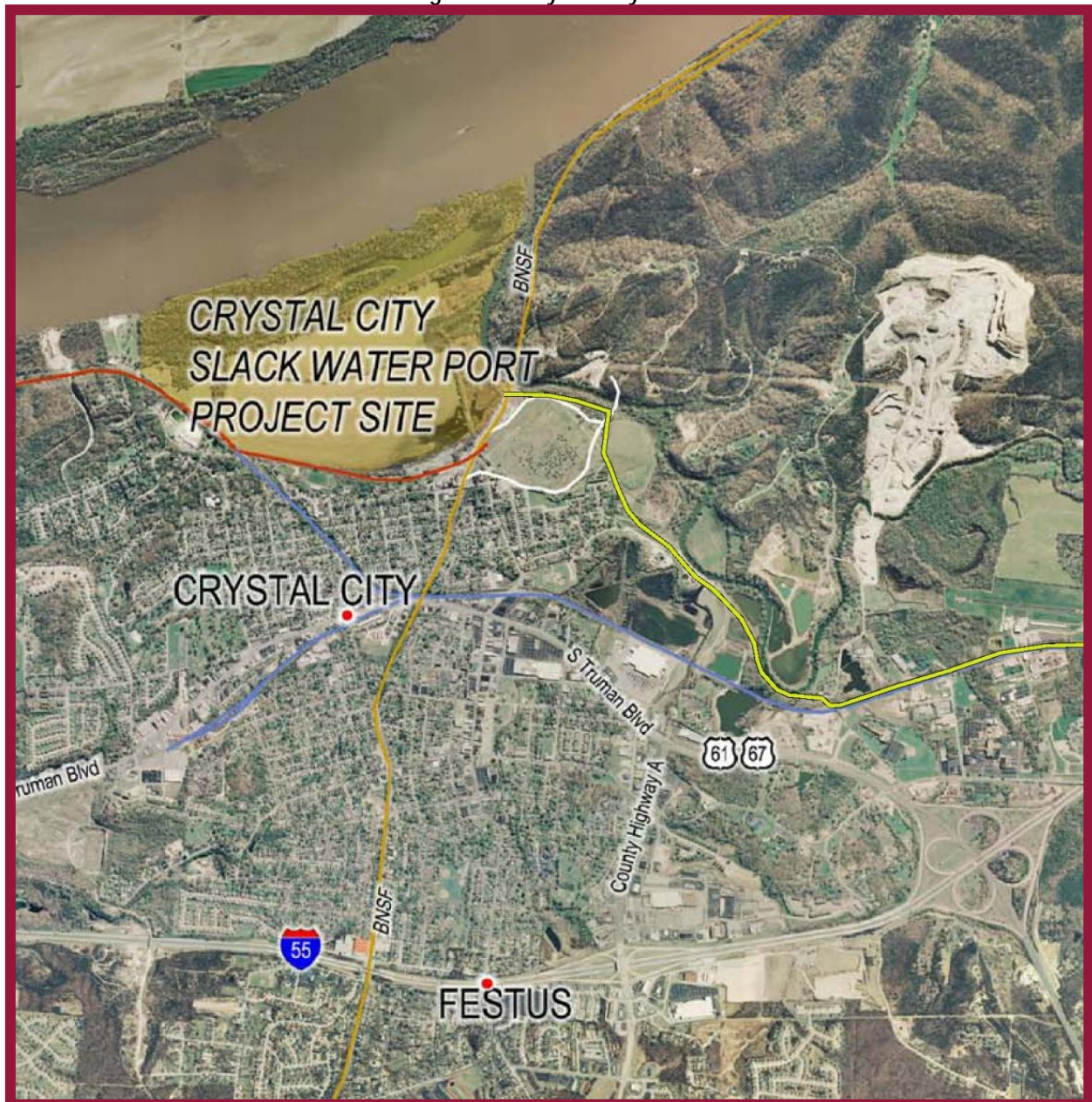


Source: Jefferson County

2.1.4 Existing Crystal City Property

The existing properties at Crystal City shown in Figure 2-3 include the site of a former PPG factory that is now a superfund site for contaminated soil. It also includes a sizable area of agricultural land that is not part of the superfund site that may be available for redevelopment and repurposing to port and commercial uses.

Figure 2-3: Crystal City Site



Source: TranSystems

The properties that are useable for port development and related upland industries are mostly situated east of Crystal City and north of Platin Creek. Intersecting rail lines from Union Pacific and BNSF railroads form a natural western boundary to the site and delineate the contaminated glass factory site from the largely uncontaminated agricultural areas. For this reason, it is recommended that only the areas east of the rail lines be considered for port development. The site east of the rail lines comprises approximately 350 acres, of which about one third is wooded riverfront and the remainder agricultural fields. During the spring high river levels, a significant portion of the site is susceptible to flooding.

2.1.5 Crystal City Riverfront

Usable river frontage immediately adjacent to the site comprises approximately 6,600 feet between a small boat club to the north and Platin Creek to the south. A portion of the area around Platin Creek may be developed for private port terminals in conjunction with a proposed iron ore refining facility shown in **Figure 2-4** on the vacant PPG upland site.

This use, if implemented, is consistent with planned development of the remaining waterfront (approximately 4,600 feet) into other public port uses. The waterfront north of the proposed Wings port development will require significant construction for use as a river terminal site. Therefore, the current concepts envision cutting a slackwater barge slip into the land and using the direct riverfront for either liquid bulk cargoes (which can be pumped from an offshore mooring) or for fleeting of barges.

Figure 2-4: Proposed Iron Ore Reduction Plant



Source: Wings Enterprises, Inc.

2.2 Access and Ground Transportation

The regional perspective of the transportation network serving the four Jefferson County sites is shown in **Figure 2-5**. The existing interstate and railroads add significant value to the inventory of existing transportation infrastructure to serve a port. Specifically, **Figure 1-1** illustrates the relative location of each of the four sites in relation to this infrastructure. Interstate 55 provides north-south interstate access for trucks as does the improved Highway 61/67 access through Jefferson County. Each of the four sites requires roadway improvements to provide direct access to the interstate to each potential port location to accommodate the required truck traffic to serve a port operation. These roadway improvements will take into consideration the existing community facilities and services (e.g. schools, employers, emergency services) as it is not ideal to introduce the anticipated increase in truck traffic to the existing commuting motorists or pedestrians. These roadway improvements will have to be included in any potential port development planning and design. The following provides a brief description of the infrastructure available to each of the four sites:

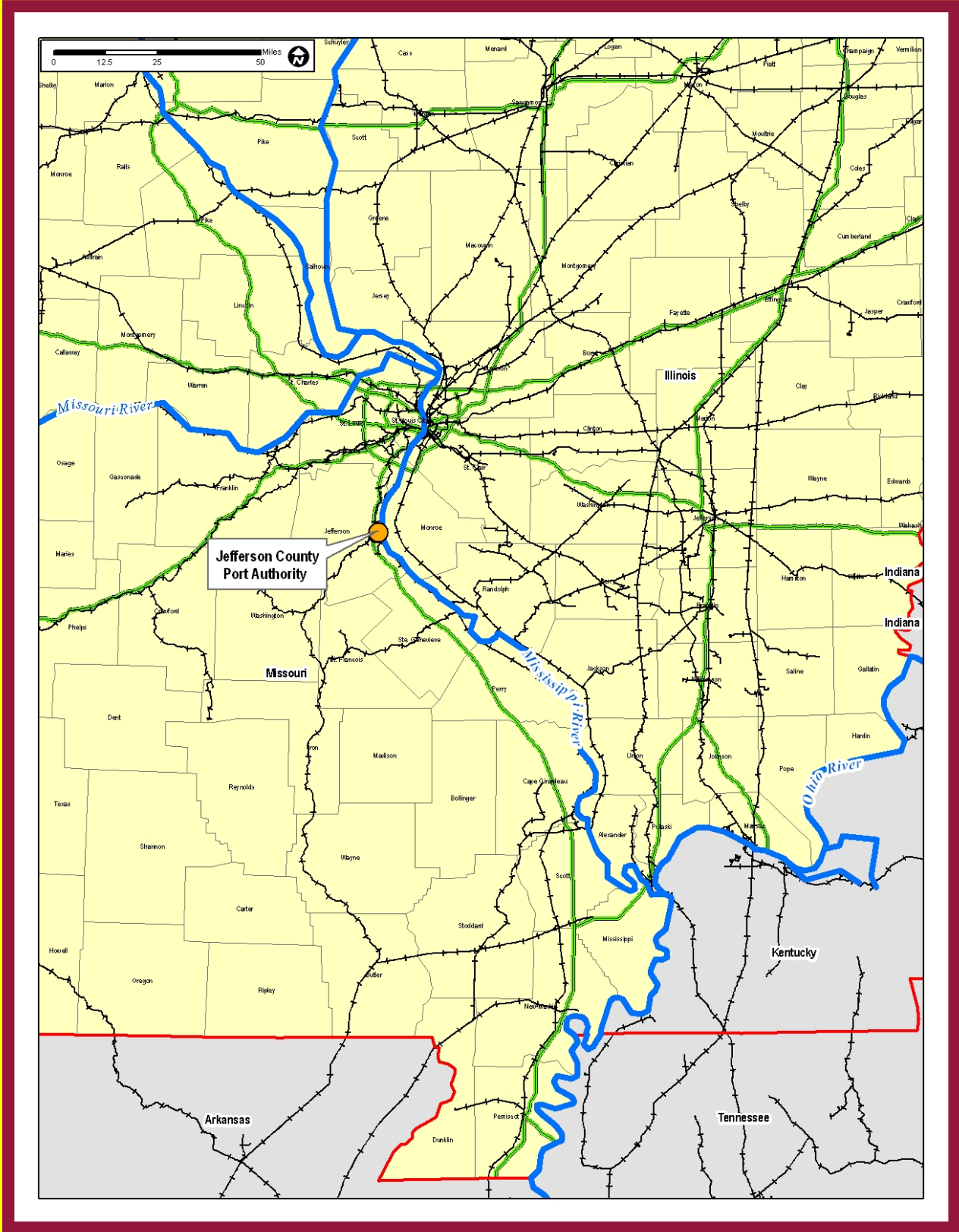
Pevely Site – The site is currently land-locked by the Dow Chemical Company plant on the west and residential developments to the north and south. However, it has good potential rail access from the UPRR line connecting to St. Louis and could be connected by road to State Highway 61/67 and Interstate 55 with the addition of a surface road past the Dow site.

Herculaneum Site – The existing railroad access via UPRR is a key component to site marketing and port operations. The roadway system, however, requires some improvements to provide more direct access to the interstate for trucks serving a port as ground transportation. A new roadway configuration is needed to provide enhanced access to and from the site to serve as an internal as well as external road system to augment any investment on the site. With the development of additional roadway access the site will be well served by direct rail, and highway access as well as waterways.

Crystal City Site – This site does not currently have a direct access to Interstate 55 and the existing diamond interchange would not support additional heavy truck traffic. Currently there are several options under consideration for improvement of truck access to the PPG properties. Chief among these is an exit ramp and underpass that follows the existing rail line southwest of town and would provide a direct route to the future port site.

LaRoche Site – South of Festus and the River Cement loading terminal, a large property can be found along the Mississippi River that formerly belonged to the LaRoche Corporation, hence the namesake. It is currently owned by River Cement Company (Buzzi Unicem USA, Inc.). This property is located east of the existing BNSF rail line and can be accessed by an un-named track that extends east of the Dooling Hollow Road. A new roadway connection either to Highway 61/67 or Interstate 55 would be required to serve a port at this location.

Figure 2-5 Regional Transportation Network of Roadways, Railways and Waterways



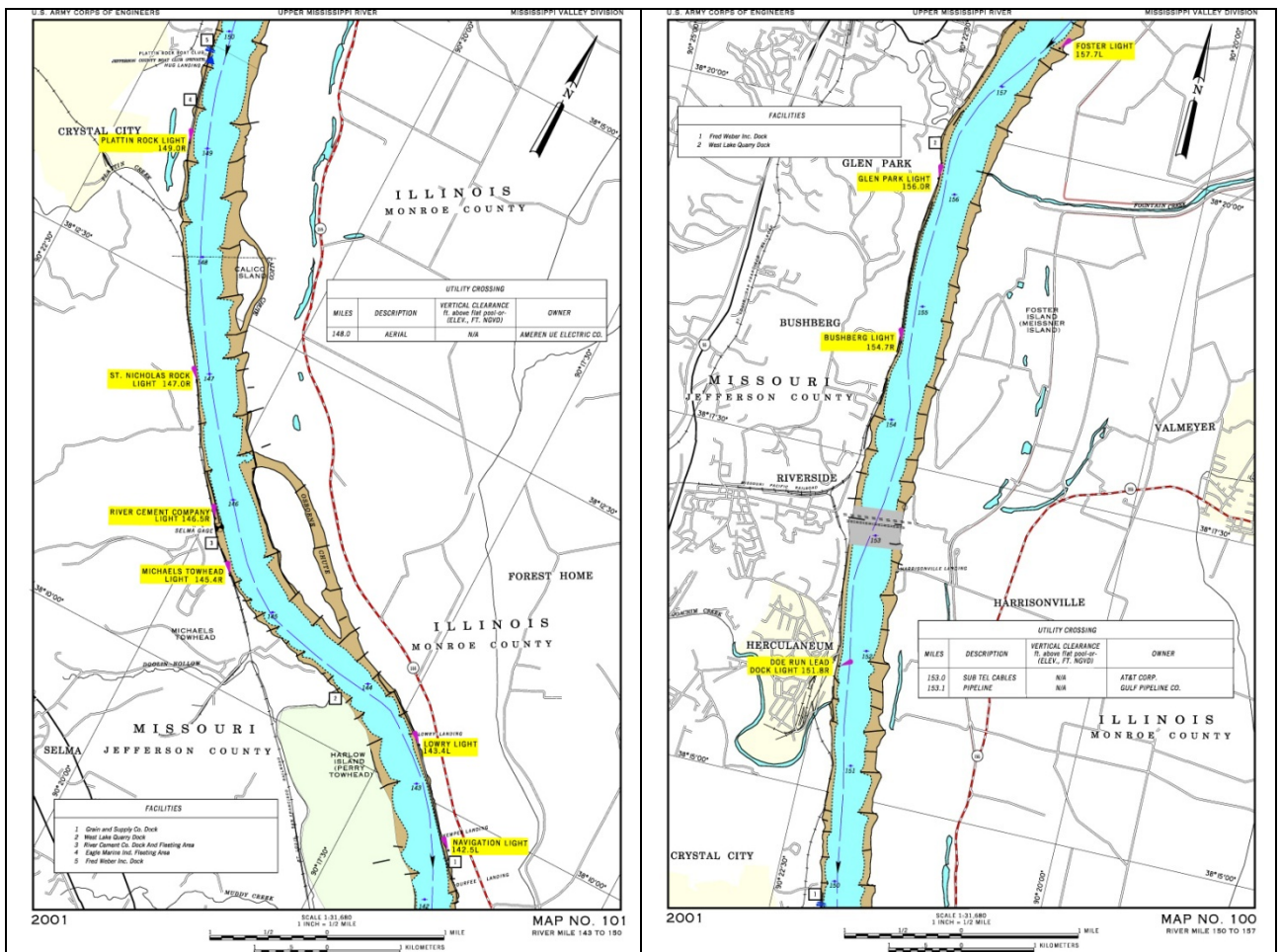
Source: TranSystems

2.3 Mississippi River Navigation

The sites under consideration for port development in Jefferson County are located between river miles 101 and 157 above the Ohio River¹ (AOR) in what is considered the Upper Mississippi River region. The sites are downstream of Lock #27, the lowest set of locks on the Mississippi River. Therefore, full tows of approximately 37 barges can be received in this area. Normally, upstream of Lock #27, tow sizes are limited by what can be reasonably broken down, passed through the locks and re-assembled. As the economics of river traffic favor maximizing the barge capacity per tow, downstream ports have an advantage over those upstream of the locks.

The Mississippi River is approximately 2,000 feet wide at the Jefferson County sites. The channel centerline, or thalweg, is approximately 500 feet from the western shore where it passes the Doe Run plant (mile 152) and remains roughly that distance past Crystal City (mile 149) and the LaRoche site (mile 145) as shown in **Figure 2-6**. To the north, at Pevely (mile 152), it crosses to the Illinois side of the river. Therefore, the strongest currents and the deepest channels are also found on the Herculaneum/Crystal City side of the river. Generally, downstream traffic follows the channel line on the western shore, and upstream traffic takes advantage of slower current and back eddies on the eastern shore.

Figure 2-6: River Miles of the Mississippi River along Jefferson County



Source: U.S. Army Corps of Engineers

There are no river features in the vicinity of Herculaneum or south that would limit port development at the three sites. However, one mile upstream there is a submerged pipeline and communications cable crossing just north of river mile

¹ All river miles referenced in this report are defined as miles above the confluence of the Ohio River and the Mississippi River, and were obtained from the U.S. Army Corps of Engineers.

153 in the vicinity of the Pevely site. Although these crossings do not impede navigation in the area, they may limit development options at Pevely. However, the crossings can generally be seen as an asset for development as they may represent commercial energy and communications resources. Soundings in the area of the Doe Run site show a relatively steep drop-off to twenty feet below normal water elevation. This depth is consistent with what could be expected on the channel side of the river and is sufficient for any river traffic found on the Upper Mississippi.

The redevelopment of any of these four sites is complex and requires a strategic and staged development plan in order to optimize the existing land values and attract investment to the area. Existing ports are an element of the existing regional infrastructure to be considered when determining the feasibility of a port at this site. Existing ports that are complementary or competing with that is discussed in detail Section 2.5 describing trade in the region.

2.4 Regional Trade and Port Facilities

The evaluation of regional trade addresses the historical and current cargo flows through the study region. The flows primarily are cargo handled by facilities located within the Port of Metropolitan St. Louis (PMSL), a 70 mile long stretch along the banks of the Mississippi River from mile 138.8 (AOR) to mile 208.8, which encompasses privately owned cargo facilities and public port authorities. In addition, a review is undertaken of activity at Southeastern Missouri Regional Port Authority (SEMO), situated at mile 48 AOR and other public port authorities located in the region. The discussion of cargo flows is complemented by a review of the types of terminal facilities operated by public and private entities.

In addition to the review of cargo handled by ports in the region there is containerized cargo generated by the states of Missouri and Illinois. Analysis and discussion of containerized cargo forms the basis for evaluation of opportunities to provide container-on-barge (COB) service between the St. Louis area and the Gulf coast.

2.4.1 Port of Metropolitan St. Louis

The Port of Metropolitan St. Louis (PMSL) extends from mile 138.8 AOR to mile 208.8 AOR and is situated just south of the confluence of three major rivers, the Illinois, Missouri and Mississippi. PMSL comprises five public port authorities and many private facilities, mostly located below the last lock on the Mississippi River. Major highway and rail corridors terminate or pass through the Port area, providing multi-modal transport options for freight.

Port of Metropolitan St. Louis is the country's third largest inland river port and the country's 25th largest port (of all inland, coastal and great lakes ports).

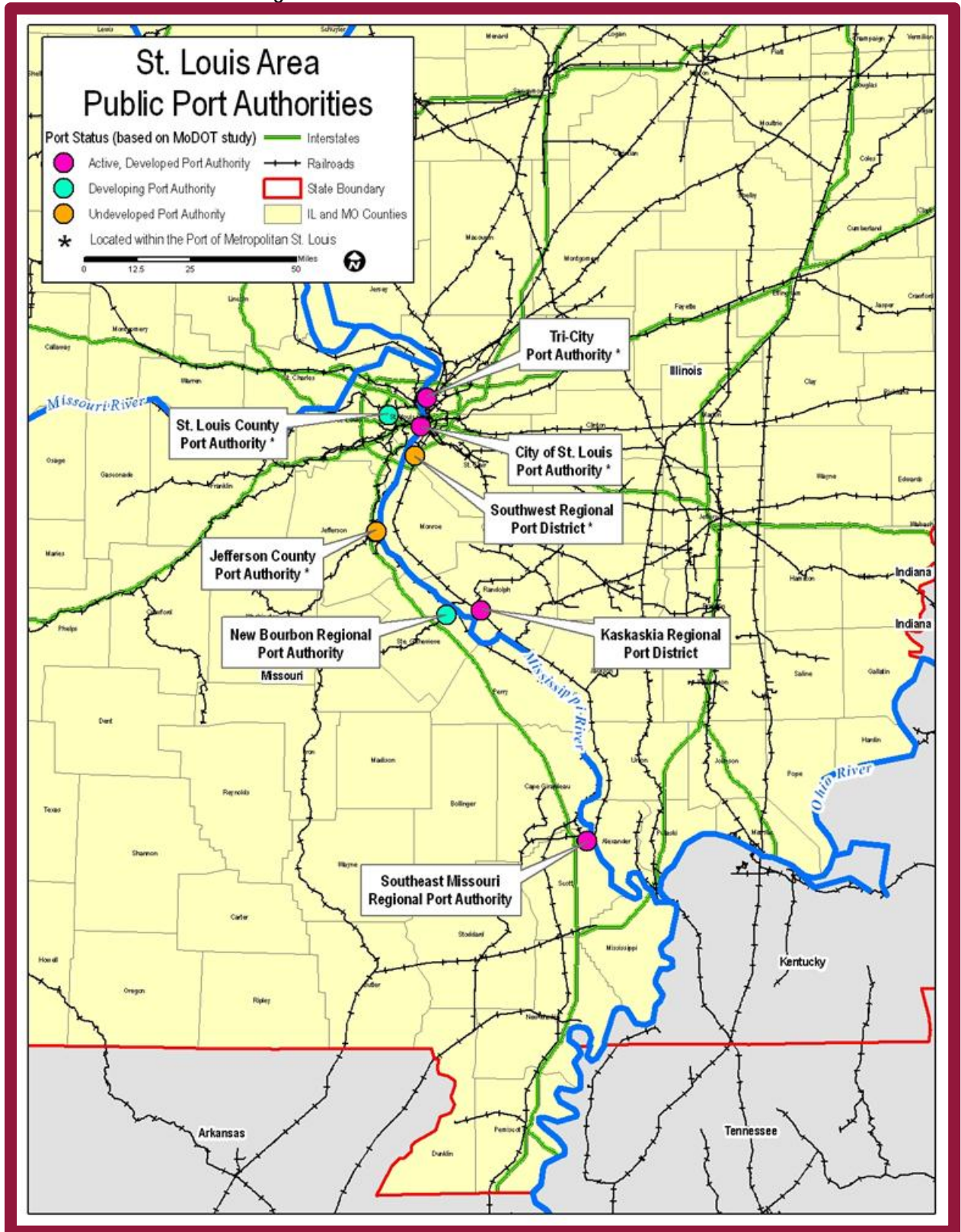
PMSL is the country's third largest inland river port, after Huntington, WV and Pittsburg, PA, based on 2007 port tonnage data from USACE. In 2007, PMSL handled 32.1 million tons of cargo, which ranked PSLMA twenty-fifth of all ports (inland, coastal and great lakes) countrywide and ahead of many important coastal ports for international cargo such as Charleston, SC, Seattle, WA, Portland, OR, and Oakland, CA. The port's hinterland is centered on the St. Louis metropolitan area, and the port handles inbound goods used by local industry and consumers, and

outbound shipments by local industries. The Port is also an important location for fleetings and other activities of barge operators. Barge fleetings is undertaken to adjust the size of barge tows, either reducing their size for the limitations of the locks to the north or increasing their size for southbound movements. Five public port authorities are located within the Port of Metropolitan St. Louis; they are (status):

- City of St. Louis Port Authority, MO (Active)
- St. Louis County Port Authority, MO (Developing)
- Jefferson County Port Authority, MO (Undeveloped)
- Tri-City Port Authority, IL (Active)
- Southwest Regional Port District, IL (Undeveloped)

In addition to the five public port authorities, there are numerous private facilities within the PMSL area. Figure 2-7 illustrates the location of the five public port authorities within PMSL and other public port authorities in the region.

Figure 2-7: Public Port Authorities in St. Louis Area



Source: TranSystems

2.4.2 Public Port Authorities

City of St. Louis Port Authority is classified by the Missouri Department of Transportation (MoDOT) as a “Developed Port Authority”². This category of port is viewed by MoDOT as one that has “developed land with facilities, infrastructure, and equipment. They support one or more waterway businesses and generate funds with which to continue development or expansion. Some of these ports have reached their desired level of development. Their objectives are developments needed to maintain businesses. Other developed ports still want to develop and expand more. Their objectives relate to developments to encourage even more businesses or more expansion. Developed ports can typically raise the 20 percent matching funds. Instead, their funding problems tend to be projects costing more than current state or federal budgets.”

City of St. Louis Port Authority is the most active port authority on the Missouri side of the study region; it has a public dock and manages the leases of city-owned waterfront property.

The Authority has a working public port facility, manages the leases of all city-owned waterfront property, which are the main income source, and promotes riverfront recreation. The majority of leases relate to barge fleeting activities and leaseholders normally undertake development of the property. MoDOT’s 2007 study identified several objectives, limitations and challenges for the Authority:

- Routine maintenance and improvement of its property
- No objectives for major new developments
- Potential impacts from construction of a new Mississippi River bridge
- Concern with the lack of Missouri River traffic due to low-flow challenges on the Missouri River. Greater Missouri River cargo would boost demand for services at St. Louis, for example barge fleeting and cargo transload
- Concern with the quantity and quality of water flowing from the Missouri River. The water is slow to mix with flows from the Upper Mississippi River and creates more silting on the Missouri side than on the Illinois side of the Mississippi River, thus requiring additional silt controls and dredging

St. Louis County Port is classified in the MoDOT study as a “Developing Port Authority”, one that typically has “land but face major roadblocks to operation. With little or no operations, they have little or no source of funding, even for matching funds.” The County Port has owned land for several years but efforts to market the land for commercial business purposes has not yet proved successful, the lack of flood protection a primary reason. The County Port has successfully marketed land for recreational uses (a casino); however, the MoDOT found the Port’s objectives did not focus on development of facilities for commercial waterway transportation.

Jefferson County Port Authority is classified by MoDOT as an “Undeveloped Port Authority”, one that has “no land, facilities, infrastructure, or equipment. They may have buildings, land, and equipment for business offices, but not for handling cargo. They cannot operate as a physical port in any way. Their primary objective is typically to find suitable land and businesses support to justify and even fund purchasing and developing waterway land. Funding is their most pressing issue. Without any physical location and businesses, they typically have no source of funding, making it nearly impossible for them to afford 20 percent matching funds.”

Jefferson County Port Authority offers potential for cargo activities; due to available river frontage, good highway and rail access, and location south of St. Louis City traffic congestion.

² Information on the three public port authorities in Missouri is drawn from the report “Update of Missouri Port Authority Assessment, Organizational Results Research Report, November 2007 OR08.007” prepared by MoDOT. In this study, the public port authorities in Missouri were classified by their level of development, Category 1- Undeveloped Port Authorities, Category 2 – Developing Port Authorities, and Category 3 – Developed Port Authorities.

The MoDOT study found that Jefferson County offers potential for cargo activities due to its lengthy river frontage, good highway and rail access, and location south of the river locks and away from the traffic congestion and river ice of St. Louis City and County. The MoDOT study observed a challenge for future development is the county's large amount of land that is unavailable for development due to the presence of deposits of high quality limestone and control of land by mining companies.

Tri-City Regional Port District, located above the last lock on the Mississippi River, is the most active port authority on the Illinois bank.

Tri-City Regional Port District, Madison County IL, is situated on the Chain of Rocks Bypass Canal and above the last lock on the Mississippi River. The District manages a 1,200 acre property with several waterfront facilities, commercial and industrial buildings and sites for development. The District's cargo throughput is estimated at 3.0 million tons, and has been as high as 4.0 million tons in the past. The port's facilities, operated by private companies, include a dry bulk terminal, liquid bulk terminal,

general cargo terminal, and barge fleeting services. In addition, the port offers a free trade zone for international cargo and non-cargo services. The District's development strategy includes the River's Edge Harbor Complex, a proposed new harbor located at the southern end of the Chain of Rocks Bypass Canal and below the last lock, which would be capable of handling a variety of products including steel, bulk cargo, and containers.

Southwest Regional Port District, St. Clair County IL, does not currently provide cargo handling facilities.

2.4.3 Facilities

PMSL has 130 facilities³ conducting a variety of cargo and non-cargo operations. Privately owned facilities account for 80 percent of the total, while the remaining 20 percent are publicly owned but leased out to private operators in nearly every case. St. Louis City and County is the location for 47 percent of facilities (Table 2-1), followed by Madison County (26 percent), St. Clair County (13 percent), and Jefferson County (8 percent).

Port of Metropolitan St. Louis has 130 facilities for handling cargo and other activities; 80 percent privately owned and the other 20 percent publicly owned but mostly operated by private companies.

Table 2-1: Port of Metropolitan St. Louis – Facilities by Location and Ownership

Number of Facilities	Private	Public (Privately Operated)	Private / Public	Total
Jefferson County	10	-	-	10
St. Louis City & County	39	20 (16)	2	61
St. Charles County	1	2 (2)	-	3
Total Right Bank	50	22 (18)	2	74
Madison County	31	3 (3)	-	34
St. Clair County	17	-	-	17
Monroe County	5	-	-	5
Total Left Bank	53	3 (3)	0	56
Total Facilities	103	25 (21)	2	130

Source: USACE National Data Center Survey of Port Facilities, 2004

³ The information on facilities was obtained from the USACE nationwide survey of port and terminal facilities, in which USACE obtains information from facility operators, port organizations, transportation companies, and on-site investigations. The survey is updated on an ongoing basis and 2004 is the latest year available for the river section covered by the Port of St. Louis Metropolitan Area.

Of the 130 facilities, 61 are involved in cargo handling operations and classified in **Table 2-2** as:

- Dry Bulk – receipt and/or shipment of dry bulk commodities including coal, grain, grain by-products, fertilizer, cement, coke, soda ash, scrap metal, and miscellaneous dry bulk commodities.
- Liquid Bulk – receipt and/or shipment of liquid bulk commodities including crude oil, fuel oil, asphalt, chemicals, and miscellaneous liquid bulk commodities.
- General Cargo / Multipurpose – receipt and/or shipment of different cargo types including steel products, other general cargo, dry bulk and liquid bulk

Table 2-2: Port of Metropolitan St. Louis – Facilities by Type of Activity

Number of Facilities	Private	Public	Private / Public	Total
Total Cargo Facilities	53	6	2	61
Total Other Facilities	50	19	-	69
Total Facilities	103	25	2	130
Dry Bulk	14	1	1	16
Liquid Bulk	11	-	1	12
General Cargo / Multipurpose	3	3	-	6
Total Cargo Facilities	28	4	2	34
Non cargo operations	18	16	-	34
Not in use	4	2	-	6
Total Right Bank	50	22	2	74
Dry Bulk	9	1	-	10
Liquid Bulk	10	-	-	10
General Cargo / Multipurpose	6	1	-	7
Total Cargo Facilities	25	2	-	27
Non cargo operations	25	1	-	26
Not in use	3	-	-	3
Total Left Bank	53	3	0	56

Source: USACE National Data Center Survey of Port Facilities, 2004

The 69 non-cargo handling facilities provide:

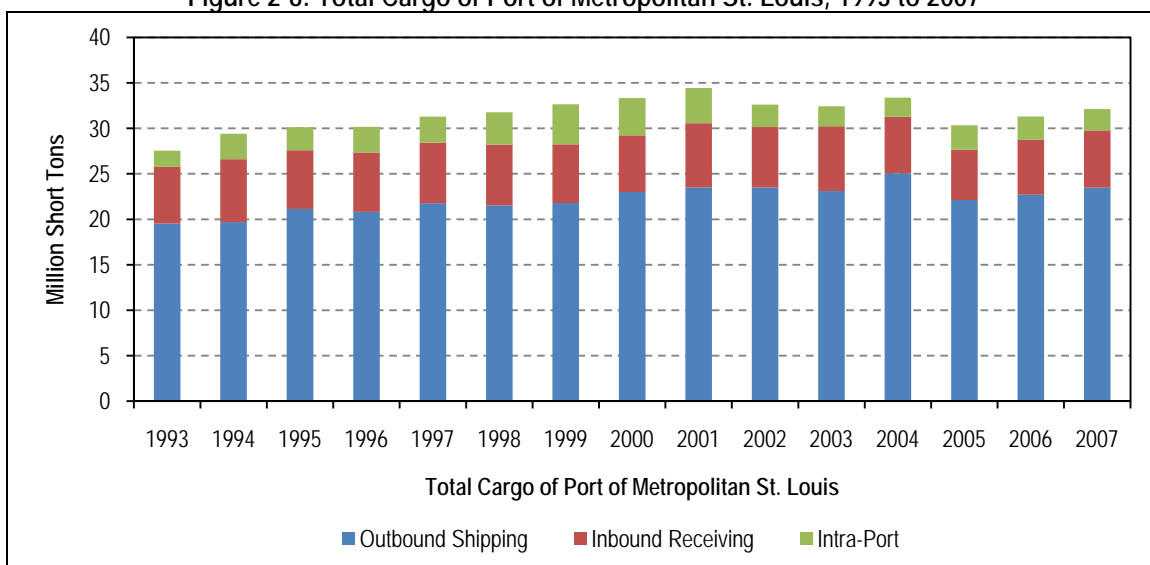
- Mooring of barges for fleeting (36 of the 69)
- Other mooring and other operations (19)
- Other operations (5)
- Not in use (9)

Further information on facilities is provided in **Appendix A** (Cargo and Facility Data).

2.4.4 Total Cargo

The cargo facilities within PMSL handled 32.1 million tons of cargo in 2007 (**Figure 2-8**), comprising 23.5 million tons of outbound cargo, 6.3 million tons of inbound cargo, and 2.4 million tons of intra-port cargo (that is, cargo moving within the area covered by the Port). Total cargo was higher than in 2006 and 2005, but lower than the peak of 34.4 million tons reached in 2001. Annual cargo volume is influenced by a variety of factors, including economic conditions, crop yields and production, specific shipper requirements, and construction activity.

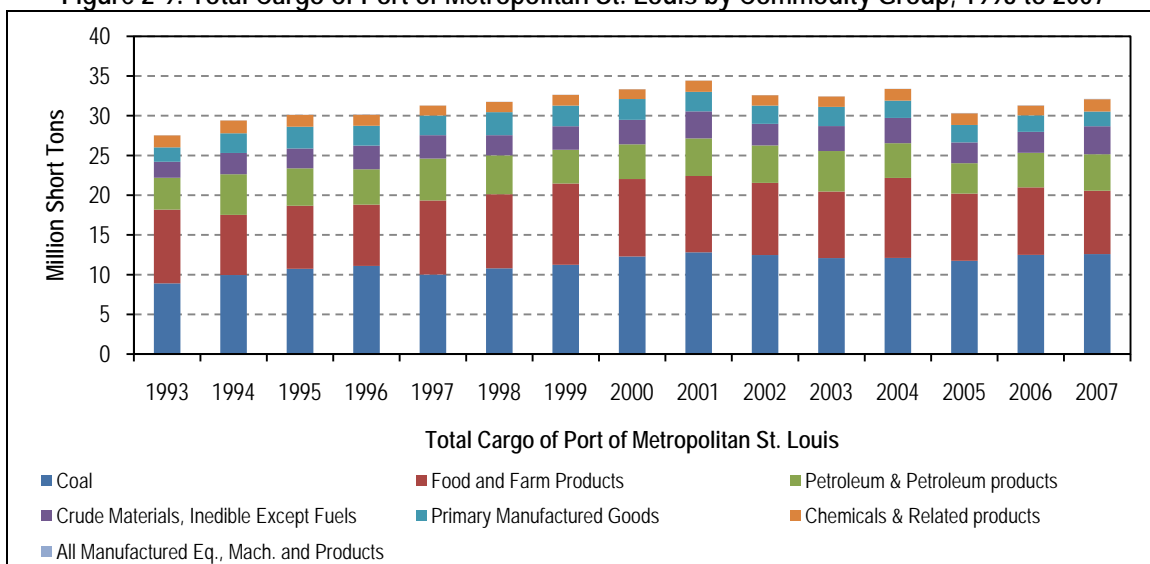
Figure 2-8: Total Cargo of Port of Metropolitan St. Louis, 1993 to 2007



Source: Waterborne Commerce Statistics, U.S. Army Corps of Engineers

Total cargo is dominated by four commodity groups – coal, food and farm products (corn, soybeans, wheat and other farm products), petroleum and petroleum products, and crude materials (sand and gravel, iron and steel scrap, and others), which together accounted for 89.3 percent of total tonnage in 2007 (Figure 2-9). These are all lower-value bulk commodities suitable for shipment by barge. Two other commodity groups – primary manufactured goods (which includes cement, and iron and steel products) and chemicals and related products – accounted for 10.6 percent of total cargo in 2007.

Figure 2-9: Total Cargo of Port of Metropolitan St. Louis by Commodity Group, 1993 to 2007

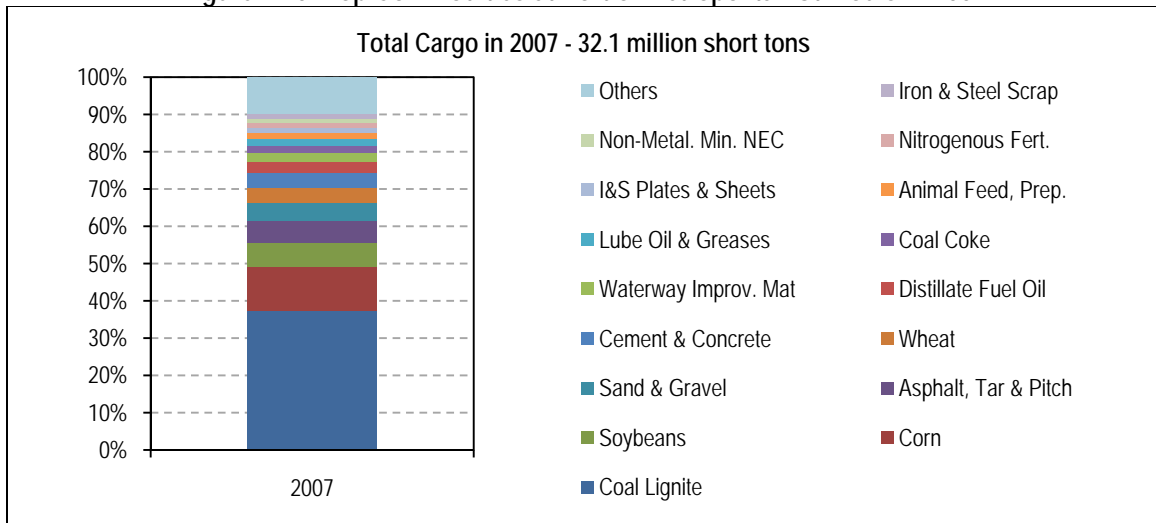


Source: Waterborne Commerce Statistics, U.S. Army Corps of Engineers

Details of the top twenty-five individual commodities are provided in Appendix A (Cargo and Facility Data) and summarized in Figure 2-10. The profile is dominated by coal lignite (used in electricity generation) with a 37.3 percent share of total cargo in 2007. Other important individual commodities are corn (11.8 percent), soybeans (6.4 percent),

asphalt, tar and pitch (6 percent), sand and gravel (4.8 percent), wheat (4.2 percent), cement and concrete (3.9 percent), and distillate fuel oil (3.0 percent).

Figure 2-10: Top Commodities at Port of Metropolitan St. Louis in 2007

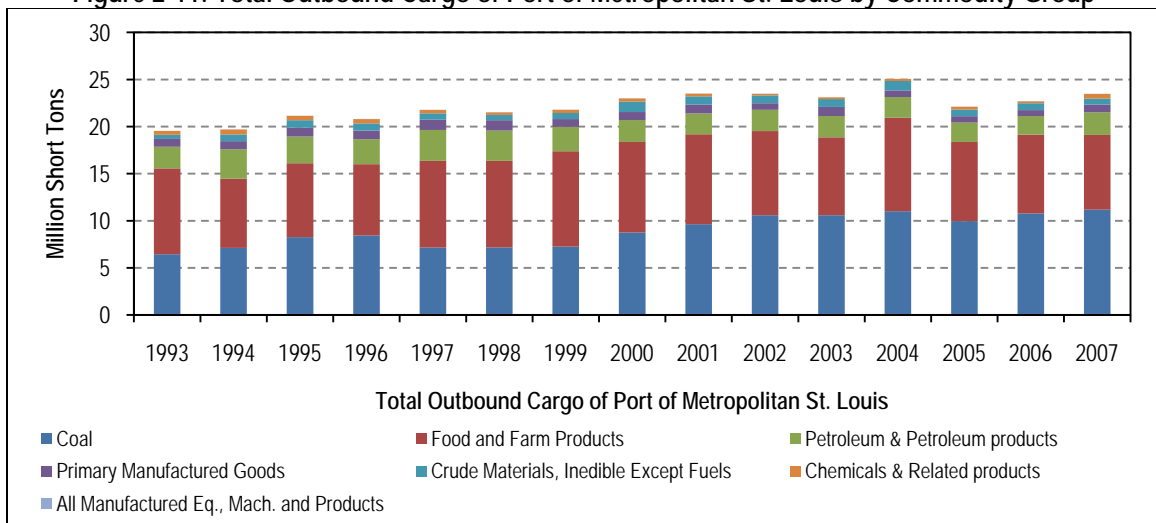


Source: Waterborne Commerce Statistics, U.S. Army Corps of Engineers

2.4.5 Outbound Cargo

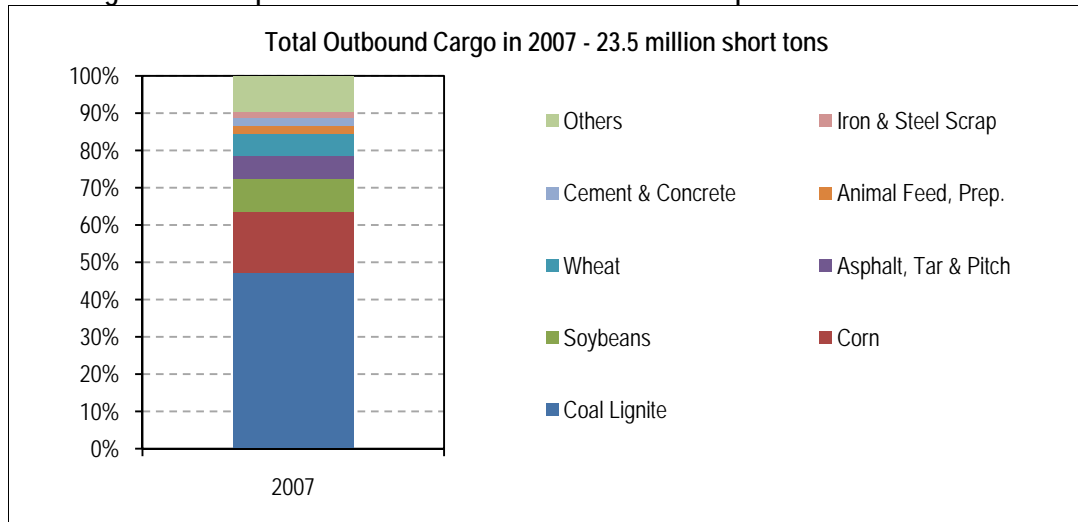
The dominant directional flow is outbound shipments of cargo from the Port. Total outbound shipments were 23.5 million tons in 2007 (Figure 2-11), higher than in 2005 and 2006, but lower than the recent peak of 25.1 million tons seen in 2004. Outbound cargo is dominated by commodity group's coal (47.6 percent in 2007) and food and farm products (33.8 percent). Looking at individual commodities (Figure 2-12), coal lignite accounted for 47.4 percent of outbound cargo in 2007. The other important commodities were corn (16.1 percent), soybeans (8.8 percent), asphalt, tar and pitch (6.5 percent), wheat (5.7 percent), animal feed (2.2 percent), cement and concrete (2.2 percent) and iron and steel scrap (1.6 percent). Coal shipments are driven by specific electric utility needs, while the drivers of grain shipments include crop yields and international demand for U.S. exports.

Figure 2-11: Total Outbound Cargo of Port of Metropolitan St. Louis by Commodity Group



Source: Waterborne Commerce Statistics, U.S. Army Corps of Engineers

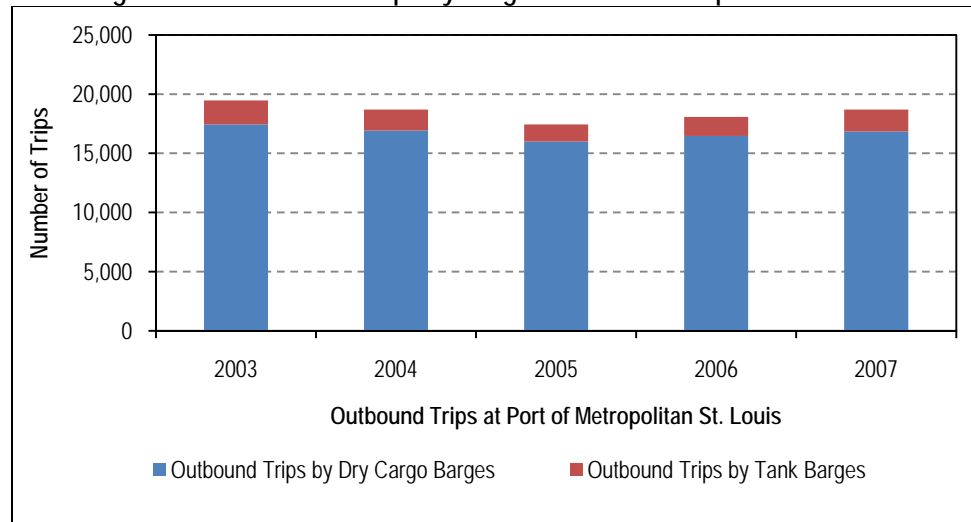
Figure 2-12: Top Outbound Commodities at Port of Metropolitan St. Louis in 2007



Source: Waterborne Commerce Statistics, U.S. Army Corps of Engineers

In 2007, the port generated 18,698 outbound barge trips (Figure 2-13), 16,850 by dry cargo barges and 1,848 by tank barges.⁴ The number of trips includes laden and empty barges; an estimated 80 percent of the dry cargo barge trips were laden and 60 percent of the tank barge trips.⁵ The number of trips generated each year fluctuates with the volume of cargo, but is also influenced by changes in the size distribution of the barge fleet and the efficiency with which operators can load and operate their barges.

Figure 2-13: Outbound Trips by Barge at Port of Metropolitan St. Louis



Source: Waterborne Commerce Statistics, U.S. Army Corps of Engineers

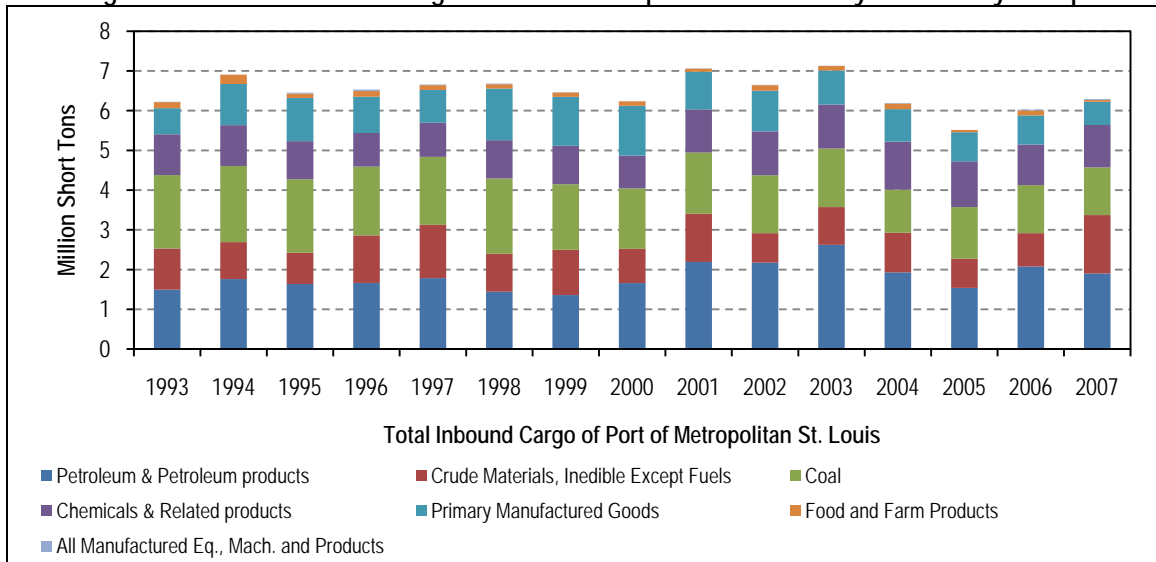
⁴ USACE defines a trip as a vessel movement. For loaded barges, a trip is logged from the point of loading to the point of unloading (i.e. excluding fleeting areas). For empty barges, trips are logged from point of unloading to the point of loading counting the fleeting areas in between (e.g. if an empty barge is moved from Dock A to Dock B and the barge stopped at three fleeting areas in between, then four trips are logged).

⁵ The estimate of laden versus empty trips is based on a review of the distribution of trips by draft. Those recorded as between zero to five feet assumed to be mostly empty trips, those above five feet assumed to be laden trips.

2.4.6 Inbound Cargo

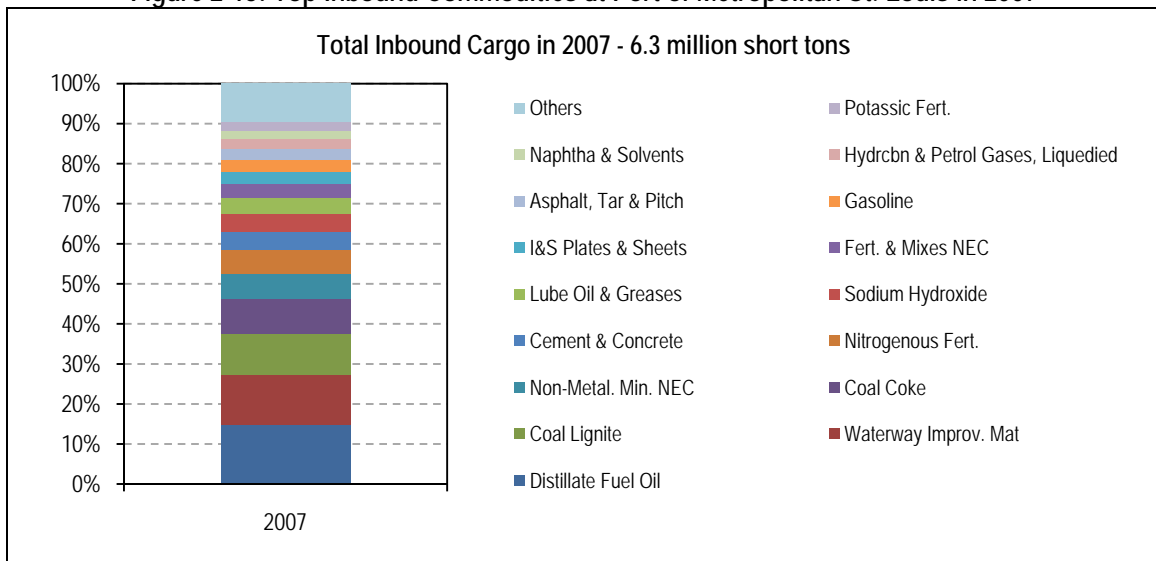
Inbound cargo is tied to local and regional economic activity, and amounted to 6.3 million tons in 2007 (Figure 2-14). Total volume was higher than 2005 and 2006, but was below the peak levels of around 7 million tons seen earlier in the decade. Inbound cargo is distributed across five commodity groups – petroleum and petroleum products (30.2 percent in 2007), crude materials (23.3 percent), coal (19.1 percent), chemicals and related products (17.0 percent) and primary manufactured goods (9.3 percent). The distribution by individual commodity (Figure 2-15) is less concentrated compared to outbound cargo, with the top five commodities – distillate fuel oil, waterway improvement material, coal lignite, and coal coke, and non-metallic minerals NEC – accounting for 52.5 percent of total inbound cargo.

Figure 2-14: Total Inbound Cargo of Port of Metropolitan St. Louis by Commodity Group



Source: Waterborne Commerce Statistics, U.S. Army Corps of Engineers

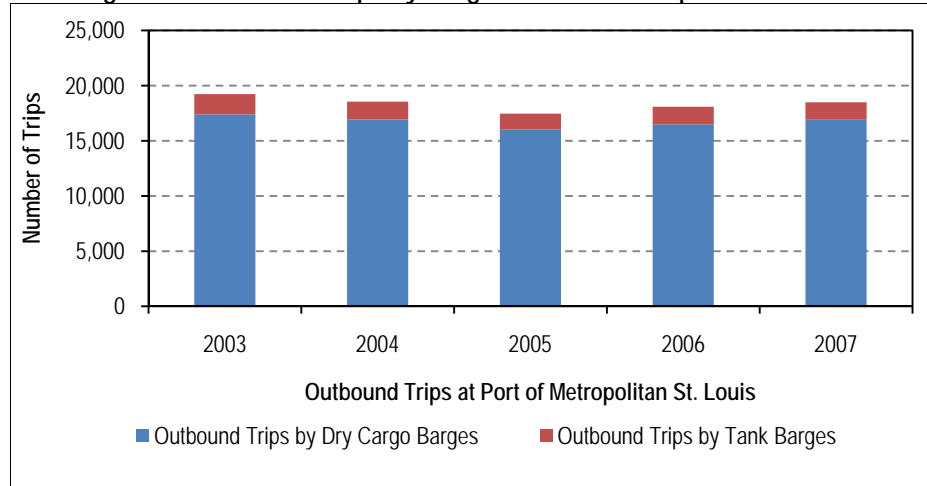
Figure 2-15: Top Inbound Commodities at Port of Metropolitan St. Louis in 2007



Source: Waterborne Commerce Statistics, U.S. Army Corps of Engineers

In 2007, the port generated 18,488 inbound barge trips (Figure 2-16), 16,908 by dry cargo barges and 1,580 by tank barges. The number of trips includes laden and empty barges; an estimated 25 to 30 percent of the dry cargo barge trips were laden and 40 to 45 percent of the by tank barges.⁶ The small amount of laden dry barge trips reflects the directional imbalance of cargo flows with more cargo moving outbound than inbound, and empty barges brought into the port area for loading with outbound cargo.

Figure 2-16: Inbound Trips by Barge at Port of Metropolitan St. Louis

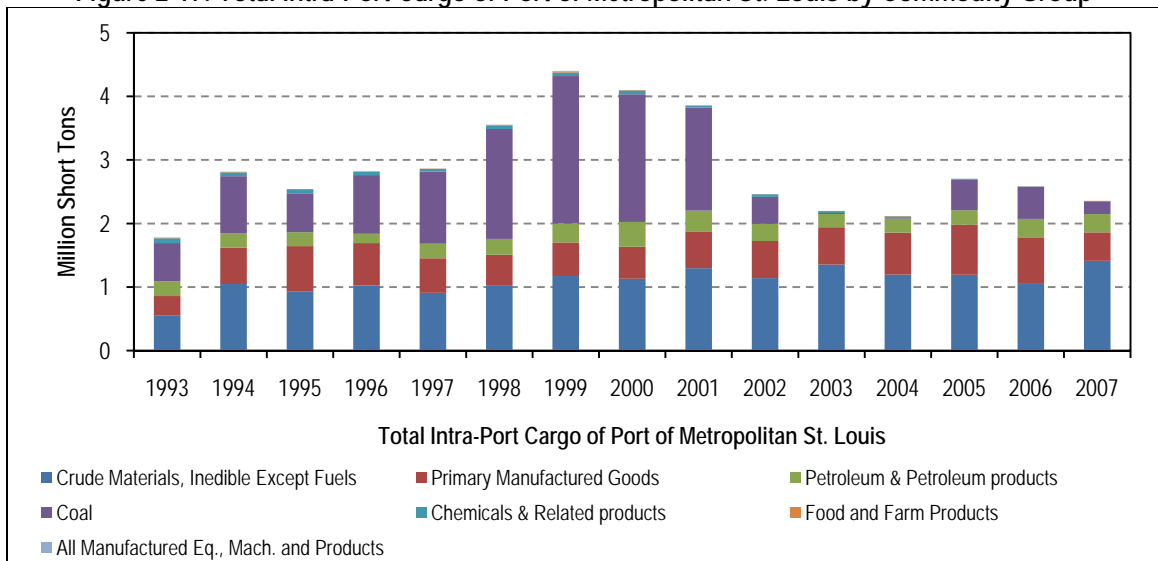


Source: Waterborne Commerce Statistics, U.S. Army Corps of Engineers

2.4.7 Intra-Port Cargo

Intra-port cargo is classified as cargo that moves between locations within the Port of Metropolitan St. Louis. For example, sand and gravel may be dredged or sourced within the area and discharged at another site in the metropolitan area for processing or use. Total intra-port cargo amounted to 2.4 million tons in 2007 (Figure 2-17) and is largely made up of sand and gravel (59.8 percent), cement and concrete (19.0 percent), asphalt, tar and pitch (10.6 percent) and coal (8.6 percent). Total intra-port cargo peaked at 4.4 million tons in 1999 due to significant intra-port movements of coal. The top intra-port commodities are summarized in Figure 2-18.

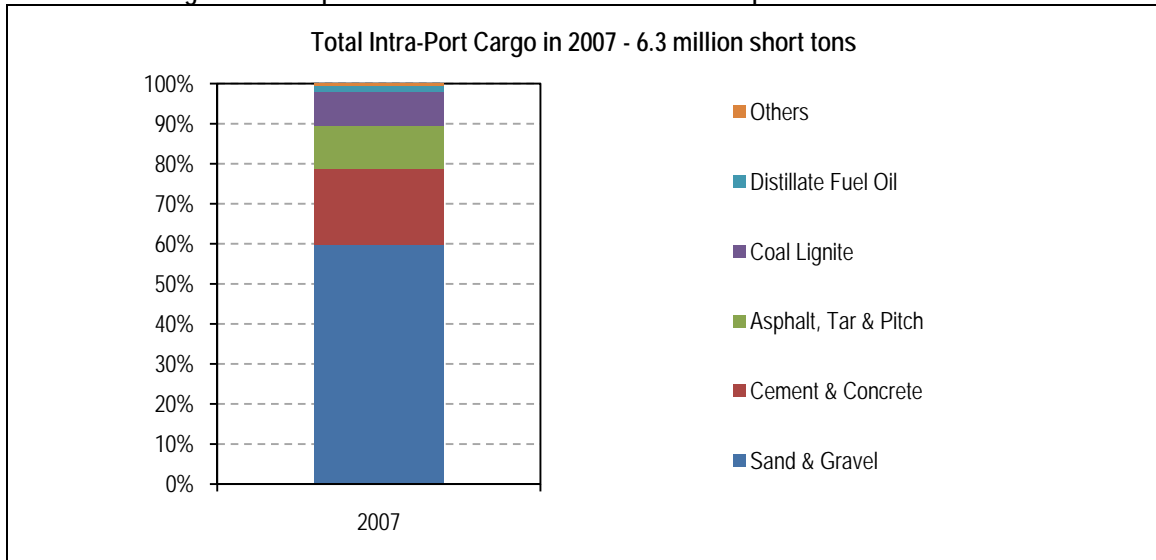
Figure 2-17: Total Intra-Port Cargo of Port of Metropolitan St. Louis by Commodity Group



Source: Waterborne Commerce Statistics, U.S. Army Corps of Engineers

⁶ The estimate of laden versus empty trips is based on a review of the distribution of trips by draft. Those recorded as between zero to five feet assumed to be mostly empty trips, those above five feet assumed to be laden trips.

Figure 2-18: Top Intra-Port Commodities at Port of Metropolitan St. Louis in 2007



Source: Waterborne Commerce Statistics, U.S. Army Corps of Engineers

2.4.8 Cargo Throughput and Facilities

PMSL handled 32.1 million tons of cargo in 2007 at 61 cargo facilities identified in the USACE port facility database. A facility is a single berth used for cargo handling.

Dry Bulk Cargo Facilities

In 2007, approximately 80 percent of total port throughput comprised dry bulk commodities such as coal and grains. These dry bulk commodities were handled by the 26 dry cargo facilities located within the Port area, 16 on the right bank (Missouri) and 10 on the left bank (Illinois). The dry bulk facilities are listed by company name and activity in Section 2.2.9, the information obtained from the USACE National Data Center Survey of Port Facilities. The facilities are characterized by the following:

Dry bulk commodities account for approximately 80 percent of cargo at Port of Metropolitan St. Louis; and these commodities are handled by an estimated 26 dry cargo facilities.

- Most berths are used for proprietary business rather than operating as common user terminals
Examples are Ameren Union Electric Co. (receipt of coal for the coal-fired Sioux Power Plant), ADM (grain shipments) and ConAgra (grain shipments), and Buzzi Unicem (for its cement plant at Selma, MO).
- Nearly every facility has rail connectivity to Class I railroads. Those located on the right bank (Missouri) connecting with BNSF or UP and those on the left bank (Illinois) with Norfolk Southern.
- They incorporate appropriate storage driven by cargo type (e.g. Grain elevators, cement silos, open bulk storage, covered bulk storage, etc).

Liquid Bulk Cargo Facilities

Twenty-two facilities were identified as handling liquid bulk cargo (See **Appendix A** for a list), 12 on the right bank and 10 on the left bank. Similar to the dry bulk sector, the liquid bulk facilities are primarily owned and/or operated by major companies as part of their specific business needs or those of their customers. The principal cargoes are petroleum products and liquid chemicals. These facilities are characterized by one or more of the following depending on cargo type:

- Berths are used for proprietary business or general receipt/shipment. Examples are ConocoPhillips, Broadway Petroleum Co (asphalt) and J.D. Streett (liquid bulks)
- Most facilities are connected to a Class I railroad
- They incorporate appropriate storage tanks connected by pipeline to the berth

Liquid bulk commodities account for approximately 18 percent of cargo at the Port of Metropolitan St. Louis; and they are handled by an estimated 22 liquid bulk facilities.

General Cargo / Multipurpose Facilities

The general cargo / multipurpose facilities in the Port handle steel products and other general cargo, as well as dry and liquid bulk commodities. A total of 13 such facilities were identified, six on the right bank and seven on the left bank, which are owned and/or operated by private companies. These facilities are characterized by one or more of the following:

- Common user services
- Most facilities are connected to a Class I railroad
- Mixed cargo handling equipment and storage (e.g. cranes for general cargo, covered storage and open storage)

Thirteen general cargo facilities within the Port of Metropolitan St. Louis area provide common-user services for cargo such as steel products, project cargo, dry bulk and liquid bulk commodities.

2.4.9 Cargo and Facility Data

Appendix A provides tables of annual data on cargo handled by the Port of Metropolitan St. Louis and lists of cargo handling facilities located within the Port's area.

2.5 Other Port Authorities

2.5.1 New Bourbon Regional Port Authority

New Bourbon Regional Port Authority is located at mile 120.5 AOR south of Ste. Genevieve MO. MoDOT classified this public port as a "Developing Port Authority" and found it suitable for mineral businesses, and with close proximity to highways and rail. One challenge is its current site location on the outside bank of a bend in the river, thus exposing the site to risk from runaway barges. Development of a slack harbor is underway but facing funding challenges, and until complete the public port is limited in its ability to develop business and revenues.

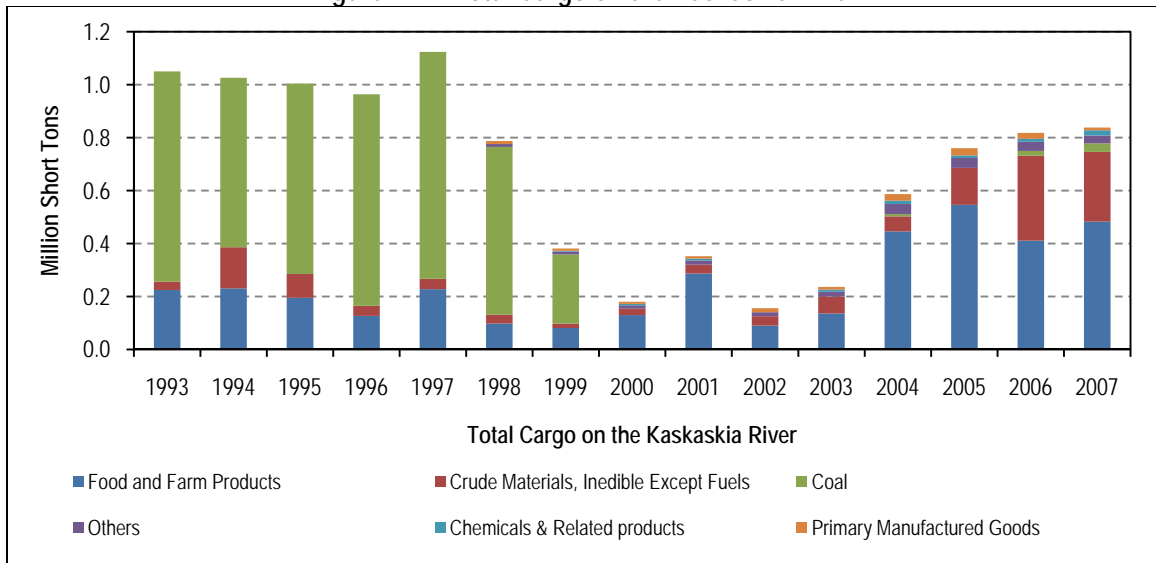
2.5.2 Kaskaskia Regional Port District

Kaskaskia Regional Port District, located in Illinois, has responsibility for an area that borders both banks of the Kaskaskia River, a tributary that joins the Mississippi River at mile 117.5 AOR and south of the Port of Metropolitan St. Louis. The Kaskaskia River has a maintained 9-foot depth over a 36.2 mile stretch to Fayetteville, IL. The Port District has two docks for handling dry commodities and three barge fleeting areas, all operated by private companies. A privately owned and operated grain elevator is also located on the River. Total cargo volume on the Kaskaskia River was 808,000 tons in 2007 (**Figure 2-19**), comprising grain, sand and gravel,

Around 800,000 tons of cargo is handled annually on the Kaskaskia River, over 95 percent outbound shipments of dry bulk commodities.

coal and other dry bulk commodities. Outbound shipments (to locations outside the Kaskaskia River) accounted for over 95 percent of total cargo.

Figure 2-19: Total Cargo on the Kaskaskia River



Source: Waterborne Commerce Statistics, U.S. Army Corps of Engineers

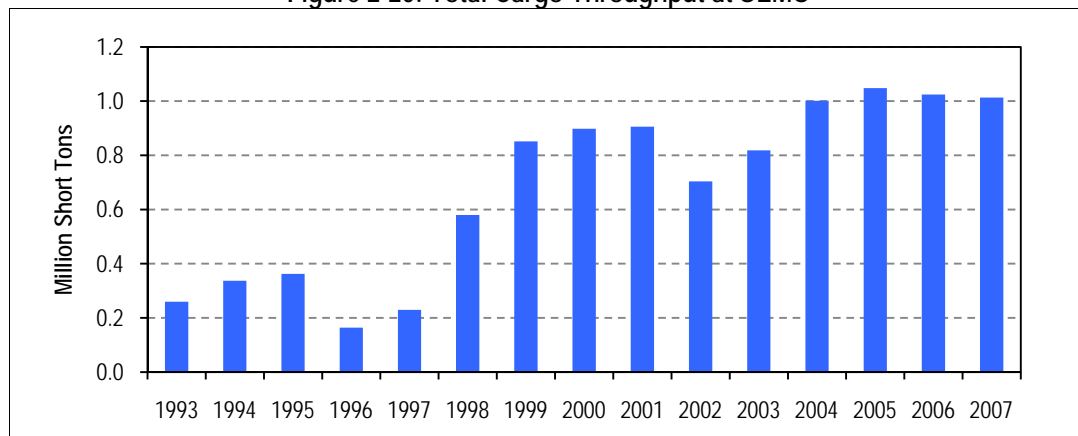
2.5.3 Southeast Missouri Regional Port Authority

Southeast Missouri Regional Port Authority (SEMO) is located at mile 48 AOR and has been an active Port Authority since the 1970s. The port is centered on a slack-water harbor, which offers a public dock and storage operated by Girardeau Stevedores and Contractors. Other cargo handling facilities are a grain elevator operated by Consolidated Grain & Barge, a dry and liquid bulk terminal operated by First Missouri Terminals, and a facility for Tower Rock Stone. The Port Authority also operates SEMO Port Railroad, a common carrier switching railroad serving the port and nearby industries, which connects to BNSF and UPRR mainlines.

Southeast Missouri Regional Port Authority has developed since the 1970s into a port handling around 1 million tons per year; mostly outbound shipments of dry bulk commodities.

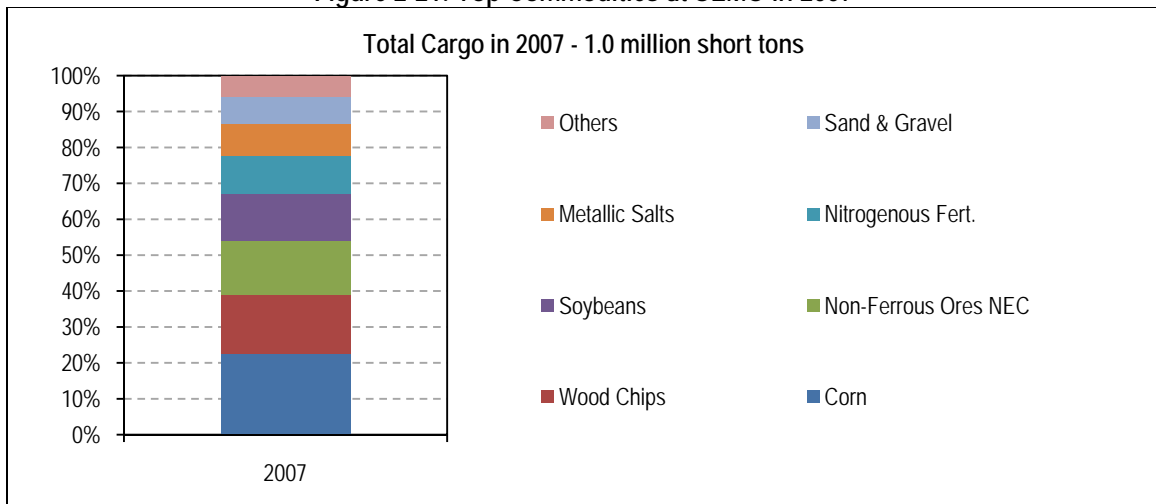
In recent years, annual cargo throughput has been 1 million tons per year of cargo (Figure 2-20) with nearly three-quarters outbound shipments. The major commodities in 2007 (Figure 2-21) were corn (21.0 percent), wood chips (15.4 percent), non-ferrous ores (13.8 percent), soybeans (12.3 percent), Nitrogenous Fertilizer (9.8 percent), Metallic Salts (8.3 percent), and Sand & Gravel (7.1 percent).

Figure 2-20: Total Cargo Throughput at SEMO



Source: SEMO, MoDOT and Waterborne Commerce Statistics, U.S. Army Corps of Engineers

Figure 2-21: Top Commodities at SEMO in 2007



Source: Waterborne Commerce Statistics, U.S. Army Corps of Engineers

2.6 Regional Containerized Cargo

In the absence of reliable statistics on the final inland destinations and origins of containerized cargo generated by the states of Missouri and Illinois, and the St. Louis region, the study team estimated containerized cargo volume by looking at macro relationships between container trade and several economic variables (disposable income, manufacturing value and employment) at the national, state and county geographic levels. As an estimate, it may under or over state export-oriented manufacturing (for example, food processing for export) in the study region, under or over state import-oriented manufacturing (for example, a plant that uses imported components from Asia) in the study region, and/or under or over state of import consumption by the study region. The following relationships were reviewed:

- For containerized imports:
 - Missouri and Illinois shares of U.S. disposable income. Disposable income is a key driver of containerized import trade as it directly influences the volume of consumer-oriented goods (for example, electronic goods) imported from overseas.
 - Missouri and Illinois share of U.S. manufacturing output. Manufacturing output is another important driver of containerized import trade as it influences the volume of manufacturing-oriented goods (for example, industrial components) imported from foreign sources.
 - County level shares of state disposable income and manufacturing output.
- For containerized exports:
 - Missouri and Illinois share of U.S. manufacturing output. Manufacturing output is an indicator of regional presence in the containerized export trade (for example, exports by the food processing industry).
 - County level shares of state manufacturing output.
- For container traffic generated within reasonable truck distance of the four sites, using Herculaneum Site as the point of reference:
 - Identified those counties within two-hour and two-hour truck driving times of Jefferson County (See **Figure 3-2**)
 - Truck speeds were assumed as 65 mph, 55 mph and 45 mph for interstates, major highways and county roads respectively
 - Evaluated the share of state disposable income and manufacturing output accounted for by counties within the two drive-time windows

The primary data sources for the analysis were the Census Bureau, Bureau of Economic Analysis, Moody's Economy.com, and JOC Piers.

Missouri generated an estimated 504,000 TEU⁷ of containerized cargo in 2008, 307,000 TEU of imports and 197,000 TEU of exports (Figure 2-22). These estimates exclude movements of empty containers in and out of the state. Missouri accounted for an estimated 1.8 percent of U.S. containerized trade, a share roughly equivalent to the State's share of U.S. disposable income, manufacturing output and population. This cargo is primarily generated by the Kansas City and St. Louis areas, the two largest population and manufacturing centers in Missouri.

The State of Illinois generated an estimated 1.3 million TEU of containerized cargo, 785,000 TEU of imports and 489,000 TEU of exports. Much of this trade is generated by the Chicago region, the principal population and manufacturing center of the State. Disaggregation of the estimated State containerized cargo to the county level (based on county level disposable income and manufacturing output) shows that the study region accounts for a significant share of Missouri's containerized cargo and only a small share of Illinois' containerized cargo.

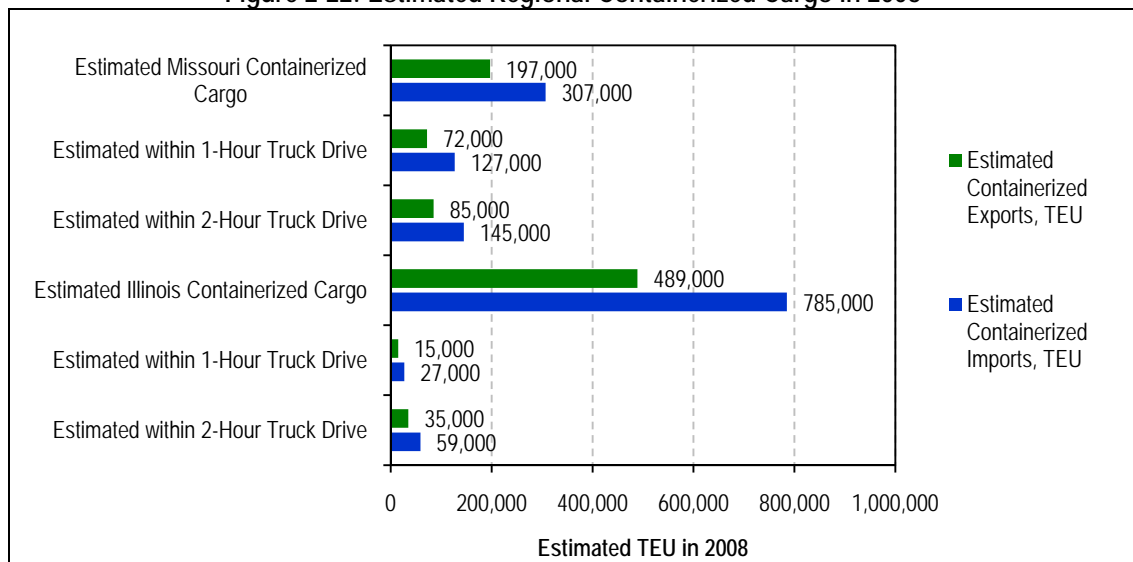
In 2008, Missouri and Illinois together generated an estimated 1.8 million loaded TEU of containerized cargo; 1.1 million loaded TEU of imports and 0.7 million loaded TEU of exports.

Missouri counties within a two-hour truck driving time of Jefferson County generate approximately 46 percent (230,000 TEU) of the State's containerized cargo. This hinterland includes St. Louis, the major population center of Eastern Missouri. Counties in Illinois within two-hour truck driving time of Jefferson County generate an estimated 7 percent (94,000 TEU) of Illinois containerized cargo.

In 2008, an estimated 324,000 loaded TEU of containerized cargo was generated within a two-hour truck driving time of the Herculaneum site; 230,000 loaded TEU by locations in Missouri and 94,000 loaded TEU by locations in Illinois.

This analysis suggests a total estimated market of 324,000 TEU of containerized cargo within a two-hour truck driving time of Jefferson County. (As noted earlier, this is an estimate of loaded container traffic and excludes empty containers).

Figure 2-22: Estimated Regional Containerized Cargo in 2008



Source: TranSystems based on data from Census Bureau, Bureau of Economic Analysis, Moody's Economy.com and JOC Piers

⁷ TEU – Twenty-foot Equivalent Unit is a standard unit of measurement of container volume used in the container shipping and port industries. One 20-foot container equals one TEU and one 40-foot container equals two TEU. Up to 72 TEU can be carried by a jumbo river barge.

2.6.1 Inland Transport Modes

The primary transport mode for regional containerized cargo is rail service between the major gateway ports and intermodal yards in Kansas City and St. Louis. Depending on trade direction, commodity type, and a shipper's specific supply chain, the major inland transport modes are intact intermodal rail service (for example, import cargo remains in the container from point of origin overseas to the inland destination), domestic containers by intermodal rail service (for example, import cargo is transloaded from marine containers to larger domestic containers near the port), and carload rail service (often in the case of export commodities). Trucking is a less attractive option than rail due to the long distances from the major container ports.

Intermodal rail service is the primary transport mode for the region's containerized imports, while the region's exports move by carload or intermodal rail service.

Alternatively, and driven by a shipper's distribution network, the region's containerized import cargo may move to alternate inland distribution points (for example, Chicago) where the cargo is then transported by domestic truckload service into the region. A summary of primary inland transport modes by trade lane is provided in **Table 2-3**.

Table 2-3: Major Trade Lanes and Inland Transport Modes for Containerized Trade

Overseas Region*	Main Port Gateway	Main Inland Mode Characteristics
Asia (62%)	West Coast	<p>Imports</p> <ul style="list-style-type: none"> • Container moves intact by rail from port to intermodal rail yard, then trucked to final destination • Cargo is transloaded from container to domestic 53-foot container near port and then moves by rail to intermodal rail yard, then trucked to final destination • Cargo is placed in a warehouse/distribution center near the port, then trucked or railed to final destination. <p>Exports</p> <ul style="list-style-type: none"> • Export cargo is moved by carload rail to port, then transloaded to container. • Container loaded at inland point, then railed to port
Europe (16%)	East and Gulf Coasts	Same as above
Latin America (13%)	Gulf and East Coasts	Same as above

*(Estimated Share of Container Cargo within 2-Hours Drive of Jefferson County)

Source: TranSystems

2.6.2 Container-on-Barge Service

The following discussion provides a review of existing, proposed and cancelled container-on-barge (COB) services around the country (**Figure 2-23**), as background to the evaluation of COB opportunities for the Jefferson County sites presented in Section 3.

Figure 2-23: Container-on-Barge Services around the Country



Source: TranSystems

New Orleans – Memphis

Osprey Line has provided weekly COB service between New Orleans and Memphis for several years, calling at the Fullen Dock in Memphis (Figure 2-24). Total throughput at Memphis was as high as 14,000 TEU in 2007 (Figure 2-25), but volumes have fallen due to the downturn in the U.S. container trades. In summer 2009, the company temporarily suspended the scheduled barge service due to the weak market and imbalanced cargo flows. In order to compete with rail, the service requires reasonably balanced full container moves to minimize the cost of repositioning empty containers. Commodities handled by the service are typically heavy and so can benefit from the heavier container loads allowed by barge compared to over-the-road and rail service. The service is also attractive for hazardous commodities. Exports have included agricultural products, such as cotton, while imports have included fertilizers. The principal overseas destinations and origins have been Europe, Central America and other Latin America.

Osprey Lines has provided weekly container barge service between New Orleans and Memphis, the latter port handling up to 14,000 TEU per year.

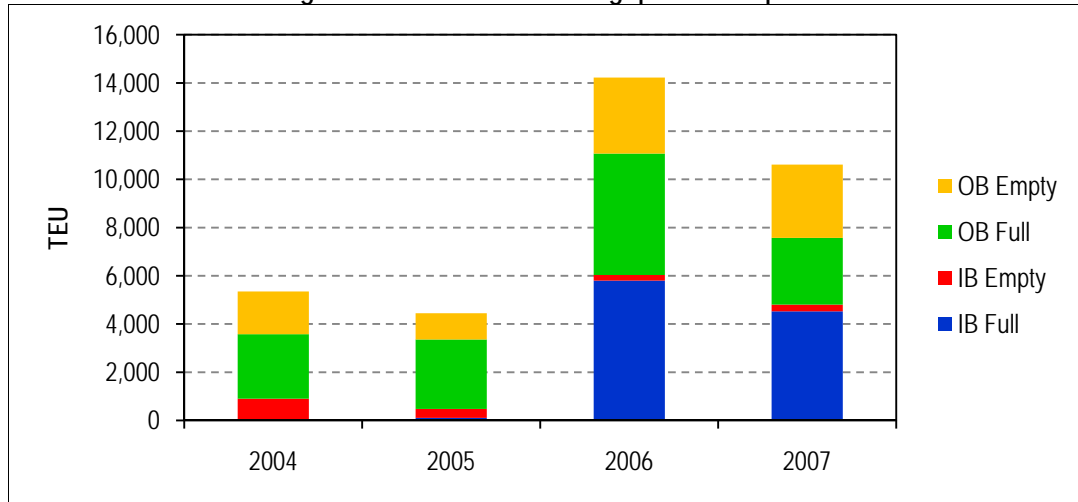
Osprey Line also provides COB service between New Orleans and Houston, advertising weekly Thursday departures. In those corridors where there has been insufficient volume commitments to support scheduled service (for example, the Ohio River), Osprey Line provides service on inducement to shipping lines and shippers with specific one-off or infrequent service needs.

Figure 2-24: New Orleans and Fullen Dock, Memphis



Source: Osprey Line Presentation to Coalition of Alabama Waterway Associations, March 2009

Figure 2-25: Container Throughput at Memphis



Source: U.S. Army Corps of Engineers

Columbia River

Barge service for containerized cargo has successfully operated for many years on the Columbia River, connecting small upriver terminals with the Port of Portland (Figure 2-26). The most distant inland terminal is at Lewiston, ID, 360 miles and 47 hours river transit time to Portland. The three other river terminals are at Pasco, WA (225 miles and 35 hours), Umatilla, OR (187 miles and 25 hours), and Morrow, OR (170 miles and 23 hours).

One of the most successful container-on-barge operations is on the Columbia River, OR; moving exports of agricultural and other commodities between small upriver terminals and the Port of Portland, OR

Containerized commodities handled by barge are mostly agricultural products for export – hay, animal feed, wheat, pulses, seeds, frozen potatoes, dry potatoes, and frozen vegetables. Other commodities include wood pulp, paper, diatomaceous earth, bentonite clay, and metal scrap. Total volume (loaded and empty containers) has been as high as 51,000 TEU earlier in the decade and was 30,000 TEU in 2007⁸. Annual changes in volume have been driven by the number of ocean carriers calling at Portland, demand for US agricultural exports, and costs compared to alternative transport modes and alternate port gateways of Seattle and Tacoma.

Representative rates for a round-trip movement of an empty container in one direction and a loaded container in the opposite direction are (rates exclude additional charges for terminal handling, fuel surcharge and hazardous cargo)⁹:

River Terminal	Round-Trip Distance	20-ft Dry	40-ft Dry	20-ft and 40-ft Refrigerated
Lewiston, ID	720 miles	\$244	\$366	-
Pasco, WA	450 miles	\$216	\$270	\$400
Umatilla, OR	374 miles	\$216	\$270	\$400
Morrow, OR	340 miles	\$200	\$250	\$300

⁸ Based on statistics reported by USACE and Columbia River ports

⁹ Tariff published by Tidewater Lines at www.tidewater.com

Figure 2-26: Columbia River Barge Service



Source: Port of Portland

Oakland – Sacramento

Container barge service is proposed between the port of Oakland and two river ports at Sacramento and Stockton, to remove truck traffic from major regional highways. The distances are comparable by river and by road, so barge service is being promoted as a competitive option by reducing the need to reposition empty containers by road, reduce truck related highway traffic, congestion and accidents, reduce truck related pollution, and accommodate long term growth in regional container movements. An important target market is the containerized exports shipped from the Central Valley agricultural region, which are currently trucked to Oakland.

East Coast Coastal

Columbia Coastal Transport provides COB feeder services between ports on the U.S. East, using ocean going barges ranging in capacity from 450 TEU to 910 TEU. The following services are provided:

- Northern Service: New York/New Jersey, Boston and Portland, ME
- Mid-Atlantic Service: New York/New Jersey, Baltimore and Norfolk
- Chesapeake Service: Norfolk and Baltimore
- Southern Service: Charleston, Savannah and Miami
- Freeport, Bahamas and Cuba

Norfolk - Richmond

In late 2008, container barge service was launched between the port of deep-sea port of Norfolk and the river terminal at Richmond, VA, a distance of approximately 100 miles up the James River. The weekly service is operated using a single barge with capacity of 160 TEU and offers rates comparable with trucking. The service was started with the state and federal assistance, including funding from the federal Congestion Mitigation and Air Quality (CMAQ) program. The primary purpose of the CMAQ program is to fund projects and programs that reduce transportation-related emissions.

Launched in late 2008, container barge service between Norfolk, VA and Richmond, VA was supported by state and federal funds.

New York - Albany

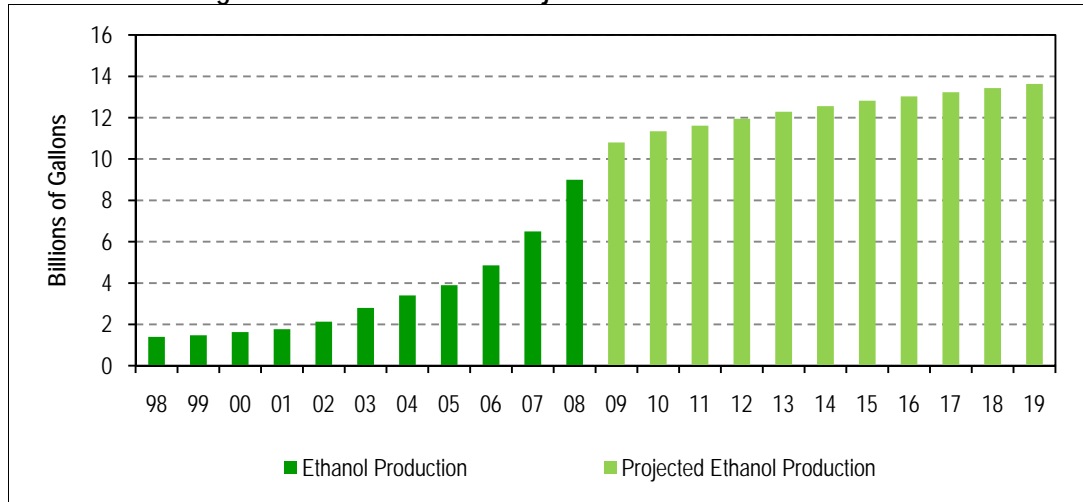
The Port of New York/New Jersey (NY/NJ), with state and federal assistance, supported a trial COB service between the port and Albany, NY, a distance of 150 miles. The service operated from 2003 to 2006, coming to an end due to lower business than originally projected and the ending of an operating subsidy provided through federal funds. Features of the barge operation were twice weekly service, container and chassis pools at the inland terminal, customs clearance at Albany, and free storage of empties at Albany. The rate to Albany was \$350 per round trip plus \$125 surcharge for each refrigerated container. The round trip included moving the loaded or empty container from NY/NJ to Albany and return of the empty or loaded container to NY/NJ.

2.7 Other Market Sectors

2.7.1 Ethanol

Production of ethanol expanded rapidly over the past five years in response to government initiatives to boost the use of alternate fuels. As shown in **Figure 2-27** ethanol production reached a new record of 9 billion gallons in 2008 and is projected to continue growing over the next decade in response to federal Renewable Fuel Standards (RFS), mandated under the terms of the Energy Independence and Security Act of 2007. Ethanol production is centered on the use of corn, which will remain the dominant feedstock in the future; however, use of alternate feedstock is projected to increase. RFS set a target of 36 billion gallons of fuel ethanol by 2022, of which 15 billion gallons can be derived from grain.

Figure 2-27: Historical and Projected Ethanol Production*



* Projected ethanol production is based on USDA projections of corn used for ethanol production and excludes ethanol derived from other feedstock.

Source: Renewable Fuels Association and USDA Long-Term Projections

As of January 2009, the Renewable Fuels Association (RFA) reported 170 operating ethanol plants with production capacity of 10.6 billion gallons and a further 20 plants under construction. The majority of this capacity (63 percent) is located in five major corn producing states of Iowa, Nebraska, Illinois, Minnesota and South Dakota. Missouri has five ethanol plants, located in the northern half of the state, with a combined annual production capacity of 261 million gallons (**Table 2-4**). There is no new ethanol capacity planned in Missouri (based on RFA data). The closest new project is the 88 million gallons per year ethanol plant under construction by Abengoa Bioenergy on a 79-acre site at Tri-City Regional Port District; the site will allow Abengoa to ship ethanol by barge and rail.

Table 2-4: Ethanol Plants in Missouri

Location	Company	Feedstock	Annual Production Capacity (million gallons)
Craig	Golden Triangle Energy, LLC	Corn	20
St. Joseph	Lifeline Foods, LLC	Corn	40
Malta Bend	Mid-Missouri Energy, Inc.	Corn	50
Ladonia	POET Biorefining	Corn	50
Macon	POET Biorefining	Corn	46
Carrollton	Show Me Ethanol	Corn	55

Source: Renewable Fuels Association

Ethanol refining capacity is concentrated in Midwest corn producing states. From there, it is typically moved by unit train (each with as many as 95 tank cars) to major consumption centers in the east (for example, New York) and west (for example, California), where it is blended with gasoline, or it is loaded into holding tanks for delivery via pipeline to blending facilities. Industry wide, approximately 75 percent of ethanol is moved by rail and the remaining by truck, with barge movements, equivalent to about 10 percent of total production, representing transfers of rail or truck shipments. Barge usage is expected to grow as new plants are built on or in close proximity to rivers.

2.7.2 Distillers Grains

Ethanol production consumes the grain's starch, leaving the protein, minerals, fat and fiber to be concentrated into distillers grains, the main co-product of ethanol production and a livestock feed. For dry mill ethanol refineries, which account for the majority of capacity, this co-product is dried and sold as Dried Distillers Grains with Solubles (DDGS). A modern dry-mill ethanol refinery produces approximately 2.8 gallons of ethanol and more than 17 pounds of distillers grains from a bushel of corn. As reported by the RFA, production of distillers grains expanded from 2.3 million metric tons (MT) in 1999 to 23 million MT in 2008. Other co-products from ethanol production are corn gluten feed (3 million MT produced in 2008) and corn gluten meal (600,000 MT in 2008).

While the majority of DDGS is consumed by the domestic livestock sector, there is a strong international market with total exports of 4.5 million MT in 2008¹⁰, nearly 20 percent of total production. The largest two export markets are Mexico and Canada, which received 43 percent of exports in 2008. Other important markets are Turkey, Japan, Israel, Taiwan, South Korea, and Southeast Asia. Primary transport modes for markets outside North America are by bulk ship or container, the latter mode popular in smaller Asian markets where importers can receive small containerized lots direct to final destination or ensure product is sourced from a single plant (that is, identity preserved).

U.S. production and exports of dry distillers grains have grown in line with ethanol production. Exports totaled 4.5 million MT in 2008, shipped in bulk or containerized depending on foreign market and shipment size.

A challenge for exporters is securing empty containers for loading at inland origins, with ocean carriers seeking to return containers rapidly from major inland intermodal hubs rather than having the containers repositioned for export loads. The typical ocean carrier positioning strategy is to turn containers as quickly as possible between high paying foreign cargo origin points and destinations in the US. Increasing the number of container "turns" increases its annual payload revenue. Loading a container in the US for export extends its turn-time and reduces the number of turns that the container can achieve.

2.7.3 Identity Preserved Grains

Identity preserved (IP) grains are specialty and higher value grains produced with a specific end-user in mind (a specific kind of animal feed, food uses, cosmetics, industrial use, etc.) and their specific characteristics must be preserved and traced from production through processing and shipment to the end user. This requires IP grains to be handled either as containerized shipments or in individual bulk shipments, segregated from general bulk grains. One example is the soybean industry, which has been exporting IP product to the Asian tofu market. Another example is Missouri Food and Fiber, Inc. (MOF2), a major IP products cooperative that sources high quality soybeans, corn, wheat and other grains from around Missouri and delivers them to world markets. As with DDGS, the availability of empty containers can be a challenge for exporters. In many cases, IP grains are trucked to transload facilities in close proximity to intermodal rail hubs (for example, Kansas City or St. Louis) in order to ensure a ready supply of empty containers.

Identity Preserved (IP) Grains are a niche but growing market sector due to foreign demand for specialty products that are traceable from production to end user.

¹⁰ *Export Markets for Distillers Grains*, John A. Fox, Kansas State University, August 2009

2.8 Conclusions

The evaluation of the existing conditions including the historical and current cargo movements in the St. Louis region suggests several broadly defined market opportunities are available to Jefferson County. They are described below.

- Jefferson County is situated in the Port of Metropolitan St. Louis, the third largest inland port in the country that services the population and industrial centers of St. Louis, Eastern Missouri and Western Illinois. The Port handled 32.1 million tons of cargo in 2007 and a broad variety of commodities (coal, grains, petroleum products, chemicals, construction materials, fertilizer, steel and other products) consumed by the regional economy. With medium to long term growth of regional population and economic activity, there will be a demand for existing and new cargo handling facilities in the region.
- Jefferson County offers excellent highway, rail and water access, combined with acreage for development and proximity to St. Louis, which makes it an attractive location for cargo handling and distribution activities.
- Private companies operate the cargo handling facilities in the region, either through direct ownership or under leases from public port authorities. Many of the older facilities may face expansion constraints due to their proximity to urban areas and/or planning constraints; and companies may require long term alternate locations for their cargo handling operations.
- Companies located near or within Jefferson County currently have to truck products to cargo facilities in St. Louis (east and west banks of the Mississippi River) or to SEMO. For example, one company currently trucks 10,000 to 30,000 tons of sand per month from their plant near Herculaneum/Crystal City to a barge terminal on the east bank of the Mississippi River, 37 miles and approximately one hour away (drive time plus unloading). The ability to move cargo through Jefferson County sites would lower their highway transportation costs.
- The potential for medium to long term development of container-on-barge service between St. Louis and the Gulf Coast would require a small container terminal in the St. Louis area, which could be facilitated at the Jefferson County sites.
- Each of the above market segments may also support warehouse/distribution services, in addition to cargo handling requirements.

The above broad market opportunities are explored further in Sections 3 (Analysis of Competitive Position for Local and Hub Traffic) and Section 4 (Future Conditions - Trade Level Forecasts).

3 Analysis of Competitive Position for Local and Hub Traffic

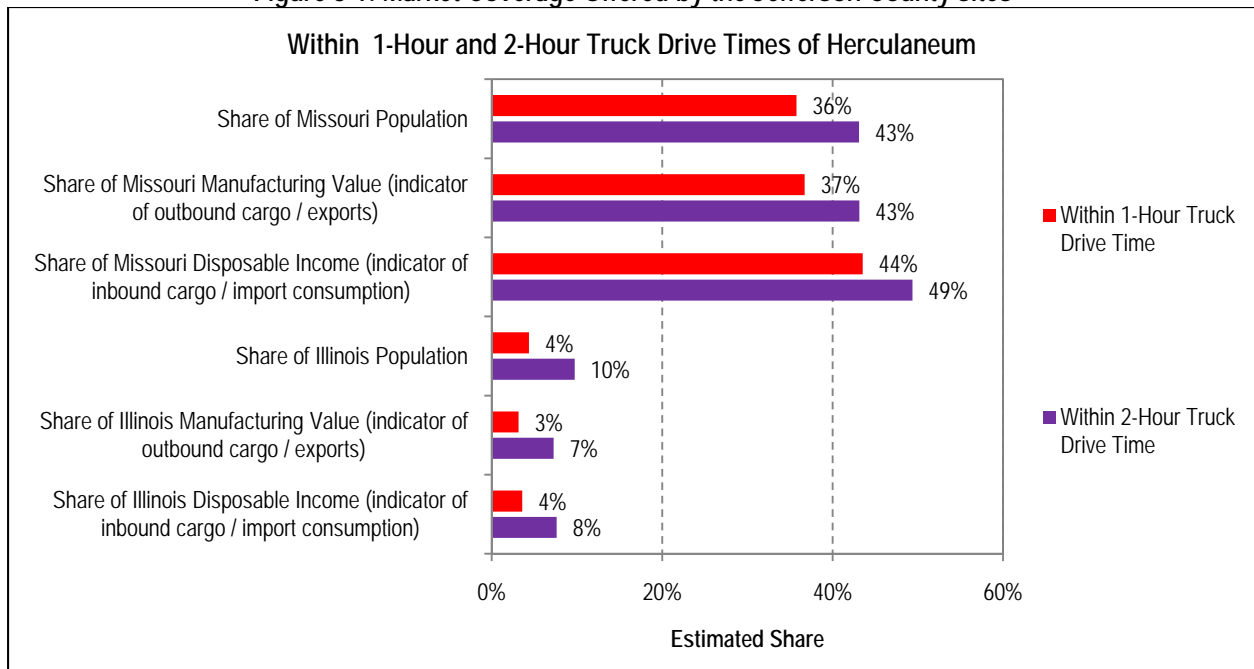
The objective of this analysis is to evaluate the competitive position of the Jefferson County sites within the regional market discussed in the Existing Conditions. The analysis starts with an evaluation of the collective Jefferson County sites' location within the regional market and concludes with a Strengths, Weaknesses, Opportunities and Threats (SWOT) assessment done for the Jefferson County sites though applicable to any potential port located among the four sites under consideration.

3.1 Market Coverage

The macro evaluation of market coverage was addressed by combining county-level population, manufacturing and income statistics with truck service windows, in order to identify the overall market within a reasonable truck driving time of Jefferson County. Two truck service windows were used – one-hour and two-hour drive times – using assumptions on truck speeds by road category – 65 mph, 55 mph and 45 mph for interstates, major highways and county roads respectively. The counties falling within these two truck service windows were identified and statistics compiled on their population, disposable income and manufacturing output, the latter two indicators for consumption of inbound goods and production of outbound goods.

The results of the analysis are summarized in **Figure 3-1**. Within one-hour truck driving time, the Jefferson County sites, for example, provides access to 2.1 million people in Missouri (36 percent of the state's population) and 0.6 million people in Illinois (4 percent of the state's population). Within a two-hour truck driving time, the Jefferson County sites cover 43 percent of Missouri's population and 10 percent of Illinois' population. The site also provides access to similar shares of state manufacturing value, an indicator of goods produced and shipped from the area. A map of the market coverage provided by the two truck service windows is shown in **Figure 3-2**. The market coverage analysis indicates the Herculaneum site, representative of the four Jefferson County sites, offers good access to the regional economy.

Figure 3-1: Market Coverage Offered by the Jefferson County sites

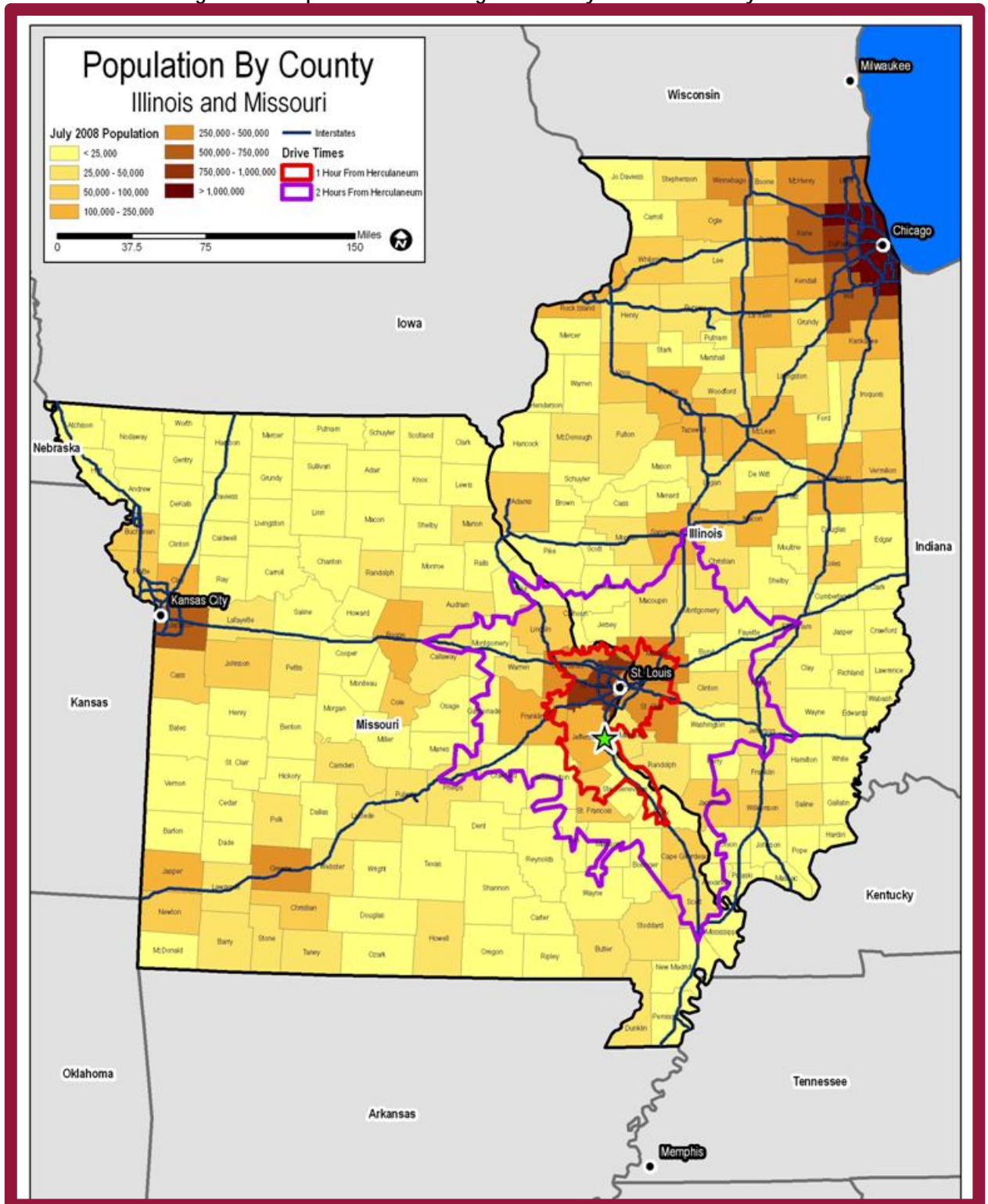


Source: TranSystems estimates based on statistics from Census Bureau, Bureau of Economic Analysis and Moody's Economy.com

An opportunity may lie in providing expansion capabilities for existing terminals in the City of St. Louis that are constrained by surrounding urban areas, impacted by highway congestion, and face competition from alternate waterfront uses. The opportunity for Jefferson County lies in providing a site for long term expansion that combines water, rail and highway transport modes, and less congested site access. From the cargo shipper point of view, barge

transportation costs would effectively be the same from the four sites compared to the existing terminals, assuming that large barge tows can be created.

Figure 3-2: Map of Market Coverage Offered by Jefferson County Sites



Source: TranSystems

Companies located in proximity to the Jefferson County sites present another opportunity. These companies currently ship cargo through terminals in St. Louis, on the east bank of the Mississippi and elsewhere, incurring additional local trucking costs. Jefferson County could offer these companies a more cost effective solution for their cargo shipments.

The evaluation of the two-hour truck driving time window around Jefferson County captured locations in Southeastern Missouri and Western Illinois. However, this hinterland would be constrained by the presence of other ports in these areas. The SEMO (Scott County, MO) offers a closer gateway for cargo generated in that part of the state. Similarly, the Tri City Regional Port Authority (Granite City, IL) and other terminals on the Illinois bank of the Mississippi River offer better access for cargoes generated by Western Illinois.

3.2 SWOT Assessment and Conclusions

The assessment of Strengths, Weaknesses, Opportunities, Threats (SWOT) presented in **Table 3-1** is based on the project team's evaluation of the regional market, site location and site characteristics, and the cargo projections. The Jefferson County sites provide good access to water, rail and highway transportation, and acreage for development. While there are many existing cargo handling facilities in the St. Louis region, the market review indicates several opportunities for Jefferson County: projected market growth over the 30-year planning horizon (See Section 4), relocation/expansion for existing facilities in the region that may be constrained by other land uses around existing facilities, and local shippers in proximity to the terminal.

Table 3-1: Strengths, Weaknesses, Opportunities, Threats (SWOT) of the Jefferson County Sites	
Strengths	Weaknesses
<ul style="list-style-type: none"> • Good Transportation Links <ul style="list-style-type: none"> ○ River access ○ Highway access ○ Rail access • Land for Development <ul style="list-style-type: none"> ○ Over 1,000 acres with riverfront access and as much as another 1,000 acres opened up for development by new transportation access ○ Mixed use potential – waterfront, port industrial, light manufacturing, warehousing, and commercial ○ Green space and reserve • Available Labor Force <ul style="list-style-type: none"> ○ Jefferson County, regional • Hinterland <ul style="list-style-type: none"> ○ Major population and industry centers of Eastern Missouri within reasonable truck distance 	<ul style="list-style-type: none"> • No site development at this time • Funding for development not identified • No direct highway and rail access to Illinois <ul style="list-style-type: none"> ○ Connections through St. Louis
Opportunities	Threats
<ul style="list-style-type: none"> • Local Companies <ul style="list-style-type: none"> ○ Cargo currently trucked to more distant terminals • Regional Cargo <ul style="list-style-type: none"> ○ Although primarily relatively slow growth bulk commodities, increased cargo volumes are projected over the 30-year planning horizon • Constraints at Existing Terminals <ul style="list-style-type: none"> ○ Identify existing terminals that face expansion constraints due to location in St. Louis City ○ Challenges facing existing terminals from expansion of non-cargo waterfront uses • Container-on-Barge <ul style="list-style-type: none"> ○ Medium to long term development ○ Cargo to/from St. Louis region ○ Relatively small volume requirement ○ Projected long term fuel cost increases 	<ul style="list-style-type: none"> • Bulk Commodities <ul style="list-style-type: none"> ○ What moves by rail today will largely continue to move by rail, so limited opportunities to convert cargo from rail to barge • Competition from other Ports • Container-on-Barge <ul style="list-style-type: none"> ○ Alternative terminal sites ○ Competing transport modes ○ Shipper transit time needs / service frequency ○ Equipment balance

Source: TranSystems

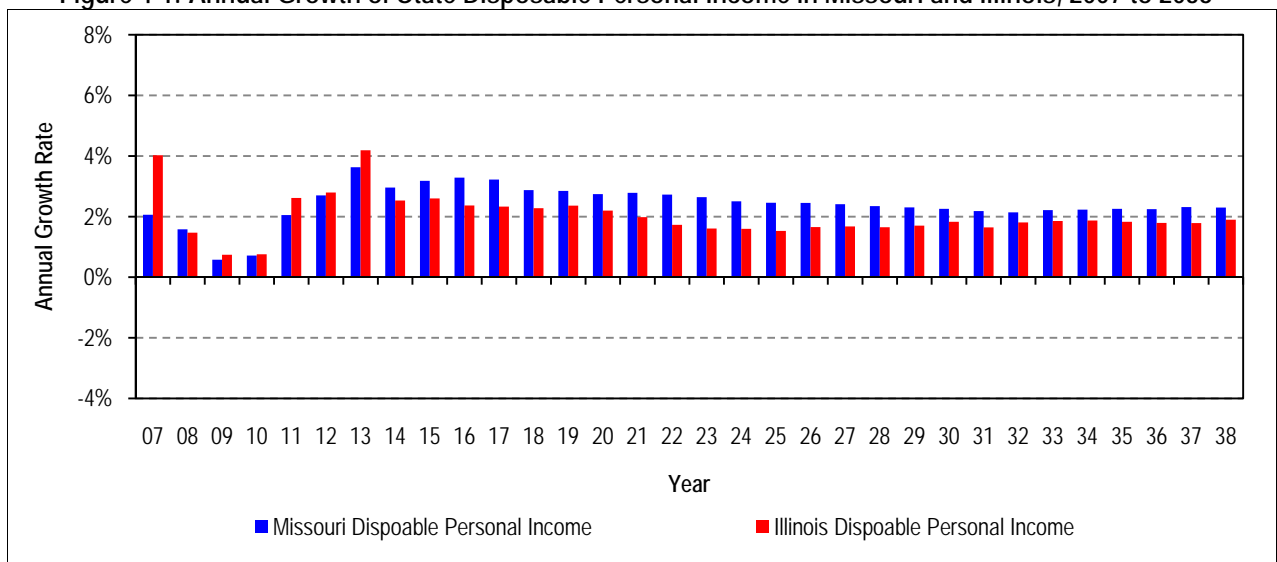
4 Future Conditions - Trade Level Forecasts

The review of historical trends and competitive factors showed the cargo market to be relatively mature, with low annual growth rates, and focused on several major commodity groups – coal, food and farm products, and petroleum and petroleum products. Cargo volumes are driven by local and regional economic activity, and external demand for major commodities. An application of the SWOT assessment across the four Jefferson County sites indicates that they have several positive attributes that may be attractive to cargo owners and barge operators, including water frontage supported by backlands for cargo storage and processing, proximity to regional highways and outside the more congested St. Louis area, and rail access. The final step in the evaluation of the regional cargo market is the development of 30-year forecasts by major commodity group, which will partly guide the facility planning elements of the study. Projections of the major bulk commodity groups are presented for Low, Medium and High Cases, and for 10-year, 20-year and 30-year planning horizons. In addition, the study team has prepared a long-term outlook for the regional containerized cargo market using the Herculaneum site as the case study with applicable results for all four sites being considered – Pevely, Herculaneum, Crystal City and LaRoche.

4.1 Regional Economic and Population Projections

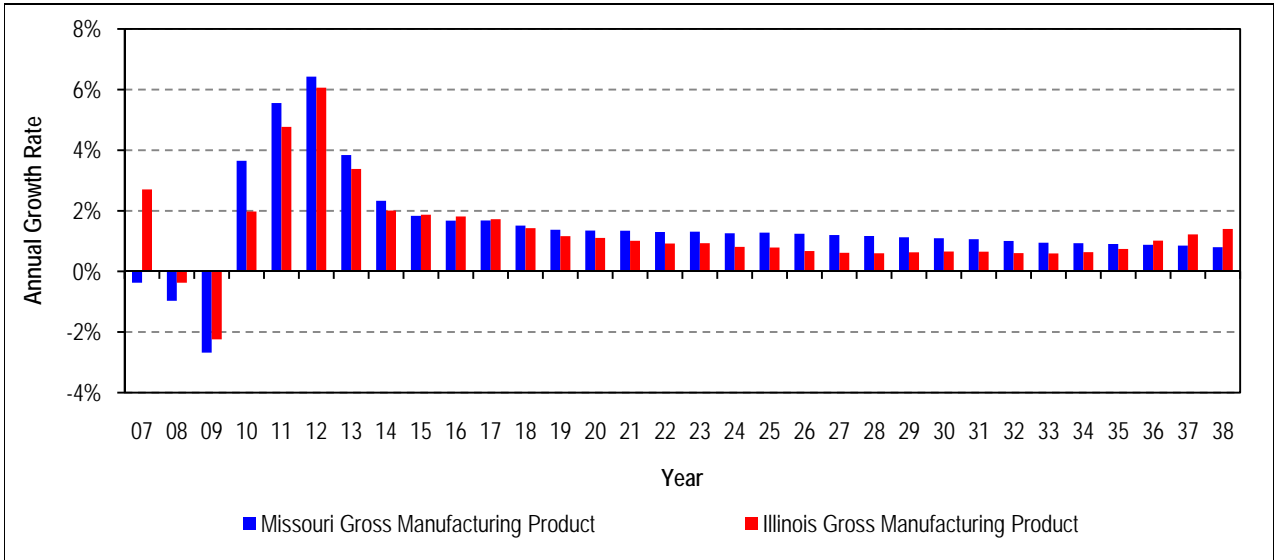
The economic outlook for Missouri, the principal driver of cargo throughput in the region, and Illinois, is broadly similar to the overall U.S. economy. Both states have experienced weaker growth over the past two years (Figure 4-1 & 4-2) due to the downturn in the U.S. and global economies. Similarly, economic activity is projected to rebound in 2010 and recovery accelerates from 2011 to 2014, which largely reflects the current outlook for the U.S. and world economies. The recovery over the next two to three years is expected to support renewed growth in regional cargo flows, inbound and outbound. Over the 30-year planning horizon a declining rate of economic growth, as expressed in the income and manufacturing indicators, and the relative maturity of the major commodities, is expected to drive low average annual growth of cargo flows. This outlook is consistent with the long term historical pattern for cargo growth in the region surrounding the Jefferson County riverfront.

Figure 4-1: Annual Growth of State Disposable Personal Income in Missouri and Illinois, 2007 to 2038



Source: Moody's Economy.com

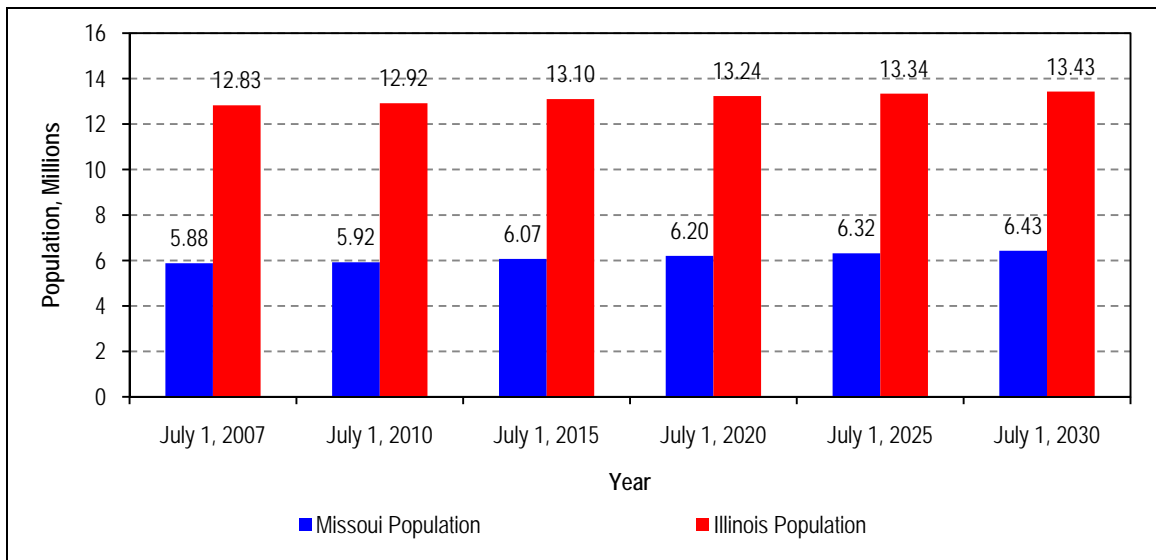
Figure 4-2: Annual Growth of State Gross Manufacturing Product in Missouri and Illinois, 2007 to 2038



Source: Moody's Economy.com

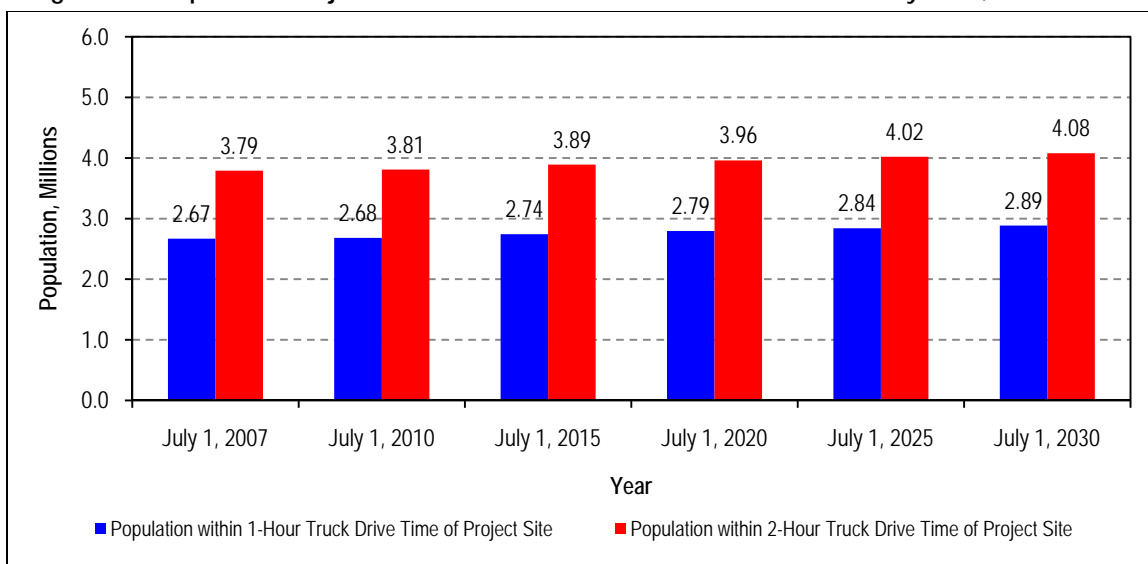
The state and regional economies served Jefferson County have relatively low-growth populations. The Census Bureau's long-term projections of population, which go out to 2030, are summarized in Figure 4-3, and estimates of population within two-hour and two-hour truck driving times of the Jefferson County sites are presented in Figure 4-4. Missouri's total population is projected to increase from 5.88 million in 2007 to 6.20 million in 2020 and 6.43 million in 2030, a 23-year (2007 to 2030) compound annual growth rate (CAGR) of only 0.4 percent. The estimated population within a two-hour truck driving time of the Jefferson County sites is projected to increase from 3.79 million in 2007 to 4.08 million in 2030, a 23-year CAGR of 0.3 percent. By contrast, the U.S. population is projected to have a 23-year CAGR of 0.9 percent.

Figure 4-3: Population Projections for Missouri and Illinois, 2007 to 2030



Source: Census Bureau

Figure 4-4: Population Projections for Hinterland around the Jefferson County sites, 2007 to 2038



Source: TranSystems estimates derived from Census Bureau

4.2 Bulk and General Cargo Projections

4.2.1 Methodology

The long-term projections for regional port traffic (coal, grain, petroleum products, etc.) were prepared using statistical models that primarily take into consideration:

- Historical growth rates of cargo by commodity group
- State level projections for disposable personal income, manufacturing employment, and gross product manufacturing
- Long-term projections for regional consumption of petroleum and coal released by the Energy Information Agency (EIA).
- Long-term projections for regional crop production released by the U.S. Department of Agriculture (USDA).

The 10-year, 20-year and 30-year projections are provided for 2018, 2028 and 2038.

4.2.2 Bulk and General Cargo Projections

Coal, food and farm products, and petroleum and petroleum products accounted for 92 percent of the 23.5 million tons of outbound cargo moving through the Port of Metropolitan St. Louis in 2007. These three commodity groups also made up 50 percent of the 6.3 million tons of inbound cargo handled by the Port. Trends in these commodity groups will have a heavy influence on future cargo tonnage moving through the region. Overall, the commodities moving through the region are relatively mature with annual growth rates in the low single digits, and this pattern is expected to continue over the forecast horizon.

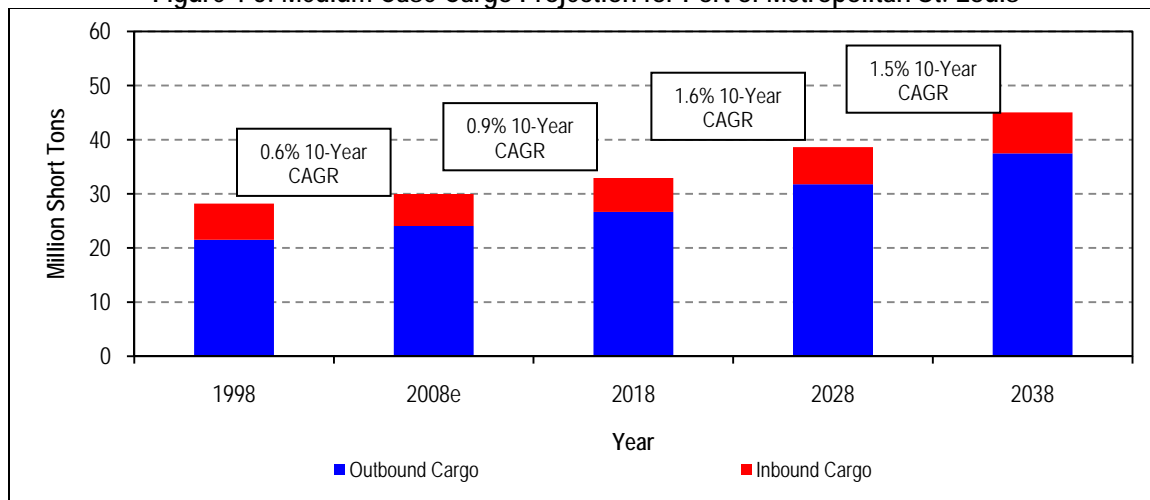
The largest commodity handled in the region is coal with 11.1 million tons shipped outbound in 2007 and a similar volume in 2008. Current and future coal shipments are tied to specific end-user requirements. Coal has been one of the strongest growing commodities moving by barge, with a 10-year historical CAGR (1998 to 2008) of 5.0 percent. The 10-year CAGR for total outbound cargo was 1.1 percent. The second largest commodity group is outbound shipments of food and farm products, made up of corn, soybeans, wheat and other agricultural products. This commodity group has declined moderately over the past decade with a 10-year CAGR of -1.3 percent. Within food and farm products, growth of corn and soybeans was offset by declines in several other commodities (wheat, other oilseeds, and animal feed). Factors that can impact volumes, and continue to do so in the future, are expansion of bio-fuel production and shifting trade patterns, which may require

Annual growth rates for the bulk commodities are projected to be in the low single-digits; however, in the Medium Case projection total cargo tonnage increases by 50 percent over the 30-year period.

alternate transport modes to barge. The petroleum and petroleum products sector has returned mixed growth over the past decade, outbound shipments having a 10-year CAGR of -3.6 percent and inbound shipments recording positive growth, a 10-year CAGR of 3.3 percent. The mixed performance reflects shifts in production, consumption and distribution patterns in the region.

The Medium Case projection, summarized in **Figure 4-5** and **Table 4-1**, is based on an evaluation of historical trends and regional economic projections, and takes into consideration the relative maturity of the major commodities. The projected annual growth rates remain below 2 percent, largely consistent with historical trends. Total inbound and outbound cargo volume handled by the Port of Metropolitan St. Louis is projected to increase from slightly less than 30 million tons in 2008 to 45 million tons in 2038, a 30-year CAGR of 1.4 percent. Outbound cargo will remain the dominant direction.

Figure 4-5: Medium Case Cargo Projection for Port of Metropolitan St. Louis



Source: TranSystems

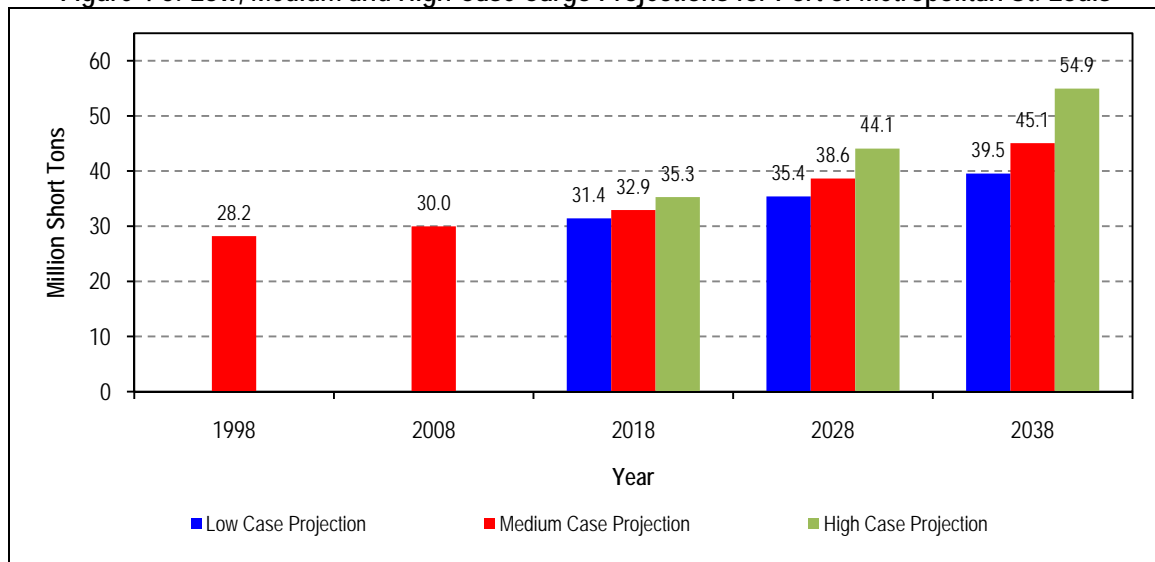
Table 4-1: Medium Case Cargo Projection for Port of Metropolitan St. Louis

000 Short Tons	1998	2007	2008e	2018	2028	2038	98 to 08	08 to 18	18 to 28	28 to 38
Outbound Commodity Group										
Coal	7,170	11,175	11,633	15,371	19,528	23,805	5.0%	2.8%	2.4%	2.0%
Food and Farm Products	9,195	7,947	8,082	7,309	8,074	9,278	-1.3%	-1.0%	1.0%	1.4%
Petroleum & Petroleum products	3,205	2,399	2,228	1,643	1,610	1,578	-3.6%	-3.0%	-0.2%	-0.2%
Primary Manufactured Goods	1,117	824	832	948	1,058	1,180	-2.9%	1.3%	1.1%	1.1%
Crude Materials, Inedible Except Fuels	550	635	777	777	777	777	3.5%	0.0%	0.0%	0.0%
Chemicals & Related products	279	479	484	593	709	831	5.7%	2.1%	1.8%	1.6%
All Manufactured Equipment, Machinery and Products	9	22	25	25	25	25	10.8%	0.0%	0.0%	0.0%
Total Outbound	21,525	23,481	24,061	26,666	31,781	37,474	1.1%	1.0%	1.8%	1.7%
Inbound Commodity Group										
Petroleum & Petroleum products	1,441	1,903	2,001	2,395	2,779	3,163	3.3%	1.8%	1.5%	1.3%
Crude Materials, Inedible Except Fuels	957	1,467	997	997	997	997	0.4%	0.0%	0.0%	0.0%
Coal	1,895	1,202	1,110	762	623	509	-5.2%	-3.7%	-2.0%	-2.0%
Chemicals & Related products	963	1,067	1,156	1,462	1,835	2,304	1.8%	2.4%	2.3%	2.3%
Primary Manufactured Goods	1,300	585	550	576	548	521	-8.2%	0.5%	-0.5%	-0.5%
Food and Farm Products	112	44	74	43	50	58	-4.0%	-5.3%	1.5%	1.5%
All Manufactured Equipment, Machinery and Products	14	25	25	25	25	25	6.0%	0.0%	0.0%	0.0%
Total Inbound	6,682	6,293	5,914	6,260	6,857	7,577	-1.2%	0.6%	0.9%	1.0%
Total Inbound and Outbound	28,207	29,774	29,975	32,926	38,638	45,051	0.6%	0.9%	1.6%	1.5%

Source: TranSystems

The Medium Case projection is compared to the Low Case and High Case projections in **Figure 4-5**, with supporting detail provided in **Tables 4-2 & 4-3**. While the three cases show considerable divergence by the end of the forecast period – total throughput is 39.5 million tons in the Low Case, 45.1 million tons in the Medium Case, and 54.9 million tons in the High Case – the results are driven by relatively small differences in annual growth rates of key macroeconomic variables. The Medium Case 30-year CAGR of 1.4 percent compares with 0.9 percent in the Low Case and 2.0 percent in the High Case. Factors that could cause lower or higher growth compared to the Medium Case include changes in demand for coal and major agricultural commodities, weaker or stronger regional economic activity, shifts in sourcing patterns and overseas markets, competitiveness of barge against other transport modes, and specific company decisions on plant location.

Figure 4-5: Low, Medium and High Case Cargo Projections for Port of Metropolitan St. Louis



Source: TranSystems

Table 4-2: Low Case Cargo Projection for Port of Metropolitan St. Louis

000 Short Tons	1998	2007	2008	2018	2028	2038	98 to 08	08 to 18	18 to 28	28 to 38
Outbound Commodity Group										
Coal	7,170	11,175	11,633	14,623	17,674	20,497	5.0%	2.3%	1.9%	1.5%
Food and Farm Products	9,195	7,947	8,082	6,617	8,074	9,278	-1.3%	-2.0%	2.0%	1.4%
Petroleum & Petroleum products	3,205	2,399	2,228	1,816	1,457	1,359	-3.6%	-2.0%	-2.2%	-0.7%
Primary Manufactured Goods	1,117	824	832	902	958	1,016	-2.9%	0.8%	0.6%	0.6%
Crude Materials, Inedible Except Fuels	550	635	777	816	703	669	3.5%	0.5%	-1.5%	-0.5%
Chemicals & Related products	279	479	484	511	526	532	5.7%	0.5%	0.3%	0.1%
All Manufactured Equipment, Machinery and Products	9	22	25	22	19	16	10.8%	-1.5%	-1.5%	-1.5%
Total Outbound	21,525	23,481	24,061	25,306	29,411	33,366	1.1%	0.5%	1.5%	1.3%
Inbound Commodity Group										
Petroleum & Petroleum products	1,441	1,903	2,001	2,278	2,515	2,723	3.3%	1.3%	1.0%	0.8%
Crude Materials, Inedible Except Fuels	957	1,467	997	1,102	902	858	0.4%	1.0%	-2.0%	-0.5%
Coal	1,895	1,202	1,110	842	564	438	-5.2%	-2.7%	-3.9%	-2.5%
Chemicals & Related products	963	1,067	1,156	1,324	1,504	1,709	1.8%	1.4%	1.3%	1.3%
Primary Manufactured Goods	1,300	585	550	521	449	387	-8.2%	-0.5%	-1.5%	-1.5%
Food and Farm Products	112	44	74	41	37	37	-4.0%	-5.8%	-1.0%	0.0%
All Manufactured Equipment, Machinery and Products	14	25	25	22	19	16	6.0%	-1.5%	-1.5%	-1.5%
Total Inbound	6,682	6,293	5,914	6,129	5,990	6,169	-1.2%	0.4%	-0.2%	0.3%
Total Inbound and Outbound	28,207	29,774	29,975	31,435	35,401	39,535	0.6%	0.5%	1.2%	1.1%

Source: TranSystems

Table 4-3: High Case Cargo Projection for Port of Metropolitan St. Louis

000 Short Tons	1998	2007	2008	2018	2028	2038	98 to 08	08 to 18	18 to 28	28 to 38
Outbound Commodity Group										
Coal	7,170	11,175	11,633	16,157	21,576	27,647	5.0%	3.3%	2.9%	2.5%
Food and Farm Products	9,195	7,947	8,082	8,074	9,851	12,505	-1.3%	0.0%	2.0%	2.4%
Petroleum & Petroleum products	3,205	2,399	2,228	1,727	1,779	1,833	-3.6%	-2.5%	0.3%	0.3%
Primary Manufactured Goods	1,117	824	832	996	1,169	1,370	-2.9%	1.8%	1.6%	1.6%
Crude Materials, Inedible Except Fuels	550	635	777	902	859	902	3.5%	1.5%	-0.5%	0.5%
Chemicals & Related products	279	479	484	688	955	1,299	5.7%	3.6%	3.3%	3.1%
All Manufactured Equipment, Machinery and Products	9	22	25	29	34	39	10.8%	1.5%	1.5%	1.5%
Total Outbound	21,525	23,481	24,061	28,574	36,223	45,596	1.1%	1.7%	2.4%	2.3%
Inbound Commodity Group										
Petroleum & Petroleum products	1,441	1,903	2,001	2,517	3,071	3,674	3.3%	2.3%	2.0%	1.8%
Crude Materials, Inedible Except Fuels	957	1,467	997	1,048	1,102	1,158	0.4%	0.5%	0.5%	0.5%
Coal	1,895	1,202	1,110	801	688	591	-5.2%	-3.2%	-1.5%	-1.5%
Chemicals & Related products	963	1,067	1,156	1,615	2,239	3,105	1.8%	3.4%	3.3%	3.3%
Primary Manufactured Goods	1,300	585	550	636	669	702	-8.2%	1.5%	0.5%	0.5%
Food and Farm Products	112	44	74	50	61	78	-4.0%	-3.9%	2.0%	2.5%
All Manufactured Equipment, Machinery and Products	14	25	25	29	34	39	6.0%	1.5%	1.5%	1.5%
Total Inbound	6,682	6,293	5,914	6,696	7,863	9,348	-1.2%	1.3%	1.6%	1.7%
Total Inbound and Outbound	28,207	29,774	29,975	35,270	44,086	54,944	0.6%	1.6%	2.3%	2.2%

Source: TranSystems

4.2.3 Projection of Barge Trips

The Port of Metropolitan St. Louis generated 18,698 outbound barge trips and 18,488 inbound barge trips in 2007, the outbound trips mostly laden and the inbound trips mostly empty. Empty barges are brought into the region to accommodate the larger outbound cargo flows. A projection of future total barge trips was made by (1) applying the 2007 ratio between outbound trips and outbound cargo tons to the projection of outbound cargo tons and (2) multiplying the results by two since barges must be positioned into the region to accommodate the greater outbound cargo movements. The results are summarized in Table 4-4 and show that barge trips are projected to increase significantly over the 30-year planning horizon.

Table 4-4: Projection* of Barge Trips Generated by the Port of Metropolitan St. Louis

Number of Barge Trips (Laden and Empty)	2007	2008	2018	2028	2038
Outbound Barge Trips					
Low Case Cargo Projection	18,698	19,160	20,151	23,420	26,570
Medium Case Cargo Projection	18,698	19,160	21,234	25,307	29,841
High Case Cargo Projection	18,698	19,160	22,753	28,844	36,308
Total Outbound and Inbound Trips*					
Low Case Cargo Projection	37,186	38,320	40,303	46,840	53,139
Medium Case Cargo Projection	37,186	38,320	42,469	50,614	59,681
High Case Cargo Projection	37,186	38,320	45,506	57,689	72,617

* Projections for years 2008 to 2038 calculated as double the number of outbound trips, since outbound cargo is the dominant cargo flow and generates inbound moves of empty barges.

Source: TranSystems

4.3 Containerized Cargo Projection

4.3.1 Methodology

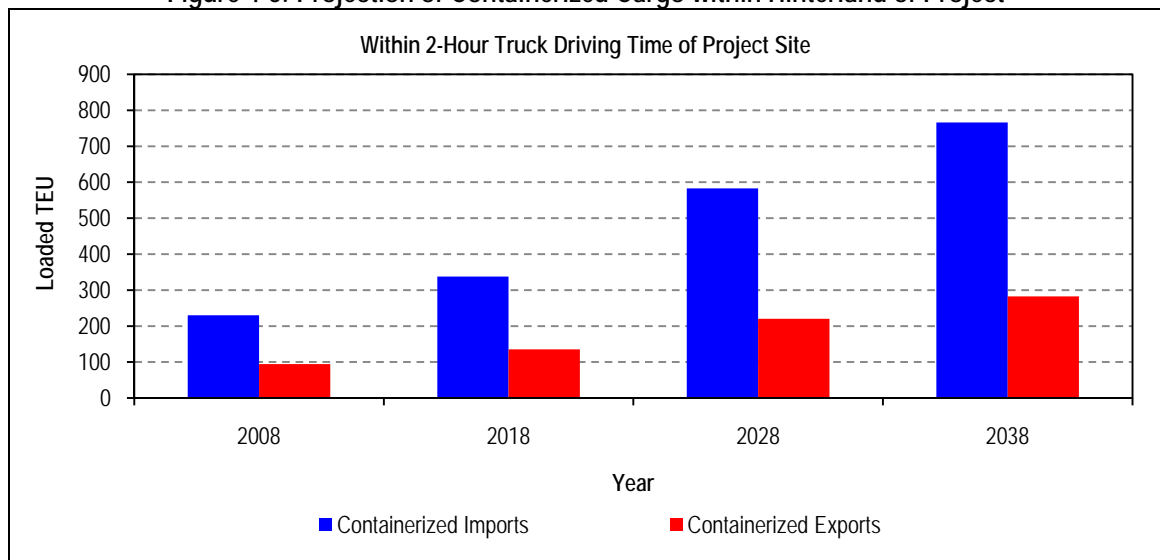
The long-term projection for the regional container market was prepared using statistical models that primarily take into consideration:

- Long-term projections for U.S. imports and exports of containerized cargo by foreign origin and destination region (Asia, Europe, Latin America, etc.).
- State level projections for disposable personal income, manufacturing employment, and gross product manufacturing
- State level county projections
- Distribution of the above metrics by county in order to determine containerized cargo generated by the truck served hinterland of the Herculeaneum site as the case study site.

4.3.2 Containerized Cargo Projection

The review of regional containerized cargo presented in Section 2.7 identified an estimated 504,000 TEU of containerized cargo was generated by Missouri in 2008, comprising 307,000 TEU of imports and 197,000 TEU of exports. In addition, Illinois generated an estimated 1.3 million TEU of containerized cargo, 785,000 TEU of imports and 489,000 TEU of exports. Of these markets, an estimated 230,000 TEU of Missouri cargo and 94,000 TEU of Illinois cargo was estimated to fall within the two-hour truck driving time window around the Jefferson County sites. This estimate was based on an evaluation of county-level disposable income and manufacturing output. Using these 2008 estimates as a base, long-term projections were prepared for containerized cargo within the hinterland of the Herculeaneum site, and the results are summarized in **Figure 4-6** and **Table 4-5**. The projections are of loaded containers and exclude empty containers and may be used in the evaluation of Pevely, Crystal City and LaRoche.

Figure 4-6: Projection of Containerized Cargo within Hinterland of Project



Source: TranSystems

Table 4-5: Projection of Regional Containerized Imports and Exports								30-Year CAGR
Loaded TEU	2008	2018	2028	2038	08 – 18	18 - 28	28 - 38	
Missouri								
Imports	307,698	433,077	814,106	1,051,204	3.5%	6.5%	2.6%	4.2%
Exports	197,124	309,582	461,058	625,996	4.6%	4.1%	3.1%	3.9%
Total	504,822	742,659	1,275,164	1,677,200	3.9%	5.6%	2.8%	4.1%
<i>Within 2 Hour Truck Driving Time</i>								
Imports	145,183	204,342	384,126	495,997	3.5%	6.5%	2.6%	4.2%
Exports	85,034	133,546	198,889	270,039	4.6%	4.1%	3.1%	3.9%
Total	230,218	337,888	583,015	766,037	3.9%	5.6%	2.8%	4.1%
Illinois								
Imports	785,222	1,083,666	1,911,553	2,395,394	3.3%	5.8%	2.3%	3.8%
Exports	486,863	742,781	1,060,984	1,419,908	4.3%	3.6%	3.0%	3.6%
Total	1,272,086	1,826,447	2,972,537	3,815,302	3.7%	5.0%	2.5%	3.7%
<i>Within 2 Hour Truck Driving Time</i>								
Imports	58,875	81,251	143,325	179,602	3.3%	5.8%	2.3%	3.8%
Exports	35,357	53,943	77,051	103,117	4.3%	3.6%	3.0%	3.6%
Total	94,232	135,194	220,376	282,720	3.7%	5.0%	2.5%	3.7%
Total Missouri and Illinois								
Imports	1,092,920	1,516,743	2,725,659	3,446,598	3.3%	6.0%	2.4%	3.9%
Exports	683,987	1,052,363	1,522,042	2,045,904	4.4%	3.8%	3.0%	3.7%
Total	1,776,907	2,569,106	4,247,701	5,492,502	3.8%	5.2%	2.6%	3.8%
<i>Within 2 Hour Truck Driving Time</i>								
Imports	204,058	285,593	527,451	675,600	3.4%	6.3%	2.5%	4.1%
Exports	120,392	187,489	275,940	373,157	4.5%	3.9%	3.1%	3.8%
Total	324,450	473,082	803,391	1,048,756	3.8%	5.4%	2.7%	4.0%

Source: TranSystems

Total containerized cargo generated by Missouri is projected to increase from 504,000 TEU in 2008 to 1.7 million TEU in 2038, a 30-year CAGR of 4.1 percent. Growth is projected to be strongest in the 10-year period to 2018, largely due to the projected recovery of the U.S. and world economies over the next several years. Containerized cargo generated by Illinois is projected to have similar rates of growth. A projection of the addressable market for the Jefferson County sites was derived based on estimated disaggregation of state containerized cargo to the county level and a two-hour truck driving window around the Jefferson County sites. The addressable market, largely comprised of Missouri imports and exports, is projected to increase from 324,000 TEU in 2008 (71 percent Missouri cargo) to 1.05 million TEU in 2038 (73 percent Missouri cargo), with imports the dominant cargo flow.

The Herculaneum site's addressable containerized market is projected to expand threefold over the 30-year planning horizon, from an estimated 324,000 TEU in 2008 to 1.05 million TEU in 2038.

The overseas origin-destination pattern of the addressable market will have a bearing on the ability of container-on-barge service to compete for business. For example, an import container from Asia will move over ports on the U.S. West Coast and then by rail to Missouri, thus not presenting an opportunity for barge service. Approximately 80 percent of containerized imports and 60 percent of containerized exports are estimated to be related to Asia, and

therefore more suited to east-west rail or truck inland transportation rather than north-south barge transportation. The more attractive market segments are trade with Latin America and Europe, which together account for an estimated 20 percent of imports and 40 percent of exports, or 30 percent of the addressable market. European cargo would also move over East Coast ports; however, there remain probable opportunities to move European cargo via barge, similar in concept to the containerized agricultural commodities shipped from Memphis via barge to New Orleans for loading to container ships bound for Europe.

The most attractive segments of the addressable market for barge service are the Latin America and Europe trades, which together account for an estimated 30 percent of the addressable market.

4.4 Conclusions

Jefferson County is located in a relatively mature cargo market with the major bulk commodities having average annual growth rates in the low single digits. However, such low growth is still projected to generate significant additions to regional cargo tonnage over the 30-year planning horizon, which is expected to require investment in existing and new terminal handling facilities. Existing terminal sites may face physical and other barriers to long term expansion. Given the slow but still substantial cargo growth and long term requirements for additional terminal capacity in the region, the Jefferson County sites, especially Herculaneum and Crystal City, offer an attractive proposition - the availability of a waterfront property with joining backlands for development and good transport connections.

The U.S. containerized trade is projected to grow at a slower rate than during the past decade, due to the slowdown in U.S. economic activity and likely structural changes in the U.S. economy due to changing private consumption patterns. Missouri has a relatively slower growth population than other regions of the country, which will dampen growth of import consumption. However, containerized cargo generated by Missouri is still projected to increase significantly over the 30-year planning horizon. Together with long-term concerns with fuel costs and environmental impacts of highway transportation, the containerized market may offer opportunities for the establishment of a niche container-on-barge service and terminal for the St. Louis/Eastern Missouri region.

These conclusions imply the following for long-term facility planning in Jefferson County:

- Designate waterfront property for cargo related activities including cargo handling, cargo storage and barge services.
- Designate selected upland properties for port industrial uses including warehousing related activities.
- Designate selected upland properties for commercial uses, either related or unrelated to cargo activities. Such uses may include warehousing, manufacturing and commercial facilities.

5 Conceptual Plans

Planning for future development at the Herculaneum and Crystal City sites begins with an assessment of Existing Conditions (Section 2) and near-term planned uses. Based on this assessment, a prioritized land use plan is developed that rated the suitability of specific areas for a variety of potential future uses. The results of the cargo and market analysis are then mapped on to the land use priorities to create preliminary alternatives for future development. These two properties include waterfront sites that are suitable for river port development. However, they also include significant backlands that must be redeveloped from residential and light commercial use to more intensive commercial and industrial uses that include capping and containment of contaminated soils.

5.1 Herculaneum Site

5.1.1 *Herculaneum VPPPA Future Land Use Framework*

In 2006, the EPA adopted a land use plan developed by E² Inc. in a six-month community planning process conducted by the City of Herculaneum. Based on their analyses, discussions and community input, the project's Future Land Use Committee prepared a land use framework for the Voluntary Property Purchase Plan Area (VPPPA) in Herculaneum¹¹. This plan included five principal findings which are listed below. The first three of these findings were applied to the Doe Run Herculaneum Repurposing study and are discussed in the subsequent sections.

5.1.2 *Project Reuse Guidelines*

During the Future Land Use Committee's initial meeting, the group reviewed the VPPPA's existing conditions and physical characteristics to develop eight guidelines for future project reuse. These guidelines are condensed and paraphrased in the following bullets:

- Long-term protection of health and safety should be top priority.
- Commercial and light-industrial uses represent a valuable opportunity for the site.
- Infrastructure and access improvements are important design considerations for reuse of the site.
- The reuse plan should recognize the historical value of the site and the location on the Mississippi River.
- The reuse plan must recognize that some existing residents and landowners within the VPPPA may elect to remain. However, residential uses must be limited in the future.
- Doe Run Company's plans and goals for property reuse must be incorporated into the plan.
- The City of Herculaneum owns roads and properties within the VPPPA and is responsible for zoning and municipal planning within the area.
- Alternative locations should be developed for Herculaneum municipal functions.

5.1.3 *Project Design Guidelines*

The Future Land Use Committee prepared four guidelines to be taken into consideration as agency and community stakeholders develop future plans. These guidelines are paraphrased as follows:

- Existing infrastructure, buildings, property ownership and natural features should be incorporated into future development plans.
- Multiple land uses should be located within the VPPPA to provide a variety of sustainable community benefits.
- Future land uses should create a core of civic and municipal activities in Herculaneum.
- The VPPPA reuse plan should foster opportunities for local businesses.

5.1.4 *Conceptual Land Use Framework*

The project consultant, E², prepared a conceptual land use framework for the VPPPA that focused on enhancing the existing conditions with road improvements, a cultural byway, and expanded trail network, a job training facility, an outdoor environmental education area, and expanded recreation fields. Various alternatives were developed for commercial, light industrial, and civic uses were considered including a research laboratory, slag recycling, warehouse and distribution center, and commercial port. These potential uses were mapped in general terms, along with infrastructure improvements, on the VPPPA footprint to create the Conceptual Land Use Framework.

¹¹ E² Inc.; *Future Land Use Framework for the Voluntary Property Purchase Plan Area, Herculaneum, Missouri*; September, 2009

5.1.5 Herculaneum Site Repurposing Priorities

Since completion of Herculaneum VPPPA Future Land Use Framework in 2006, several significant developments have taken place at the Doe Run, Herculaneum site. Foremost of these is the announcement by the Doe Run Company that they will discontinue smelting and refining at the plant by 2017. Additionally, plans for a direct bridge access from McNutt Street to the VPPPA and the Doe Run plant site have been approved and funded. The bridge access will not only route Doe Run trucks away from the Herculaneum city center, it also enables relocation of the Herculaneum fire department out of the VPPPA to a site west of Joachim Creek.

Based on the conceptual findings of the VPPPA Future Land Use Framework, and the data and analysis developed in the Site Assessment, a set of criteria was developed to categorize the repurposing priorities for the various assets that will become available for port and commercial/industrial activities. This evaluation not only includes the VPPPA, but also covers adjacent property owned by Doe Run Company and available for development. In developing the repurposing priorities, it is understood that limited residential, commercial, social and municipal activities remain within the VPPPA. However, the findings of the previous study recognize that these uses should eventually be relocated outside of the area of lead contamination. Therefore, with the exception of a small residential cluster between Cross Street and Brown Street, all of the VPPPA has been assigned to commercial, industrial or green space priority uses.

Six fundamental priority uses have been developed by the consultant team that are consistent with the Project Reuse Guidelines and are considered to be commercially viable and sustainable for the long term benefit of Herculaneum residents and Jefferson County. These uses take into consideration the intrinsic commercial values of the site while recognizing the social needs and constraints. The primary value found in Herculaneum is the confluence of three cargo handling modes; port, rail and highway. Facultative values include developable land, existing commercial-industrial uses, skilled workforce, on-site utilities and political consensus. Based on these values and the project objectives, six repurposing priorities were identified:

1. **Waterfront Port Priority** sites are those areas that should be dedicated to commercial port uses requiring direct access to the river for cargo loading or ancillary tug and barge services.
2. **Waterfront Port Secondary** sites should be reserved for cargo storage and services that directly benefit the commercial port activities. This could include rail loading, bulk storage and cargo support activities.
3. **Port Industrial Priority** sites are designated for industries that derive directly from port activities but rely on other local resources as well. This could include grain or other bulk commodity storage, blending, bagging and packaging operations that ship or receive goods both by rail and by water.
4. **The Port Industrial Secondary** uses are similar to the Port Industrial Priority uses in that they are related to the port development. However, they do not require immediate adjacency to the water. These sites are flexible in their use and could include warehousing, manufacturing, and other commercial developments.
5. **Inland Commercial Industrial** sites are the most flexible uses, as they could support other industries, but they do not require waterfront adjacency.
6. **Green Space and Buffer Zones** include social amenities and educational opportunities can be used to separate the residential community from the commercial industrial activities.

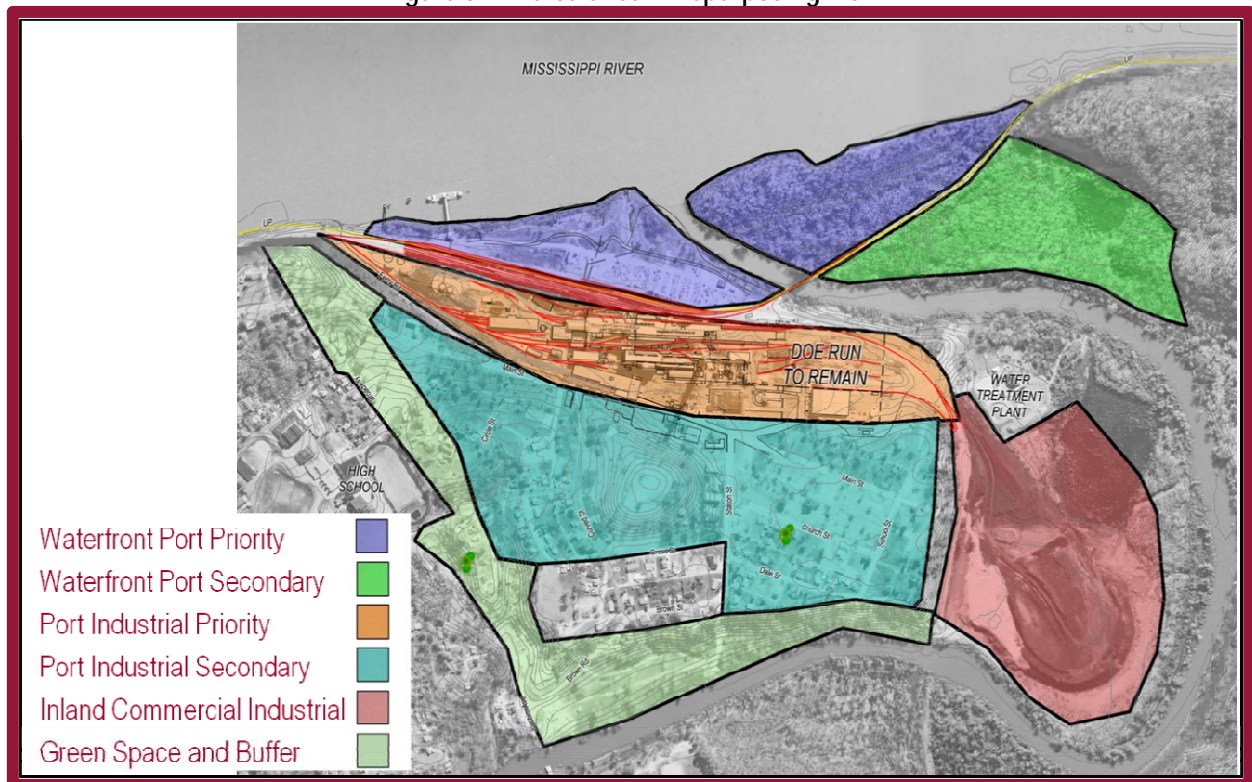
Quite often, in the urgency to generate economic development projects, the choicest sites are given over to the first opportunity to arise. This leaves a situation where the remaining sites cannot be developed to their highest and best uses. Often incompatible uses, such as big-box retail are located in areas better devoted to port or industrial development. At Herculaneum, this has not occurred and by prioritizing its repurposing, a highest and best use can be obtained for all of the sites.

5.1.6 Herculaneum Repurposing Uses

The repurposing uses were mapped against existing site infrastructure, topography, and land use to identify areas that are suitable for the various use priorities. Functional adjacency considerations as well as road and rail access corridors figured strongly in the evaluation criteria. As a result the six repurposing priorities focused on waterfront development, Doe Run Company lead smelter repurposing and local terrain. Port priority areas include the existing Doe Run waterfront as well as potential development of land south of Joachim Creek. Port Secondary then include back-lands south of Joachim Creek. The existing Doe Run smelter site is designated as Port Industrial Priority due to its adjacency to the port properties as well as rail access and history of industrial use. The uplands, including most of the VPPPA site have been designated as Port Industrial Secondary, as it represents a transition area between port uses and commercial upland uses. The slag containment site designated as Inland Commercial Industrial as it could support a variety of uses and does not have critical adjacency or dependency on the port development. Along Joachim Creek and the north boundary of the VPPPA a strip that is approximately 200 feet to 400 feet wide has been designated as Green Space and Buffer.

This designation of prioritized uses ensures that large contiguous tracts of land are assigned to compatible uses and that these uses have good adjacency with neighboring designations. Figure 5-1 illustrates the Repurposing Plan for the Herculaneum site properties and the VPPPA.

Figure 5-1: Herculaneum Repurposing Plan



Source: TranSystems

5.2 Crystal City Site

5.2.1 Crystal City Site Land Use Criteria

The plate glass manufacturing plant that gave Crystal City its name was closed in 1990 and demolished in 1991. The actual plant site comprises approximately 100 acres north of Platin Creek and west of the BNSF railroad tracks. However, on the east side of the tracks, there are approximately 350 acres of additional land that formerly belonged to Pittsburg Plate Glass. This site, fronting the Mississippi River had not been used for manufacturing and is largely agricultural land.

5.2.2 County Industrial Planning Guidelines

The Jefferson County Master Plan¹² identifies an *Industrial Development Pattern* that is applicable to areas such as Crystal City that have been designated as *Primary Growth Areas*. The Industrial Development Pattern has been considered as appropriate in the following instances:

- Areas with easy and convenient access to good transportation facilities, including highway, rail and air
- Areas with reasonable location with respect to labor supply, raw material resource and markets
- Areas with an adequate amount of developable land, free from foundation and drainage problems, with a sufficient reserve for future growth
- Areas with an adequate and reliable supply of utilities, including water, sewer and power
- Areas that are protected from encroachment of residential and other non-compatible land uses
- Areas that minimize obnoxious external effects on neighboring land uses and the environment

Within the Jefferson County Master Plan, the Industrial Development Pattern represents development that is not compatible with other uses because of the large amounts of land required or the incompatible nature of the use. Industrial types of uses should be congregated into districts that can be buffered or separated from other non-compatible uses. Additionally, these types of uses rely on a direct, improved transportation system because of the traffic, typically heavy trucks that they generate. Other relevant guidelines presented in the Jefferson County Master Plan include:

The land uses in this category require separation from other uses, because of their size or the incompatible nature of their uses. Uses generally include warehousing, shipping and receiving and large-scale manufacturing.

Generally within this pattern, buffers or berms further separate each individual site. These areas may be either natural or manicured. Edges between Industrial patterns and other Development Patterns (specifically residential) require extensive buffering to reduce the impact on the adjacent areas.

Fire, police, schools, parks and other community infrastructure can be supplied by existing, but remote facilities, if sufficient capacity exists. New infrastructure facilities may be phased in as developments that support industrial activity increase (i.e. commercial and residential development).

5.2.3 Crystal City Redevelopment Uses

The redevelopment uses were derived for the Crystal City site based on existing natural and cadastral site boundaries, adjacent uses and Jefferson County land use criteria. These potential uses were mapped against existing site infrastructure, topography, and land use to identify areas that are suitable for the various uses. Functional adjacency considerations as well as road and rail access corridors figured strongly in the evaluation criteria. As a result the four redevelopment uses focused on waterfront development with complementary adjacent zones. Port priority areas include the existing waterfront as well as potential development of a slackwater harbor. Related commercial uses were identified for the interior sites. These designations ensure that large contiguous tracts of land are assigned to compatible uses and that these uses have good adjacency with neighboring designations.

1. **Port and Port Related Uses** are the highest designation for potential uses should be port related as they pertain to the existing available river frontage. However the ultimate configuration of this area must be flexible, depending on whether a slackwater port is constructed and what the configuration of the cut should be.
2. **Rail and Backlands Uses** are one of the most important assets of the Crystal City site is the existing rail access and the potential for creating a loop track for high capacity bulk unloading and other rail terminal operations. Therefore, a significant contiguous parcel, having adequate dimensions, must be maintained for rail loop construction, material storage and other related operations.

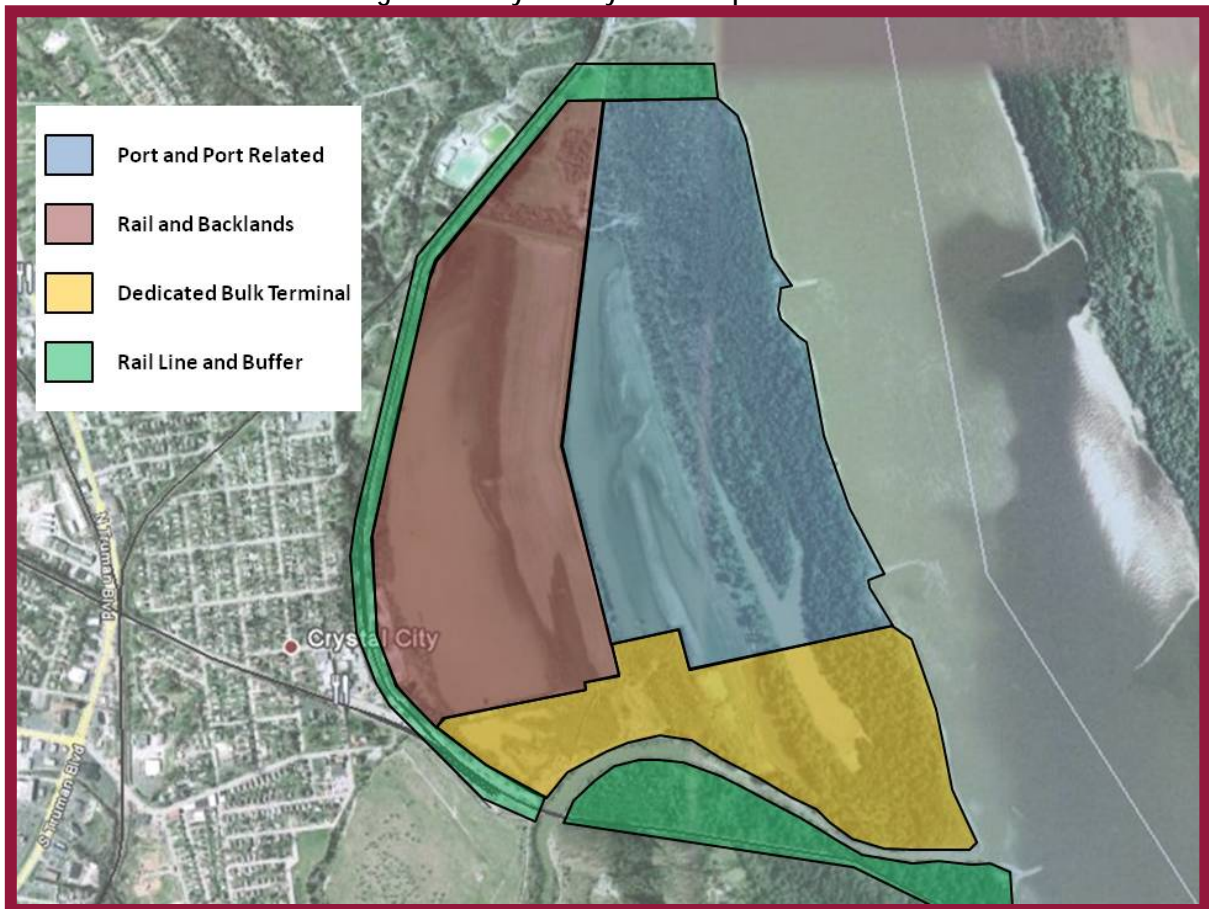
¹² Gould Evans Goodman Associates, LC, Stinson Morrison Hecker LLP.; *Jefferson County Official Master Plan*, August 6, 2003

3. **Dedicated Bulk Terminal Use** consists of approximately 137 acres of the site currently owned by a private firm that is planning an iron ore reduction plant on the former Pittsburg Plate Glass site. This 137 acre site is to be used for importing dry bulk commodities including coal and coke for the reduction process as well as loading pelletized iron ore concentrate for export.
4. **Rail Line and Buffer** is the existing rail line and rail berm to the west of the project site forms a good natural buffer. The Jefferson County Official Master Plan calls for adequate buffer zones around industrial developments including ports and warehousing operations. In addition, green space on the north will buffer the recreational boating uses there while sufficient green space south of Platin Creek will be necessary to buffer the residential areas.

5.2.4 Crystal City Redevelopment Plan

The uses designated for the Crystal City site are shown in Figure 5-2. This Redevelopment Plan functions as a basic starting point for developing the alternative site layouts and will, of necessity, be modified as specific configurations are developed. However in all cases, any modifications must comply with the land use criteria previously described.

Figure 5-2: Crystal City Redevelopment Plan



Source: TranSystems

5.3 Industry Modules

A powerful site planning tool that can be used in evaluating alternative developments schemes is the Port and Industry module. These modules quantify the land and infrastructure needs as well as development costs and employment benefits for a variety of activities and industries.

5.3.1 Module Development

A series of various port and warehouse development modules were developed to estimate the acreage and infrastructure needs that are best applicable for each site. Eleven different warehouse modules and a separate intermodal yard module were used to estimate the necessary area, costs, impacts, and infrastructure needs to facilitate evaluation such development.

During the initial design of the modules the infrastructure components necessary to operate each were considered. In addition, the modules were developed to occupy a minimal footprint, ensuring that only the required amount of land is used and allow flexibility while creating conceptual layout designs. Each of these modules is designed to fill a quantifiable unit of “econometric need.” That is, one module provides standard requirements for each industry identified or each defined quantity of throughput capacity.

These modules are essential to the planning process because they allow multiple alternatives to be developed and evaluated based on a uniform set of requirements and criteria. These planning modules are also used to translate “needs” in terms of econometric projections into “needs” in terms of land and infrastructure. For this analysis, a very general approach was taken with respect to land and infrastructure needs as the specific industries and tenants have not yet been identified.

5.3.2 Typical Modules

A number of modules were developed for evaluation of the site. These modules represent the type of information used in site planning and feasibility analysis. These modules are mapped onto the site to create a group of alternative developments. Although the module graphics cannot be expected to fit exactly on the site geometry, it is understood that design of the actual development will involve modifications to the module to make it reflect the actual boundary conditions present. However, this methodology is used to ensure a consistent and repeatable evaluation process for master plan alternative layouts.

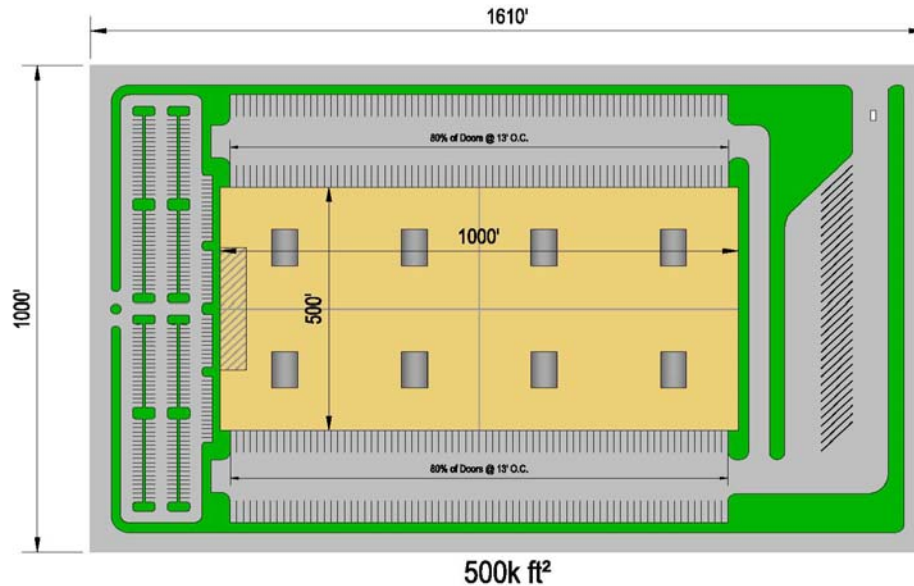
500,000 ft² Distribution Center Module

The distribution center modules are designed to meet the market demand for large retailers or wholesalers as well as large dedicated logistic providers. The distribution center serves the large retailer or wholesaler by enabling the large warehouse to facilitate the re-distribution of products (mainly imports) to its individual retail stores on an as-needed basis.

Representative Distribution Centers

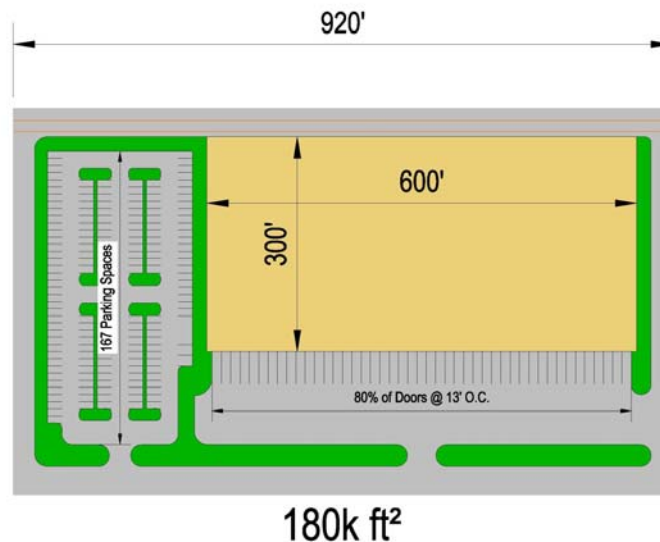


Distribution Center Module



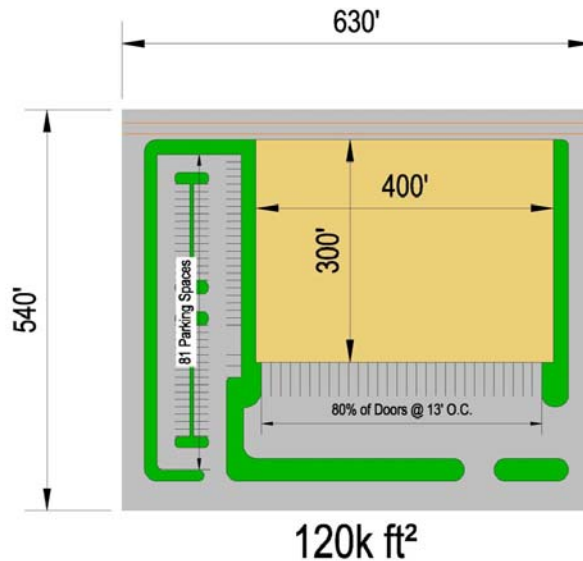
- Total Area Footprint: 1,407,600 ft² / 32 acres
- Building Area: 500,000 ft² (36% of total area)
- Office Area: 12,500 ft²
- Employee Usage
 - DC: 0.5 employee per 1,000 ft² = 250 employees per shift
 - Office: 3.25 employees per 1,000 ft² = 41 employees per shift
- POV Parking: 358 spaces
 - Dock Doors: 148
 - Dock doors are spaced every 13' using 80% of the warehouse's length
- Truck Parking: 148 spaces
 - 1 truck space per dock door
- Rear Gate
 - 32 truck queuing spaces
- Green Space: 226,586 ft² (16% of total area)
- Paved Area: 681,014 ft² (48% of total area)
- Throughput
 - 1,103,520 tons per year
 - 137,940 TEU per year
 - 276 TEU per year per 1,000 ft²
- Cost
 - Site Work: \$6.3 million (\$12.64 per ft²)
 - i.e. – site preparation, utility installation, paving, etc.
 - Shell Building: \$12.2 million (\$24.44 per ft²)
 - Owner Furnished Equipment: \$4.9 million (\$10.00 per ft²)
 - i.e. – racking
 - Tenant Improvements: \$6.3 million (\$12.52 per ft²)
 - i.e. – office finishes, HVAC, electrical, interior walls, etc.

Rail Dependent Distribution Center Module



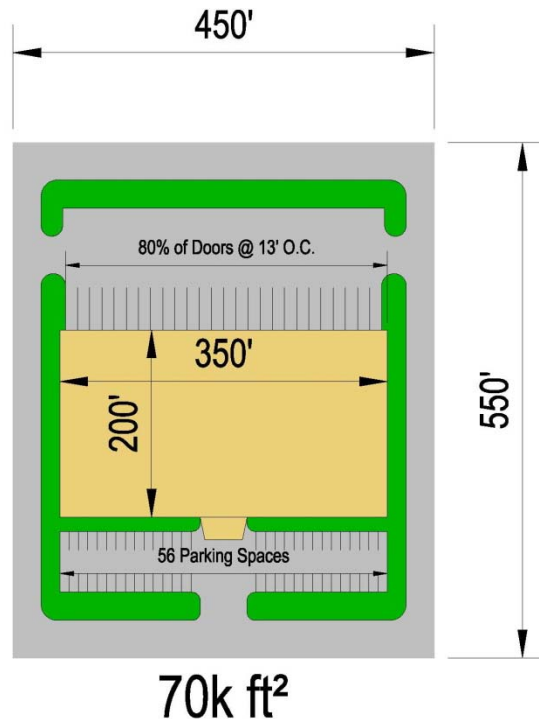
- Total Area Footprint: 386,400 ft² / 9 acres
- Building Area: 180,000 ft² (47% of total area)
- Office Area: 7,500 ft²
- Employee Usage
 - DC: 0.5 employee per 1,000 ft² = 90 employees per shift
 - Office: 3.25 employees per 1,000 ft² = 24 employees per shift
- POV Parking: 167 spaces
- Dock Doors: 45
 - Dock doors are spaced every 13' using 80% of the warehouse's length
- Truck Parking: 0 spaces
 - Trucks will use empty dock doors or an empty area of the parking lot
- Green Space: 61,515 ft² (16% of total area)
- Paved Area: 144,885 ft² (37% of total area)
- Throughput
 - 348,480 tons per year
 - 43,560 TEU per year
 - 242 TEU per year per 1,000 ft²
- Cost
 - Site Work: \$1.3 million (\$7.38 per ft²)
 - i.e. – site preparation, utility installation, paving, etc.
 - Shell Building: \$5 million (\$27.78 per ft²)
 - Owner Furnished Equipment: \$1.7 million (\$10.00 per ft²)
 - i.e. – racking
 - Tenant Improvements: \$2.7 million (\$14.83 per ft²)
 - i.e. – office finishes, HVAC, electrical, interior walls, etc.

Rail Dependent Warehouse Module



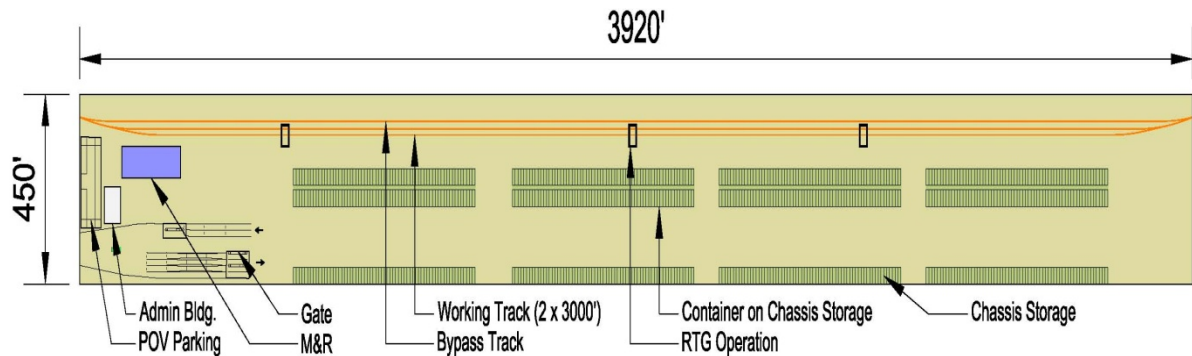
- Total Area Footprint: 253,000 ft² / 6 acres
- Building Area: 120,000 ft² (47% of total area)
- Office Area: 7,500 ft²
- Employee Usage
 - DC: 0.5 employee per 1,000 ft² = 60 employees per shift
 - Office: 3.25 employees per 1,000 ft² = 24 employees per shift
- POV Parking: 81 spaces
- Dock Doors: 29
 - Dock doors are spaced every 13' using 80% of the warehouse's length
- Truck Parking: 0 spaces
 - Trucks will use empty dock doors or an empty area of the parking lot
- Green Space: 45,377 ft² (18% of total area)
- Paved Area: 87,623 ft² (35% of total area)
- Throughput
 - 232,320 tons per year
 - 29,040 TEU per year
 - 242 TEU per year per 1,000 ft²
- Cost
 - Site Work: \$869,000 (\$7.24 per ft²)
 - i.e. – site preparation, utility installation, paving, etc.
 - Shell Building: \$3.7 million (\$30.42 per ft²)
 - Owner Furnished Equipment: \$1.1 million (\$10.00 per ft²)
 - i.e. – racking
 - Tenant Improvements: \$2.3 million (\$19.17 per ft²)
 - i.e. – office finishes, HVAC, electrical, interior walls, etc.

Light Manufacturing & Warehousing Module



- Total Area Footprint: 173,900 ft² / 4 acres
- Building Area: 70,000 ft² (40% of total area)
- Office Area: 5,000 ft²
- Employee Usage
 - DC: 0.5 employee per 1,000 ft² = 35 employees per shift
 - Office: 3.25 employees per 1,000 ft² = 16 employees per shift
- POV Parking: 56 spaces
- Dock Doors: 26
 - Dock doors are spaced every 13' using 80% of the warehouse's length
- Truck Parking: 0 spaces
 - Trucks will use empty dock doors or an empty area of the parking lot
- Green Space: 41,487 ft² (24% of total area)
- Paved Area: 62,413 ft² (36% of total area)
- Throughput
 - 76,230 tons per year
 - 9,529 TEU per year
 - 136 TEU per year per 1,000 ft²
- Cost
 - Site Work: \$676,000 (\$9.66 per ft²)
 - i.e. – site preparation, utility installation, paving, etc.
 - Shell Building: \$2.5 million (\$36.00 per ft²)
 - Owner Furnished Equipment: \$650,000 (\$10.00 per ft²)
 - i.e. – racking
 - Tenant Improvements: \$1.5 million (\$21.43 per ft²)
 - i.e. – office finishes, HVAC, electrical, interior walls, etc.

Intermodal Yard Module



- Total Area Footprint: 1,764,187 ft² / 40.5 acres
- Working Track: 6,000 ft (3,000 ft x 2 tracks)
- Bypass/Runaround Track: 3,000 ft
- Rubber Tire Gantry (RTG) Crane Operation
 - 3 RTGs: 1 per 1,000 ft of working track
- Wheeled Storage: 512 spots
- Chassis Storage: 256 spots
- Administration Building Area: 4,958 ft²
- Maintenance & Repair Building Area: 15,562 ft²
- Typical Intermodal Yard has 75 full-time workers and 25 part-time workers
- POV Parking: 45 spots
- Gate
 - 3 inbound lanes / 2 outbound lanes / bypass lane
- Throughput
 - 330,000,000 tons per year
 - 20,644 TEU per year
 - 86 TEU per year per 1,000 ft²
- Cost
 - Site Work: \$19.7 million (\$11.16 per ft²)
 - i.e. – site preparation, utility installation, paving, RTG runways, etc.
 - Owner Furnished Equipment: \$3.1 million (\$1.76 per ft²)
 - i.e. – RTGs, hostlers, and bomb carts
 - Rail Installation: \$4.7 million (\$2.69 per ft²)

6 Concept Development

On November 4th, 2009 an Alternatives Development Workshop was conducted in Herculaneum to assess the opportunities and constraints within the study area and to evaluate the three Draft Alternatives that were currently under development. On November the 5th, a similar working session was held in Crystal City for evaluation of the proposed concepts at the PPG site. Land use priorities, engineering constraints, and market needs were considered in determining logical uses of both sites. Additionally, opportunities that had been previously identified were considered for viability and compatibility with river port development in the context of market analysis and site evaluations performed as part of this study. The compatible businesses under consideration included:

- River Port Terminals
- Tug and Barge Services
- Warehousing
- Light Manufacturing
- Professional Offices
- Large Scale Distribution Centers
- Large and Small Scale Rail Terminals
- Business Incubator
- Green Space and Related Activities

These suggested uses were combined with port-specific uses developed by the consultant team and supported by the market analysis. Reconfiguration of rail access options at the Herculaneum site and at Crystal City was evaluated as well as more detailed shoreline development and slackwater barge berthing. Draft potential alternatives, based on these uses were by project stakeholders and the ensuing comment and discussion was incorporated into the planning process. The outcome of the workshops brought several important points to light:

1. Container on barge and container services have a high priority for potential development and have been considered for both sites
2. Port development at Doe Run and Crystal City must be integrated into a larger port plan for Jefferson County
3. Provision for some existing site features and social resources within the Herculaneum site must be maintained in the final plan
4. On site or near site mitigation for wetlands impacts is preferred, however, mitigation banking has been used in the past
5. A broad variety of developments are preferred over a specialized or concentrated program of site activities
6. An alternative that is comprised mostly of small business incubators or eco-park businesses is not preferred
7. Planning for the Wings iron reduction plant must be incorporated into the alternatives
8. High priority must be given to rail access and loop track improvements at the Crystal City site

6.1 Conceptual Development Alternatives

Based on the findings of previous tasks and recommendations considered at the workshop sessions, the conceptual opportunities and commercial/industrial/cargo modules were compiled into Development Alternatives for the Herculaneum site and Crystal City site. Two final alternatives were retained for Herculaneum and three alternatives remain under consideration for Crystal City. Each development alternative was prepared based on commodity type and the operational needs of the repurposing designation. For each alternative, the following metrics have been collected:

- 1) Acreage allocation by proposed use
- 2) Port operations and throughput capability by commodities
- 3) Distribution center and other upland cargo operations by square footage and cargo type
- 4) Construction costs by proposed use (excepting equipment for manufacturing processes)
- 5) Infrastructure construction costs

Three conceptual development alternatives were prepared from the initial data collected on the site and the regional market. These alternatives were predicated on individual key drivers with understanding that subsequent analysis

would refine the alternatives, eliminate some of them, and guide development of the preferred alternatives. The alternative key drivers were:

- Herculaneum Rail and River Port Activities
- Herculaneum Distribution Center, Manufacturing and Warehousing Activities
- Crystal City Maximum Slackwater Harbor
- Crystal City Mixed Use Warehousing, and Bulk Cargo
- Crystal City Maximum Container and Light Manufacturing

All of the Herculaneum alternatives include significant development of the adjacent uplands, as capping and repurposing of the contaminated sites is a high priority for the overall site repurposing plan. Similarly, all of the Crystal City alternatives include a slackwater barge harbor to increase the level of port activity possible and to provide "borrow" material to raise adjacent land elevations. The Crystal City alternatives also have variations on a loop track configuration common among them.

6.2 Herculaneum Site Alternative 1 – Rail and Port Driven Development

As river and rail access are among the most important assets of the Doe Run – VPPPA site, the first alternative focuses on elements driven by those conditions (See **Figure 6-1**). In Alternative 1, early development of the port would include Dry Bulk handling terminals for aggregate, agricultural products, or both. These products are dependent on rail and truck access for transloading to barges on the river. In the Port Industrial Secondary area, a small intermodal rail yard would be constructed as an ancillary feature to rail-dependent warehousing or value added services on the site. Other port development would include liquid bulk storage, blending and rail loading in the Waterfront Port Secondary areas and future container terminal development along the southern waterfront of the site. Upland developments would include warehousing, office complex and a single large distribution center. A summary of Alternative 1 elements follows:

- Dry Bulk Terminal Aggregate – 500,000 tons per year; 15 acres
- Dry Bulk Terminal Grain – 2,000,000 tons per year; 15 acres
- Liquid Bulk Terminal – 1,000,000 tons per year; 15 acres
- Container Terminal – 30,000 twenty-foot equivalent units per year; 15 acres
- Rail Dependent Distribution with Intermodal – 300,000 square feet total in two buildings; 15 acres of warehousing and 5 acres of intermodal rail terminal
- Flexible Warehousing – 390,000 square feet in six buildings; 20 acres
- Distribution Center – 500,000 square feet in one building; 25 acres
- Office Complex and Park – 80,000 square feet in two buildings; 5 acres

6.3 Herculaneum Site Alternative 2 – Distribution Center and Warehousing Development

Although repurposing of the Doe Run smelter site is focused on port development, the greatest land area is found in the upland Port Industrial and Inland Commercial areas. Therefore, the second alternative focuses on maximizing the use of the industrial and commercial land while reserving adequate areas for port development (See **Figure 6-2**). In the Distribution Center and Warehousing scenario, merchandise freight and light manufacturing would be the dominant activities. This Alternative assumes that the availability of a buildable site with existing infrastructure and good freeway access will attract a large warehouse and distribution center operator to develop the properties. On the port side, the plan assumes that the merchandise cargo that is passing through the distribution centers will stimulate a container on barge terminal on the north side of Joachim Creek with dry bulk and liquid bulk on the south side. A summary of Alternative 1 elements follows:

- Dry Bulk Terminal Aggregate – 500,000 tons per year; 15 acres
- Liquid Bulk Terminal – 1,000,000 tons per year; 15 acres
- Container Terminal – 30,000 twenty-foot equivalent units per year; 15 acres
- Manufacturing and Warehousing – 300,000 square feet in three buildings; 15 acres
- Flexible Warehousing – 200,000 square feet in three buildings; 9 acres
- Distribution Center – 1,000,000 square feet in two buildings; 50 acres
- Office Complex and Park – 80,000 square feet in two buildings; 5 acres

Figure 6-1: Herculaneum Site Alternative 1 - Rail and Port Driven Development

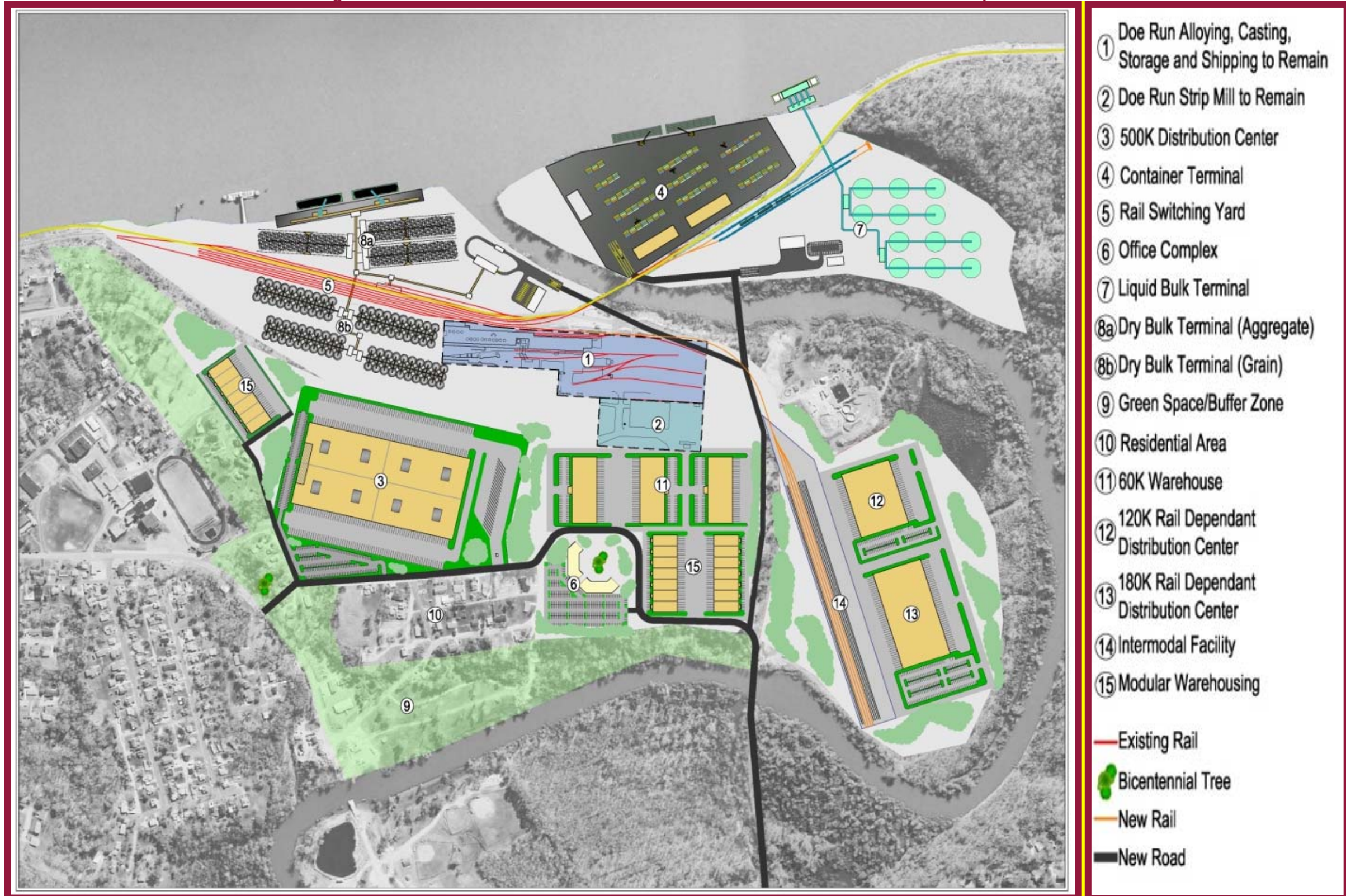


Figure 6-2: Herculaneum Site Alternative 2 - Distribution Center and Warehousing Development



6.4 Crystal City Alternative 1 – Maximum Slackwater Harbor

As considerable borrow is required to raise the surrounding land above Mississippi River flood levels, the first Crystal City alternative proposes an “L” shaped slackwater barge harbor that is oriented primarily north and south (See **Figure 6-3**). This configuration would create a peninsula on the east side that would support a significant barge and tug services terminal with good potential for public break-bulk, merchandise cargo and project cargo uses. It would also favor “double loading” with potential fleeting areas on the Mississippi River side and cargo uses on the slackwater side. This alternative places the loop track to the south with possible liquid bulk, dry bulk and rail dependant warehousing within the loop. This kind of configuration could favor grain export with bagging or repackaging as a related use. A minor variation would eliminate the warehousing so that the entire site could be devoted to high volume bulks such as coal or aggregate. The Maximum Slackwater Harbor alternative also has provision for a container terminal or expanded public terminal uses with potential intermodal rail or other rail cargo lift capabilities. If significant merchandise cargo is attracted to this port, then additional warehousing would be possible at the north end of the slackwater harbor. A summary of Alternative 1 elements follows:

- Dry Bulk Terminal Aggregate – 500,000 tons to 1,500,000 per year; 15 to 50 acres
- Dry Bulk Terminal Grain – 2,000,000 tons per year; 15 acres
- Liquid Bulk Terminal – 1,000,000 tons per year; 15 acres
- Container Terminal – 30,000 twenty-foot equivalent units per year; 15 acres
- Intermodal Rail Terminal – 20,000 lifts per year; 10 acres
- Rail Dependent Warehousing – 540,000 square feet in four buildings; 45 acres
- Barge Service Area and Public Terminal – 150,000 square feet in two buildings; 30 acres

6.5 Crystal City Alternative 2 – Mixed Use Warehousing and Bulk Cargo

A smaller slackwater barge harbor would be possible, if sufficient borrow could be taken at the site or brought in from adjacent mining operations. This would allow a broader mixture of uses including expanded warehousing and liquid bulk. The loop track configuration would be retained with the main loop oriented further north allowing better rail curve layouts and possibly a denser land use (See **Figure 6-4**). This configuration would create a “North Port” and a “South Port” wherein the bulk cargos would be primarily handled at the North Port and the container and merchandise cargo along with tug and barge services would be located at the South Port. Constructing the site this way may be more favorable for phasing. The North Port, with its more conventional river port uses, could be built in the early phases with construction of South Port activities being dependant on later demand for barge services and merchandise cargos. Warehouse construction would be solely dependent on the level of demand. A summary of Alternative 2 elements follows:

- Dry Bulk Terminal Aggregate – 500,000 tons to 1,000,000 per year; 15 to 30 acres
- Dry Bulk Terminal Grain – 2,000,000 tons per year; 15 acres
- Liquid Bulk Terminal – 2,000,000 tons per year in two terminals; 30 acres
- Container Terminal – 20,000 twenty-foot equivalent units per year; 10 acres
- Intermodal Rail Terminal – 20,000 lifts per year; 10 acres
- Rail Dependent Warehousing – 250,000 square feet in two buildings; 15 acres
- Barge Service Area and Public Terminal – 75,000 square feet in one building; 15 acres

6.6 Crystal City Alternative 3 – Maximum Container and Light Manufacturing

A smaller slackwater barge harbor is also considered for Alternative 3. In this configuration, the mix of uses would favor light manufacturing in conjunction with a larger and denser container terminal with reduced barge services. This alternative would also be configured with a North Port and a South Port to facilitate phasing and to enhance functional adjacencies (See **Figure 6-5**). Loop track activities would be pushed to the far north of the site and would support the same dry bulk and liquid bulk facilities as found in Alternative 2. However, additional land would be dedicated to manufacturing and warehousing in conjunction with the South Port merchandise cargo activities. Alternative 3 construction is much more dependent on demand for unconventional cargo and on local manufacturing growth in the region. Therefore, flexibility must be maintained for shifting market trends and success of the project would be solely dependent on the level of demand. A summary of Alternative 3 elements follows:

- Dry Bulk Terminal Aggregate – 500,000 tons to 1,000,000 per year; 15 to 30 acres
- Dry Bulk Terminal Grain – 2,000,000 tons per year; 15 acres
- Liquid Bulk Terminal – 2,000,000 tons per year in two terminals; 30 acres
- Container Terminal – 30,000 twenty-foot equivalent units per year; 15 acres
- Intermodal Rail Terminal – 20,000 lifts per year; 10 acres
- Manufacturing and Warehousing – 540,000 square feet in six buildings; 30 acres
- Barge Service Area and Public Terminal – 75,000 square feet in one building; 5 acres

6.7 Conceptual Investment Levels for All Four Sites

Conceptual alternatives were not developed for the Pevely and LaRoche sites at this time; however, general acreages were estimated for all four sites to approximate potential area for port development. Based on the previous Herculaneum and Crystal City average module costs, comparable development was applied to these acreages to estimate a range of investment anticipated to develop the four pad ready sites. In addition, assumptions for general site work requirements for each site provided a basis for an approximate cost to prepare the sites for the port development (pad ready). These approximations are as follows in **Table 6-1**:

Site	Range of Port Development Costs			Pad Ready Site Work*
	Low	Medium	High	
Pevely	\$22 million	\$25 million	\$27 million	\$4 million
Crystal City	\$178 million	\$198 million	\$218 million	\$38 million
Herculaneum	\$193 million	\$214 million	\$236 million	\$30 million
LaRoche	\$101 million	\$112 million	\$124 million	\$19 million
Totals	\$494 M	\$549 M	\$605 M	\$91 M

*Site work estimates assume balanced cut and fill based on average site contours.
More detailed estimates will be developed in Phase II.

Source: TranSystems

6.8 Conclusions

All of the potential sites under consideration have proportionately similar costs and benefits. However, they potentially target different markets and presuppose different key drivers. For example, Herculaneum Alternative 1 and Crystal City Alternative 1 and 2 are all focused on river operators and shippers; however, the other alternatives have a heavier emphasis on inland distribution and manufacturing. For all of the alternatives, the uses of the Port zones and Industrial zones are similar and some elements could be interchanged. All of alternatives include buffer zones with provision for open space, and nearly identical liquid bulk developments in their Waterfront Port Secondary zones. These similarities were carried forward in the assumptions used to approximate the development costs for the Pevely and LaRoche sites. Therefore, the principal variable in all cases is the future market growth of river traffic, inland distribution and manufacturing. The most important consideration at this point must be that planning and development at any combination of the potential four sites must be coordinated so that resources are not devoted to uses at one site that can be better developed at the other.

Figure 6-3: Crystal City Site Alternative 1 – Maximum Slackwater Harbor Development

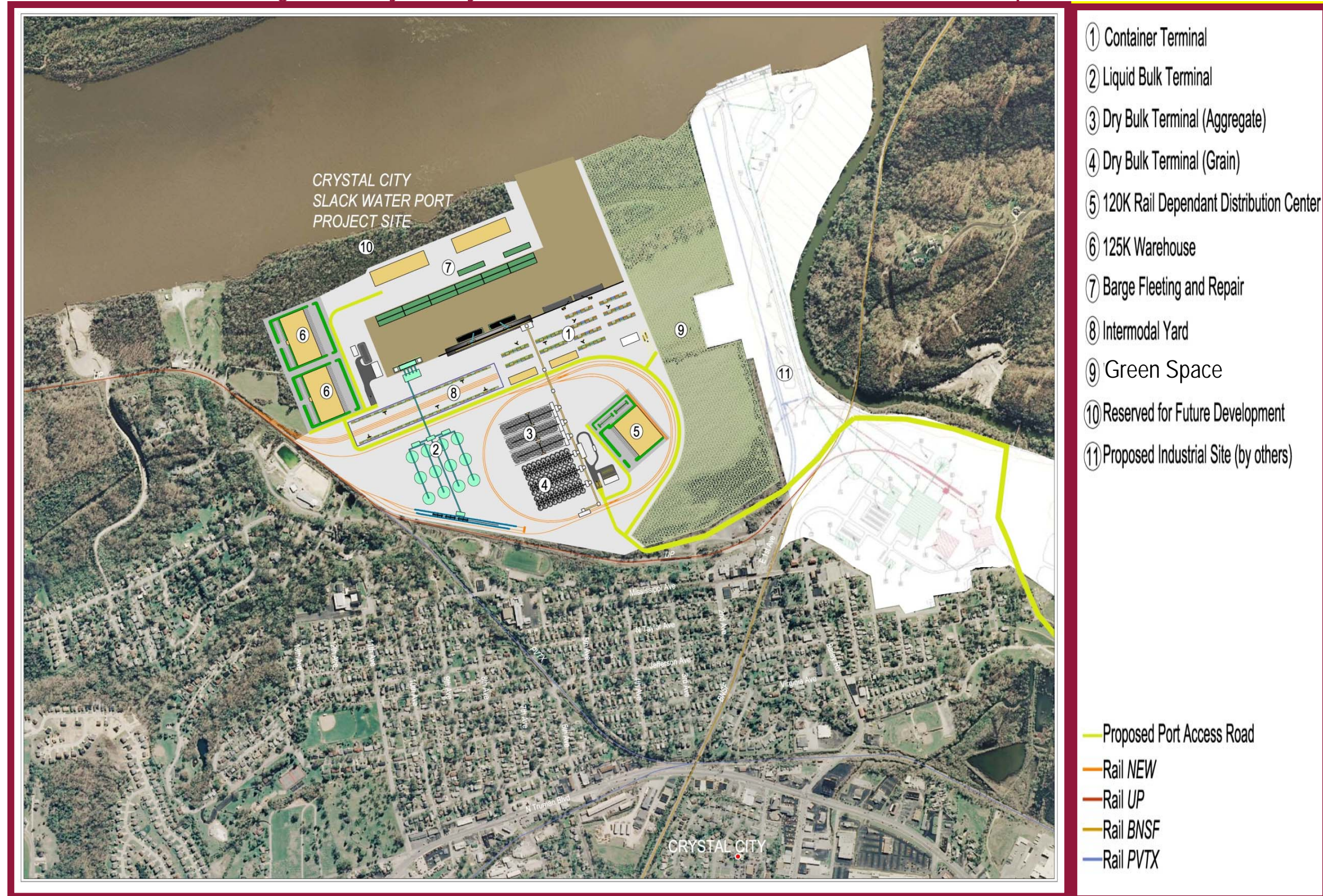


Figure 6-5: Crystal City Site Alternative 2 – Maximum Container and Light Manufacturing Development



Figure 6-3: Crystal City Site Alternative 3 – Maximum Slackwater Harbor Development



7 Economic Benefit Analysis

The potential economic benefits of each of the two Herculaneum site alternatives were analyzed for three distinct, but overlapping, geographic areas: the State of Missouri, Jefferson County, and the St. Louis Region. The full report may be found in **Appendix B, An Economic Impact Study – The Doe Run Herculaneum Port Feasibility Analysis**, December 10, 2009. Applying the methodology from the Herculaneum case study, economic benefit was derived for the Pevely, Crystal City and LaRoche sites to estimate the collective impact.

The following presents a summary of an economic impact analysis of the port alternatives, including multiplier (“ripple”) effects based on the Herculaneum site case study. Two economic impact periods are evaluated: (1) The full time frame of construction of port facilities, and (2) the annual, permanent impacts from full build-out of each alternative.¹³ During the full, multi-year construction period a million dollars invested in that port construction could trigger \$2.873 million in added economic activity (GDP) in Jefferson County, plus 21.6 jobs in Jefferson County, paying \$39,000 in annual wages per job. The annual permanent impacts after full build-out could produce \$384,000 in added economic activity, plus 11.2 jobs paying \$32,700. These figures apply for each million dollars invested; therefore, the estimated range of investment to develop all four sites, \$494 Million to \$605 Million plus the \$91 Million for the work to get the sites pad ready, has the potential to generate the following:

<i>During construction period (which could be multiple years) the port development could generate:</i>	
\$1.68-2 Billion	in added economic activity (GDP) in Jefferson County accrued over the lifespan of the total build
<i>After construction is completed the combined port facilities could support:</i>	
\$225-267 Million	annually in additional economic activity (GDP) in Jefferson County, plus
6,500-7,800	jobs in Jefferson County, paying
\$32,700	in annual wages per job

Over 10 years for every dollar invested in the project there could potentially be a return of over \$8 to the State of Missouri. Phase II will investigate the projected port demand for the Jefferson County riverfront to determine the appropriate size of the Jefferson County port facility justified for development to reap this benefit potential.

The latest comparable data for Jefferson County show that the average wage for jobs in the county (including salaries but excluding benefits or other forms of personal income) is about \$31,800; so the impacts shown above would generally create jobs paying higher than average wages. All dollar amounts expressed in this report are in constant 2009 values. In addition to the above benefits for Jefferson County, there would be broader economic benefits for the St. Louis Region and the State of Missouri.

Full build-out in Jefferson County for the proposed sites will be driven by the growth in market demand over a 15-30 year period. The full impact and benefits mentioned above will be realized after the full build-out is achieved. Initial phases will produce a proportionate benefit as they are developed and become fully operational.

The remainder of Section 7 is an excerpt from the Executive Summary of the **Appendix B** report presenting the Herculaneum case study used for this economic analysis.

¹³ These periods may overlap. Some port operations might be undertaken after a limited amount of construction as other port facilities begin construction. The prospective annual impacts of these overlaps are not estimated because no firm timeframe for construction has yet been determined nor has it been determined how quickly a port development might become operational.

Two alternatives for the potential redevelopment of the Herculaneum site were developed as summarized on the following table. This analysis separately evaluates the potential economic benefits of each alternative for three distinct, but overlapping, geographic areas: the State of Missouri, Jefferson County, and the St. Louis Region. In addition, fiscal, or tax, benefits were determined only for state government because of the complexity and number of local governments in the region and the county, although econometric modeling of local government tax benefits can be accomplished if further study is warranted.

Doe Run Herculaneum Port Feasibility Alternatives: Build-Out Assumptions		
Uses	Square Feet or Tons per Alternative	
	<u>Alternative 1:</u>	<u>Alternative 2: Warehousing and</u>
	<u>Rail Dependent Cargo</u>	<u>Distribution</u>
Distribution Center	500,000 sf	1,000,000 sf
Warehouse	180,000 sf	200,000 sf
Rail Distribution	300,000 sf	0 sf
Manufacturing	0 sf	300,000 sf
Modular Warehousing	210,000 sf	80,000 sf
Office	60,000 sf	60,000 sf
Container Terminal	30,000 tons	30,000 tons
Intermodal Rail	50,000 tons	0 tons
Dry Bulk Aggregate	500,000 tons	500,000 tons
Dry Bulk Grain	2,000,000 tons	0 tons
Liquid Bulk Terminal	1,000,000 tons	1,000,000 tons

Source: TranSystems

Redevelopment of the port site is projected to occur in various phases, but timeframes for development phases have not been determined at this time. This analysis, therefore, estimates the economic impact of the total construction of each alternative at full build out, but expressed in 2009 dollars.

Alternative 1 – Construction Impacts

- \$227.1 million in direct construction spending, creating 1,640 jobs and \$85.2 million in earnings for workers involved with the construction
- An additional \$652.4 million in state economic output triggered by multiplier effects; an additional \$434.8 million in county economic output (included in the state's portion); and an additional \$620.9 million economic output throughout the St. Louis Region (including the county portion).

Summary Economic Impact from Scenario 1 - Construction			
<i>All dollars in millions of 2009 values</i>			
DIRECT EFFECTS			
Construction Spending	\$227.1		
Job Creation	1,640		
Household Earnings	\$85.2		
MULTIPLIER EFFECTS			
	State of Missouri	Jefferson County	St. Louis Region
Economic Activity	\$652.4	\$434.8	\$620.9
Job Creation	5,545	3,255	4,930
Household Earnings	\$186.2	\$105.8	\$187.8
STATE TAX REVENUES			
From Direct Household Earnings	\$2.6		
Multiplier Effects	\$11.9		

Source: Development Strategies

- An additional 5,545 jobs throughout the state across all industries triggered by multiplier effects; 3,255 jobs throughout the county across all industries; and 4,930 jobs throughout the St. Louis Region across all industries.
- \$186.2 million in additional household earnings in the state; \$105.8 million in the county; and \$187.8 million in the St. Louis Region.
- \$2.6 million in individual income taxes for the state from direct earnings, and an additional \$11.9 million to total tax revenue for the state from multiplier effects.

Alternative 2 – Construction Impacts

- \$201.1 million in direct construction spending, creating 1,450 jobs and \$75.4 million in earnings for workers involved with the construction.
- An additional \$577.6 million in state economic output triggered by multiplier effects; an additional \$385.0 million in county economic output (included in the state's portion); and an additional \$549.7 million economic output throughout the St. Louis Region (including the county portion).

Summary Economic Impact from Scenario 2 - Construction			
<i>All dollars in millions of 2009 values</i>			
DIRECT EFFECTS			
Construction Spending	\$201.1		
Job Creation	1,450		
Household Earnings	\$75.4		
MULTIPLIER EFFECTS			
	State of Missouri	Jefferson County	St. Louis Region
Economic Activity	\$577.6	\$385.0	\$549.7
Job Creation	4,910	2,880	4,365
Household Earnings	\$164.8	\$93.7	\$166.3
STATE TAX REVENUES			
From Direct Household Earnings	\$2.3		
Multiplier Effects	\$10.5		

Source: Development Strategies

- An additional 4,910 jobs throughout the state across all industries triggered by multiplier effects; 2,880 jobs throughout the county across all industries; and 4,365 jobs throughout the St. Louis Region across all industries.
- \$164.8 million in additional household earnings in the state; \$93.7 million in the county; and \$166.3 million in the St. Louis Region.
- \$2.3 million in direct individual income taxes for the state, and an additional \$10.5 million to total tax revenue for the state from multiplier effects.

Once the alternatives are fully built and operations reach stabilization, the economic activity at the port will have long-term annual economic benefits on the three geographic areas.

Alternative 1 - Operations

- \$91.5 million in direct operational spending, including \$66.3 million in wages, supporting 1,945 full-time-equivalent jobs.
- An additional \$151.1 million in state economic output; an additional \$87.3 million in county economic output (included in the state's portion); and an additional \$147.8 million economic output throughout the St. Louis Region (including the county portion).

Summary Economic Impact from Scenario 1 - Operations			
<i>All dollars in millions of 2009 values</i>			
DIRECT EFFECTS			
Total Operational Spending	\$91.5	1.65	
Job Creation	1,945	13.06	
Household Earnings	\$66.3	0.41	
MULTIPLIER EFFECTS			
	State of Missouri	Jefferson County	St. Louis Region
Economic Activity	\$151.1	\$87.3	\$147.8
Job Creation	1,195	595	1,115
Household Earnings	\$37.5	\$16.7	\$39.8
STATE TAX REVENUES			
From Direct Household Earnings	\$1.7		
Multiplier Effects	\$2.4		

Source: Development Strategies

- An additional 1,195 jobs throughout the state across all industries; 595 jobs throughout the county across all industries; 1,115 jobs throughout the St. Louis Region across all industries.
- \$37.5 million in additional household earnings in the state; \$16.7 million in the county; \$39.8 million in the St. Louis Region.
- \$1.7 million in direct individual income taxes for the state, and an additional \$2.4 million to total tax revenue for the state from multiplier effects.

Alternative 2 - Operations

- \$103.9 million in direct operational spending, including \$80.5 million in wages, supporting 2,365 full-time-equivalent jobs.
- An additional \$169.2 million in state economic output; an additional \$99.2 million in county economic output (included in the state's portion); and an additional \$163.6 million economic output throughout the St. Louis Region (including the county portion).

Summary Economic Impact from Scenario 2 - Operations			
All dollars in millions of 2009 values			
DIRECT EFFECTS			
Operational Spending	\$103.9		
Job Creation	2,365		
Household Earnings	\$80.5		
MULTIPLIER EFFECTS			
	State of Missouri	Jefferson County	St. Louis Region
Economic Activity	\$169.2	\$99.2	\$163.6
Job Creation	1,415	745	1,305
Household Earnings	\$43.7	\$20.9	\$45.7
STATE TAX REVENUES			
From Direct Household Earnings	\$2.0		
Multiplier Effects	\$2.8		

Source: Development Strategies

- An additional 1,415 jobs throughout the state across all industries; 745 jobs throughout the county across all industries; 1,305 jobs throughout the St. Louis Region across all industries.
- \$43.7 million in additional household earnings in the state; \$20.9 million in the county; \$45.7 million in the St. Louis Region.
- \$2.0 million in direct individual income taxes for the state, and an additional \$2.8 million to total tax revenue for the state from multiplier effects.

In conclusion, not only will the capital investment required to build the new facilities ripple through the economy and impact output, earnings and employment (Table 7-5), but the reuse of the site under each of the two scenarios will have sizable on-going economic and fiscal impacts (Table 7-6) on the state, Jefferson County, and the St. Louis region.

Table 7-5: Economic Impacts of Port Feasibility Alternatives – Construction Summary		
dollars in 2009\$	Alternative 1	Alternative 2
Direct Impacts (total)		
Construction Spending	\$227,100,000	\$201,100,000
Jobs	1,640	1,450
Indirect Impacts (total)		
Jefferson County		
Output	\$434,800,000	\$385,000,000
Earnings	\$105,800,000	\$93,700,000
Jobs	3,255	2,880
St. Louis Region		
Output	\$620,900,000	\$549,700,000
Earnings	\$187,800,000	\$166,300,000
Jobs	4,930	4,365
State of Missouri		
Output	\$652,400,000	\$577,600,000
Earnings	\$186,200,000	\$164,800,000
Jobs	5,545	4,910
Indirect Taxes	\$11,900,000	\$10,500,000

Source: Development Strategies

Table 7-6: Economic Impacts of Port Feasibility Alternatives – Annual Operations Summary		
<i>dollars in 2009\$</i>	Alternative 1	Alternative 2
<i>Direct Impacts (average annual)</i>		
Total Operational Expenditures	\$91,500,000	\$103,900,000
Jobs	1,945	2,365
<i>Indirect Impacts (average annual)</i>		
<i>Jefferson County</i>		
Output	\$87,300,000	\$99,200,000
Earnings	\$16,700,000	\$20,900,000
Jobs	595	745
<i>St. Louis Region</i>		
Output	\$147,800,000	\$163,600,000
Earnings	\$39,800,000	\$45,700,000
Jobs	1,115	1,305
<i>State of Missouri</i>		
Output	\$151,100,000	\$169,200,000
Earnings	\$37,500,000	\$43,700,000
Jobs	1,195	1,415
Indirect Taxes	\$2,400,000	\$2,800,000

Source: Development Strategies

Note: In above tables, the multiplier effects for smaller regions are included in the multiplier effects of larger regions. That is to say, the multiplier effects in Jefferson County are captured in the multiplier effects of the St. Louis Region. The multiplier effects of the St. Louis Region, however, are not entirely captured by the total multiplier effects for the State of Missouri because the St. Louis Region includes three counties in Illinois.

8 Investment Evaluation

8.1 Port Authority Structure

A port authority normally takes one of three forms that define its interaction with port users, service providers and the financial community¹⁴:

- Landlord Port (or non-operating port): the port authority may build the berths and backlands, which it then rents or leases to a terminal operator. The terminal operator invests in cargo-handling equipment, hires labor, and negotiates contracts with shippers and barge operators for the loading, unloading and storage of cargo. Alternatively, the Port Authority may lease land to a private operator who then undertakes development and operation of terminal infrastructure. Further elements of the landlord port are:
 - Principal relationship is with the terminal operator/stevedore
 - More focus on long-term construction, planning and financing
 - Little operational control and insulated from many operating issues
- Operating Port: the port authority provides the terminal infrastructure, owns the cranes and other equipment, and hires labor for handling cargo on the terminal storage. Private stevedore companies hire longshore labor to lift cargo between the ship and the dock. Further elements of the operating port are:
 - Principal relationship with the user
 - Focus on daily operations and long-term issues
 - Direct operational control/oversight
- Limited-Operating Port: the port authority leases facilities to others, but continues to operate one or more facilities with port employees.

Some operating ports have started shifting towards a landlord structure through the granting of long-term concessions to private terminal operators. The concession process is designed to shift certain financing, construction, and/or operating risks of public terminal infrastructure to the private sector. In the study region, City of St. Louis Port Authority and Tri-City Regional Port District are landlord ports, providing and leasing infrastructure to private stevedores and other companies.

8.2 Funding Sources

The Maritime Administration (MARAD), in cooperation with the American Association of Port Authorities (AAPA), conducts an annual survey¹⁵ of port authorities to determine financial conditions and sources for operations and investment. While the survey focuses on coastal and Great Lakes ports, it provides broad guidance on funding sources for the proposed port developments in Jefferson County.

At port authorities, capital expenditures on new construction and modernization/rehabilitation of port infrastructure principally fall into one or more of the following types:

- Cargo facilities.
- Other infrastructure – includes structures, land, and fixtures not directly related to the movement of cargo, such as maintenance and administrative facilities.
- Dredging – associated with local port expenditures on deepening or maintenance of federal and non-federal channels, connecting channels and berths, and local costs for land, easements, rights-of-way, disposal areas, and mitigation.
- Security – expenditures for all security-related capital expenditure projects (for example, fencing, access controls, lighting, surveillance, etc).

¹⁴ Definitions are based on information from the American Association of Port Authorities and Maritime Administration

¹⁵ U.S. Public Port Development Expenditure Report (FYs 2006 & 2007-11), Maritime Administration.

As observed earlier, the type of port operating structure will influence to what extent the port authority engages in each of the above capital expenditure categories. AAPA and MARAD identify the following methods used to finance capital investments:

- Port Revenues – income generated by the port through its activities
- General Obligation Bonds – issued by a state, city or local government. They are secured by the taxing and borrowing power of the issuing jurisdiction, rather than the revenue from a given project.
- Revenue Bonds – issued by a state, city or local government to finance public works projects. Bond principal and interest are secured by the revenues of a given project.
- Loans – they can be short or long term.
- Grants – a contribution of cash by one government entity or organization to another. Many times these contributions are made to local governments from state and federal governments.
- Other – includes all financing sources that were not described above, such as transportation trust funds, state appropriations, and taxes.

In developing funding and leasing strategies for infrastructure development, a primary objective of the Port Authority is to secure sufficient return to cover debt service (principal plus interest payments) and day-to-day operating expenses. The Port Authority, partly in its function as an economic development agency and often with access to lower cost financing, has a reduced financial return threshold than the private sector. Much of the benefits or return on investments for a Port Authority come from the broader economic impacts on the local and regional communities – including direct and indirect jobs, tax revenue, use of services and so forth.

8.3 Regional Funding Examples

The region's three main cargo handling ports are City of St. Louis Port Authority, Tri-City Regional Port District and Southeast Missouri Regional Port Authority (SEMO). All three agencies have used a blend of operating income, public grants, and revenue bonds to support the development of port infrastructure.

The City of St. Louis Port Authority, under the St. Louis Development Corporation, obtains revenue from the lease of city-owned waterfront property for cargo handling, storage and barge fleeting activities. The Port Authority Fund¹⁶ was established to manage all phases of the harbor and wharf operation including enforcement of all regulations. The Port Authority also receives grants from state and federal sources; for example, a grant for security improvements under the Port Security Grant Program (PSGP) of the American Recovery & Reinvestment Act (ARRA).

Tri-City Regional Port District has funded infrastructure through income from the lease of facilities and sites, revenue bonds supported by lease payments, low-interest loans from Illinois state agencies, commercial loans, and grants from federal and state agencies. The District currently has several outstanding revenue bonds and loans from commercial banks and the Illinois Department of Transportation. The District is seeking federal stimulus funds for its proposed Rivers Edge Harbor Complex, which would provide cargo handling below Lock 27.

SEMO has received funding for infrastructure from the Missouri Statewide Transportation Improvement Program, U.S. Department of Commerce's Economic Development Agency, the Missouri Department of Economic Development's Community Development Block Grant and other public sources. Grants from the Transportation Security Administration have helped fund fencing and other security measures at the port. Funding also came through the issuance of Sales Tax Revenue Bonds. In early 1985, voters from Scott County and Cape Girardeau County passed a one-quarter cent sales tax for capital improvements¹⁷. The sales tax began January 1, 1986, and ended December 31, 1989. With the sales tax, SEMO issued Sales Tax Revenue Bonds in an aggregate amount of \$4.85 million to be used, in addition to grants, to construct the slack-water harbor, dock, water tank, water lines, access road, rail spur,

¹⁶ City of St. Louis, Missouri Fiscal Year 2010 Annual Operating Plan

¹⁷ Southeast Missouri Regional Port Authority: The Making of a Mississippi River Port 1975 – 2005, Charles David Briggs and Kristin K. Smith

and other facilities. Additionally, SEMO leased out its public dock to Girardeau Stevedores and Contractors, Inc., a private stevedore who provides cargo handling and storage services for users of the dock.

8.4 Financial Analysis and Return on Investment

The following financial analysis was performed using the Herculaneum site as a case study applicable to what could be expected of any of the four sites of similar port development. The planning process identified two conceptual layouts for the Herculaneum site, differentiated by the extent to which rail is a component of long-term site development. The two modules are: Alternative 1: Rail Dependent Cargo and Alternative 2: Warehousing and Distribution.

The projected long-term capital expenditure for each alternative is summarized in **Table 8-1**. The total long-term cost of Alternative 1 is \$227.07 million and Alternative 2 is \$201.09. This total cost is built up from a variety of components – cargo terminals, warehousing, distribution centers, rail facilities, manufacturing and offices. The cost is also comprised of basic facility infrastructure (for example, site work and building construction) and operational elements (for example, equipment). It is expected each component will be developed case-by-case, tied to specific market opportunities and private sector users. This has been the strategy pursued by other port authorities in the region, who have developed facilities based on private sector opportunities, and in many cases funded specific projects through revenue bonds, grants or other measures. Additionally, the port authority may provide the basic facility infrastructure, while equipment and interior building fit-out are provided by the operator or tenant.

Table 8-1: Capital Expenditure of Development Alternatives		
Capital Expenditure (\$ Million)	Alternative 1 Rail Dependent Cargo	Alternative 2 Warehousing and Distribution
Distribution Center	\$29.70	\$59.40
Rail Distribution Center	\$10.70	\$0.00
Rail Distribution Center	\$8.00	\$0.00
Warehouse	\$0.00	\$15.20
Warehouse	\$15.90	\$5.30
Manufacturing	\$0.00	\$33.74
Modular Warehousing	\$16.17	\$6.16
Office	\$6.30	\$6.30
Container Terminal	\$30.00	\$30.00
Intermodal Rail	\$5.60	\$0.00
Dry Bulk Aggregate	\$23.00	\$23.00
Dry Bulk Grain	\$59.70	\$0.00
Liquid Bulk Terminal	\$22.00	\$22.00
Total Capital Expenditure	\$227.07 M	\$201.09 M

Source: TranSystems

Unlike the private sector, which seeks a high financial return on investment, the major benefit or return on investment for the port authority comes from the economic benefits to the community and region generated by the project. As described in the Economic Impact Study, economic benefits, such as new jobs and tax revenue, occur during construction of the facility and during annual operation of the facility. The Economic Impact Study concluded that each \$1 million invested at the Doe Run site to develop the facilities described above would trigger:

During the construction period (which could be multiple years)

- o \$2.873 million in added economic activity (GDP) in Jefferson County, plus
- o 21.6 jobs in Jefferson County, paying
- o \$39,000 in annual wages per job

- Annual permanent impacts (from facility operation) of:
 - \$0.84 million in added economic activity (GDP) in Jefferson County, plus
 - 11.2 jobs in Jefferson County, paying
 - \$32,700 in annual wages per job

The above economic impacts are focused on Jefferson County; as stated in the Economic Impact Study there would be additional economic benefits for the St. Louis Region and the State of Missouri.

Given the principal return on investment for the port authority are the economic benefits summarized above, a primary financial objective of the port authority will be to ensure facility lease revenue is sufficient to cover repayment of debt used to fund construction and also to provide revenue for the port authority's day-to-day operating expenses, primarily for administrative and other support staff. Assuming the port authority funds development through revenue bonds, the potential annual debt repayment can be calculated and converted to potential required lease payments per acre or per square foot. The results are shown in **Table 8-2**. Naturally lease payments will be influenced by market rates in the region and specific facility requirements of the lessee. Furthermore, some of the facility elements (e.g. equipment) could be funded through private sector investment, thus lowering the financial investment (and size of revenue bonds) by the port authority.

Table 8-2: Examples of Annual Debt Repayments and Implied Facility Lease Rates							
Alternative 1: Rail Dependent Cargo	Acres	Square Feet	Modules	Capital Expenditure * (\$ Million)	Annual Debt Payment ** (\$ Million)	Implied Lease Rate Per Acre / Year	Implied Lease Rate Per Sq. Ft / Year
Distribution Center	25.0	500,000	1	\$29.70	(\$1.93)	\$77,281	\$3.86
Rail Distribution Center	9.0	180,000	1	\$10.70	(\$0.70)	\$77,339	\$3.87
Rail Distribution Center	6.0	120,000	1	\$8.00	(\$0.52)	\$86,735	\$4.34
Warehouse	2.5	60,000	3	\$15.90	(\$1.03)	\$137,909	\$5.75
Small Business Incubator	0.5	10,000	21	\$16.17	(\$1.05)	\$100,179	\$5.01
Office	5.0	60,000	1	\$6.30	(\$0.41)	\$81,965	\$6.83
Container Terminal	15.0		1	\$30.00	(\$1.95)	\$130,103	
Intermodal Rail	5.0		1	\$5.60	(\$0.36)	\$72,858	
Dry Bulk Aggregate	15.0		1	\$23.00	(\$1.50)	\$99,746	
Dry Bulk Grain	15.0		1	\$59.70	(\$3.88)	\$258,905	
Liquid Bulk Terminal	15.0		1	\$22.00	(\$1.43)	\$95,409	
Total Capital Expenditure				\$227.07 M			
Alternative 2: Warehousing and Distribution	Acres	Square Feet	Modules	Capital Expenditure (\$ Million)	Annual Debt Payment * (\$ Million)	Per Acre/Year	Per Sq.Ft/Year
Distribution Center	25.0	500,000	2	\$59.40	(\$3.86)	\$77,281	\$3.86
Warehouse	3.0	70,000	2	\$15.20	(\$0.99)	\$164,797	\$7.06
Warehouse	2.5	60,000	1	\$5.30	(\$0.34)	\$137,909	\$5.75
Manufacturing	5.0	100,000	3	\$33.74	(\$2.19)	\$146,322	\$7.32
Small Business Incubator	0.5	10,000	8	\$6.16	(\$0.40)	\$100,179	\$5.01
Office	5.0	60,000	1	\$6.30	(\$0.41)	\$81,965	\$6.83
Container Terminal	15.0		1	\$30.00	(\$1.95)	\$130,103	
Dry Bulk Aggregate	15.0		1	\$23.00	(\$1.50)	\$99,746	
Liquid Bulk Terminal	15.0		1	\$22.00	(\$1.43)	\$95,409	
Total Capital Expenditure				\$201.09 M			

* Total estimated cost for site working, building, equipment and other improvements.

** Assumes revenue bonds, 30-years and 5 percent interest rate.

Source: TranSystems

8.5 Conclusions

The review of port authority structures and funding sources provides guidance on future development strategy for the Jefferson County Port Authority, as follows:

- The Jefferson County Port Authority should operate as a landlord port, similar in purpose to other public port authorities in the region. As a landlord port, the Jefferson County Port Authority will generally invest in infrastructure and facilities that are then leased to private companies.
- Each proposed facility should be evaluated on a case-by-case basis to determine the extent of investment by the Jefferson County Port Authority. For example, investment may be made in the physical infrastructure (e.g. berth and storage yard), while a private operator provides the equipment for cargo handling.
- Funding should be pursued from a variety of sources - state and federal grants, revenue bonds, etc. - as illustrated by the review of active port authorities in the region.
- A primary objective will be for facility leases to cover the debt repayments, and day-to-day operating costs, incurred by the Jefferson County Port Authority.

9 Summary of Recommendations

To effectively serve the transportation needs of eastern Missouri, the Jefferson County Port Authority intends to develop several new Mississippi River ports for both public and private operations. The intent of these river port terminals is to act as nuclei for redevelopment and repurposing of former and existing industrial activity along the river. Market analysis shows that there will be modest, but steady growth of demand for river terminal facilities within the coming decades. In addition, there may be displacement of riverfront activities from the urbanized St. Louis area to new locations with less congestion and more area available for expansion.

Four sites were evaluated for the Jefferson County Port Authority. From north to south these sites include a parcel of riverfront in Pevely that is associated with an existing Dow Chemical Company plant that produces extruded polystyrene, a site that is part of the Doe Run Company's lead reduction plant in Herculaneum, a site associated with the former Pittsburg Plate Glass plant in Crystal City, and a site formerly owned by LaRoche Corporation in Festus that is now River Cement. Of these four sites, the Doe Run property and the Crystal City property have the surface access, utilities, and local support for conversion to public port operations. The Pevely site and the LaRoche site have good potential, but will probably be developed on a later time frame than the other two.

River port development will be a partnership of public and private entities for repurposing existing industrial sites as well as developing new sites along the Mississippi. However, the most important principal will be to create and adhere to a consistent and coordinated development plan that ensures that the Jefferson County ports operate as a system and are developed to respond to the market and the highest and best uses of the available riverfront property.

Development of the available sites will require a strategic and staged development plan in order to optimize the existing land values and attract investment to the area. Future capping and repurposing of the contaminated areas of Herculaneum will include additional land acquisition, street de-mapping and general re-zoning of the site. Development of the Crystal City site will need not only community support, but also coordination with private investors, developers and companies as well as other initiatives in the area. Both Herculaneum and Crystal City will need significant surface access improvements; and, in the future, the Pevely and LaRoche sites will require major new road infrastructure enhancements. Jefferson County and the Cities of Herculaneum, Crystal City, Festus and Pevely have expressed support for investigating potential port development in Jefferson County. These conclusions imply the following for long-term facility planning at the Herculaneum and Crystal City sites:

- Designate waterfront property for cargo related activities including cargo handling, cargo storage and barge services.
- Designate selected upland properties for port industrial uses including warehousing related activities.
- Negotiate with the railroads for operational concessions in return for increased cargo and improved rail infrastructure
- Designate selected upland properties for commercial uses, either related or unrelated to cargo activities. Such uses may include warehousing, manufacturing and commercial facilities.
- Improve surface road access and freeway interchanges to support additional truck cargo.

In the context of redeveloping the Herculaneum site and Crystal City site as a public river port, the existing railroad access adds value to the inventory of existing transportation infrastructure to serve a port. Direct rail access is a key component to site marketing and port operations. A new freeway access road is being implemented to provide enhanced connection to and from the Herculaneum site and to serve as an internal as well as external road system. Additionally, a second interchange on Highway 55 is being discussed and considered for dedicated truck access to the Crystal City sites. With the development of additional roadway access the sites will be well served by direct rail, and highway access as well as waterways.

The evaluation of the existing conditions including the historical and current cargo movements in the St. Louis region suggests several broadly defined market opportunities are available to the Herculaneum site. These opportunities include:

- Medium to long term growth of regional population and economic activity generating a demand for existing and new cargo handling facilities in the region.
- Highway, rail and water access, combined with acreage for development and proximity to St. Louis, which makes it an attractive location for cargo handling and distribution activities.
- Private companies operating the cargo handling facilities in the region may require long term alternate locations for their cargo handling operations.
- The ability to move cargo through the Jefferson County sites would lower their highway transportation costs for companies located close to Herculaneum.
- The potential for medium to long term development of container-on-barge service between St. Louis and the Gulf Coast would require a small container terminal in the St. Louis area, which could be facilitated at the Herculaneum or Crystal City sites.
- Each of the above market segments may also support warehouse/distribution services, in addition to cargo handling requirements.

Two Herculaneum alternatives and three Crystal City alternatives were developed to fill these opportunities. All of the alternatives have both significant costs and demonstrable benefits. However, they target different markets. Whereas the Herculaneum Alternative 1 focuses on river operators and shippers, Alternative 2 focuses on inland distribution and manufacturing. For Crystal City, the first alternative emphasizes a maximum port development, while the other two focus on specific upland uses. For all of the alternatives, the land uses of the Industrial zones are similar and could easily be interchanged. All of the alternatives have buffer zones (with provision for trails, recreation, environmental education and open space), and similar liquid bulk and dry bulk terminals. Therefore, the major variable is the future market growth of river traffic versus inland distribution. Since all of the options are potentially viable, this report recommends that they be retained for future evaluation as part of a larger Jefferson County Port development.

APPENDIX A

Annual PMSL Cargo and Facility Data

Appendix A provides tables of annual data on cargo handled by the Port of Metropolitan St. Louis and lists of cargo handling facilities located within the Port's area.

Table 1: Top 25-Commodities Handled by Port of Metropolitan St. Louis

000 Short Tons	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2007 Share
Coal Lignite	9,419	10,156	10,807	11,763	12,196	11,806	11,421	11,841	11,261	11,900	11,972	37.3%
Corn	2,304	2,688	3,792	3,686	3,532	3,471	3,281	4,571	4,030	4,033	3,799	11.8%
Soybeans	1,546	1,530	1,755	1,980	1,911	2,051	1,935	2,013	1,937	1,966	2,065	6.4%
Asphalt, Tar & Pitch	1,848	1,766	1,715	1,769	1,477	1,803	1,974	2,140	1,745	1,806	1,938	6.0%
Sand & Gravel	1,095	1,211	1,410	1,369	1,560	1,344	1,639	1,500	1,383	1,242	1,532	4.8%
Wheat	1,693	1,511	1,949	1,511	1,498	1,503	1,494	1,852	1,254	1,428	1,344	4.2%
Cement & Concrete	1,544	1,729	1,709	1,578	1,680	1,644	1,641	1,338	1,362	1,428	1,237	3.9%
Distillate Fuel Oil	748	598	438	477	551	944	1,244	820	524	773	970	3.0%
Waterway Improv. Mat	392	161	127	84	360	62	26	4	24	162	790	2.5%
Coal Coke	588	638	422	530	606	658	654	268	479	583	607	1.9%
Lube Oil & Greases	502	451	609	592	651	608	595	565	513	500	557	1.7%
Animal Feed, Prep.	1,882	1,561	1,259	1,264	1,124	931	958	948	785	724	537	1.7%
I&S Plates & Sheets	545	576	379	428	438	285	454	416	511	374	452	1.4%
Nitrogenous Fert.	180	266	218	191	321	225	313	377	369	359	392	1.2%
Non-Metal. Min. NEC	443	268	499	266	413	312	522	498	305	256	386	1.2%
Iron & Steel Scrap	315	327	193	382	350	463	489	575	349	395	384	1.2%
Crude Petroleum	0	0	0	54	15	8	0	19	6	74	363	1.1%
Sodium Hydroxide	332	306	329	328	319	304	309	334	316	274	278	0.9%
Potassic Fert.	42	29	44	28	85	138	122	222	315	149	232	0.7%
Fert. & Mixes NEC	116	115	99	118	170	254	185	150	173	196	229	0.7%
Gasoline	781	705	482	516	891	682	897	357	366	283	220	0.7%
Slag	102	80	60	29	107	146	138	174	73	264	202	0.6%
Residual Fuel Oil	664	705	449	435	634	247	95	91	280	388	182	0.6%
Alcohols	51	54	76	77	122	112	124	122	84	78	158	0.5%
Benzene & Toluene	174	145	125	124	151	146	134	115	94	82	157	0.5%
Top 25 Commodities	27,306	27,576	28,945	29,579	31,162	30,147	30,644	31,310	28,538	29,717	30,983	96.4%
Total Cargo	31,292	31,762	32,651	33,338	34,431	32,607	32,429	33,385	30,345	31,313	32,129	

Source: Waterborne Commerce Statistics, U.S. Army Corps of Engineers

Table 2: Top 25 Outbound Commodities Handled by Port of Metropolitan St. Louis

000 Short Tons	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2007 Share
Coal Lignite	7,086	7,149	7,194	8,758	9,631	10,567	10,543	10,955	9,947	10,696	11,123	47.4%
Corn	2,298	2,671	3,783	3,674	3,522	3,458	3,270	4,559	4,028	3,998	3,790	16.1%
Soybeans	1,544	1,525	1,753	1,971	1,909	2,041	1,934	2,011	1,936	1,935	2,059	8.8%
Asphalt, Tar & Pitch	1,527	1,365	1,204	1,077	884	1,307	1,592	1,691	1,287	1,277	1,518	6.5%
Wheat	1,642	1,481	1,928	1,506	1,494	1,466	1,466	1,815	1,248	1,422	1,344	5.7%
Animal Feed, Prep.	1,850	1,535	1,222	1,243	1,103	914	931	921	768	678	506	2.2%
Cement & Concrete	686	799	652	649	638	544	575	446	313	404	505	2.2%
Iron & Steel Scrap	211	184	122	274	328	453	459	532	336	381	368	1.6%
Crude Petroleum	0	0	0	46	0	0	0	19	0	69	354	1.5%
Lube Oil & Greases	251	199	332	186	240	262	310	335	300	229	307	1.3%
I&S Plates & Sheets	349	266	161	156	292	123	292	215	288	168	259	1.1%
Benzene & Toluene	115	76	70	71	102	99	107	93	85	78	157	0.7%
Alcohols	3	0	3	5	31	7	2	1	7	52	155	0.7%
Residual Fuel Oil	443	666	284	296	521	207	30	43	249	209	135	0.6%
Oilseeds NEC	1,306	1,469	1,052	872	1,103	794	513	402	217	171	105	0.4%
Potassic Fert.	21	15	4	8	5	3	12	111	190	33	99	0.4%
Slag	102	72	46	16	98	138	133	172	71	126	87	0.4%
Sorghum Grains	280	243	177	103	93	86	108	151	153	118	82	0.3%
Coal Coke	75	21	63	2	6	14	41	58	9	75	52	0.2%
Sand & Gravel	98	41	21	61	43	15	39	43	21	55	50	0.2%
Wood Chips	49	38	63	95	89	85	82	78	64	73	47	0.2%
Ammonia	99	65	129	150	36	25	10	10	0	16	45	0.2%
Non-Ferrous Ores NEC	0	0	0	0	2	45	55	34	54	54	38	0.2%
Gasoline	402	390	336	244	261	293	218	22	47	88	37	0.2%
Petroleum Coke	233	242	178	272	140	8	35	77	92	46	33	0.1%
Top 25 Commodities	20,670	20,512	20,777	21,735	22,571	22,954	22,757	24,794	21,710	22,451	23,255	99.0%
Total Outbound Cargo	21,770	21,525	21,787	23,003	23,507	23,497	23,103	25,067	22,127	22,704	23,481	

Source: Waterborne Commerce Statistics, U.S. Army Corps of Engineers

Table 3: Top 25 Inbound Commodities Handled by Port of Metropolitan St. Louis

000 Short Tons	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2007 Share
Distillate Fuel Oil	269	189	145	233	353	749	1,130	760	439	679	928	14.7%
Waterway Improv. Mat	392	161	126	70	347	59	12	3	18	160	788	12.5%
Coal Lignite	1,198	1,278	1,291	996	944	813	861	874	834	699	647	10.3%
Coal Coke	513	617	359	528	600	644	613	210	470	508	555	8.8%
Non-Metal. Min. NEC	442	268	499	263	410	309	519	495	303	256	383	6.1%
Nitrogenous Fert.	156	207	167	152	277	222	310	375	364	353	381	6.1%
Cement & Concrete	313	454	529	426	464	517	479	232	260	315	285	4.5%
Sodium Hydroxide	316	298	329	328	318	303	303	333	316	274	278	4.4%
Lube Oil & Greases	246	245	265	406	411	346	285	230	213	271	250	4.0%
Fert. & Mixes NEC	114	110	88	105	160	239	168	150	164	194	227	3.6%
I&S Plates & Sheets	196	310	218	272	146	162	162	201	223	206	193	3.1%
Gasoline	351	262	111	225	611	384	667	334	315	195	183	2.9%
Asphalt, Tar & Pitch	256	322	345	419	331	268	227	268	268	277	171	2.7%
Hydrocarbon & Petrol Gases, Liquefied and Gaseous	0	0	0	0	0	0	0	6	118	353	148	2.4%
Naphtha & Solvents	44	131	84	55	109	126	37	127	93	79	141	2.2%
Potassic Fert.	21	14	40	20	80	135	110	101	113	113	130	2.1%
Slag	0	8	14	11	9	6	5	2	2	138	115	1.8%
Sand & Gravel	89	139	217	182	222	194	251	262	169	124	73	1.2%
Residual Fuel Oil	205	30	147	127	100	40	57	48	31	179	42	0.7%
I&S Bars & Shapes	15	46	47	53	83	93	22	70	46	72	39	0.6%
Animal Feed, Prep.	31	24	35	21	21	17	27	27	17	46	31	0.5%
Petro. Products NEC	75	0	0	16	27	69	10	9	6	19	30	0.5%
Iron Ore	67	50	21	52	48	46	30	53	60	39	28	0.4%
Pig Iron	109	141	60	20	19	12	16	26	15	7	20	0.3%
Metallic Salts	72	80	83	33	43	54	39	45	40	17	19	0.3%
Top 25 Commodities	5,490	5,384	5,220	5,013	6,133	5,807	6,340	5,241	4,897	5,573	6,085	96.7%
Total Inbound Cargo	6,657	6,682	6,463	6,235	7,067	6,649	7,129	6,200	5,514	6,025	6,293	

Source: Waterborne Commerce Statistics, U.S. Army Corps of Engineers

Table 4: Intra-Port Cargo Commodities Handled by Port of Metropolitan St. Louis

000 Short Tons	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2007 Share
Sand & Gravel	908	1,031	1,172	1,126	1,295	1,135	1,349	1,195	1,193	1,063	1,409	59.8%
Cement & Concrete	545	476	528	503	578	583	587	660	789	709	447	19.0%
Asphalt, Tar & Pitch	65	79	166	273	262	228	155	181	190	252	249	10.6%
Coal Lignite	1,135	1,729	2,322	2,009	1,621	426	17	12	480	505	202	8.6%
Distillate Fuel Oil	89	92	56	50	32	36	33	39	33	48	34	1.4%
Residual Fuel Oil	16	9	18	12	13	0	8	0	0	0	5	0.2%
Iron & Steel Scrap	0	0	1	2	0	2	0	0	0	0	4	0.2%
Potassic Fert.	0	0	0	0	0	0	0	10	12	3	3	0.1%
Soybeans	0	0	0	2	0	2	1	0	0	2	2	0.1%
Top Commodities	2,844	3,522	4,362	4,087	3,856	2,457	2,186	2,115	2,704	2,583	2,355	100%
Total Local Cargo	2,865	3,555	4,401	4,100	3,857	2,461	2,197	2,118	2,704	2,584	2,355	

Source: Waterborne Commerce Statistics, U.S. Army Corps of Engineers

Table 5: Dry Bulk Cargo Facilities in the Port of Metropolitan St. Louis

Company Name (as reported by USACE)	Activity (as reported by USACE)	Right Bank (Missouri)	Left Bank (Illinois)	Rail Access*
ADM/Growmark River Systems Co.	Receipt and shipment of grain	1		BNSF
Ameren Union Electric Co.	Receipt and shipment of coal	1		None
	Receipt of coal	1		UP
	Receipt of coal for Sioux Power Plant	1		None
American Commercial Terminals, Inc.	Shipment of coal	1		BNSF
Bluff City Minerals.	Receipt of sand		1	None
Bulk Service Corp.	Shipment of dry-bulk commodities, including grain and grain by-products	1		TRRA; NS
	Shipment of grain and grain by-products, soda ash, and miscellaneous dry-bulk commodities, including coal		1	NS
	Shipment of grain, grain by-products, soybean meal, soda ash, and miscellaneous dry-bulk commodities, including coal		1	NS
Bussen Quarries, Inc.	Receipt of sand	1		None
Bussen Terminal, Inc.	Receipt of miscellaneous dry-bulk commodities, including filter cake, copper, clay, lead, slag, scrap metal, coal, salt, and fertilizer	1		UP
Buzzi Unicem USA, Inc.	Receipt of bulk cement	1		None
	Receipt of bulk cement	1		UP
	Receipt of coke; and shipment of cement clinker	1		BNSF
	Shipment of bulk cement	1		BNSF
Cargill AgHorizons.	Shipment of grain		1	TRRA
ConAgra Foods, Inc.	Receipt of wheat, and occasionally rye; and shipment of pellets (pressed-wheat-processing-waste)		1	NS, UP
Continental Cement Co., Inc.	Receipt of cement	1		TRRA
Dynegy Midwest Generation, Inc.	Receipt of coal		1	NS
Fred Weber, Inc.	Occasional receipt of sand	1		None
	Receipt of sand	1		BNSF
Gateway FS, Inc.	Shipment of grain		1	None
Italgrani Elevator Co.	Receipt and shipment of grain	1		UP
Peavey / Conagra Foods	Receipt and shipment of dry-bulk materials, including grain, grain by-products, fertilizer, and chemicals; receipt of coal		1	Alton & Southern
Peavey / Conagra Foods.	Shipment of dry-bulk commodities, including coal		1	TRRA
The American Milling Co.	Receipt and shipment of miscellaneous dry-bulk materials, including grain, coal, salt, fertilizer, and livestock feed		1	Alton & Southern
Total Dry Bulk Cargo Facilities		16	10	

* Indicates railroad with access to facility; does not indicate if railroad is currently servicing the facility.

Source: USACE National Data Center Survey of Port Facilities, 2004

Table 6: Liquid Bulk Cargo Facilities in the Port of Metropolitan St. Louis

Company Name (as reported by USACE)	Activity (as reported by USACE)	Right Bank (Missouri)	Left Bank (Illinois)	Rail Access *
American River Transportation Co., a subsidiary of Archer Daniels Midland Co.	Receipt and shipment of petroleum products and other miscellaneous bulk liquids; and mooring barges for topside repair, cleaning, and gas-freeing	1		UP
	Receipt and shipment of petroleum products; and mooring and handling supplies for company-owned boats	1		UP
Brenntag Mid-South, Inc.	Receipt and shipment of miscellaneous liquid chemicals and petrochemicals	1		UP
Broadway Petroleum Co., LLC.	Receipt and occasional shipment of asphalt	1		UP
Center Point Terminal Co., subsidiary of Apex Oil Co.	Receipt and shipment of fuel oil and asphalt	1		None
ConocoPhillips	Receipt and shipment of No. 6 fuel oil; and shipment of petroleum products		1	NS
	Receipt and shipment of petroleum products		1	NS
	Shipment of asphalt and benzene		1	NS
	Shipment of lubricating oil and asphalt		1	NS
	Shipment of petroleum products		1	NS
Economy Boat Store.	Receipt and shipment of petroleum products		1	NS
J. D. Streett & Co., Inc.	Receipt and shipment of petroleum products	1		None
	Receipt of petroleum products, caustic soda, ethylene glycol, and ethanol	1		UP
Kiesel Marine Service, Inc.	Occasional receipt of petroleum products by barge	1		None
Koch Fertilizer Storage and Terminal	Receipt and shipment of anhydrous ammonia		1	NS
Marathon Ashland Pipe Line, LLC.	Receipt and shipment of crude oil and petroleum products		1	None
Petroleum Fuel and Terminal Co., a subsidiary of Apex Oil Co.	Receipt and shipment of asphalt		1	NS
Shell Oil Products US, LLC.	Receipt and shipment of asphalt and petroleum products	1		UP
Slay Bulk Terminals, Inc.	Receipt of miscellaneous liquid chemicals	1		TRRA
The Doe Run Co.	Shipment of sulphuric acid	1		BNSF
The Premcor Refining Group.	Receipt and shipment of petroleum products		1	None
The Valvoline Co., Subsidiary of Ashland	Receipt of lubricating oil	1		UP
Total Liquid Bulk Cargo Facilities		12	10	

* Indicates railroad with access to facility; does not indicate if railroad is currently servicing the facility.

Source: USACE National Data Center Survey of Port Facilities, 2004

Table 7: General Cargo / Multipurpose Facilities in the Port of Metropolitan St. Louis

Company Name (as reported by USACE)	Activity (as reported by USACE)	Right Bank (Missouri)	Left Bank (Illinois)	Rail Access *
Azcon Corp.	Receipt and shipment of dry-bulk commodities, scrap metal, and steel products		1	NS
Beelman River Terminals, Inc.	Receipt and shipment of general cargo and heavy-lift commodities; dry-bulk commodities, including grain, coal, coke, sand, scrap metal, and ores; and liquid-bulk commodities		1	None
	Receipt and shipment of general cargo and heavy-lift commodities; dry-bulk commodities, including grain, coke, coal, sand, scrap metal, and ores; and liquid-bulk commodities, including caustic soda	1		TRRA; NS
	Receipt and shipment of general cargo and heavy-lift commodities; dry-bulk commodities, including grain, coke, coal, sand, scrap metal, ores, and caustic soda; and other liquid-bulk commodities	1		TRRA; NS
Bussen Terminal, Inc.	Receipt of miscellaneous dry-bulk materials, including bulk fertilizer, steel products, pipe, coal, and salt	1		UP
	Shipment of dry-bulk commodities, including filter cake, copper, clay, lead, slag, and scrap metal	1		UP
Cahokia Marine Service, Inc.	Receipt and shipment of general cargo, including steel products, grain, grain by-products, and dry and liquid chemicals, including benzene; fertilizers; and dry-bulk commodities, including coal, stone, and sand		1	CSX, UP
Lange-Stegmann Co.	Receipt of bulk commodities, including dry and liquid fertilizer, coal, coke, miscellaneous ores, grain, and salt	1		TRRA; BNSF
Mid-Coast Terminal Co.	Receipt and shipment of general cargo, steel, liquid- and dry-bulk fertilizer, packaged goods, and miscellaneous dry-bulk commodities		1	NS
Phoenix Terminal Co., Inc.	Receipt and shipment of steel products, lumber, and dry-bulk commodities, including sand, grain, coal, and coke; and mooring steel barges for scrapping		1	None
St. Louis Auto Shredding, Inc.	Shipment of scrap metal		1	None
Transload Services, LLC.	Receipt and shipment of steel products	1		UP
U.S. Steel, Granite City Works.	Receipt of steel slabs and miscellaneous dry-bulk materials for steel-mill use; and shipment of steel products, including coils and sheets		1	NS
Total General Cargo / Multipurpose Facilities		6	7	

* Indicates railroad with access to facility; does not indicate if railroad is currently servicing the facility.

Source: USACE National Data Center Survey of Port Facilities, 2004

APPENDIX B

An Economic Impact Study
The Doe Run Herculaneum Port Feasibility Analysis
Herculaneum, Missouri
December 10, 2009

Prepared by
Development Strategies

AN ECONOMIC IMPACT STUDY OF

THE DOE RUN HERCULANEUM PORT FEASIBILITY ANALYSIS

HERCULANEUM, MISSOURI

DECEMBER 10, 2009

PREPARED FOR



December 10, 2009

Mr. Kyle Kittrell
TranSystems
1001 Craig Road
Suite 260
St. Louis, Missouri 63146

Re: Economic Impact Study of the Doe Run Herculaneum Port Feasibility Analysis

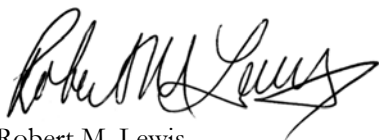
Dear Mr. Kittrell:

Development Strategies is pleased to submit this report on the potential construction and permanent economic and fiscal impacts of two potential scenarios for the reuse of the Doe Run Herculaneum port facility.

The economic and fiscal impact projections are based on the capital investment to complete the build-out of each scenario and on the operational spending by the facilities' end-users in each scenario, assuming full build-out.

It has been a pleasure to work with you on this assignment. Please let us know if we can be of further assistance as the project moves forward.

Yours very truly,



Robert M. Lewis
Principal



Naomi Shanker
Senior Analyst

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APPENDIX

- Scenario Alternatives
- Detailed Construction and Operating Expense Assumptions
- Detailed projections of multiplier effects

EXECUTIVE SUMMARY

The Doe Run Company operates its Lead Smelting Division in Herculaneum, Missouri, on the Mississippi River in Jefferson County, and is exploring redevelopment opportunities for its 260-acre Herculaneum property. To that end, Doe Run retained the transportation consulting firm TranSystems to perform a feasibility analysis for multi-modal port operations (e.g., river, road, rail). In turn, TranSystems retained Development Strategies to conduct an economic impact analysis of the port alternatives, including multiplier (“ripple”) effects. Two economic impact periods are evaluated:

1. The full time frame of construction of port facilities, and
2. Annual, permanent impacts from full build-out of each scenario.¹

In summary, each \$1,000,000 invested in port construction could trigger:	
<i>During the construction period (which could be multiple years)</i>	
\$2,873,000	in added economic activity (GDP) in Jefferson County, plus
21.6	jobs in Jefferson County, paying
\$39,000	in annual wages per job
<i>Annual permanent impacts of:</i>	
\$384,000	in added economic activity (GDP) in Jefferson County, plus
11.2	jobs in Jefferson County, paying
\$32,700	in annual wages per job

The latest comparable data for Jefferson County show that the average wage for jobs in the county (including salaries but excluding benefits or other forms of personal income) is about \$31,800, so the impacts shown above would generally create jobs paying higher than average wages. All dollar amounts expressed in this report are in constant 2009 values. In addition to the above benefits for Jefferson County, there would be broader economic benefits for the St. Louis Region and the State of Missouri.

TranSystems provided two alternatives for the potential redevelopment of the Doe Run Herculaneum port site, summarized on the following table. This report separately evaluates the potential economic benefits of each scenario for three distinct, but overlapping, geographic areas: the State of Missouri, Jefferson County, and the St. Louis Region. In addition, fiscal, or tax, benefits were determined only for state government because of the complexity and number of local governments in the region and the county, although econometric modeling of local government tax benefits can be accomplished if further study is warranted.

¹ These periods may overlap. Some port operations might be undertaken after a limited amount of construction as other port facilities begin construction. The prospective annual impacts of these overlaps are not estimated because no firm timeframe for construction has yet been determined nor has it been determined how quickly a port development might become operational.

Doe Run Herculeaneum Port Feasibility Scenarios: Build-Out Assumptions		
Uses	Square Feet or Tons per Scenario	
	<u>Scenario 1: Rail Dependent Cargo</u>	<u>Scenario 2: Ware- housing and Dis- tribution</u>
Distribution Center	500,000 sf	1,000,000 sf
Warehouse	180,000 sf	200,000 sf
Rail Distribution	300,000 sf	0 sf
Manufacturing	0 sf	300,000 sf
Modular Warehousing	210,000 sf	80,000 sf
Office	60,000 sf	60,000 sf
Container Terminal	30,000 tons	30,000 tons
Intermodal Rail	50,000 tons	0 tons
Dry Bulk Aggregate	500,000 tons	500,000 tons
Dry Bulk Grain	2,000,000 tons	0 tons
Liquid Bulk Terminal	1,000,000 tons	1,000,000 tons

Source: TranSystems

Redevelopment of the port site is projected to occur in various phases, but timeframes for development phases have not been determined at this time. Our analysis, therefore, estimates the economic impact of the total construction of each scenario at full build out, but expressed in 2009 dollars.

Construction impacts are expected to be:

Scenario 1 - Construction

- \$227.1 million in direct construction spending, creating 1,640 jobs and \$85.2 million in earnings for workers involved with the construction.
- An additional \$652.4 million in state economic output triggered by multiplier effects; an additional \$434.8 million in county economic output (included in the state's portion); and an additional \$620.9 million economic output throughout the St. Louis Region (including the county portion).
- An additional 5,545 jobs throughout the state across all industries triggered by multiplier effects; 3,255 jobs throughout the county across all industries; and 4,930 jobs throughout the St. Louis Region across all industries.
- \$186.2 million in additional household earnings in the state; \$105.8 million in the county; and \$187.8 million in the St. Louis Region.

Table E-1 Summary Economic Impact from Scenario 1 - Construction			
All dollars in millions of 2009 values			
DIRECT EFFECTS			
Construction Spending	\$227.1		
Job Creation	1,640		
Household Earnings	\$85.2		
MULTIPLIER EFFECTS			
	State of Missouri	Jefferson County	St. Louis Region
Economic Activity	\$652.4	\$434.8	\$620.9
Job Creation	5,545	3,255	4,930
Household Earnings	\$186.2	\$105.8	\$187.8
STATE TAX REVENUES			
From Direct Household Earnings	\$2.6		
Multiplier Effects	\$11.9		

- \$2.6 million in individual income taxes for the state from direct earnings, and an additional \$11.9 million to total tax revenue for the state from multiplier effects.

Scenario 2 - Construction

- \$201.1 million in direct construction spending, creating 1,450 jobs and \$75.4 million in earnings for workers involved with the construction.
- An additional \$577.6 million in state economic output triggered by multiplier effects; an additional \$385.0 million in county economic output (included in the state’s portion); and an additional \$549.7 million economic output throughout the St. Louis Region (including the county portion).
- An additional 4,910 jobs throughout the state across all industries triggered by multiplier effects; 2,880 jobs throughout the county across all industries; and 4,365 jobs throughout the St. Louis Region across all industries.
- \$164.8 million in additional household earnings in the state; \$93.7 million in the county; and \$166.3 million in the St. Louis Region.
- \$2.3 million in direct individual income taxes for the state, and an additional \$10.5 million to total tax revenue for the state from multiplier effects.

Table E-2			
Summary Economic Impact from Scenario 2 - Construction			
<i>All dollars in millions of 2009 values</i>			
DIRECT EFFECTS			
Construction Spending	\$201.1		
Job Creation	1,450		
Household Earnings	\$75.4		
MULTIPLIER EFFECTS			
	State of Missouri	Jefferson County	St. Louis Region
Economic Activity	\$577.6	\$385.0	\$549.7
Job Creation	4,910	2,880	4,365
Household Earnings	\$164.8	\$93.7	\$166.3
STATE TAX REVENUES			
From Direct Household Earnings	\$2.3		
Multiplier Effects	\$10.5		

Once the scenarios are fully built and operations reach stabilization, the economic activity at the port will have long-term annual economic benefits on the three geographic areas.

Scenario 1 - Operations

- \$91.5 million in direct operational spending, including \$66.3 million in wages, supporting 1,945 full-time-equivalent jobs.

Table E-3			
Summary Economic Impact from Scenario 1 - Operations			
<i>All dollars in millions of 2009 values</i>			
DIRECT EFFECTS			
Total Operational Spending	\$91.5	1.65	
Job Creation	1,945	13.06	
Household Earnings	\$66.3	0.41	
MULTIPLIER EFFECTS			
	State of Missouri	Jefferson County	St. Louis Region
Economic Activity	\$151.1	\$87.3	\$147.8
Job Creation	1,195	595	1,115
Household Earnings	\$37.5	\$16.7	\$39.8
STATE TAX REVENUES			
From Direct Household Earnings	\$1.7		
Multiplier Effects	\$2.4		

- An additional \$151.1 million in state economic output; an additional \$87.3 million in county economic output (included in the state’s portion); and an additional \$147.8 million economic output throughout the St. Louis Region (including the county portion).
- An additional 1,195 jobs throughout the state across all industries; 595 jobs throughout the county across all industries; 1,115 jobs throughout the St. Louis Region across all industries.
- \$37.5 million in additional household earnings in the state; \$16.7 million in the county; \$39.8 million in the St. Louis Region.
- \$1.7 million in direct individual income taxes for the state, and an additional \$2.4 million to total tax revenue for the state from multiplier effects.

Scenario 2 - Operations

- \$103.9 million in direct operational spending, including \$80.5 million in wages, supporting 2,365 full-time-equivalent jobs.
- An additional \$169.2 million in state economic output; an additional \$99.2 million in county economic output (included in the state’s portion); and an additional \$163.6 million economic output throughout the St. Louis Region (including the county portion).
- An additional 1,415 jobs throughout the state across all industries; 745 jobs throughout the county across all industries; 1,305 jobs throughout the St. Louis Region across all industries.
- \$43.7 million in additional household earnings in the state; \$20.9 million in the county; \$45.7 million in the St. Louis Region.
- \$2.0 million in direct individual income taxes for the state, and an additional \$2.8 million to total tax revenue for the state from multiplier effects.

Table E-4			
Summary Economic Impact from Scenario 2 - Operations			
<i>All dollars in millions of 2009 values</i>			
DIRECT EFFECTS			
Operational Spending	\$103.9		
Job Creation	2,365		
Household Earnings	\$80.5		
MULTIPLIER EFFECTS			
	State of Missouri	Jefferson County	St. Louis Region
Economic Activity	\$169.2	\$99.2	\$163.6
Job Creation	1,415	745	1,305
Household Earnings	\$43.7	\$20.9	\$45.7
STATE TAX REVENUES			
From Direct Household Earnings	\$2.0		
Multiplier Effects	\$2.8		

In conclusion, not only will the capital investment required to build the new facilities ripple through the economy and impact output, earnings and employment, but the reuse of the site under each of the two scenarios will have sizable on-going economic and fiscal impacts on the state, Jefferson County, and the St. Louis region.

Table E-5: Economic Impacts of Port Feasibility Scenarios – Construction Summary		
<i>dollars in 2009\$</i>	Scenario 1	Scenario 2
	Direct Impacts (total)	
Construction Spending	\$227,100,000	\$201,100,000
Jobs	1,640	1,450
	Indirect Impacts (total)	
<i>Jefferson County</i>		
Output	\$434,800,000	\$385,000,000
Earnings	\$105,800,000	\$93,700,000
Jobs	3,255	2,880
<i>St. Louis Region</i>		
Output	\$620,900,000	\$549,700,000
Earnings	\$187,800,000	\$166,300,000
Jobs	4,930	4,365
<i>State of Missouri</i>		
Output	\$652,400,000	\$577,600,000
Earnings	\$186,200,000	\$164,800,000
Jobs	5,545	4,910
Indirect Taxes	\$11,900,000	\$10,500,000

Table E-6: Economic Impacts of Port Feasibility Scenarios – Annual Operations Summary		
<i>dollars in 2009\$</i>	Scenario 1	Scenario 2
	Direct Impacts (average annual)	
Total Operational Expenditures	\$91,500,000	\$103,900,000
Jobs	1,945	2,365
	Indirect Impacts (average annual)	
<i>Jefferson County</i>		
Output	\$87,300,000	\$99,200,000
Earnings	\$16,700,000	\$20,900,000
Jobs	595	745
<i>St. Louis Region</i>		
Output	\$147,800,000	\$163,600,000
Earnings	\$39,800,000	\$45,700,000
Jobs	1,115	1,305
<i>State of Missouri</i>		
Output	\$151,100,000	\$169,200,000
Earnings	\$37,500,000	\$43,700,000
Jobs	1,195	1,415
Indirect Taxes	\$2,400,000	\$2,800,000

Note: In above tables, the multiplier effects for smaller regions are included in the multiplier effects of larger regions. That is to say, the multiplier effects in Jefferson County are captured in the multiplier effects of the St. Louis Region. The multiplier effects of the St. Louis Region, however, are not entirely captured by the total multiplier effects for the State of Missouri because the St. Louis Region includes three counties in Illinois.

PROJECT BACKGROUND

The Doe Run Company (“Doe Run”), based in St. Louis, Missouri, is a natural resource company focused on metals mining, smelting, recycling and fabrication. Doe Run is the largest integrated lead producer in the western hemisphere and the third largest total lead producer in the world. Additionally, the company retrieves and recycles more than 150,000 tons of lead annually from manufactured products such as batteries and telephone cables.

Doe Run operates its Lead Smelting Division in Herculaneum, Missouri, located in Jefferson County. The smelting facility is located twenty-five miles south of St. Louis on the Mississippi River (see full map on next page). Due to environmental contamination and community safety issues, Doe Run owns approximately 260 acres of land surrounding its smelter facility.

Doe Run is exploring redevelopment opportunities for its property in Herculaneum. To that end, Doe Run retained the transportation consulting firm TranSystems to perform a port feasibility analysis. TranSystem’s report evaluates the competitive position of the Herculaneum site within the regional market for cargo handling facilities. The TranSystems report concludes that the Herculaneum site offers excellent highway, rail and water access, combined with acreage for development and proximity to St. Louis. These strengths make it an attractive location for cargo handling and distribution activities.

The TranSystems report provides two alternative scenarios for the redevelopment of the Doe Run Herculaneum site. The scenarios focus on the market opportunities discussed in the TranSystems report².

- Scenario 1 focuses on rail and is the only alternative that has an on-site dedicated intermodal lift yard as well as a dedicated, rail-served grain elevator complex.
- Scenario 2 is warehousing and distribution, and light manufacturing, focusing on larger firms and operations.

Illustrations of the two scenarios developed by TranSystems are in the Appendix.

Development Strategies was retained to perform an economic impact study of the two redevelopment scenarios developed by TranSystems. This report evaluates the potential economic and fiscal benefits to the state, county and region from the construction activity related to the redevelopment of the site as well as from future operations at the site at full build-out.

² The two alternatives were selected as two extremes of possible site uses; subset combinations and permutations of the two are possible.

METHODOLOGY

ECONOMIC IMPACT ANALYSIS

Economic impacts manifest themselves in a number of ways. The spending by any business supports other businesses which causes multiplier effects as that money continues to be re-spent through the economy. Employees are paid their wages and salaries, and their subsequent spending in their communities to support their households likewise triggers multiplier effects.

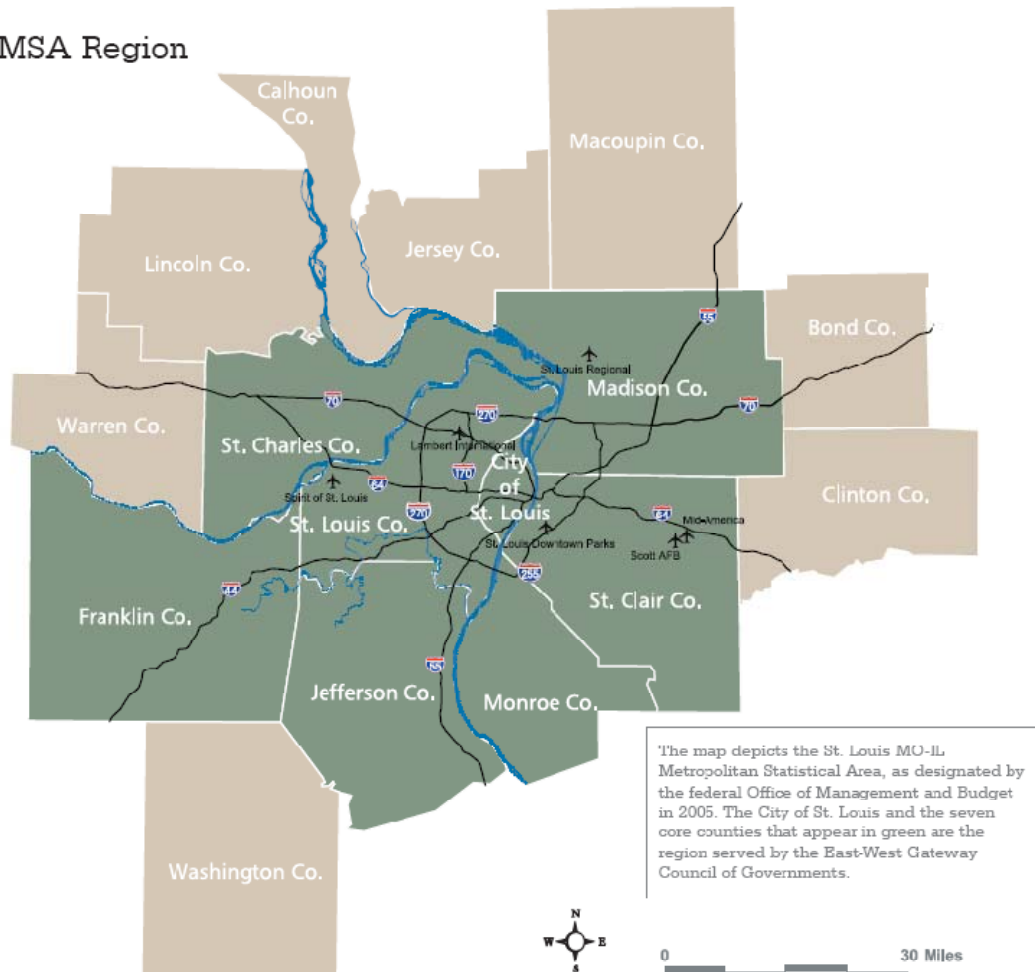
Direct economic impacts are represented by the estimated dollars spent during the construction phases and the dollars spent by the facility users on annual operating expenditures. In this analysis, ongoing annual expenses include the salaries paid to employees and other non-payroll operating expenses, including general overhead and facilities maintenance. Direct fiscal impacts are the tax benefits generated by the direct spending. The property owners and users will be subject to taxes and fees levied by the various authorities that have jurisdiction over the site. However, because the scenarios are still conceptual, many of the values from which taxes and fees are calculated cannot be estimated at this time. Therefore, our analysis only includes potential direct individual income tax revenue accrued to the state.

Indirect economic impacts measure the “ripple effect” of the construction dollars and spending on operations by the facility users. The direct spending will ripple through the state, county and region supporting other businesses and jobs; construction workers and permanent employees will spend a large portion of their income near their homes at local businesses such as retail stores, restaurants, mechanics, and others, and will also require housing in the area. Thus, every dollar and each job related to construction of, and operations at, the port will contribute to additional job support across many sectors.

To calculate these indirect impacts, multiplier coefficients for specific industries are applied to the direct impact dollars; these multipliers take into account the amount of “leakage” from the local economies because some wages and expenditures will be spent outside of the respective regions. Multiplier coefficients are provided by the U.S. Department of Commerce’s *Regional Input-Output Multiplier System (RIMS-II)*. RIMS II provides multiplier coefficients for any selected region comprised of states, counties and/or metropolitan statistical areas; multiplier coefficients for smaller geographies are not available. This analysis focuses on the impact of the various reuse scenarios on the State of Missouri, Jefferson County, and the eight-county St. Louis Region, as defined by the East-West Gateway Council of Governments.³

³ The East-West Gateway region does not include the three Missouri counties (Franklin, Warren and Washington) and five Illinois counties (Bond, Calhoun, Clinton, Jersey, and Macoupin) that are included in the St. Louis MO-IL metropolitan statistical area. See map on the next page.

16 County MSA Region



Therefore, only multipliers for these three regions were chosen. Multiplier effects for smaller regions are included in the multiplier effects of larger regions. That is to say, the multiplier effects in Jefferson County are captured in the multiplier effects of the St. Louis Region. The multiplier effects in the St. Louis Region, however, are not entirely captured by the total multiplier effects for the State of Missouri because the St. Louis Region includes three counties in Illinois; however, there is some overlap with the state multiplier effects because of the five Missouri counties included in the St. Louis Region.

Industry sectors relevant to this economic impact analysis were identified based on the probable industry sector classification of the anticipated port facility uses. For the distribution and warehouse facility users the following industry sectors were chosen:

- *Warehousing and storage*, because of the type of distribution facilities included in the reuse scenarios.
- *Water transportation*, because of the type of port activity that is projected to occur in each reuse scenario.

- *Rail transportation*, because of the type of rail distribution activity that is projected to occur in each reuse scenario.

Planned manufacturing space, small business incubator space and general office space could be used by a variety of users that may be classified in different industries. Light manufacturing and small business incubator users are likely to be categorized in the following three industry sectors:

- Fabricated metal product manufacturing
- Wood product manufacturing
- Miscellaneous manufacturing

General office users are likely to be categorized in the following three industry sectors:

- Information and data processing services
- Professional, scientific and technical services
- Administrative and support services

These probable industry sectors were consolidated into two general industry categories: Light manufacturing and Office.

The Construction and Households industry sectors are also included:

- *Construction*, because of the construction spending associated with building the new port facilities.
- *Households*, because of the household earnings of both temporary and permanent employees associated with the new facilities.

Economic impacts are demonstrated through multiplier effects in three primary ways:

- **Output**, which is similar to the nation's and state's gross domestic product (GDP). That is, the output measure is the sum of all additional dollars that are spent in the local and regional economies as a result of the direct spending on construction, operations and by employee households.
- **Earnings**, which show how much added income will accrue to local and regional households because of the multiplier effects, in addition to the direct compensation paid to construction laborers and employees at the various port facilities.
- **Jobs** supported in the local and regional economies as a result of the multiplier effects, in addition to construction jobs and employees of the various port facilities.

Indirect tax impacts can also be measured from the indirect economic impacts for some geographies. A common denominator for direct and indirect impacts is household earnings. Therefore, we can estimate the indirect income tax revenue collected as a percent of total earnings in a given geography, provided an income

tax is levied in the given geography. Of the geographies selected for this analysis, only the State of Missouri imposes an income tax. Therefore, indirect tax impacts are projected for only the state. To estimate the indirect income tax revenue that the state would collect due to multiplier effects we relied on data from the Missouri Department of Revenue and from the U.S. Bureau of Economic Analysis, which publishes total estimated personal earnings for every state and county in the country.

ASSUMPTIONS

The analysis relies on data and assumptions provided by TranSystems for two potential scenarios of the reuse of the Doe Run port facility in Herculaneum. The two scenarios developed by TranSystems include new warehouse and distribution facilities, light manufacturing facilities, small business incubator space, and general office space. Table 1 summarizes the build-out scenarios for each alternative. Illustrations of each of the two alternatives can be found in the Appendix.

Table 1: Doe Run Herculaneum Port Feasibility Scenarios

<i>Build-Out Assumptions</i>	<i>Square Feet or Tons per Scenario</i>	
	<i>Scenario 1: Rail Dependent Cargo</i>	<i>Scenario 2: Warehousing and Distribution</i>
	<i>Use</i>	
Distribution Center	500,000 sf	1,000,000 sf
Warehouse	180,000 sf	200,000 sf
Rail Distribution	300,000 sf	0 sf
Intermodal Rail	50,000 tons	0 tons
Manufacturing	0 sf	300,000 sf
Modular Warehousing	210,000 sf	80,000 sf
Office	60,000 sf	60,000 sf
Container Terminal	30,000 tons	30,000 tons
Dry Bulk Aggregate	500,000 tons	500,000 tons
Dry Bulk Grain	2,000,000 tons	0 tons
Liquid Bulk Terminal	1,000,000 tons	1,000,000 tons

Source: TranSystems

Because the two alternatives are only conceptual, a number of assumptions were applied to the scenarios in order to calculate the economic and fiscal impacts. Those assumptions relate to the cost of building the facilities, the types of users and businesses that will locate at the new facilities, the number of jobs they will create, the average wages paid to employees, and the average annual operating expenses of the end users.

Annual operating expenditures are defined in two main categories: payroll (excluding benefits), and non-payroll expenses. Non-payroll operating expenses included such expenses as payroll benefits, general overhead, and facilities maintenance. They do not include items such as rent, utilities, and expenses related to roadway or municipal services. The estimated construction costs and annual operating expenditures for the two scenarios are summarized in Table 2. A complete list of the model assumptions can be found in the Appendix.

Table 2: Model Assumptions		
<u>Assumptions - Construction Period</u>	<u>Scenario 1</u>	<u>Scenario 2</u>
Total Construction Costs	\$227,100,000	\$201,100,000
Percent Labor Costs ⁴	50%	50%
Percent Payroll Benefits	25%	25%
Construction Jobs	1,640	1,450
Average Annual Wage	\$52,000	\$52,000
Average State Income Tax Withholding	3.1%	3.1%
<u>Assumptions - Annual Operations</u>	<u>Scenario 1</u>	<u>Scenario 2</u>
Annual Payroll	\$66,300,000	\$80,500,000
Annual Non-Payroll Operating Expenses	\$25,200,000	\$23,400,000
Full-Time Equivalent Jobs	1,945	2,365
Average Annual Wage for FTE Jobs	\$34,000	\$34,000
Average State Income Tax Withholding	2.5%	2.5%
Sources: TranSystems, Development Strategies, Missouri Department of Revenue		

To calculate the indirect impacts of the port reuse scenarios, Development Strategies relied on multiplier coefficients provided by the U.S. Department of Commerce's *Regional Input-Output Multiplier System* (RIMS-II) for the State of Missouri, Jefferson County, Missouri, and the St. Louis Region. Multiplier coefficients were selected based on the probable industry sector classification of the anticipated port facility users. Table 3 summarizes the assumptions related to industry classifications of port uses.

Table 3: Industry Classification of Facility Uses

<u>Use</u>	<u>Industry Classification</u>
Distribution Center Warehouse	= Warehousing & Storage
Rail Distribution Center Intermodal Rail	= Rail Transportation
Manufacturing Small Business Incubator	= Light Manufacturing ⁵
Office	= Office ⁶
Container Terminal Dry Bulk Aggregate Dry Bulk Grain Liquid Bulk Terminal	= Water Transportation

The Construction and Households industry sectors are also included to capture the construction spending during the build-out phase as well as the earnings of the workers during both the construction and operation-

⁴ Assumption based on Development Strategies professional experience with construction related projects.

⁵ Light Manufacturing is a composite of the Fabricated metal product manufacturing sector; Wood product manufacturing sector; and the Miscellaneous manufacturing sector.

⁶ Office is a composite of the Information and data processing services sector; Professional, scientific and technical services sector; and the Administrative and support services sector.

al phases of each scenario. Table 4 summarizes the multiplier coefficients for the three study regions for the industry sectors used in the economic impact model.

Table 4: Industry Multipliers			
	Output	Earnings	Jobs
<i>State of Missouri</i>			
Construction	2.308	0.677	19.578
Warehousing and Storage	1.967	0.678	20.840
Water Transportation	2.083	0.393	10.198
Rail Transportation	1.806	0.387	8.545
Light Manufacturing	2.145	0.525	14.232
Office	2.077	0.586	17.334
Households	1.506	0.381	12.930
<i>Jefferson County</i>			
Construction	1.597	0.397	11.690
Warehousing and Storage	1.454	0.430	13.366
Water Transportation(see text for explanation)	1.000	0.000	0.000
Rail Transportation	1.391	0.234	4.767
Light Manufacturing	1.440	0.267	7.104
Office	1.499	0.308	9.830
Households	0.847	0.184	7.026
<i>St. Louis Region</i>			
Construction	2.200	0.681	17.360
Warehousing and Storage	2.016	0.750	20.974
Water Transportation	2.236	0.491	11.405
Rail Transportation	1.910	0.455	9.211
Light Manufacturing	2.053	0.528	12.400
Office	2.144	0.669	17.677
Households	1.423	0.388	11.583
Source: Regional Input-Output Modeling System (RIMS II), Regional Economic Analysis Division, Bureau of Economic Analysis. Multipliers are based on the 2006 Annual Input-Output Table for the nation and 2006 regional data.			

As Table 4 shows, for every \$1.00 spent in the Construction industry sector in the State of Missouri, for example, state output increases by \$2.308 and earnings in the state increase by \$0.677; 19.578 jobs are supported per \$1,000,000 of added output. In the St. Louis Region, \$1.00 spent in the Construction industry results in \$2.200 in added output within the region, which is nearly as much impact as on the state as a whole. Spending in the Warehousing and Storage, Water Transportation and Rail Transportation industry sectors has a greater impact on the St. Louis Region than on the state as a whole, likely due to the fact that such industries and channel partners are concentrated in the region.

As shown in Table 4, above, a dollar spent in the Water Transportation industry within Jefferson County generates no additional economic activity within the county itself, evidenced by the multiplier coefficients of 1.0

and 0.0. This is because, currently, there is no Water Transportation industry in Jefferson County. If a port at the Doe Run Herculaneum site is developed, however, these multiplier coefficients would increase. Therefore, for purposes of projecting the potential economic impact of a developed port site under the two proposed scenarios, we estimated potential multiplier coefficients for the Water Transportation industry in Jefferson County based on the ratio the county's industry multipliers to those for the entire St. Louis Region, as shown on Table 5.

	Output	Earnings	Jobs
<i>Jefferson County % of St. Louis Region</i>			
Total All Industries	68.9%	47.8%	54.7%
<i>Jefferson County Adjusted Multipliers</i>			
Water Transportation	1.541	0.235	6.241

The multiplier effects triggered by business activity in Jefferson County across all industries represent approximately 69 percent of output, 48 percent of earnings, and 55 percent of jobs experienced from multiplier effects throughout the St. Louis Region. These percentages are applied to the St. Louis Region multiplier for water transportation to arrive at a reasonable estimation of the potential future multiplier effects from a Water Transportation industry in Jefferson County should a port in Herculaneum be developed.

In order to calculate the indirect tax impacts for the State of Missouri from the two reuse scenarios, Development Strategies relied on 2008 Missouri state tax revenue data and estimates of total personal income in the state from the U.S. Bureau of Economic Analysis. Table 6 summarizes the analysis of the 2008 tax revenue and personal income data for the State of Missouri.

	Fiscal Year 2008	% of Individual Income Tax
Cigarette Tax	\$115,661,014	1.9%
Financial Institutions Tax	\$13,571,410	0.2%
Fuel Tax	\$742,177,802	12.1%
Individual Income Tax	\$6,119,090,558	100.0%
Corporate Income Tax	\$613,486,056	10.0%
Insurance Tax	\$255,299,419	4.2%
Local Sales and Use Tax	\$2,311,806,597	37.8%
State Sales and Use Tax	\$3,266,917,096	53.4%
Other Taxes	\$362,295,945	5.9%
Total Collections	\$13,800,305,897	
		Income Tax Revenue % of Personal Income
State Personal Income	\$216,546,820,000	2.8%

Individual income taxes = 2.8% of personal earnings

Corporate income taxes = 10.0% of individual income taxes

Sales taxes = 91.2% of individual income taxes

All other taxes = 12.1% of above

Sources: Missouri Department of Revenue, U.S. Bureau of Economic Analysis

In 2008, individual income taxes collected were approximately 2.8 percent of total state personal income. In 2007, individual income taxes collected were also approximately 2.8 percent of total state personal income. Therefore, the state will collect about 2.8 percent of the indirect earnings generated by multiplier effects of the reuse scenarios.⁷

In addition, the multiplier effects from the two reuse scenarios will generate additional tax revenues for the state. The estimated tax revenue from these two tax categories was calculated based on their ratios compared to the individual income taxes collected. That is, as highlighted in the box next to Table 5, corporate taxes are approximately 10 percent of individual income taxes, and sales taxes are about 91 percent of individual income taxes. All other taxes are approximately 12 percent of the collective total of the three largest tax categories (individual income, corporate income, and sales).

The projections ignore inflation, and all dollars are expressed in constant 2009 values.

⁷ The estimated individual income tax rate of 2.8% for the indirect jobs affected by the port activity may be higher or lower than the estimated income tax withholding rate for the jobs associated with the construction and use of the port reuse scenarios due to the variance in estimated average wages for construction jobs and jobs at the subject site.

ECONOMIC AND FISCAL IMPACTS OF CONSTRUCTION PHASES

Construction activity related to the redevelopment of the Doe Run site in Herculaneum will produce economic and fiscal impacts on the state and region. Redevelopment of the port site is projected to take thirty years, with completion occurring in various phases. The development phases have not been determined at this time. Therefore, this analysis estimates the direct and indirect benefits of total construction spending and household spending under the two build-out scenarios, but stated in constant 2009 dollar values. This analysis does not consider the additional impacts that may result from other ancillary construction activity that may be required to complete the redevelopment project, such as road infrastructure development and utility infrastructure development.

SCENARIO 1: RAIL DEPENDENT CARGO (SEE TABLE 7)

Direct Impacts

Construction of Scenario 1 is estimated to cost \$227.1 million. Labor costs associated with this construction project are estimated to be about 50 percent of the total budget, or approximately \$113.6 million. These labor costs include fringe benefits and insurance; benefits are estimated to be approximately 25 percent of total labor costs. Therefore, we estimate wages alone to total about \$85.2 million during the construction period. We estimate that the average annual wage for construction related occupations is \$52,000⁸. Employees who earn this wage level will pay approximately 3.1 percent in state income taxes.⁹ Therefore, construction related earnings will generate direct state income tax revenue totaling approximately \$2.6 million.¹⁰

Indirect Impacts

Both the non-labor construction spending and construction earnings will ripple through the three regional economies to create indirect impacts.

Jefferson County

Total construction spending will:

- trigger \$434.8 million in indirect output within the county, which is included in the \$652.4 million in state economic output,

⁸ May 2008 Occupational Employment Statistics from the U.S. Bureau of Labor Statistics. We assume wages have not increased.

⁹ This tax rate may vary depending on filing status of individuals.

¹⁰ Additional tax revenues, such as sales taxes and corporate taxes may also be generated by the construction activity, however, without know the purchasing channels for the construction materials or other related activities, such taxes cannot be estimated.

- stimulate \$105.8 million in additional household earnings, also part of the \$186.2 million in state household earnings, and
- support 3,255 jobs throughout the county across all industries.

St. Louis Region

Total construction spending will:

- trigger an additional \$620.9 million in output in the St. Louis Region, which includes Jefferson County,
- stimulate \$187.8 million in additional household earnings, and
- support 4,930 jobs throughout the St. Louis Region across all industries.

State of Missouri

Total construction spending will:

- trigger an additional \$652.4 million in state economic output,
- stimulate \$186.2 million in additional household earnings,
- support 5,545 jobs throughout the state across all industries, and
- generate an additional \$11.9 million in total state tax revenue from all tax sources from multiplier effects.

Table 7: Economic Impacts of Scenario 1 – Construction Period	
<i>dollars in 2009\$</i>	Scenario 1
Direct Impacts (total)	
Construction Spending	\$227,100,000
State Income Taxes	\$2,600,000
Jobs	1,640
Indirect Impacts (total)	
<i>Jefferson County</i>	
Output	\$434,800,000
Earnings	\$105,800,000
Jobs	3,255
<i>St. Louis Region</i>	
Output	\$620,900,000
Earnings	\$187,800,000
Jobs	4,930
<i>State of Missouri</i>	
Output	\$652,400,000
Earnings	\$186,200,000
Jobs	5,545
Indirect Taxes	\$11,900,000
Multiplier Definitions:	
Output:	Total dollar change in the economy due to expenditures by the project.
Earnings:	Total dollar change in earnings of households due to expenditures by the project.
Jobs:	Total change in the number of jobs held by residents per \$1,000,000 of added output.

Note: In above table, the multiplier effects for smaller regions are included in the multiplier effects of larger regions. That is to say, the multiplier effects in Jefferson County are captured in the multiplier effects of the St. Louis Region. The multiplier effects of the St. Louis Region, however, are not entirely captured by the total multiplier effects for the State of Missouri because the St. Louis Region includes three counties in Illinois.

SCENARIO 2: WAREHOUSING AND DISTRIBUTION (SEE TABLE 8)

Direct Impacts

Construction of Scenarios 2 is estimated to cost \$201.1 million. Labor costs associated with this construction project are estimated to be about 50 percent of the total budget, or \$100.6 million. These labor costs include fringe benefits and insurance; benefits are estimated to be approximately 25 percent of total labor costs. Therefore, wages alone are estimated to total about \$75.4 million during the construction period. Construction related earnings will generate direct state income tax revenue totaling approximately \$2.3 million.¹¹

Indirect Impacts

Both the non-labor construction spending and construction earnings will ripple through the three regional economies to create indirect impacts.

Jefferson County

Total construction spending will:

- trigger \$385.0 million in indirect output within the county, which is included in the \$577.6 million in state economic output,
- stimulate \$93.7 million in additional household earnings, which is part of the \$194.0 million in state household earnings, and
- support 2,880 jobs throughout the county across all industries.

St. Louis Region

Total construction spending will:

- trigger an additional \$549.7 million in output in the St. Louis Region, which includes Jefferson County,
- stimulate \$166.3 million in additional household earnings, and
- support 4,365 jobs throughout the St. Louis Region across all industries.

¹¹ Additional tax revenues, such as sales taxes and corporate taxes, may also be generated by construction activity. Without knowing the purchasing channels for the construction materials or other related activities, however, such taxes cannot be estimated.

State of Missouri

Total construction spending will:

- trigger an additional \$577.6 million in state economic output,
- stimulate \$164.8 in additional household earnings,
- support 4,910 jobs throughout the state across all industries, and
- generate an additional \$10.5 million in total state tax revenue from all tax sources from multiplier effects.

Table 8: Economic Impacts of Scenario 2 – Construction Period	
<i>dollars in 2009\$</i>	Scenario 2
Direct Impacts (total)	
Construction Spending	\$201,100,000
State Income Taxes	\$2,300,000
Jobs	1,450
Indirect Impacts (total)	
<i>Jefferson County</i>	
Output	\$385,000,000
Earnings	\$93,700,000
Jobs	2,880
<i>St. Louis Region</i>	
Output	\$549,700,000
Earnings	\$166,300,000
Jobs	4,365
<i>State of Missouri</i>	
Output	\$577,600,000
Earnings	\$164,800,000
Jobs	4,910
Indirect Taxes	\$10,500,000
Multiplier Definitions:	
Output:	Total dollar change in the economy due to ex users.
Earnings:	Total dollar change in earnings of households due to expenditures by the facility users.
Jobs:	Total change in the number of jobs held by residents per \$1,000,000 of added output.

Note: In above table, the multiplier effects for smaller regions are included in the multiplier effects of larger regions. That is to say, the multiplier effects in Jefferson County are captured in the multiplier effects of the St. Louis Region. The multiplier effects of the St. Louis Region, however, are not entirely captured by the total multiplier effects for the State of Missouri because the St. Louis Region includes three counties in Illinois.

ECONOMIC AND FISCAL IMPACTS OF FACILITY OPERATIONS

Economic activity related to the operations of the proposed facility users under the two redevelopment scenarios will produce long-term economic and fiscal impacts on the state and region. This analysis estimates the direct and indirect benefits of operational spending and household spending under the two build-out scenarios. This analysis does not consider the additional impacts that may result from other ancillary economic activity, such as truck transportation activity to and from the port.

SCENARIO 1: RAIL DEPENDENT CARGO (SEE TABLE 9)

Direct Impacts

Direct economic impacts from the use of the new port facilities include spending by the end users on payroll, operating expenditures, capital expenditures, maintenance and repairs and other operational costs. Based on the build-out and design of Scenario 1, total operating costs for Scenario 1 are estimated to be \$91.5 million annually. This includes approximately \$66.3 million for salaries and \$25.2 for other non-payroll expenses.¹² Scenario 1 is estimated to create 1,945 jobs.

Direct spending under Scenario 1 will generate direct tax impacts for the three regions as well. Employee earnings are taxed by the state, and are estimated to generate approximately \$1.7 million in state income tax revenue annually. There may be additional sources of tax revenue for the cities and counties within the three study regions, such as port usage and cargo fees, and corporate taxes. However, because Scenario 1 is still conceptual, these taxes cannot be estimated.

Indirect Impacts

Spending by the facility users on payroll and other operating expenses will ripple through the economies of the three study regions to create indirect impacts. The multiplier effects of spending by both facility users and employee households for all three regions are summarized below.

Jefferson County

Total construction spending will:

- trigger an additional \$87.3 million in county output, which is part of the total \$151.1 million for the state,
- stimulate \$16.7 million in additional household earnings, and
- support 595 jobs throughout the county across all industries.

¹² For the purpose of our economic impact model, non-payroll operating expenses include only payroll benefits, maintenance and repairs, and general overhead. It does not include taxes, rent, services, utilities, debt service, or other such expenses.

St. Louis Region

Total construction spending will:

- trigger an additional \$147.8 million in output in the St. Louis Region, which includes the added output for Jefferson County,
- stimulate \$39.8 million in additional household earnings, and
- support 1,115 jobs throughout the St. Louis Region across all industries.

State of Missouri

Total operational spending will:

- trigger an additional \$151.1 million in state economic output,
- stimulate \$37.5 million in additional household earnings,
- support 1,195 jobs throughout the state across all industries, and
- generate an additional \$2.4 million in total state tax revenue from all tax sources from multiplier effects.

Table 9: Economic Impacts of Scenario 1 – Operational Period	
<i>dollars in 2009\$</i>	Scenario 1
Direct Impacts (average annual)	
Total Operational Expenditures	\$91,500,000
State Income Taxes	\$1,700,000
Jobs	1,945
Indirect Impacts (average annual)	
<i>Jefferson County</i>	
Output	\$87,300,000
Earnings	\$16,700,000
Jobs	595
<i>St. Louis Region</i>	
Output	\$147,800,000
Earnings	\$39,800,000
Jobs	1,115
<i>State of Missouri</i>	
Output	\$151,100,000
Earnings	\$37,500,000
Jobs	1,195
Indirect Taxes	\$2,400,000
Multiplier Definitions:	
Output:	Total dollar change in the economy due to expenditures by the facility.
Earnings:	Total dollar change in earnings of households due to expenditures by the facility.
Jobs:	Total change in the number of jobs held by residents per \$1,000,000 of added output.

SCENARIO 2: WAREHOUSING AND DISTRIBUTION (SEE TABLE 10)

Direct Impacts

Based on the build-out and design of Scenario 2, total operating costs for Scenario 23 are estimated to be \$103.9 million annually. This includes approximately \$80.5 million for salaries and \$23.4 for other non-payroll expenses. Scenario 2 is estimated to create 2,365 jobs.

Direct spending under Scenario 2 will generate direct tax impacts for the three regions as well. Employee earnings are taxed by the state, and are estimated to generate approximately \$2.0 million in state income tax revenue annually.

Indirect Impacts

Spending by the facility users on payroll and other operating expenses will ripple through the economies of the three study regions to create indirect impacts. The multiplier effects of spending by both facility users and employee households under Scenario 2 for all three regions are summarized below.

Jefferson County

Total construction spending will:

- trigger an additional \$99.2 million in county output, which is part of the total \$169.2 million for the state,
- stimulate \$20.9 million in additional household earnings, and
- support 745 jobs throughout the county across all industries.

St. Louis Region

Total construction spending will:

- trigger an additional \$163.6 million in output in the St. Louis Region, which includes the added output for Jefferson County,
- stimulate \$45.7 million in additional household earnings, and
- support 1,305 jobs throughout the St. Louis Region across all industries.

State of Missouri

Total operational spending will:

- trigger an additional \$169.2 million in state economic output,
- stimulate \$43.7 million in additional household earnings,
- support 1,415 jobs throughout the state across all industries, and
- generate an additional \$2.8 million in total state tax revenue from all tax sources from multiplier effects.

Table 10: Economic Impacts of Scenario 2 – Operational Period	
<i>dollars in 2009\$</i>	Scenario 2
Direct Impacts (average annual)	
Total Operational Expenditures	\$103,900,000
State Income Taxes	\$2,000,000
Jobs	2,365
Indirect Impacts (average annual)	
<i>Jefferson County</i>	
Output	\$99,200,000
Earnings	\$20,900,000
Jobs	745
<i>St. Louis Region</i>	
Output	\$163,600,000
Earnings	\$45,700,000
Jobs	1,305
<i>State of Missouri</i>	
Output	\$169,200,000
Earnings	\$43,700,000
Jobs	1,415
Indirect Taxes	\$2,800,000
Multiplier Definitions:	
Output:	Total dollar change in the economy due to expenditures by the facility.
Earnings:	Total dollar change in earnings of households due to expenditures by the facility.
Jobs:	Total change in the number of jobs held by residents per \$1,000,000 of added output.

APPENDIX

- A. SCENARIO ALTERNATIVES
- B. DETAILED CONSTRUCTION AND OPERATING EXPENSE ASSUMPTIONS
- C. DETAILED PROJECTIONS OF MULTIPLIER EFFECTS

APPENDIX A: SCENARIO ALTERNATIVES

Scenario 1

**See Section 6, page 59, Figure 6-1
Herculaneum Site Alternative 1
Rail and Port Driven Development**

Scenario 2

**See Section 6, page 60, Figure 6-2
Herculaneum Site Alternative 2
Distribution Center and Warehousing Development**

APPENDIX B: DETAILED CONSTRUCTION AND OPERATING EXPENSE ASSUMPTIONS

Model Assumptions								
<u>Use</u>	<u>Scenario 1</u> # per Use	<u>Scenario 2</u> # per Use	<u>Sq. Ft. or Tons</u> per Use	<u>SF or Units</u> per Job	<u>Construction</u> Cost per Use	<u>Wage per</u> Job	<u>Overhead @</u> 4% of Payroll	<u>Maintenance @ 3%</u> of Construction Cost
Distribution Center	1	2	500,000 sf	1,000 sf	\$29,700,000	\$34,000	\$680,000	\$891,000
Rail Distribution Center	1	0	180,000 sf	1,000 sf	\$10,700,000	\$34,000	\$245,000	\$321,000
Rail Distribution Center	1	0	120,000 sf	1,000 sf	\$8,000,000	\$34,000	\$163,000	\$240,000
Warehouse	0	2	70,000 sf	780 sf	\$7,602,000	\$34,000	\$122,000	\$228,000
Warehouse	3	1	60,000 sf	780 sf	\$5,300,000	\$34,000	\$105,000	\$159,000
Manufacturing	0	3	100,000 sf	500 sf	\$11,245,000	\$34,000	\$272,000	\$337,000
Modular Warehousing	21	8	10,000 sf	450 sf	\$770,000	\$34,000	\$30,000	\$23,000
Office	1	1	60,000 tons	250 sf	\$6,300,000	\$34,000	\$326,000	\$189,000
Container Terminal	1	1	30,000 tons	1,800 tons	\$30,000,000	\$34,000	\$23,000	\$900,000
Intermodal Rail	1	0	50,000 tons	2,500 tons	\$5,600,000	\$34,000	\$27,000	\$168,000
Dry Bulk Aggregate	1	1	500,000 tons	20,000 tons	\$23,000,000	\$34,000	\$34,000	\$690,000
Dry Bulk Grain	1	0	2,000,000 tons	20,000 tons	\$59,700,000	\$34,000	\$136,000	\$1,791,000
Liquid Bulk Terminal	1	1	1,000,000 tons	20,000 tons	\$22,000,000	\$34,000	\$68,000	\$660,000
Source: TranSystems								

APPENDIX C: DETAILED PROJECTIONS OF MULTIPLIER EFFECTS

JEFFERSON COUNTY						
MULTIPLIER EFFECTS						
				SCENARIO 1	SCENARIO 2	
CONSTRUCTION				Total	Total	
Construction						
	Output	1.597		\$362,700,000	\$321,180,000	
	Earnings	0.397		\$90,090,000	\$79,780,000	
	Jobs	11.690		2,655	2,350	
Households						
	Output	0.847		\$72,140,000	\$63,840,000	
	Earnings	0.184		\$15,670,000	\$13,870,000	
	Jobs	7.026		600	530	
Total						
	Output			\$434,840,000	\$385,020,000	
	Earnings			\$105,760,000	\$93,650,000	
	Jobs			3,255	2,880	
Indirect Tax Impacts						
	Indiv. Income Taxes			\$0	\$0	
	Corporate Income Taxes			\$0	\$0	
	Sales and Use Taxes			\$0	\$0	
	All Other Taxes			\$0	\$0	
TOTAL TAXES				\$0	\$0	
OPERATIONS				Average Annual	Average Annual	
Warehousing and Storage						
	Output	1.454		\$8,000,000	\$13,810,000	
	Earnings	0.430		\$2,370,000	\$4,090,000	
	Jobs	13.366		75	125	
Rail transportation						
	Output	1.391		\$3,890,000	\$0	
	Earnings	0.234		\$660,000	\$0	
	Jobs	4.767		15	0	
Light manufacturing						
	Output	1.440		\$4,900,000	\$8,210,000	
	Earnings	0.267		\$910,000	\$1,520,000	
	Jobs	7.104		25	40	
Office						
	Output	1.499		\$2,550,000	\$2,550,000	
	Earnings	0.308		\$520,000	\$520,000	
	Jobs	9.830		15	15	
Water transportation						
	Output	1.541		\$18,180,000	\$10,020,000	
	Earnings	0.235		\$2,770,000	\$1,530,000	
	Jobs	6.241		75	40	
Households						
	Output	0.847		\$56,140,000	\$68,160,000	
	Earnings	0.184		\$12,190,000	\$14,800,000	
	Jobs	7.026		465	565	
Total						
	Output			\$93,660,000	\$102,750,000	
	Earnings			\$19,420,000	\$22,460,000	
	Jobs			670	785	
Indirect Tax Impacts						
	Indiv. Income Taxes			\$0	\$0	
	Corporate Income Taxes			\$0	\$0	
	Sales and Use Taxes			\$0	\$0	
	All Other Taxes			\$0	\$0	
TOTAL TAXES				\$0	\$0	

ST. LOUIS REGION					
<i>MULTIPLIER EFFECTS</i>					
			SCENARIO 1	SCENARIO 2	
CONSTRUCTION			Total	Total	
Construction					
Output	2.200		\$499,600,000	\$442,400,000	
Earnings	0.681		\$154,750,000	\$137,030,000	
Jobs	17.360		3,945	3,490	
Households					
Output	1.423		\$121,270,000	\$107,320,000	
Earnings	0.388		\$33,020,000	\$29,230,000	
Jobs	11.583		985	875	
Total					
	Output		\$620,870,000	\$549,720,000	
	Earnings		\$187,770,000	\$166,260,000	
	Jobs		4,930	4,365	
Indirect Tax Impacts					
Earnings Taxes			\$0	\$0	
Corporate Income Taxes			\$0	\$0	
Sales and Use Taxes			\$0	\$0	
All Other Taxes			\$0	\$0	
TOTAL TAXES			\$0	\$0	
OPERATIONS			Average Annual	Average Annual	
Warehousing and Storage					
Output	2.016		\$11,090,000	\$19,150,000	
Earnings	0.750		\$4,130,000	\$7,130,000	
Jobs	20.974		115	200	
Rail transportation					
Output	1.910		\$5,350,000	\$0	
Earnings	0.455		\$1,270,000	\$0	
Jobs	9.211		25	0	
Light manufacturing					
Output	2.053		\$6,980,000	\$11,700,000	
Earnings	0.528		\$1,800,000	\$3,010,000	
Jobs	12.400		40	70	
Office					
Output	2.144		\$3,650,000	\$3,650,000	
Earnings	0.669		\$1,140,000	\$1,140,000	
Jobs	17.677		30	30	
Water transportation					
Output	2.236		\$26,390,000	\$14,530,000	
Earnings	0.491		\$5,800,000	\$3,190,000	
Jobs	11.405		135	75	
Households					
Output	1.423		\$94,360,000	\$114,580,000	
Earnings	0.388		\$25,700,000	\$31,200,000	
Jobs	11.583		770	930	
Total					
	Output		\$147,820,000	\$163,610,000	
	Earnings		\$39,840,000	\$45,670,000	
	Jobs		1,115	1,305	
Indirect Tax Impacts					
Earnings Taxes			\$0	\$0	
Corporate Income Taxes			\$0	\$0	
Sales and Use Taxes			\$0	\$0	
All Other Taxes			\$0	\$0	
TOTAL TAXES			\$0	\$0	

STATE OF MISSOURI					
MULTIPLIER EFFECTS					
			SCENARIO 1	SCENARIO 2	
CONSTRUCTION			Total	Total	
Construction					
	Output	2.308	\$524,120,000	\$464,120,000	
	Earnings	0.677	\$153,700,000	\$136,100,000	
	Jobs	19.578	4,445	3,935	
Households					
	Output	1.506	\$128,280,000	\$113,520,000	
	Earnings	0.381	\$32,460,000	\$28,730,000	
	Jobs	12.930	1,100	975	
Total					
	Output		\$652,400,000	\$577,640,000	
	Earnings		\$186,160,000	\$164,830,000	
	Jobs		5,545	4,910	
Indirect Tax Impacts					
	Earnings Taxes		\$5,260,000	\$4,660,000	
	Corporate Income Taxes		\$527,000	\$467,000	
	Sales and Use Taxes		\$4,800,000	\$4,250,000	
	All Other Taxes		\$1,280,000	\$1,130,000	
TOTAL TAXES			\$11,867,000	\$10,507,000	
OPERATIONS			Average Annual	Average Annual	
Warehousing and Storage					
	Output	1.967	\$10,820,000	\$18,680,000	
	Earnings	0.678	\$3,730,000	\$6,440,000	
	Jobs	20.840	115	200	
Rail transportation					
	Output	1.806	\$5,060,000	\$0	
	Earnings	0.387	\$1,080,000	\$0	
	Jobs	8.545	25	0	
Light manufacturing					
	Output	2.145	\$7,290,000	\$12,230,000	
	Earnings	0.525	\$1,790,000	\$2,990,000	
	Jobs	14.232	50	80	
Office					
	Output	2.077	\$3,530,000	\$3,530,000	
	Earnings	0.586	\$1,000,000	\$1,000,000	
	Jobs	17.334	30	30	
Water transportation					
	Output	2.083	\$24,580,000	\$13,540,000	
	Earnings	0.393	\$4,640,000	\$2,550,000	
	Jobs	10.198	120	65	
Households					
	Output	1.506	\$99,820,000	\$121,200,000	
	Earnings	0.381	\$25,260,000	\$30,670,000	
	Jobs	12.930	855	1,040	
Total					
	Output		\$151,100,000	\$169,180,000	
	Earnings		\$37,500,000	\$43,650,000	
	Jobs		1,195	1,415	
Indirect Tax Impacts					
	Earnings Taxes		\$1,060,000	\$1,230,000	
	Corporate Income Taxes		\$106,000	\$123,000	
	Sales and Use Taxes		\$970,000	\$1,120,000	
	All Other Taxes		\$260,000	\$300,000	
TOTAL TAXES			\$2,396,000	\$2,773,000	