

STRATEGIC MASTER PLAN PORT OF MEMPHIS



EXECUTIVE SUMMARY



Economic Impact & Growth Potential

The International Port of Memphis is the second largest inland port on the shallow draft portion of the Mississippi River, and the 5th largest inland Port in the United States. The International Port of Memphis covers the Tennessee and Arkansas sides of the Mississippi River from river Mile 725 to mile 740. Within this 15 mile reach, there are 68 water fronted facilities, 37 of which are terminal facilities moving products such as: petroleum, tar, asphalt, cement, steel, coal, salt, fertilizers, rock & gravel, and of course grains.

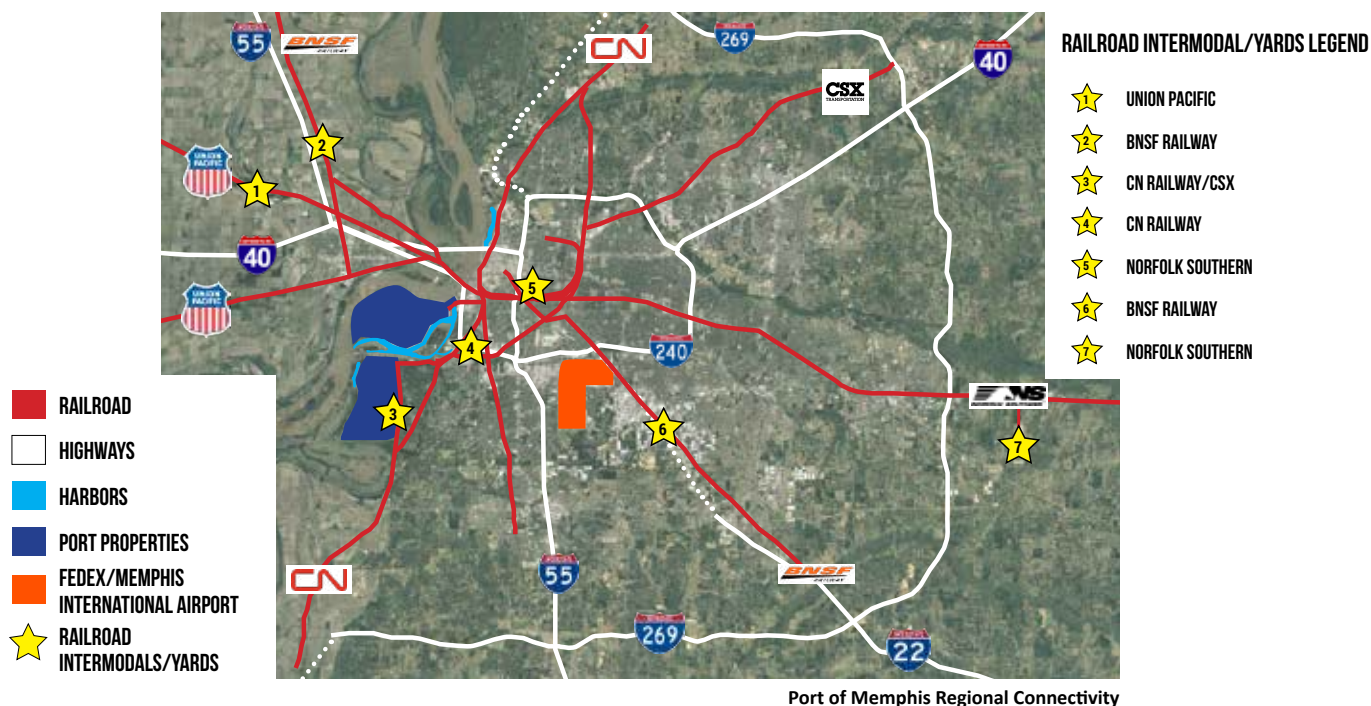
With an annual economic impact of approximately \$9.3 Billion, the Port of Memphis contributes significantly to the local, regional and statewide economies.

The 1947 actions to target and support industrial development on President’s Island and the 1967 actions to target and support industrial development at the adjacent Pidgeon Industrial Park were visionary and today support more than 9,000 direct jobs and an additional 13,000 indirect jobs in the greater Memphis region.

Port-related jobs have the highest multiplier effect in the region—for every port-related direct job created, an average of 1.5 indirect jobs are also created or supported. Specifically, for every Water Transportation job created, 3.7 indirect jobs are also created in Shelby County.

The Port of Memphis encompasses approximately 127 operating entities, including major employers as diverse as Mitsubishi Electric Power Products, Inc., Nucor Steel, Valero, Cargill, TVA, CN Railway, CSX, Electrolux, and Seacor AMH.

The Port of Memphis is in a highly advantageous central U.S. location on the inland waterway. systems Infrastructure connectivity is more robust than many other metros, but the surrounding regional economy is weaker than other growth markets such as Atlanta and Dallas.



The Port of Memphis offers a full suite of maritime and riverine support services, a slack water harbor, numerous private marine terminals, and a skilled maritime workforce to support not only commodity movements on the Mississippi River but also water-dependent and water-advantaged industries in the steel, electronics, and petrochemical sectors.

- The Port of Memphis lies at a unique juncture of major north-south and east-west interstate highways, allowing the Port properties to not only serve local and regional markets, but also to adapt to the rapidly changing industrial, logistical, and commercial supply chains.
- The Port of Memphis is part of a metropolitan area that lies at one of the few junctures of five Class 1 railroads, allowing the movement of goods by rail to both north-south and east west markets—including the industrial and agricultural centers of the US and Canada. The Memphis region is ringed by major intermodal facilities, including the substantial intermodal yard in Pidgeon Industrial Park operated jointly by Canadian National Railway and CSX.
- The Port of Memphis has easy access to the busiest cargo airport in the U.S., Memphis International Airport. As shown in places like Mobile, Charlotte and Richmond, the combined access to roads, rail, runways and rivers can be attractive to freight originators, freight destinations and freight operators.
- The Port of Memphis is well-served by a variety of pipelines, including natural gas and the recently-completed Diamond Pipeline that allows the processing of domestic sweet crude oil at the local Valero refinery. Current and future pipeline access could support the expansion of existing high-wage industries as well as the attraction of new high wage industries.

The Port of Memphis can benefit from several regional, national and global trends.

Domestic investment opportunities in logistical, industrial, and energy facilities have attracted significant global capital, and streamlined state and federal regulatory regimes have supported these investments.

The combined effects of the expanded Panama Canal, revisions to the North American Free Trade Agreement, the evolution of e-commerce supply and distribution networks, and the imposition of new tariff programs have created barriers to some domestic industries, but also have created new opportunities for flexible and adaptive entities such as the Port of Memphis.

In this positive environment, the Port of Memphis may be in a position to improve, acquire or gain control of major development sites at Pidgeon Industrial Park, TVA Allen Steam Plant site, the Memphis Light Gas & Water (MLGW) Peninsula, and President's Island.



Downtown Memphis and Wolf River Harbor

Working together, the Port of Memphis, EDGE, the City of Memphis, Shelby County, the Chamber of Commerce, and the State of Tennessee can undertake several actions to protect and expand current employers, attract new industries and employers, and create a long term path of growth every bit as consequential as the 1947 and 1967 decisions creating the President's island and Pidgeon Industrial Park.

Impediments to Growth

While there are always impediments, the Port is uniquely positioned to leverage its assets to achieve sustained economic development and growth. This study has identified several target industries that make sense to locate to the Memphis region and more specifically, develop on Port controlled property. These options range from shorter term opportunities in the steel finishing and agricultural processing industries to longer term targets of chemical and automotive facilities. Also looming on the horizon is the promising concept of container on vessel transport on the Mississippi River and how the Port of Memphis can support, and benefit, from that industry.

While the overall conditions and long-term trends are favorable to growth at the Port of Memphis, a number of short, medium and long-term impediments to growth exist. In addition, the Port cannot compete in every industrial, logistical, or commercial sector; competitive choices must be made, and priorities established.

President’s Island

The most immediate set of impediments to growth at the Port are at President’s Island. That industrial park is essentially at capacity and has been for a number of years. When parcel vacancies occur they typically are too small for many contemporary users. While expansion of President’s Island may be feasible, the raw timeline and cost for planning, designing, permitting and filling the expansion areas, along with extending the necessary roads, utilities and ancillary services to the reclaimed areas, is likely beyond a reasonable schedule or budget for a public enterprise. Reclaiming the property to an elevation above flood levels, and providing road and rail services to the 875 acres identified in the long-term master plan buildout, would require an investment in excess of \$50 million and may take over a year to get permits and approvals after completion of design. One cost savings approach would be to take advantage of planned river and harbor dredging to fill those areas over time.

Beyond schedule and cost, a major reclamation project on President’s Island is fraught with significant regulatory risk. Changing floodplain and river flow standards could increase the cost or even preclude the reclamation of significant acreage on President’s Island.

In addition, President’s Island is now 70 years old. The roads, rail, stormwater, and marine terminal assets are all in declining to poor condition. The 53-acre Public Marine Terminal, managed by the Memphis and Shelby County Port Commission, is in extremely poor shape and immediate action is needed to forestall weight limitations or outright closure.

An infrastructure assessment was performed at President’s Island and Pidgeon Industrial Park, with short term, priority maintenance projects identified below:

Recommendation	Estimated Conceptual Cost (for planning purposes only)
Repave President’s Island Terminal Sites	\$1,750,000
Rebuild Public Terminal	\$4,000,000
Replace Railing at Crane Loading Facility	\$100,000
Repair Stormwater Outfalls to McKellar Lake	\$750,000
Riverport / Paul R. Lowry Road Resurfacing	\$5,700,000
Harbor and Channel Avenue Resurfacing	\$10,200,000
Add Paved Shoulder on Harbor Avenue	\$1,300,000
President’s Island Cross Street Paving	\$3,500,000
Riverport Road Bridge Transitions	\$150,000
Rail Upgrade – President’s Island (3.7 miles)	\$5,550,000

Pidgeon Industrial Park

The 4,500-acre Pidgeon Industrial Park has reasonable road, rail and utility service, and nearly 2,300 acres available for development on land controlled by the Port, Electrolux and Nucor. In addition, the adjacent Canadian National/CSX rail intermodal facility is a significant and underutilized asset.

Rail intermodal facilities have been significant catalysts for development in numerous locations around the country, including in California, Texas, Georgia, South Carolina and Virginia. The Burlington Northern rail intermodal facility in the Memphis region is surrounded by significant industrial and logistical users.



CN/CX Intermodal Site - Adjacent Development



BNSF Intermodal Site - Adjacent Development

While poor ground conditions constrain development at all current and potential Port sites (President's Island, Pidgeon Industrial Park, TVA Allen, and MLGW Peninsula), the Port-controlled and Port-owned sites in Pidgeon Industrial Park have the shortest timeline and lowest total cost for creating development sites attractive to current industrial and logistical users.

Poor soils have historically been a major deterrent in getting through the due diligence phase of attracting economic development projects. With virtually all other significant infrastructure requirements readily available in the Park, the need for a different approach to ground improvements, both technically and politically, is paramount. Failure to address the Pidgeon Industrial Park soil conditions will lead to continued underutilization of the Pidgeon land assets and a failure to fully capitalize on the Canadian National/CSX intermodal yard.

TVA Allen and MLGW Sites

The TVA Allen and the MLGW peninsula sites both have exceptional long term value to the Port of Memphis and offer both diversification new economic development opportunities. The timeline and/or cost of developing each or both sites is an impediment to short-term or even mid-term development of the sites.

With ownership transition and remediation of the TVA Allen site(s) underway, and road, rail, utility and flood protection assets generally in place, including the potential re-use of the TVA Allen marine terminal, development of these sites is a short term priority.

The processes for ownership transition of the MLGW peninsula are potentially reasonable. However, the cost of extending road, rail, and utilities to the MLGW site, and potentially developing a marine terminal onsite, is substantial.



TVA Steam Plant and MLGW Peninsula

Short Term Opportunities for Growth: Recommendations in the 1 - 5 Year Timeline

Over the next five years, the Port of Memphis should pursue actions to achieve a state of good repair for existing infrastructure assets in order to retain and expand current employers and industries; acquire or gain control of additional sites for future, long-term economic development; and implement selective ground improvements at Pidgeon Industrial Park in order to compete for industrial, logistical and commercial users in the short term.

While the general condition of President's Island infrastructure is poor, the public marine terminal is effectively at the end of its useful life and needs either a major rehabilitation or a relocation to the former TVA Allen marine terminal. Recent inspections revealed safety issues that must be addressed in the near term. The conceptual rehabilitation cost estimate is approximately \$4 million; the cost or schedule of relocating the public marine terminal to the TVA Allen site is unknown at this time.

While these rehabilitation efforts are underway, the Port of Memphis can secure the rights to valuable long-term expansion sites at the TVA Allen facility and the MLGW peninsula.

Over a five year time horizon, Pidgeon Industrial Park is the most likely development site for major new economic development. However, this will require proactive measures to address the poor soils in the Pidgeon Industrial Park:

- Immediately seek Tennessee Economic and Community Development (TECD) and/or Tennessee Valley Authority (TVA) Site Development Grant to determine the best location(s) and strategies for publicly-owned soil improvements
- Develop an internal strategy and approach to amend and compact soils at specific locations over 18 to 24 months in order to support up to 1 million square feet of logistic or light industrial uses that can benefit from the adjacent Canadian National/CSX intermodal facility (conceptual cost estimate of \$5 to \$10 million, depending on technology and allowable schedule)

With an estimated \$44 million in local tax revenues attributable to the Port of Memphis employers, the Port, EDGE and the City should also seek a long term, dedicated source of funding for capital improvements on President’s Island—either by earmarking a portion of local revenues attributable to President’s Island employers or a utility fee type of approach. Failure to address road, rail, stormwater and utility deficiencies could result in a loss of valuable tenants. As part of this initiative, the Port should seek to acquire or control individual parcels on President’s Island in order to consolidate parcels and create larger development sites that are better able to accommodate contemporary facility and operational needs.

Finally, efforts should continue to complete negotiations with both the Canadian National rail lines and the marine terminal facility operators on Presidents Island.

Medium Term Opportunities for Growth: Recommendations in the 5-10 Year Timeframe

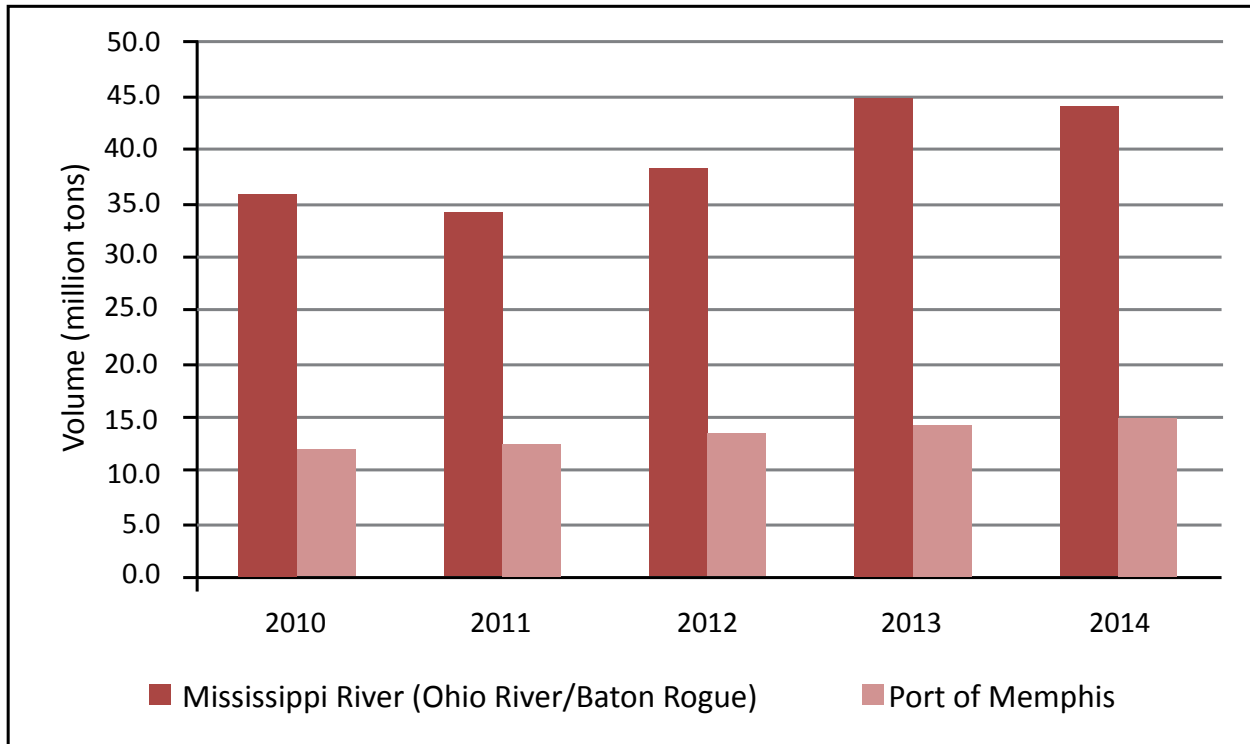
Based on current trends, the Port of Memphis has numerous opportunities for investments and growth. A careful review of those trends—both positive and negative—led to designating five target industries for the most likely short- to medium term location for major new facilities in the Pidgeon Industrial Park:

- Steel Finishing & Production
- Agricultural Processing & Food Production
- Intermodal Logistics & Distribution
- Waste Paper & Plastics Recycling & Aggregation
- Empty Container & Trailer Pools

Attracting all five targeted industries to Pidgeon Industrial Park over the next ten years will require significant public and private investments. But this “success scenario” could yield more than 1,900 new, direct jobs and an additional 2,200 new, indirect jobs that would produce an annual economic impact of \$655 million and nearly \$8 million in annual local tax revenues.

Medium Term Constraints

While inland waterway access is absolutely essential to major Port employers and the entire region, the long-term cargo trends on the Mississippi River show flat to declining cargo volumes and values. Inland waterway access can complement economic growth opportunities at the Port of Memphis, but it is unlikely to lead economic growth at the Port. Put another way, there is not a large amount of discretionary cargo that the Port of Memphis could feasibly capture from other river ports or other north-south rail or highway corridors.



Not reflected in these trends are the recent Chinese soybean and corn tariffs. These tariffs could be extremely consequential not only to soy and corn producers, but also to the waterborne commerce of the U.S. inland waterway system.

A second set of constraints are the timelines needed to develop sites within the Port-controlled properties. Cost considerations aside, planning, permitting, and executing a major floodplain expansion of President's Island is a lengthy process, with a high degree of regulatory risk. While Pidgeon Industrial Park requires significant soil improvements, the schedule and risk of those actions can be managed by the City and the Port of Memphis. As noted above, a ground improvement investment of \$5-10 million could support approximately 1 million square feet of industrial or logistical facilities in the Pidgeon Industrial Park.

An evaluation of market and site constraints points to Pidgeon Industrial Park as the strongest candidate for medium term growth—likely taking advantage of the synergistic and adjacent Canadian National/CSX intermodal facility.

Medium Term Trends

Despite the inland waterway limitations and the previously discussed site availability constraints, a number of global, national and regional trends illustrate significant opportunities for public and private investments and growth.

At the global level, the expansion of the Panama Canal has allowed east and Gulf coast container ports to grow faster than west coast container ports. The Panama Canal expansion also has enabled significant export volumes of liquified natural gas (LNG) and LNG-derived resins and plastics. U.S. produced resins and plastics often require empty containers for back haul trips to Asian destinations, and Memphis has historically been a major depository of empty shipping containers.

The renegotiated NAFTA agreement (USMCA) calls for higher domestic automobile content and higher wages for Mexican auto workers. In addition to the NAFTA renegotiation, ongoing tariffs on steel, aluminum and numerous Chinese products may strengthen existing Memphis steel industries and may create opportunities for additional automobile component production and distribution. A Memphis location could compete in both midwestern and southeastern steel and U.S. automobile component markets.

At the national level, the combined effect of railroad re-engineering and consumer supply chain evolution create new opportunities for logistic and light industrial/assembly facilities. Over the last two years, Class 1 railroads have begun moving towards “precision railroading” with longer, denser train sets, fewer stops, and more predictable schedules. Fewer and higher volume rail intermodal facilities are a likely outcome of this process, with significant synergies and economic benefits accruing to communities and markets served by the remaining intermodal facilities. The Greater Memphis Region is ringed by rail intermodal facilities and the Pidgeon Industrial Park is immediately adjacent to the Canadian National/CSX rail intermodal facility.

While the rail network are consolidating and densifying services, the consumer supply chain is expanding and moving away from the traditional hub-and-spoke model and towards a vast network of consolidation, distribution and fulfillment centers to meet the needs of e-commerce and reduced inventories for traditional retailers—the “Amazon Effect.”

The combined effect of these rail and consumer supply chain consolidations is public and private investment in facilities with excellent air, rail, trucking, and seaport services and access.

Targeted Industries

Based on the above constraints and trends, five industries are targeted for growth in the medium term. These contain both base and support industries. Base industries are those that export nearly all of their production outside of the local economy, creating new incomes and spending power locally. In contrast, support industries primarily offer goods and services to local base industries. Detailed summaries for each target industry are contained within the body of this report.

Steel finishing and production is an existing industry in the Memphis region with an identifiable workforce and a major employer within the Port of Memphis (Nucor). Expansion of Nucor may require a reconfiguration of the Nucor harbor chute, improved road and rail service, and ground (soil) improvements. Attraction of additional steel industries to Pidgeon Industrial Park may require improved road and rail service as well as ground (soil) improvements. The Ports of Indiana have shown long-term success in building a range of steel and specialty steel industries in and around their three port facilities.



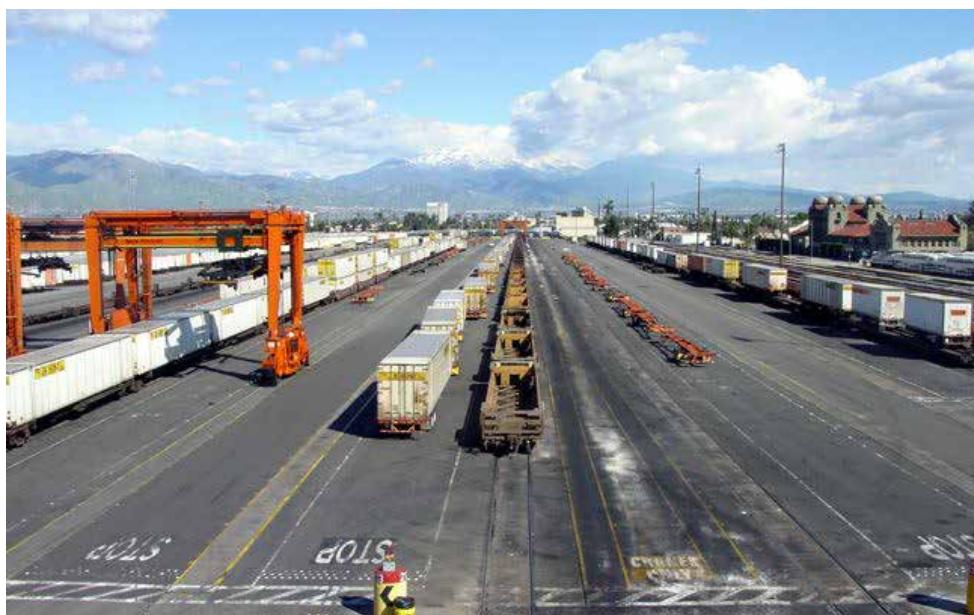
Agricultural Processing and Food Production is an existing industry in the Memphis region with an identifiable workforce and a major employer within the Port of Memphis (Cargill). Previous initiatives



to support primarily bulk transports and exports in the corn and soy markets do not appear viable in the current tariff and global market environments. The 5 - 10 year forecast in the bulk market does not appear strong due to the number of underutilized storage and processing facilities north and south of Memphis, including West Memphis and St. Louis and the back haul rail opportunities to west coast ports. However,

attracting higher value agricultural processing and actual food production facilities and employers to Pidgeon Industrial Park is consistent with TECD goals and market analysis. Attraction of agricultural processing and food production facilities to Pidgeon Industrial Park may require improved road and rail services, and almost certainly will require ground (soil) improvements. The Ports of Philadelphia and Delaware have shown long term success in supporting a range of higher-end food production, cold storage, and related distribution facilities.

Intermodal Logistics and Distribution is an existing industry in the Memphis region with an identifiable workforce and a potentially major employer within the Port of Memphis (CN/CSX). The synergies and opportunities for rail and truck intermodal growth at Pidgeon Industrial Park, including access to Memphis International Airport, are evident within the greater Memphis region, and in numerous regions across the U.S. The greater opportunity lies in containerized freight. Memphis is one area of the country which has a surplus of empty containers and enjoys a competitive advantage when that surplus is combined with the CN/CSX facility. Certain specialized agricultural commodities are both higher value and amenable to containerization, e.g. non-GMO soy, organic corn and wheat, ginger, etc. These are much more specialized markets and would require a more detailed knowledge of Tennessee supply and global demand. In addition, recent changes to NAFTA (USMCA) and tariff regimes may incent the development of facilities for the consolidation, assembly, or distribution of auto parts or components. However, attracting intermodal logistics and distribution facilities to Pidgeon Industrial Park will almost certainly require ground (soil) improvements and may also require a second road access point to the industrial park and/or the construction of a highway bridge over the CN/CSX rail line for enhanced,



uninterrupted access to the property east of the existing intermodal yard. The current Trade Point Atlantic development in Baltimore is but one of many examples where value is created by bringing together multiple modes of transportation to serve national and global markets and supply chains.



Waste Paper and Plastics Recycling and Aggregation is a rapidly changing global industry due to Chinese regulatory actions to reduce the volume and nature of waste paper and waste plastics transported to China. In terms of raw volume, waste paper and waste plastics represent the largest containerized exports from the U.S. The export of containerized waste paper and waste plastics is an important backhaul segment in the global supply chain—

returning otherwise empty containers to Asian producers at a lower cost than returning empty containers. In addition, domestic recyclers of paper and plastic, both public and private, may see either increased recycling costs or increased use of domestic landfills, both public and private. These trends could support at least two growth opportunities for the Pidgeon Industrial Park and its excellent road, river and rail connections:

- Location of a recovered paper facility to break down and re-use old corrugated containers, old newspaper pulp, or recycled containerboard or recycled boxboard. Several domestic papermills have reopened and revised their production capacity in the last year to capture or incorporate recyclable components.
- Location of a selective paper or plastic aggregator to transport containerized and sorted plastics either to Mobile or Prince Rupert, BC for export to willing and permissible Asian markets.

Empty Container or Trailer Pools are existing industries within the Memphis region with at least one identifiable employer in the Port of Memphis (Seacor). While neither industry is likely to become a major employer within the Port, both are necessary to support the growth of existing, targeted and base industries. For example, empty containers are highly valued by plastic and resin producers in Louisiana and Texas. Reliable access to empty containers could help to attract base industries such as plastic or resin facilities to the Port of Memphis, or at least to develop supporting services to those industries. Similarly, “grey” trailer pools are becoming increasingly common throughout the U.S. and the presence of one or more could help to attract other logistic, distribution and light industrial facilities to Pidgeon Industrial Park.



Targeted Land Acquisitions

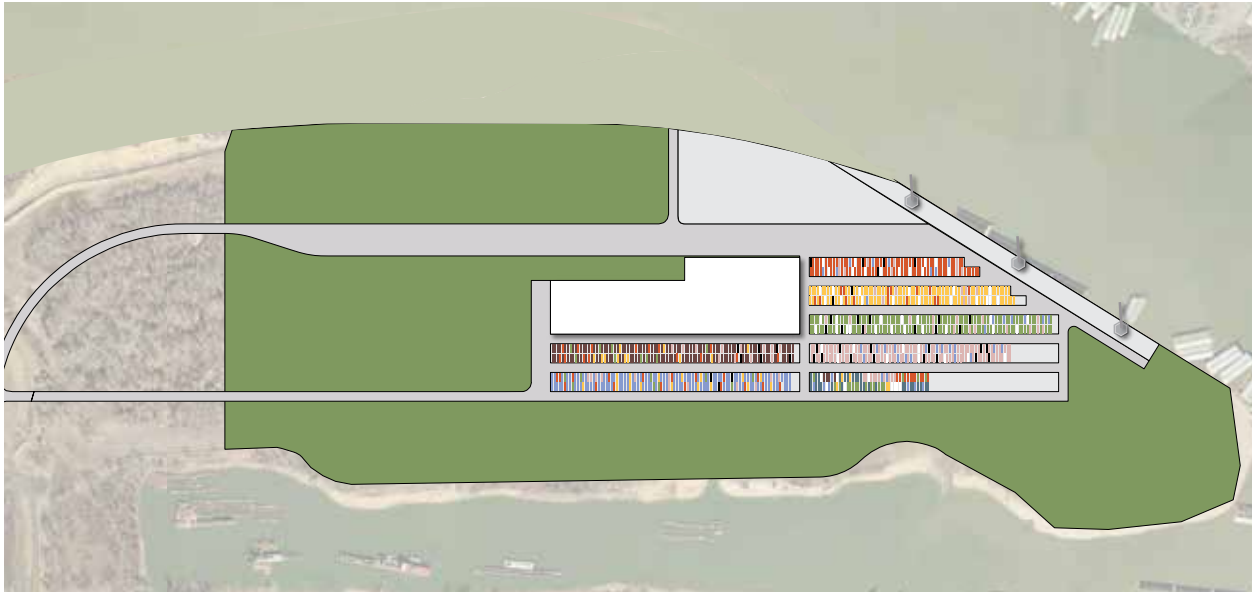
While acquisition of all potential properties for future development is a short term priority, two of these properties, once acquired, lend themselves to more medium term economic development opportunities to ensure another 20-30 years of uninterrupted growth.

The old TVA Allen site has been decommissioned and is in the demolition design process. That process can be grouped into two phases. The first is the main steam plant, which would typically require 4-5 years to demolish. The second is the remediation and removal of the coal ash pond/storage areas on both sides of the main plant, which could require 5-8 years. Once the properties that are currently under TVA ownership have been transferred, movement toward re-use can commence. This site is properly positioned, has significant infrastructure assets, and is of adequate size to support a heavy industrial or terminal operations user in the future.



TVA Steam Plant

Additionally, a peninsula exists across the TVA harbor to the north that is currently owned by the City of Memphis on behalf of Memphis Light Gas & Water and contains approximately 350 acres as configured in the master plan. It is expected that this ownership transition would be relatively uncomplicated. However, significant investment would be required to raise the site above flood elevation and to extend road, rail, and utility service to the site. Again, given those cost and permitting constraints, this is likely a mid-term development opportunity, with the property well suited for terminal operations (high volume container or bulk marine) or waterfront industry user.



MLGW Peninsula Development Concept

Long Term Vision for Growth: Recommendations in the 10 - 20 Year Timeframe

The long term vision for the Port of Memphis is simple—commit to growing and diversifying the existing base industries at the Port with a long term commitment to protecting and enhancing those industrial sectors which are most likely to be employment and investment anchors for the region for at least another twenty years.

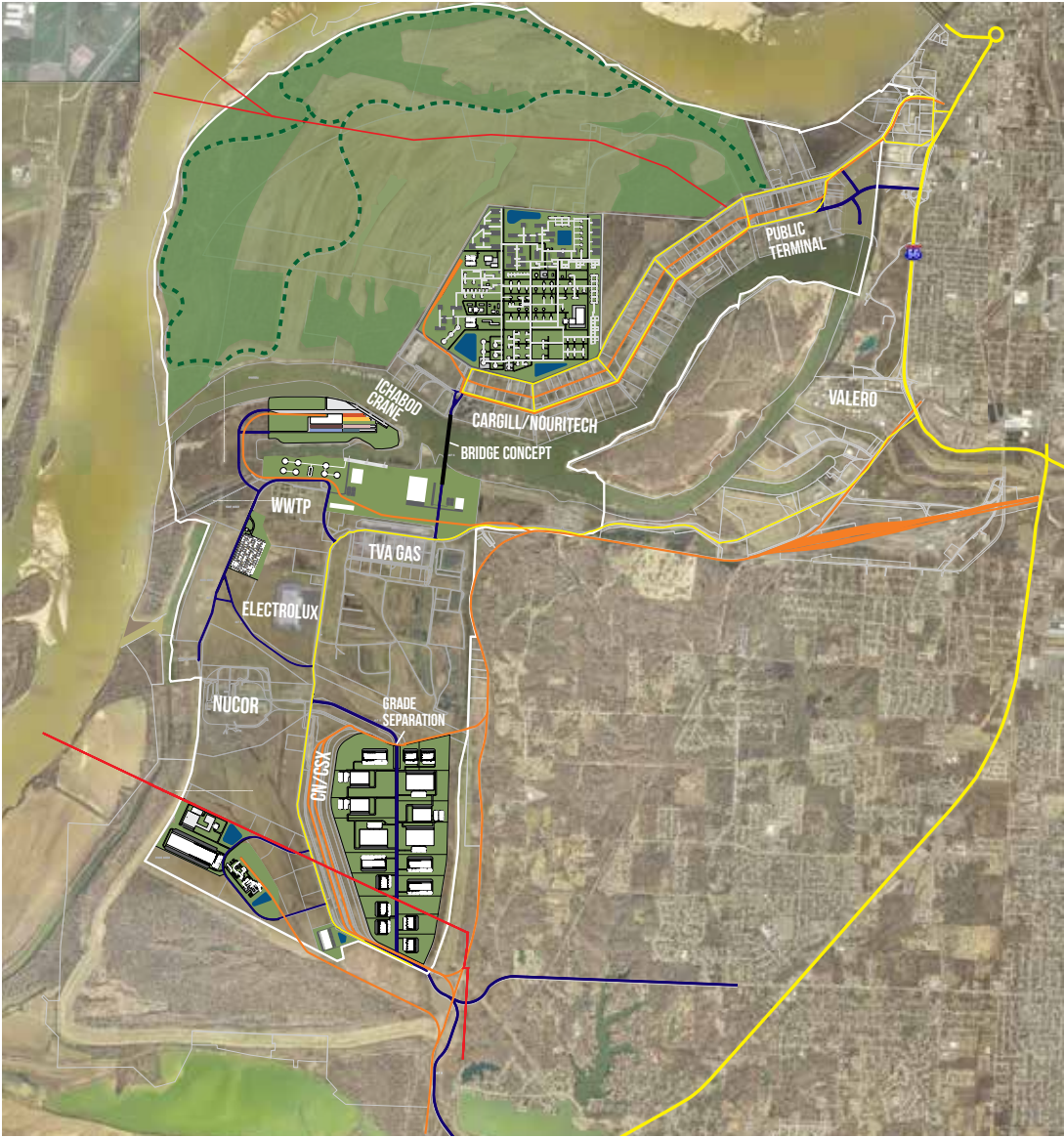
As short and midterm objectives are achieved, land availability at the Port properties becomes increasingly scarce. In an effort to alleviate that shortage, planning should commence for flood plain reclamation on President’s Island. Given permitting processes, land acquisition, Mississippi River hydraulics, and cost of execution, 875 acres of Pidgeon Industrial flood plain have been identified for future reclamation. The most cost-effective approach in accomplishing this task is through use of dredge spoils from the Mississippi River, and to a lesser extent, the harbor. To enhance cost savings, a systematic long-term approach using the spoils from regular river and harbor maintenance is possible. Once reclaimed, this land mass and accompanying infrastructure is well suited for the long-term target industries identified. The long-term vision doesn’t start in year ten; it starts on day one.

As recent developments have shown in the petroleum, LNG and containerized supply chains, the supply chains and networks are capable of significant and even radical adaptation, including the complete reversal of pipeline flows and import supply chains. Some areas of potential long term growth and public sector commitments within the Port of Memphis include:

- **Chemicals and petrochemicals** may be able to draw from recent and future pipeline investments in the region that would support major production facilities on President’s Island, McKellar Lake or in the Pidgeon, TVA/Allen or MLGW Peninsula sites. In addition, the robust rail, roadway, river, runway and pipeline networks could provide highly efficient means of delivering chemical and petrochemical products to the next-phase users in manufacturing, export, or consumer markets.

- **Petroleum distillates** could draw from or expand on the highly successful Valero refinery on McKellar Lake and its related workforce and suppliers. Petroleum distillates is a category that encompasses the full range of petroleum products, from coke to ultra-pure solvents. New energy-related products are being developed all the time, from both petroleum and LNG sources. This industry is naturally synergistic with the existing refinery. As with chemicals and petrochemicals, the robust rail, roadway, river, runway and pipeline networks could provide highly efficient means of delivering petroleum distillates to the next-phase users in manufacturing, export, or consumer markets.
- **Automotive parts** and components have historically been manufactured overseas and assembled in the U.S. The very recent re-negotiation of the NAFTA agreement (USMC) appears to include stronger domestic content requirements. This may provide an opportunity for the Memphis region to either produce automobile parts or components, or to utilize the region’s road, rail, runway, and river assets to serve as a hub supplier to both the Midwestern (Detroit) and the Southeastern automobile manufacturing centers.

These current and potential base industries yield among the best wage and longevity returns for any public investments in industrial and logistic industries. The right investments and disciplined execution could yield very successful employment and investment returns as conceptually illustrated below:



Long Range Port Property Buildout

There are numerous recommendations contained within this report that are focused on maintaining and growing the level of economic impact that currently exists as a result of operations on Port jurisdiction properties. In addition to the recommendation of industries to target as potential economic development partners, the study also provided recommendations geared toward sustaining existing economic activities and enhancing future development opportunities. In an effort to help the Port focus on the highest and best use of existing and potential resources, the top development and maintenance action item recommendations are presented.

Development Priorities

- 1. Public Terminal Redevelopment**
- 2. Create President's Island Short Line Railroad**
- 3. TVA Pidgeon Industrial Park Property Acquisition and Utilization**
- 4. MLG&W Pidgeon Industrial Park Peninsula Utilization**
- 5. Property Acquisition Program**
- 6. EDGE Property Access Roadway in Pidgeon Industrial Park**
- 7. Shelby Drive Access Road into Pidgeon Industrial Park**
- 8. President's Island Industrial Site Expansion**

Maintenance Priorities

- 1. President's Island Industrial Road Resurfacing**
- 2. President's Island Outflow Structure Repairs**
- 3. Riverport Road Industrial Road Resurfacing**
- 4. Riverport Road, Cypress Creek Bridge Transition**