Alabama State Port Authority Master Plan

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1 INTRODUCTION

Alabama State Port Authority (ASPA) has undergone a major change in its governance, core businesses and development strategy over the past 18 years. Formerly a coal and forest products port, with no clearly defined commercial, management or investment strategy, the then Alabama State Docks Department (ASDD) faced major fluctuations in its basic commodity movements at the same time as the growth of Asian economies were placing heavy demands for container facilities at key entry ports in the U.S.

The planning work undertaken in the early 2000s identified a strong opportunity for Mobile to take advantage of its excellent highway and main line rail connections to the mid-west and other destinations and ASPA embarked on the development of the Mobile Container Terminal (APMT) and logistics complex in 2001.

At the same time, the demand for coal imports and exports surged from a low of 9.7 million tons in 2002 to over 20 million tons in 2007, and then down to the current level of some 12 million tons, dispelling any expectations that the McDuffie location will be available for conversion to other marine activities in the near to mid-term future.

Mobile also became one of the two main forest products ports in the U.S., sharing the handling of paper and other commodities with the Port of Baltimore and a number of key tenants are now occupying the Middle Bay Port that was acquired in the 1990s.

2 ASPA IN 2018

As part of a strategic effort to encourage private investment in the Port, ASPA has formed several Public Private Partnership (PPP or P3) associations in addition to the original arrangement for the new container terminal with the APMT group. These include the grain elevator operated by AGREX, the Alabama Steel terminal (AST) and the freezing/cold storage facility within the main docks area and an agreement with APMT to manage the Intermodal yard as part of the integrated container and inland transfer venture in the Garrows Bend area.

More recently, the Port has obtained funding for the development of a Ro/Ro terminal at the former Bulk Handling Plant in the Main docks and has signed a Public Private Partnership (PPP or 3P) agreement with the Chilean/Argentinian joint venture of SAAM Puertos/Terminal Zarate, with construction programmed to commence in 2019.

The combination of private handling and commercial management of several of the key commodities at the Port provides an efficient balance for the overall operations and reduces the wide range of facility needs formerly accommodated within the Main Docks complex.

As a result, the ASPA now has the opportunity to focus on the efficient management and upgrade of its break bulk installations, the terminal railroad services (TASD), McDuffie Terminal and the properties at Middle Bay and Theodore. However, more importantly, as an agency of the State of Alabama, the Port can now extend its economic presence in the state to enhance the expansion of the PPPs and public facilities to connect with the internal industrial and economic development of the state. A main focus of this effort is directly aimed at the opportunities related to the expansion of the automobile manufacturing business in the region.

Finally, the international trend to larger and large vessels for containers and bulk products has continued steadily since the mid-1990s and those ports that cannot accommodate these ships are increasingly being placed at a market disadvantage.

It is now a key priority that the main access channel to the Port to be upgraded to permit the entry and transit of vessels that can now pass through the expanded locks of the Panama Canal and match the profile of container and other vessels deployed on the service routes that are looking to call at the Port of Mobile.

However, the Port is facing difficulties in the receipt and handling of material that is generated by its need to regularly dredge the navigation areas under its jurisdiction. Innovative or more economic solutions are urgently needed to enable this work to continue and incorporate this material within the expansion program for the APMT terminal and other installations.

3 STUDY OBJECTIVES

Moffatt & Nichol (M&N) has been retained by the Port Authority to produce a Strategic Plan Update which will assist the Port of Mobile in guiding future business and infrastructure development decisions. This effort serves as an update to the study and revised Master Plan conducted by M&N for ASPA in 2006/2007.

This update is split into two sets of analyses. The commercial segment establishes the outlook for trade volumes through the Port based on evaluation of the existing and potential commodity base/market conditions. The technical segment translates the market expectations and opportunities into facility requirements and also identifies the infrastructure and maintenance requirements (including equipment) which are needed to ensure that existing levels of operations/efficiency are maintained and/or improved. The output from the technical assessment is then used to assess the future capital needs at the Port.

The key elements of the scope of this Master Plan Update include

- Asset Inventory and Terminal Facility Maps
- Market Assessment and Cargo Forecasts to 2037, to include
    - Changes in commodity or trade patterns since 2006 Master Plan
    - Focus on containers, RoRo, forest products, steel
    - Regional economic/industrial development
    - Local and regional requirements for industries using waterborne transport
- Assets Assessment
    - Condition assessment of ASPA facilities (walk-thru inspection and interviews)
    - Capacity assessments (open and covered storage and berths)
- Functional requirements to meet projected demand
    - Navigation
    - Berths
    - Open and Covered storage
    - Hinterland transfer & security
- Identify constraints imposed by lease obligations or other limitations
- Identify local and regional infrastructure constraints/enhancement needs
- Upgrade and Development Recommendations for
    - Existing Assets
    - Capacity enhancements (both capital and operational) and system preservation improvements
    - Off-terminal development opportunities to increase cargo (i.e. Logistics Park and Inland Rail Facilities)
    - Potential for diversification of ASPA activities linked to forecasts (consolidation, warehousing, industry support, distribution, value added)
- Develop capital program schedule and budget
- Recommended Implementation Program

4 ASSET INVENTORY & TERMINAL FACILITY MAPS

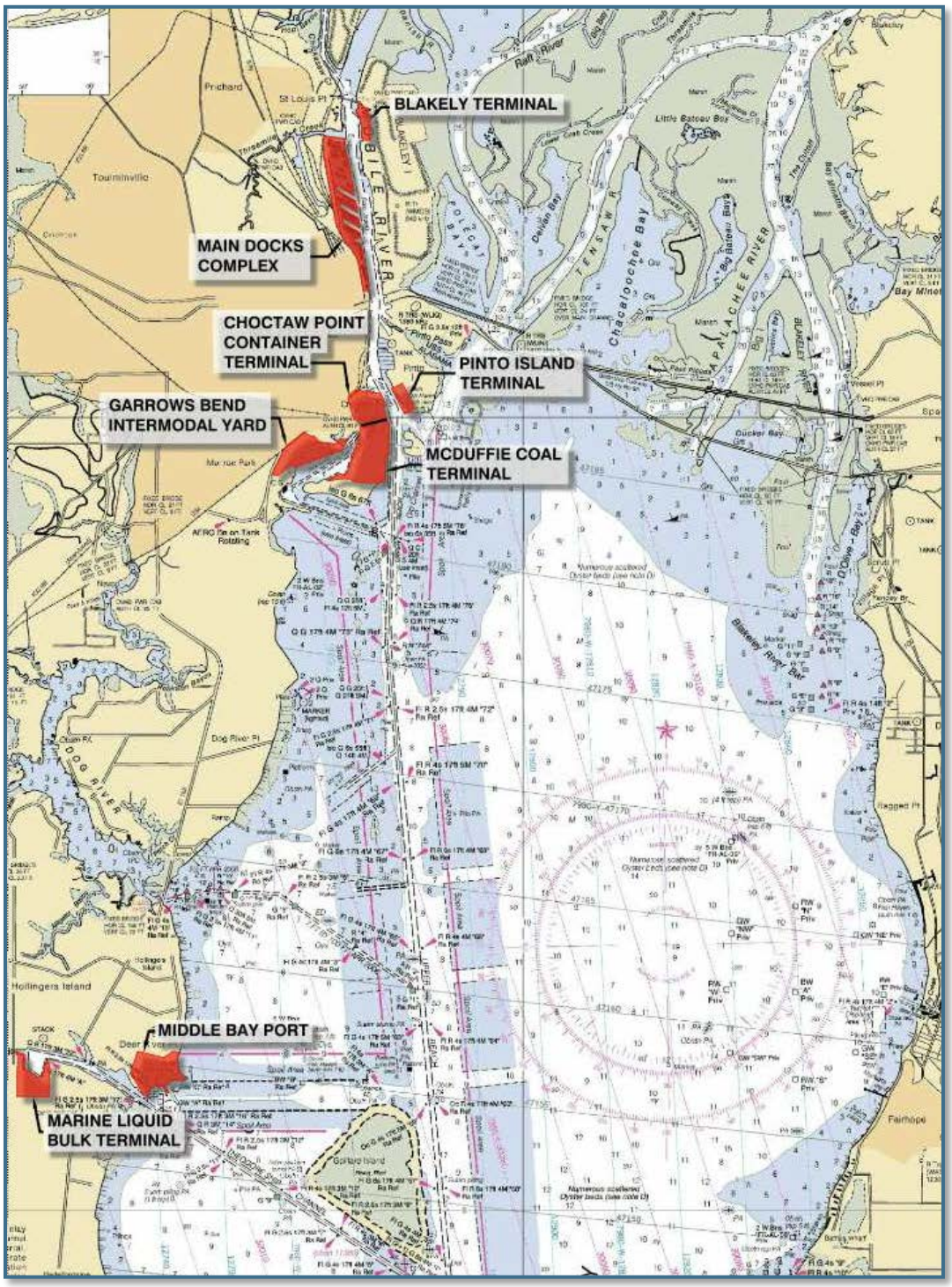
Terminals owned and operated by ASPA in the Mobile metropolitan area include the Main Docks Complex, Pinto Island Slab Terminal, McDuffie Coal Terminal, Blakely Island, Middle Bay Port, and the Marine Liquid Bulk Terminal. In addition to the above, ASPA has developed new privately-operated facilities at the APMT Container Terminal, Garrows Bend Intermodal Yard (ICTF) and the Alabama Steel Terminal (AST). It is also in the process of developing a new 57.4 acre Ro/Ro terminal for autos at the site of the former Bulk terminal. The locations of these terminals are depicted in Figure 4 1.

4.1 MAIN DOCKS COMPLEX

The Main Docks Complex extends approximately 2.2 miles along the west bank of the Mobile River and is bordered by the Terminal Railway tracks to the west and Three-Mile Creek to the north. This 570-acre terminal area includes 28 berths with an aggregate length of over 17,000 linear feet and approximately 1.9 million square feet of warehouse space within the main port area and excluding the 22-acre inactive Bulk Handling Plant at the north end.

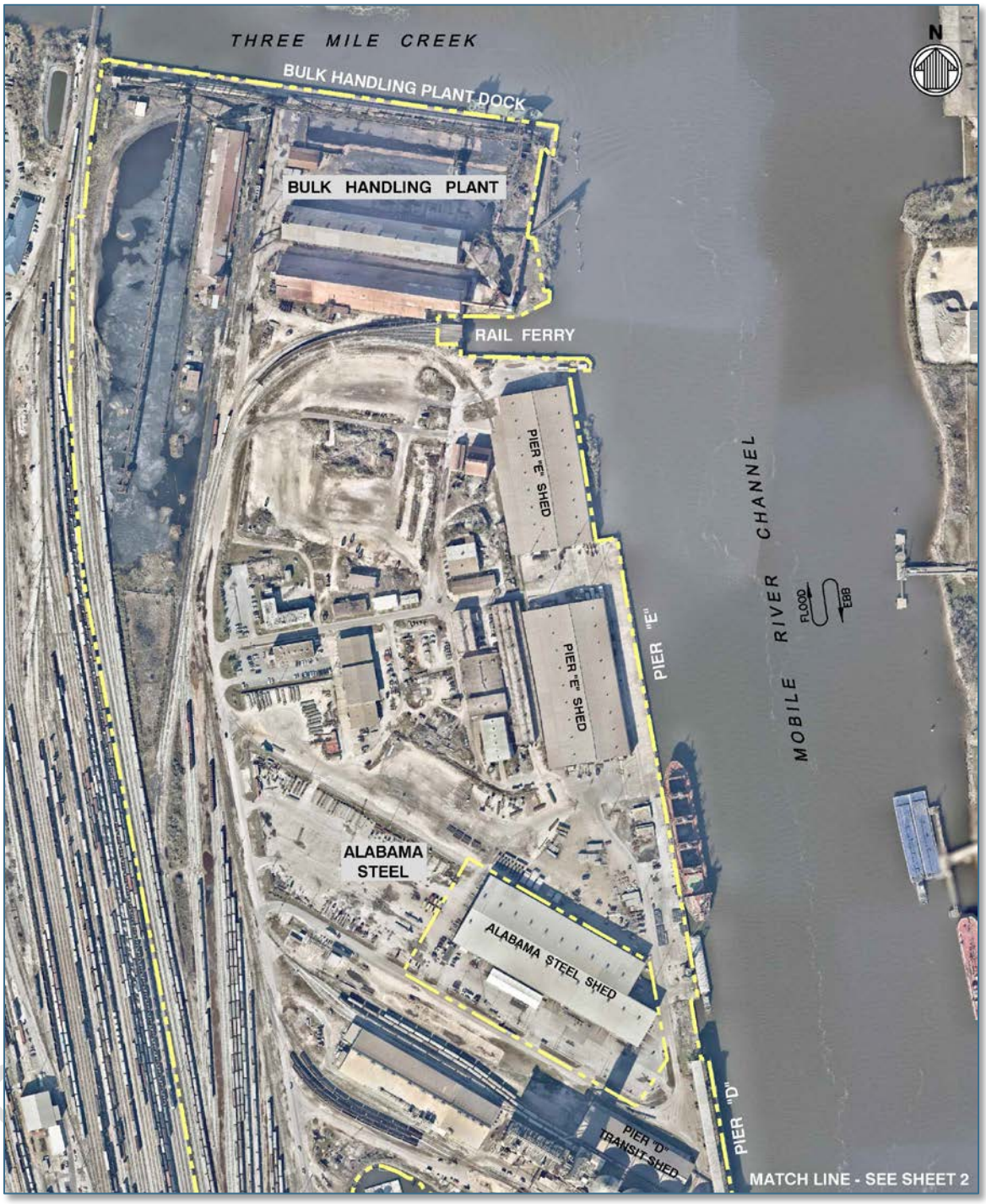
Waterside access is provided by the Federal Channel which is maintained at a 40' depth. This 40' channel draft is restricted by the Bankhead and George Wallace tunnels at the Government Street and I-10 crossings. The terminal is served by the Terminal Railway and has immediate access to I-10 and I-65. The Terminal Railway, which is owned by ASPA, interchanges with the CSX, CN. AGR (BNSF), KCS and NS railways. The primary commodities handled within the main port area are forest products, iron and steel products, aluminum, and Ro/Ro cargoes

Aerial photos of the Main Docks Complex with facility descriptions are presented in Figure 4 2 through Figure 4 5.



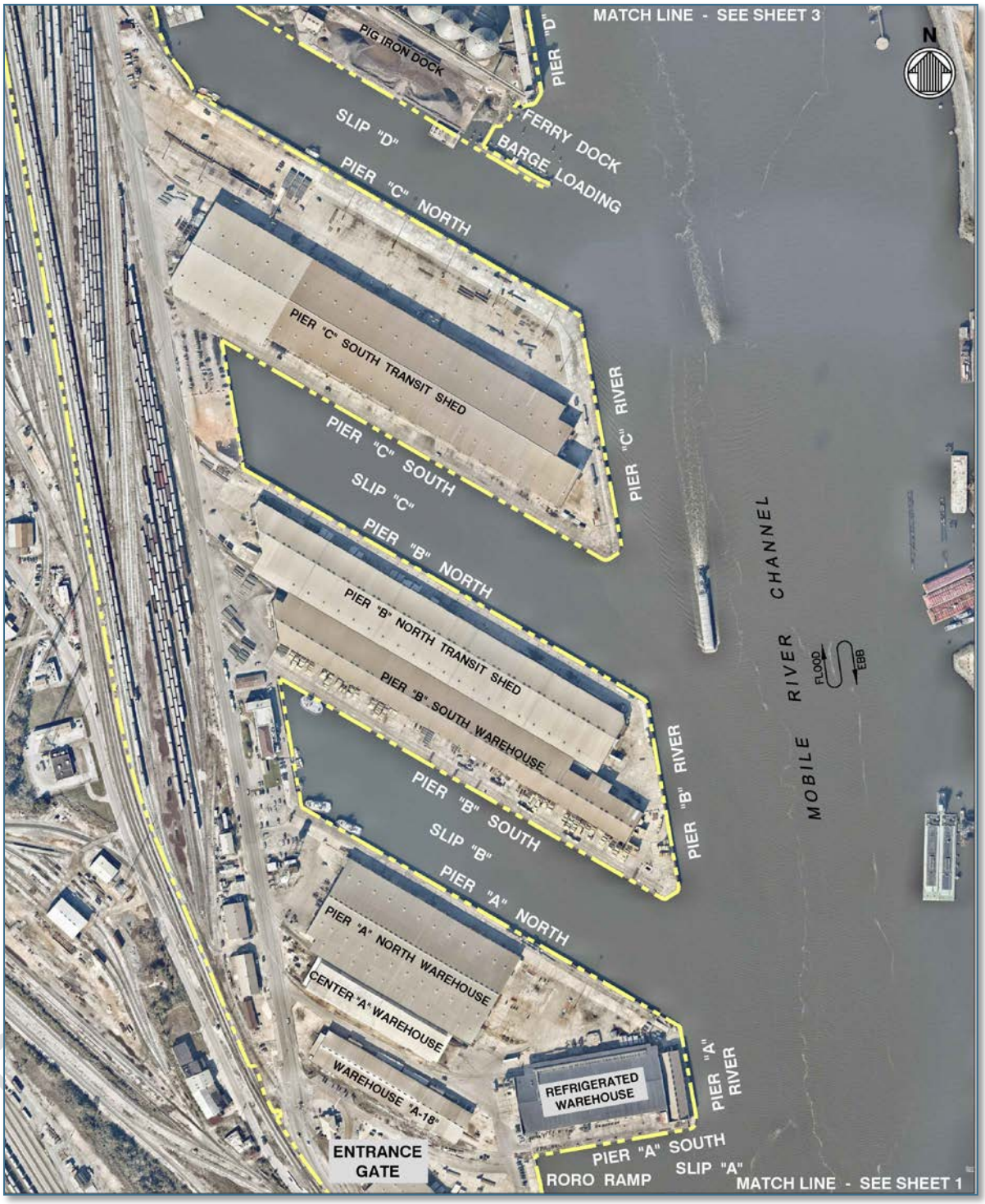
Source: M&N 2018

Figure 4-1: General Location of ASPA Facilities



Source: M&N 2018

Figure 4-2: Main Docks Properties - Sheet 1



Source: M&N 2018

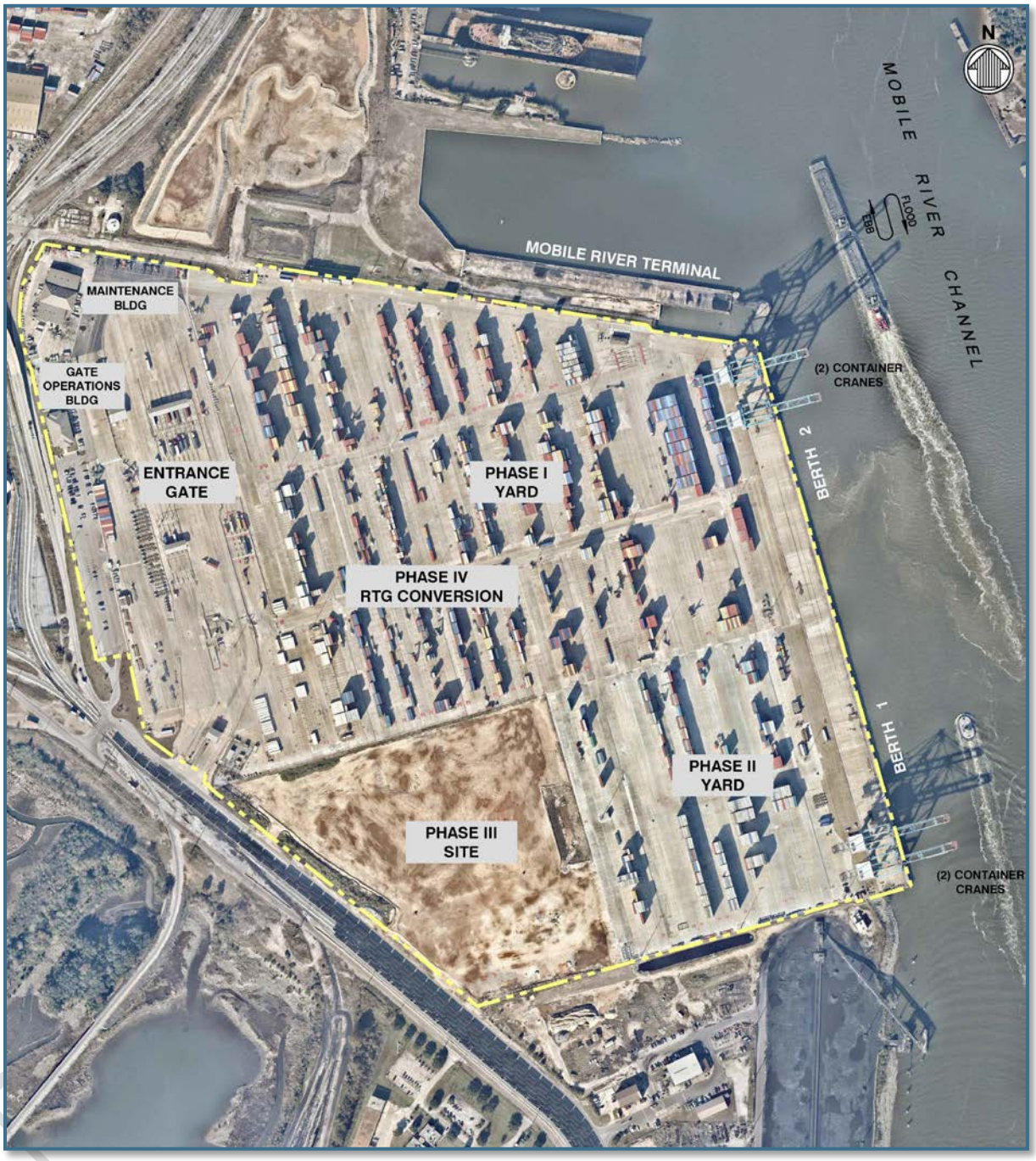
Figure 4-3: Main Docks Properties - Sheet 2

Source: M&N 2018

Figure 4-4: Main Docks Properties - Sheet 3

Source: M&N 2018

Figure 4-5: Middle Bay Properties



Source: M&N 2018

Figure 4-6: APMT Container Terminal

Source: M&N 2018

Figure 4-7: Pinto Island Steel Terminal

Source: M&N 2018

Figure 4-8: McDuffie Coal Terminal

5 MARKET ANALYSIS

5.1 ECONOMIC AND TRADE BACKGROUND

This analysis provides the economic backdrop and dominant trade trends which have had a material impact on trade through the Port of Mobile. It is from this historical perspective that the basis for future volume growth is developed and the need for future port infrastructure-requirements can be inferred.

The analysis begins with a wider view of global economic growth before focusing on national-level and local-level trends.

5.1.1 Global and US Economic Trends

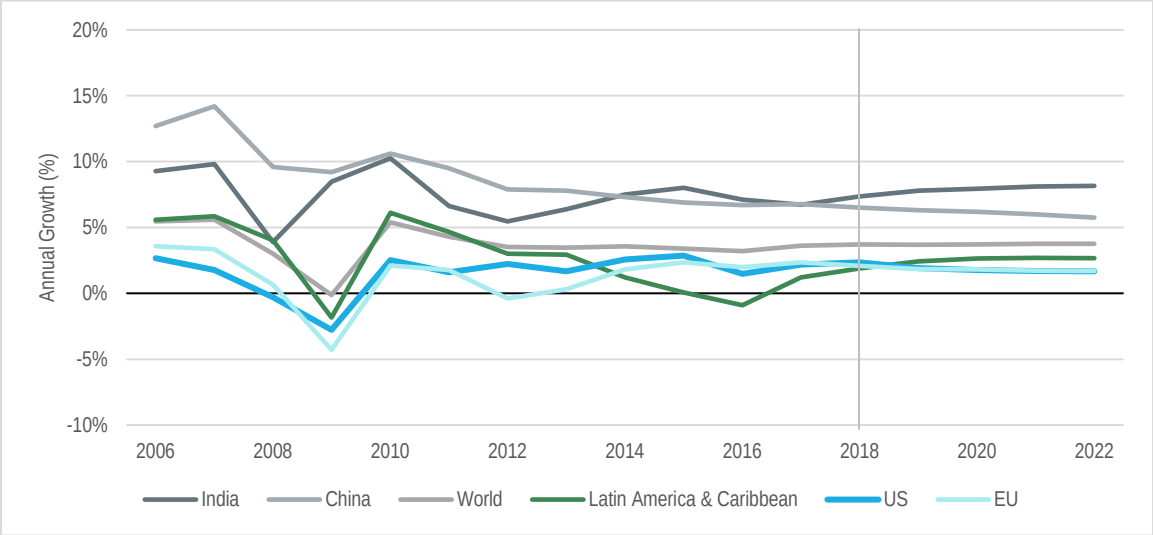
The trajectory of economic growth both globally and in the US has shifted dramatically since 2006 when this study was last completed. While growth in the developing Asian economies , denoted by China and India in Figure 5-1, is projected to continue to outpace that of the developed nations (denoted by the US and EU), the spread in average GDP growth between the two has narrowed considerably and is projected to narrow further into the future as the economies converge. This suggests that the rate of economic and trade growth will continue to become more balanced, and that developed economies, in particular the US, will continue to be the driver of global economic growth in the future.

To help support this outlook the time frame presented in Figure 5-1 is discussed in three periods:

- Pre-2008: Lead Up to the Global Financial Crisis
- 2010 – 2017: Recovery
- 2018 – 2022: Outlook

Pre-2008: Lead Up to the Global Financial Crisis (GFC)

- Leading up to the GFC, the global economy and corresponding trade flows could be summarized as an adjustment period to China's entrance into the WTO. The impact on developed and developing economies was two-fold. In developed economies, it marked the beginning of an accelerated period of off-shoring of low-to-mid value manufacturing and led to a dramatic shift in the way the world's consumer, manufacturing and construction sectors in developed economies sourced their products.
- Developing economies, which predominantly relied on raw material exports such as agriculture, energy and mineral products, saw a significant increase in demand for their respective goods. China's appetite for these goods drove commodity prices higher, causing economic growth throughout the Middle East, Latin America and Southeast Asia at high-single digit rates.
- In the US, the economy was driven by a housing/construction market bubble. With the loss of domestic manufacturing and the need to build and fill new homes with consumer-products, demand for imported commodities, in particular containerized products from China, was the outright leader of trade growth. For US ports, this meant a rush to develop new facilities and expand on existing container capacity, sometimes at the expense of general and bulk cargo operations.
- Once the GFC took hold, with much of the developed and many developing economies falling into recession, China's reliance on exports and infrastructure investment to drive growth was exposed. The slowdown in developed economies slowed China's growth, which in turn fell and dragged down resource dependent developing economies. The ripple-effect worked its way around the globe in that fashion.



Source: IMF

Figure 5-1: Global GDP Growth Rates, 2006-2022

2010 – 2017: Recovery

- As the global economy emerged from the GFC, it became clear that the forces which led to the strong economic and trade growth of the early 2000s would not do so going forward. Developing economies which had built up substantial fiscal reserves as a result of their performance in the prior years would enjoy some continued prosperity, but with a growing commodity glut it was inevitable that the fall in prices would cause a decline in the economic prosperity of these countries. Meanwhile, the US and Europe struggled to regain stability as consumer and housing markets were upended while unemployment rose and credit availability declined significantly. China's investment boom-stalled and the focus began to shift to developing a self-sustaining consumer led economy as opposed to the export/investment model which dominated the last twenty years.
- In the US, export commodities, in particular bulk energy and agriculture products, became a lifeline to overall trade growth. With the profound weaknesses in the US consumer/housing market, imported containerized volumes were the hardest hit. This resulted in the strongest declines at import-dominated West Coast container gateways including those in Southern California and the Pacific Northwest. Nevertheless, with the oil & gas industry leading growth, trade and economic growth began to accelerate in and around these clusters. The decline in gas prices fueled the rapid growth of the US plastics industry throughout the Gulf Coast, and with additional capacity slated to come online in the near-future and by 2020, these will continue to be some of the leading sources of containerized export volumes.
- In the effort to capitalize on the resurgent US market and take advantage of low capital costs and a safe environment, many high value manufacturing companies opened plants in the US Southeast and Gulf Coast states. Anchored by traditional base material (e.g. wood, metals and foods) manufacturing operations, the southern US has been a strong beneficiary of industry migration within the US.
- By February 2018, the US economy experienced for all intents and purposes a full recovery. Employment is at peak levels and consumer/housing activity is progressing at a healthy rate. This has led to a resurgence in imported containers which have once again become the leaders of growth. But even these import flows have now taken on a new shape following the GFC and with the continued shift towards e-commerce and rapid fulfilment, the big box and leading online retailers are reconfiguring their distribution networks. This includes opening new distribution centers away from traditional urban centers into more strategic locations which can be leveraged for speed.

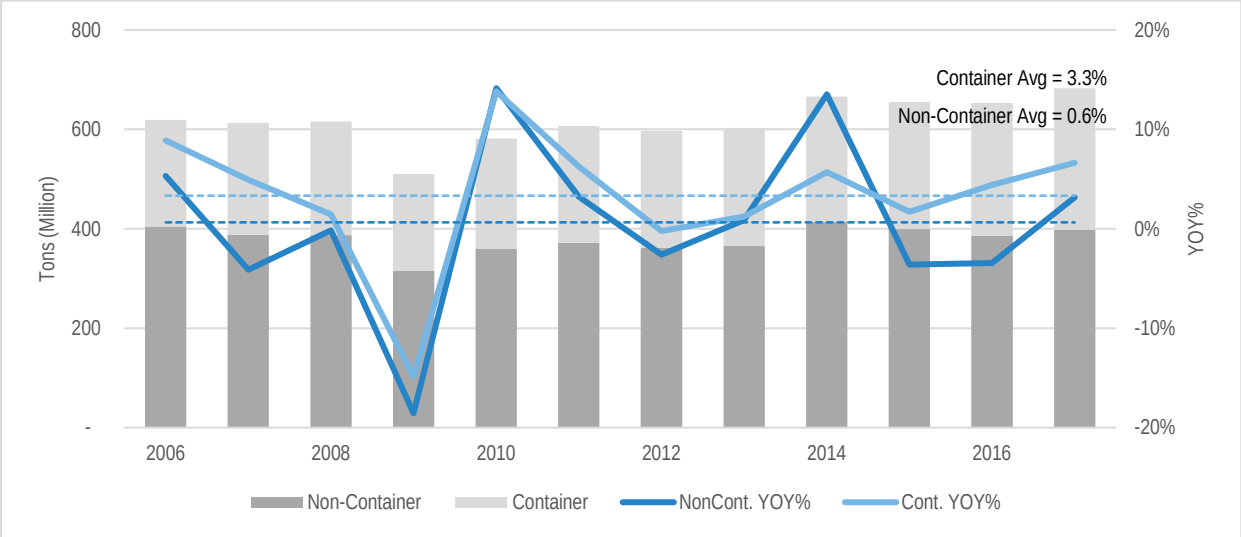
2018 – 2022: Outlook

- Barring any serious exogenous event to the global economy, whether that be financial, political and/or weather related, the growth outlook remains generally positive. The developed economies of Europe, the US and Asia appear to be maintaining favorable conditions, with unemployment and inflation at or near cyclical lows, and fixed investment trends rising. This signals good conditions in the all-important consumer/service sectors as well as new manufacturing and industrial capacity coming online. Longer-term macro trends will continue to be affected by the demographic shifts in these developed markets, with large portions of their populations being of retirement (and older) age. In the US this aging segment is offset by a very large younger population. As spending shifts from goods to services as the population ages, the balance here in the US suggests that consumer activity will remain a critical driver of trade growth.
- Additionally, the US will continue to leverage its natural resource base and remain a leading producer of energy-and-related products/derivatives, agriculture including grains and livestock, and capital equipment due to the low cost of capital and long-term experience in producing such goods. Market share will continue to be challenged, however, by other global manufacturing hubs including Mexico and China.
- According to the IMF projections, the coming years will be marked by consistent outperformance by India, with China's growth falling below. Should this in fact materialize, this could add significant trade demand on Atlantic traffic to/from the US East and Gulf Coast ports. India is undertaking the ambitious Sagarmala project to improve logistics costs and international trade capacity in the country. If successful, it could transform India's economy by improving connectivity between the coastal port zones and major inland population/manufacturing centers and, as a result, would likely accelerate the international trade growth of all cargo types to/from South Asia.

5.1.2 Impact on US Trade

The impact of these global and national economic trends on US maritime trade growth is summarized in Figure 5-2 through Figure 5-5.

At its base level, total US trade currently stands at over 680 million metric tons (Mt) as presented in Figure 5-2. This excludes the energy related commodities which alone account for an additional 700Mt and are discussed separately when addressing the outlook for coal and petroleum products at Port of Mobile.

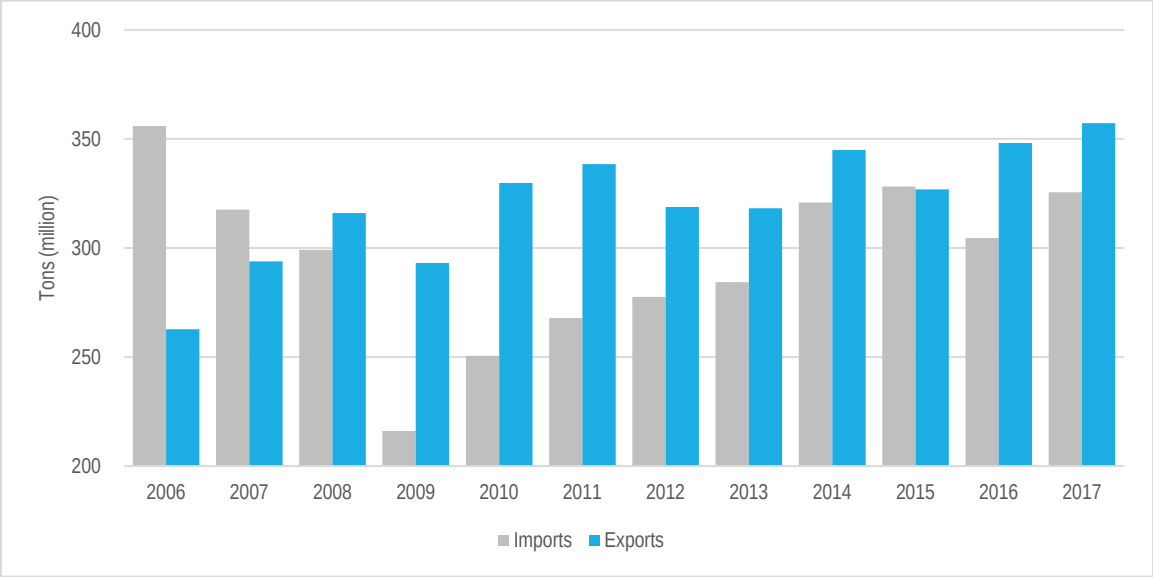


Source: USATO; * Excludes Energy Products (Coal, Crude, Petroleum Products and Natural Gas); M&N

Figure 5-2: US Maritime Trade (2006-2017*)

The total non-containerized & containerized volume in the US has been growing by an average 0.8% annually since 2006, but this includes the economic decline and recovery out of the GFC. Non-containerized tonnage, which includes large volumes of bulk agriculture, chemical/fertilizer, metals and forest products, has progressed at a generally slower pace. 2012/2013 was marked by drought conditions that hurt grain exports, which again fell in 2015 as the US dollar rose relative to other currencies. Total growth of non-containerized commodities remained negative in 2016 as imports of salt fell due to warmer-than expected winters in 2015 and 2016, and imports of iron and steel products declined as the oil & gas industry retracted. In 2017, the fall in the US dollar and increase in US production of oil & gas led to an overall recovery in non-containerized trade growth.

In brief, exports remain the largest flow by weight as presented in Figure 5-3, which again consist of the traditional large-volume non-containerized products. This has been the case in the post-GFC period, with exports representing the largest volume. Ongoing investment in agriculture, chemicals, forestry products and oil & gas equipment should continue to support export volumes. Though containerization of traditional bulk/breakbulk commodities, even at marginal levels, could lead to containers gaining some share relative to other cargo types. Import tonnage (in total) will most likely continue to be led by mineral products, iron and steel, machinery and chemicals/fertilizers. Consumer products and manufacturing inputs (components/auto parts), on the other hand, will continue to remain predominantly containerized.

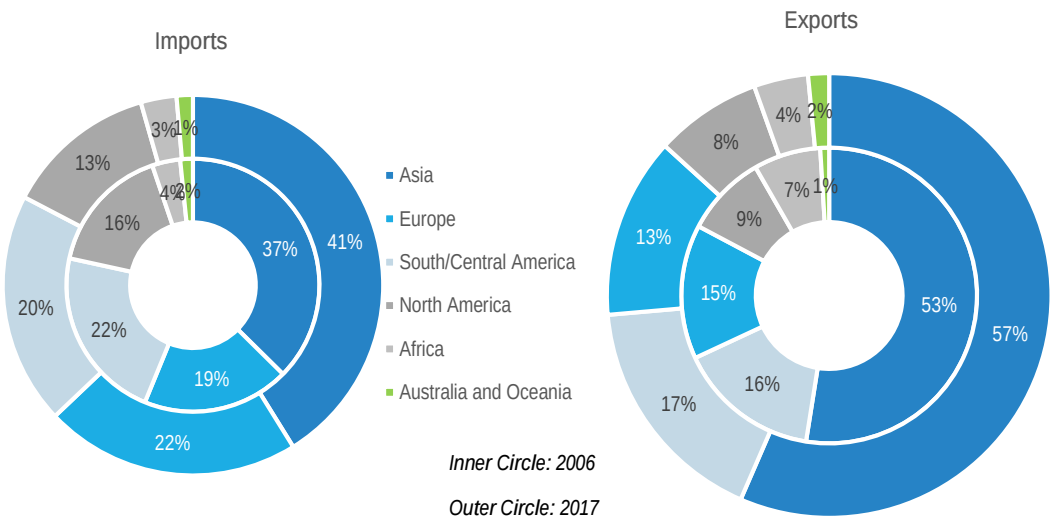


Source: USATO; * Excludes Energy Products (Coal, Crude, Petroleum Products and Natural Gas); M&N

Figure 5-3: US Maritime Trade by Direction (2006-2017 by weight*)

In terms of global trade partners, there has not been a significant shift in the overall balance between the respective origins and destinations as presented in Figure 5-4. Asia continues to be the largest source of US import tonnage at 41% in 2017, compared to 37% in 2006 and destination for export tonnage at 57% in 2017 compared to 53% in 2006. The continued need to serve the Asian market supports trade through an increasingly diversified US Port structure. Once almost exclusively the domain of US West Coast ports, particularly for containers, the Asian trade lane has become more prevalent at both US East and Gulf Coast ports including the Port of Mobile. This comes from increased all-water service through both the Suez and recently expanded Panama Canal. Trade of bulk and breakbulk commodities from the Gulf Coast continue to receive support through efficient shipping services to and from Asia allowing exports produced within the region to compete against other global producers of similar products, including pulp and paper.

Europe remains the second largest source for import tonnage, having gained share from South/Central America through a surge of cement imports originating in Turkey, and is also the third largest export destination. South/Central America remains the third and second largest import origin and export destination, respectively. These trade lanes have both been important, traditional leaders of demand through the US Gulf Coast ports. As growth within South/Central America recovers (in aggregate), the development of north-south trade, particularly for containerized commodities, is likely to accelerate. This region will also continue to be an important source of non-containerized cargo as these South/Central American markets remain important sources for a variety of traditionally non-containerized commodities including forest products such as lumber, paper and pulp as well as chemical products, automobiles and iron and steel products. It will be important for the Port of Mobile to continue to cultivate connectivity and business opportunities with this region.



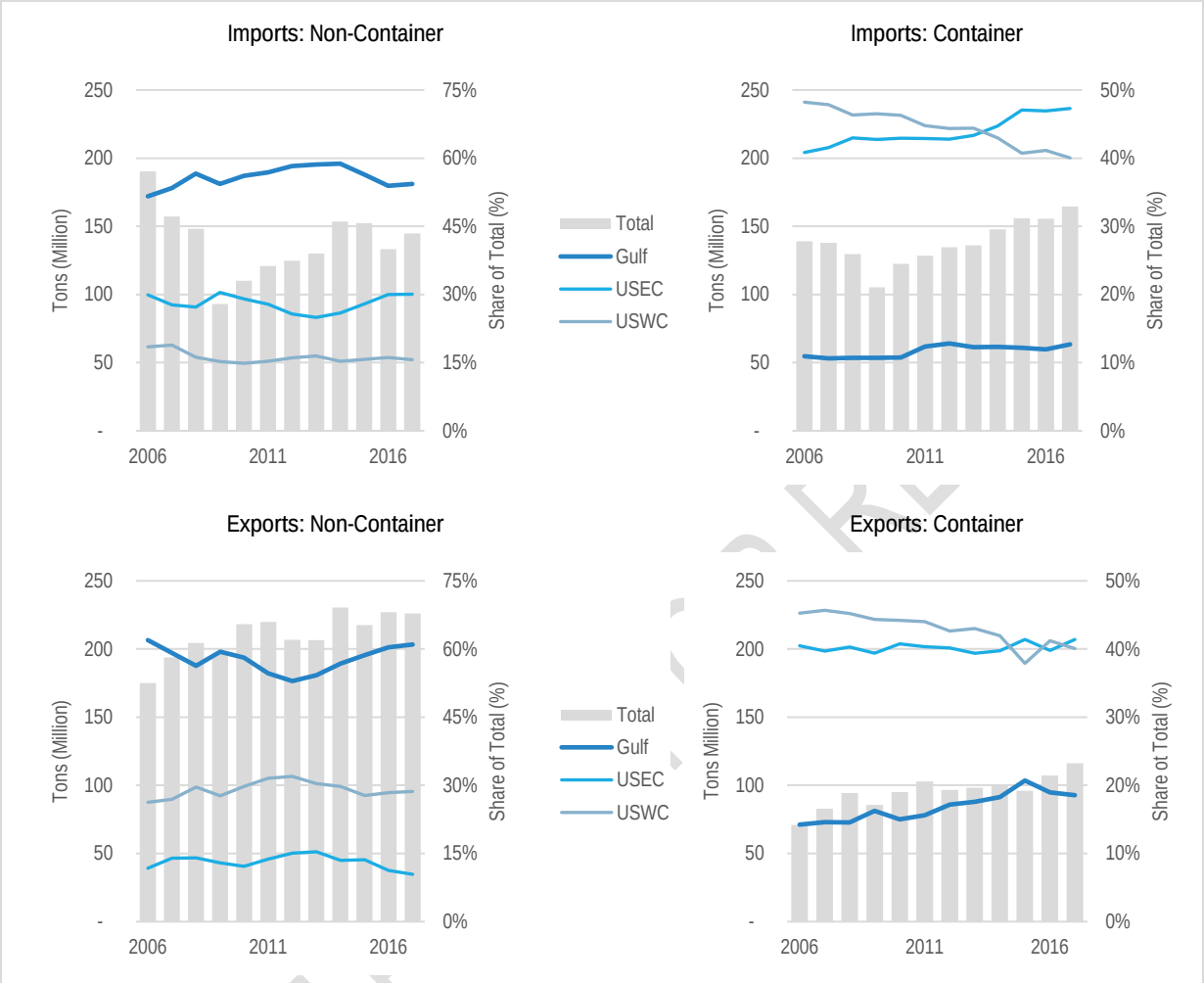
Source: USATO; * Excludes Energy Products (Coal, Crude, Petroleum Products and Natural Gas); M&N

Figure 5-4: Import and Export Destination of US Trade (Based on Tonnage)

To show how US trade is split by coast, Figure 5-5 presents total US trade tonnage by import and export/non-containerized and containerized tonnage and provides the respective coast's share of that total trade. What becomes apparent is the Gulf Coast's dominance in non-containerized trade and comparatively smaller share of containerized trade. There are many factors that have contributed to this, including:

- The Gulf ports have been the traditional bulk gateways for agriculture, chemicals, energy-related cargo and metals led by access to the inland waterway system and proximity to the oil-producing/refining clusters in the Gulf
- The major container trade flows have been east-west routes to Asia and Europe; with north-south being considerably smaller volumes
- Container trade was destined to the largest urban centers along the West and East Coasts, and leveraged rail connections to serve inland locations

There are indications of change underway, some of which have direct implications for the Port of Mobile. First, the Gulf has retained its dominant position of non-containerized trade. However, non-containerized handling capacity is being reduced in the West and East Coast ports in favor of container capacity implying a need/opportunity to continue to support non-containerized trade. This includes locally produced breakbulk forestry and metal products, along with traditional bulk commodities. Secondly, the Gulf is gaining share of the national container market, particularly on the export side. Therefore, in order to further support the underlying growth, as well as capitalize on new logistics routes and direct services to Asia, operations which have proven to be effective at capturing container trade at other gateways could be pursued at the Port. These could include enhancement of the intermodal service by rail, near/on-dock transloading/warehouse and dedicated cold storage.



Source: USATO; M&N

Figure 5-5: US Trade Totals & Coastal Share

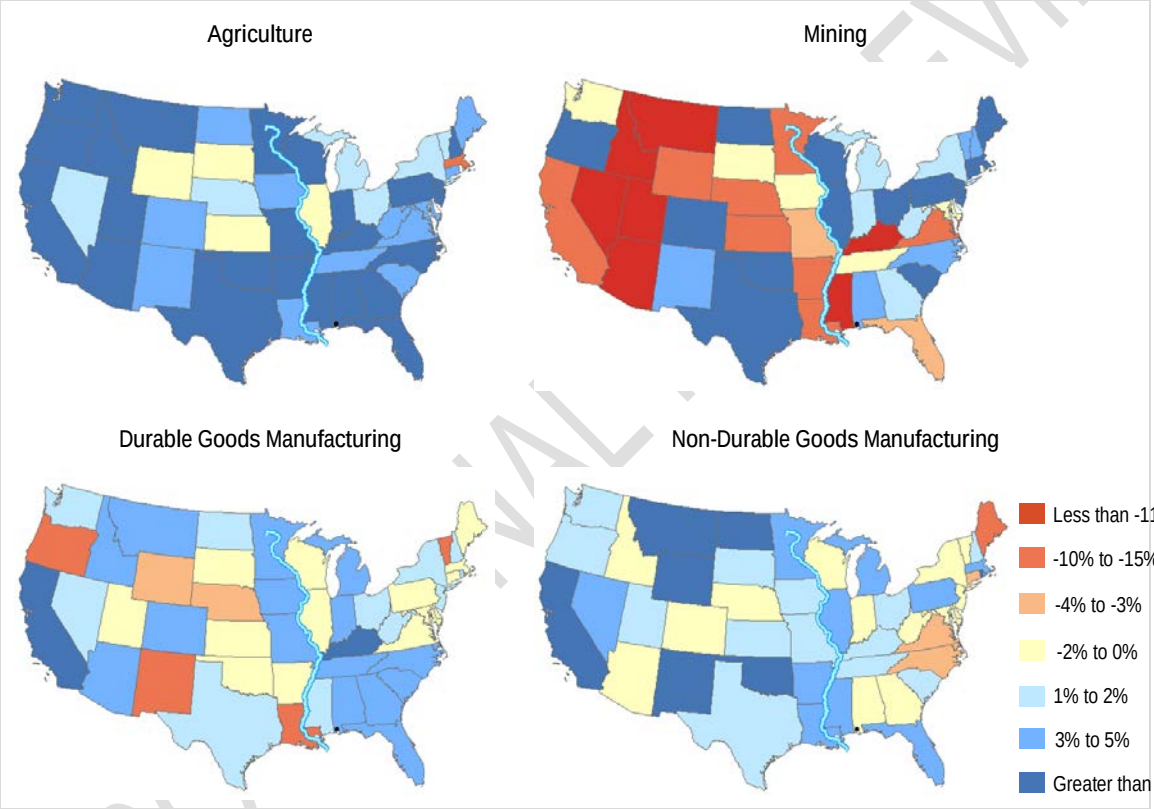
5.1.3 Industry Participation with a Focus on Alabama

To gain a better understanding of the drivers of growth at the Port of Mobile, and develop an economically consistent outlook for future growth, it is helpful to contextualize the performance of the Gulf region in relation to other areas of the country. The maps presented in Figure 5-6 illustrate the average growth by sector between 2006 and 2017 at the state-level. From these maps, as well as those presented in Figure 5-7 and Figure 5-8, it becomes clearer why trade through the Port of Mobile has developed the way it has, and what dominant trends will continue to influence future growth.

Agriculture: The Gulf region serves two primary roles in the US agriculture sector;

- it is the leading gateway for exported bulk grains and imported fertilizers which are destined to/from markets in the South as well as the US Midwest through connectivity via the inland waterway system
- it is home to the largest production of poultry meat in the country, with the Gulf and Southeast ports competing aggressively for this trade.

Mining: While fracking has generated new growth in the northern plains and Northeast, the Gulf Coast ports handle the vast majority of product and support equipment associated with petroleum and coal-based industries. This emphasizes the importance of dedicated liquid and dry bulk terminals to handle raw product, as well as multipurpose facilities to handle iron and steel products, plastics/tubing and machinery.



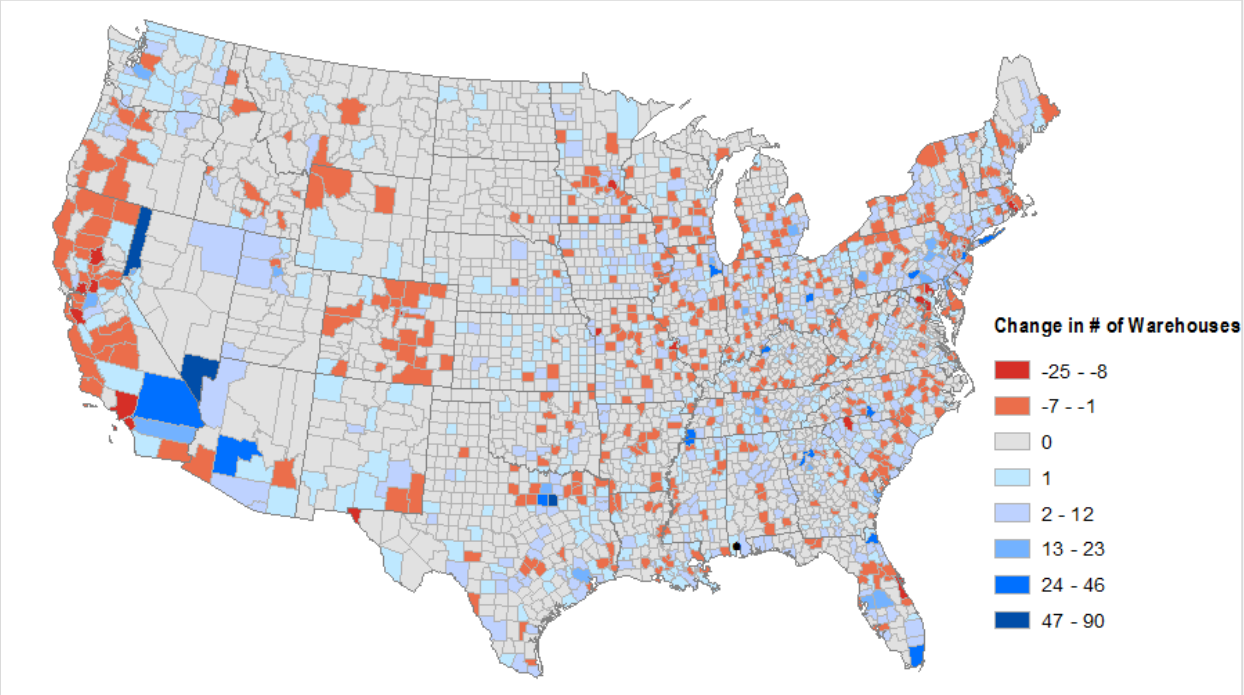
Source: BEA; M&N

Figure 5-6: Industry Growth by State (2006 – 2017 annual average)

Durable Goods Manufacturing: Durable goods manufacturing includes autos, machinery, capital equipment and metal products. Alabama has been a leader in this regard with new assembly plants for autos (Mercedes, Honda, Hyundai, Kia, Toyota/Mazda and Toyota engines), aeronautics (Airbus assembly, Boeing defense), shipbuilding (Austal), and steel plants (including SSAB, AM/NS Calvert, and Nucor's three locations [Tuscaloosa, Birmingham and Decatur]), all contributing to the durable goods base that continues to fuel growth.

Non-Durable Goods Manufacturing: Non-durable goods manufacturing, which includes food preparation, forestry products and chemicals, has seen strongest growth in Gulf states which border the Mississippi River and which have benefitted from higher production of petrochemicals/derivatives. Alabama has underperformed much of the Gulf region in this regard, but still maintains sizable paper/pulp/lumber, food preparation and chemical manufacturing operations that support trade through the Port. The natural gas supply (and access to) in Alabama could be leveraged to support similar resin/plastic manufacturing operations in Alabama.

General Warehousing: Warehousing provides an indication of how big retailers and logistic providers are structuring their distribution systems. What becomes clear in Figure 5-7 is that highest rates of warehouse development is occurring outside the traditional coastal urban centers of the West and East Coast and is moving to newer coastal markets such as Savannah, Houston, Baltimore and Miami as well as important inland hubs in Reno, Dallas, Memphis, Columbus and Eastern Pennsylvania. This is all reflective of the need for these warehouses to serve as consolidation points for both the respective nearby urban centers as well as for broader hinterland markets. The inland locations are generally marked by the confluence of rail and road infrastructure which allows for rapid receipt and dispersion of cargo.



Source: BLS; M&N

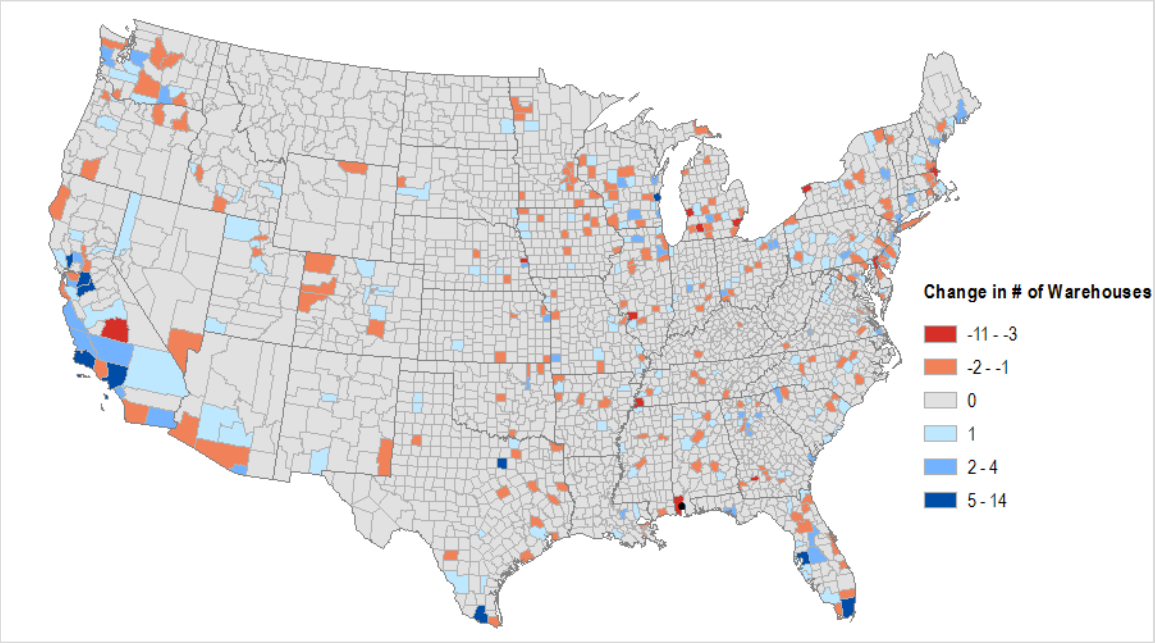
Figure 5-7: Change in General Warehousing by County 2006-2016

In Alabama, the warehousing gains have been strongest in and around the Birmingham market, as well as in Mobile. This appears consistent with the overall trend that both inland and newer coastal port regions are the strongest sources of growth. Walmart's decision to develop a 2.5 million square foot regional distribution center in Mobile along I-10. This is one of five facilities this size nationwide supporting 800 store locations and is evidence of a strategy for the major retailers to locate themselves to best serve growing markets. These warehouses are part of the retailer's supply chains and serve as anchors for driving cargo through local ports.

Refrigerated Warehouses: These facilities are less widely distributed throughout the US and tend to be clustered in regions which traditionally account for the largest production/trade of fruits and vegetables, dairy products and livestock. This includes areas of southern

California, the Pacific Northwest, Florida and the US Northeast. More recently, the construction of dedicated cold storage facilities has translated into new business for the nearby ports. Both Savannah and New Orleans have developed on/near dock cold storage facilities that specialize in containerized shipments of frozen meat exports.

Mobile on the other hand appears as one of the locations where refrigerated storage operations were lost. Traditionally the Port served as one of the leading gateways for poultry exports destined to Russia. Following the implementation of the trade embargo on these exports in 2014, volume fell dramatically and at the same time, the Millard freezer was condemned by the USDA due to settlement of the floors. It is now used for dry storage. As a result of the closure, Mobile's share of US poultry exports declined between 2006 and 2017 from 430,000 tons or 18% of the US's total volume in 2006, to 120,000 tons or just 4% of the 2017 national total. Therefore, as with general warehousing, the development of dedicated cold storage facilities, particularly for containerized exports, could serve as a catalyst for anchoring poultry export business and recovering some if not all of this lost share.



Source: BLS; M&N

Figure 5-8: Change in Refrigerated Warehousing by County 2006-2016

5.1.4 Alabama Industrial Development

The outlook for continued development of industry and commerce in the State of Alabama will most likely have a material impact on the volume and type of cargo transiting the Port of Mobile. Therefore, a brief overview of future projects (new facilities as well as expansion of existing operations) is presented in this section, with a subset of the largest by investment listed in Table 5-1 .

The manufacturing sector was the largest recipient of investment in 2016 totaling $3.1 Billion with the top four listed accounting for $1.0B of the total. Within manufacturing, some of the largest industries to receive investment were forest products including fiber and pulp plants, and lumber/saw mills; the automotive industry including parts/engines, wheel assembly, underbody stamping and injection molding; and food including poultry processing and feed. These base industries, along with other developing ones will continue to support the demand of intermediate inputs and finished products to/from the State of Alabama and the Port of Mobile.

Table 5-1: Top Investments by Sector in Alabama, 2016

Sector/Company	County	City	Product	Investment
Manufacturing				
Kronospan U.S. LLC	Calhoun	Oxford	Wood Laminated Flooring Products	$362,000,000
Lenzing Fibers Inc.	Mobile	Axis	Cellulosic Manmade Fibers Manufacturers	$293,000,000
Weyerhaeuser Company	Lamar	Millport	Lumber Mill	$165,000,000
Georgia Pacific Corp.	Escambia	Brewton	Corrugated & Solid Fiber Boxes	$150,000,000
Wholesale				
Adam's Beverage Inc.	Houston	Dothan	Beer Wholesaler	$33,000,000
McLane Company Inc.	Houston	Cottonwood	General Line Grocery Merchant Wholesalers	$17,000,000
Big Lots Inc.	Montgomery	Montgomery	Retail Consumer Goods Distribution	$12,705,646
Transportation & Warehousing				
Millard Maritime	Mobile	Theodore	Port Facility Producer	$13,500,000
Farmers Home Furniture	Franklin	Russellville	Distribution Center	$9,596,219
E Sumter McElroy Truck Lines	Sumter	Cuba	Flatbed Trucking-Specialized Freight Trucking	$3,000,000
Mining				
Seneca Coal Resources	Jefferson	Oak Grove	Natural Resources, Coal Mining	$20,000,000
Hickman Williams & Company	Jefferson	Birmingham	Mining, Slag Products	$1,500,000
Retail				
Interstate Plastics	Jefferson	Homewood	Distribution, Industrial Plastics	$1,070,000
Jet-Pep Inc.	Cullman	Holly Pond	Bulk Petroleum Distribution	$1,000,000

Source: Alabama Department of Commerce

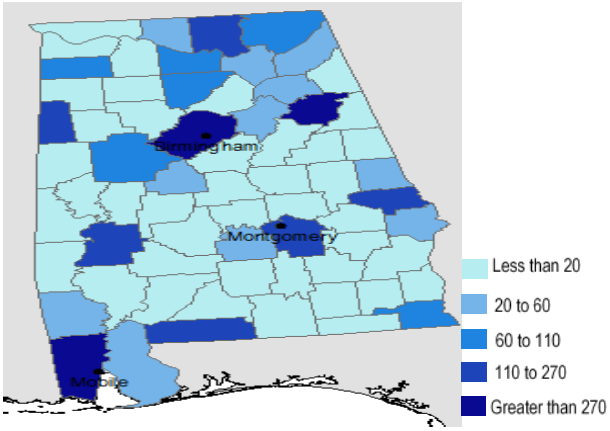
In addition to manufacturing, the wholesale and retail sectors will also be drivers of trade through the Port. Some of the largest investments in the wholesale sector include general consumer product distributors, including Big Lots, Wal-Mart, McLane and Adam's Beverages.

Other more industry specific wholesale operations including motor vehicles (Custom Assembly), tires (American Tire) and poultry products (Emmaus). Furniture wholesalers Farmer Home also made an investment in a new distribution center in Franklin County. These, along with other goods producing/consuming operations, will form the base of demand for freight movement in the State.

As can be seen in Figure 5-9, the highest concentrations of investment tend to be in counties in/around the population/industrial centers of Alabama. These include Jefferson (Birmingham), Montgomery (Montgomery) and Mobile (Mobile).

Other notable counties include Calhoun, which is the location of the Kronospan laminate flooring plant; Madison, Morgan and Cullman counties in the northern part of the state which benefited from investment in the aerospace and/or automotive industries; and the southern portion of Escambia and Marengo counties which were home to the Georgia-Pacific and Two Rivers Lumber investments, respectively.

Within the immediate counties around the Port, some of the largest investments remain in the core forest product, chemicals and equipment industries. In so far as they continue to use maritime services, freight associated with these operations should continue to represent some of the largest volumes through the Port of Mobile and facilities in the Theodore Ship Channel.



Source: Alabama Department of Commerce; M&N

Figure 5-9*: Investments by County in Alabama, 2016 ($USM)*

Table 5-2: Top Investments close to Mobile, 2016

County - Sector/Company	City	Product	Investment
Mobile – Manufacturing			
Lenzing Fibers Inc.	Axis	Cellulosic Manmade Fibers Manufacturers	$293,000,000
Worthington Cryogenics	Theodore	Metal Tank (heavy gauge) Manufacturing	$8,465,000
Masland Carpets Inc.	Saraland	Carpet & Rugs	$3,000,000
Evonik Corporation	Theodore	Specialty Chemicals	$2,750,000
Mobile – Other*			$16,950,000
Baldwin - Manufacturing			
Morganton Pressure Vessels	Bay Minette	Compressed-Air Systems	$1,700,000
CRC Distribution, Inc.	Robertsdale	Hydraulic Cylinder Parts, Rods, Tubes Merchant Wholesalers	$500,000
Crenshaw Machine Systems	Bay Minette	General Industrial Machinery and Equipment	$600,000
Clarke - Manufacturing			
Louisiana-Pacific Corporation	Thomasville	Oriented Strand Board (OSB)	$14,000,000
Washington - Manufacturing			
BASF	McIntosh	Specialty Chemicals for Automotive Coatings	$23,500,000

Source: Alabama Department of Commerce;

*$13.5M is Millard Maritime in the Theodore Shipping Channel

5.2 PORT OF MOBILE TRADE VOLUMES (2007 – 2017)

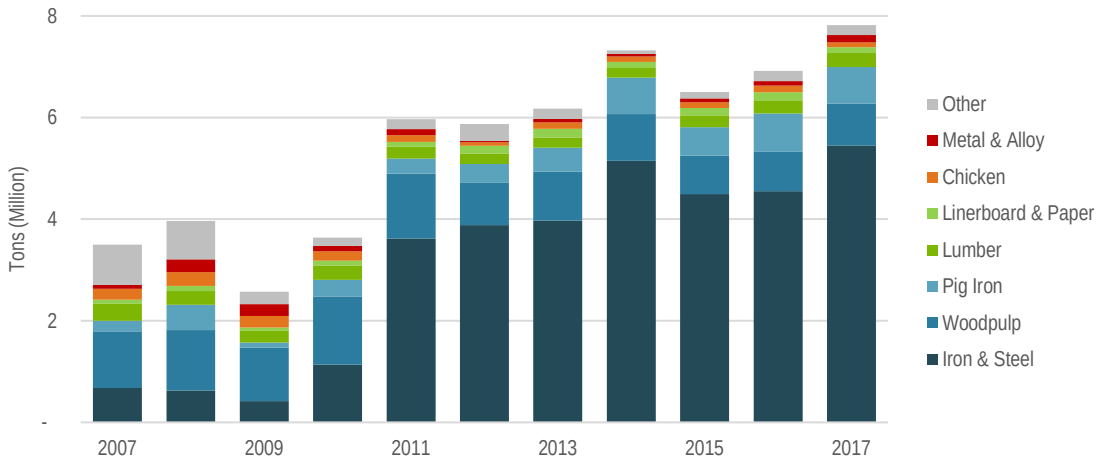
5.2.1 Introduction

There are five collective groupings of port facilities under ASPA's jurisdiction, namely:

- General Cargo - Main Docks Complex,
- APMT, AST and Pinto Island
- Coal - McDuffie Terminal,
- Industry - Dedicated leased terminals including Agribulk, Chemicals, Cement
- the General Port which includes the Middle Bay Port/Liquid Bulk Port and privately-operated terminals which use the Mobile River

5.2.2 Recent Performance

Volume through the Main Docks has grown from 3.5M tons to 7.8M tons over the past decade, an average 8.4% annual increase, as presented in Figure 5-10. Much of the volume growth has been led by iron and steel shipments, which have contributed significant tonnage following the start of operations at the Pinto Island facility in late 2010. This terminal handles raw steel slab imports which are barged to the Calvert plant and processed into coils for export through the Alabama Steel facility, located on the Main Docks. Additionally, forest products, including pulp, linerboard/paper and lumber remain staple commodities at the Port. These reflect both import and export tonnages, depending on commodity, some of which necessitate covered/high quality storage.



Source : ASPA; M&N, June 2018

Figure 5-10: Tonnage at ASPA Main Docks

The top-line growth at these respective groupings reflects the change underway at the Port as whole, with unitized break bulk and containers leading and dry bulk cargo lagging. This is reflected in the trade volumes presented in Table 5-3, which are the official ASPA tonnages reported in the 2016 Comprehensive Annual Financial Report (CAFR). Trade at the Main Docks and the Industry facilities has been growing by an average of 8.4% and 1.9% annually since 2007. Conversely, coal movements at McDuffie have fallen by an average of 6.3% per year over the same time.

During that same period, cargo through the private terminals on the Mobile River and Port area dropped from 19.04 MT in 2007 to 11.97 Mt in 2017.

Table 5-3: Port Tonnage from 2007 – 2016. (Short tons x millions)

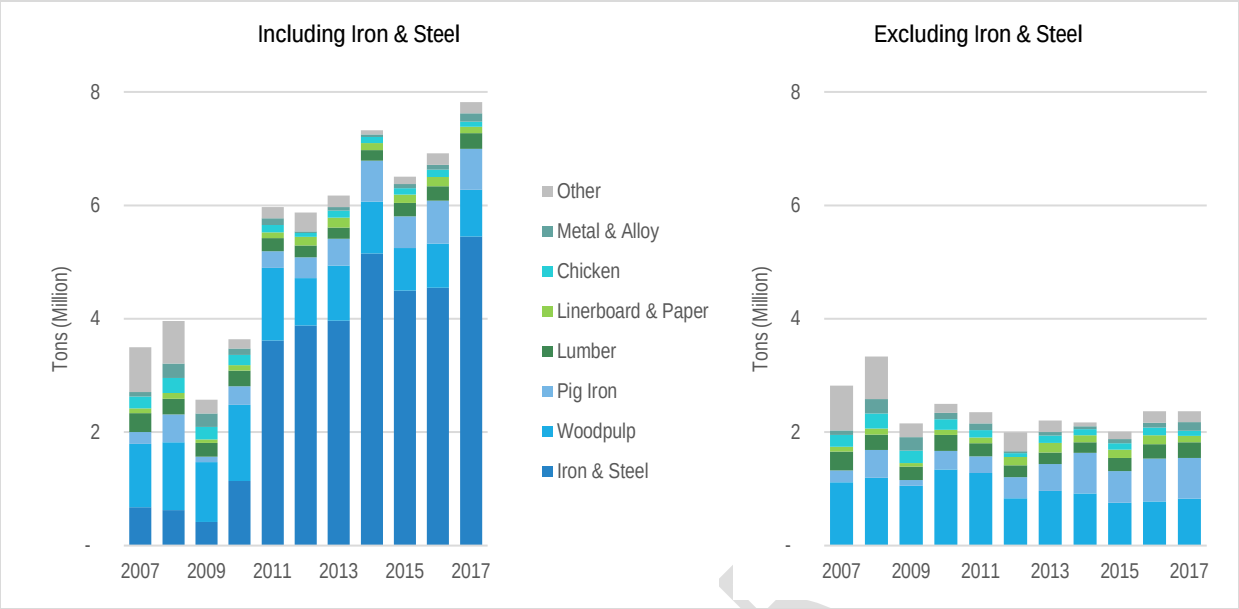
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	CAGR
General Cargo	3.498	3.962	2.570	3.637	5.969	5.876	6.174	7.322	6.503	6.916	7.818	*8.4%*
McDuffie Coal	21.977	20.435	13.678	17.081	15.330	16.404	17.046	18.021	13.406	10.404	11.523	*-6.3%*
Industry Total[1]	2.800	3.206	3.087	4.649	3.796	3.297	3.338	3.528	2.865	3.611	3.388	*1.9%*
Total tonnage	28.276	27.603	19.334	25.368	25.095	25.577	26.558	28.871	22.774	20.931	22.729	*-2.2%*
Ex McDuffie	6.299	7.168	5.657	8.287	9.765	9.173	9.512	10.850	9.368	10.527	11.206	*5.9%*
Private terminals	19.040	19.495	14.588	13.870	13.046	13.097	11.475	15.257	16.437	14.119	11.968	*-4.5%*

Source: ASPA

5.2.3 General Cargo (Main Docks + Pinto Island)

As seen in Figure 5-11, total volume at the Main Docks reached 7.8Mt in 2017 representing a significant gain over 2007. The main driver of growth has been the increase in iron and steel product handled at the Port. This volume began rising sharply with the opening of Pinto Island in 2010 and has continued to trend higher ever since. Trade under this commodity grouping includes the imported semi-finished steel slabs (received/transferred at Pinto Island) destined to the ArcelorMittal/Nippon Steel Calvert Plant (AM/NS Calvert), which are rolled into coils and are shipped to auto plants in the US South and/or back out as exports destined to Mexico through the Port of Mobile. This plant has recently increased its production from 4.6Mt to 5.3Mt which appears to be aligned with a jump in growth of 20% in tonnages at the Port in 2017. Coil exports are predominantly handled at the Alabama Steel Terminal, a dedicated covered warehouse facility, in breakbulk and containerized form. In addition to the AM/NS plant, big exporters also include SSAB and Nucor while the Berg Steel Pipe plant located north of the Main Docks does not export volume through Mobile.

[1] *Includes Containers through APMT after 2008*



Source: ASPA

Figure 5-11: ASPA General Cargo Tons*

The total volume of the other cargoes handled at the Main Docks has held at roughly 2.0Mt. The decline from 2007/2008 came mostly from "other" and was container tonnage which shifted to the APMT facility. The remaining general cargo commodities are traditional base commodities associated with local (southern Alabama) industry. These include forest products (e.g. wood pulp, paper and lumber), frozen chicken, and metals & alloys including aluminum. Forest product trade (e.g. pulp, paper and lumber) has traditionally accounted for an average of 1.3Mt of cargo, and in recent years has been dominated by import tonnage of eucalyptus pulp used in paper production, exports of fluff pulp, used in hygiene products and food grade and liner board. Both the import and export trade require covered storage and is a main customer of the warehousing space available at the Main Docks. The fluff pulp exports in particular require specialized care including very clean warehouses and specialized lifts to carry the sealed rolls. Lumber exports are predominantly destined to the Caribbean and are used in construction.

The imported pig iron is primarily destined for the SDI Mill in Columbus, Mississippi and smaller volumes to the steel plants throughout the state, including Tuscaloosa, Trinity and Birmingham, with total tonnage averaging roughly 700,000 tons per year. These volumes do not require covered storage but should be stored on a heavy-lift surface. Similarly, metal & alloys, which have traditionally been raw aluminum imports, can be stored outside and have averaged a throughput of 80,000 tons per year, with 2017 being a record year at 148,000 tons. Mobile is part of the London Metal Exchanges (LME) Shield Network for storage/inventory management associated with the trade of metals.

Additionally, the Main Docks serve as a loading/unloading point for heavy-lift/roro and project cargo pieces. These include components of GE wind turbines and Airbus fuselages along with other large steel shapes and forms. These units generally require an open area for laydown before being transferred to landside transportation.

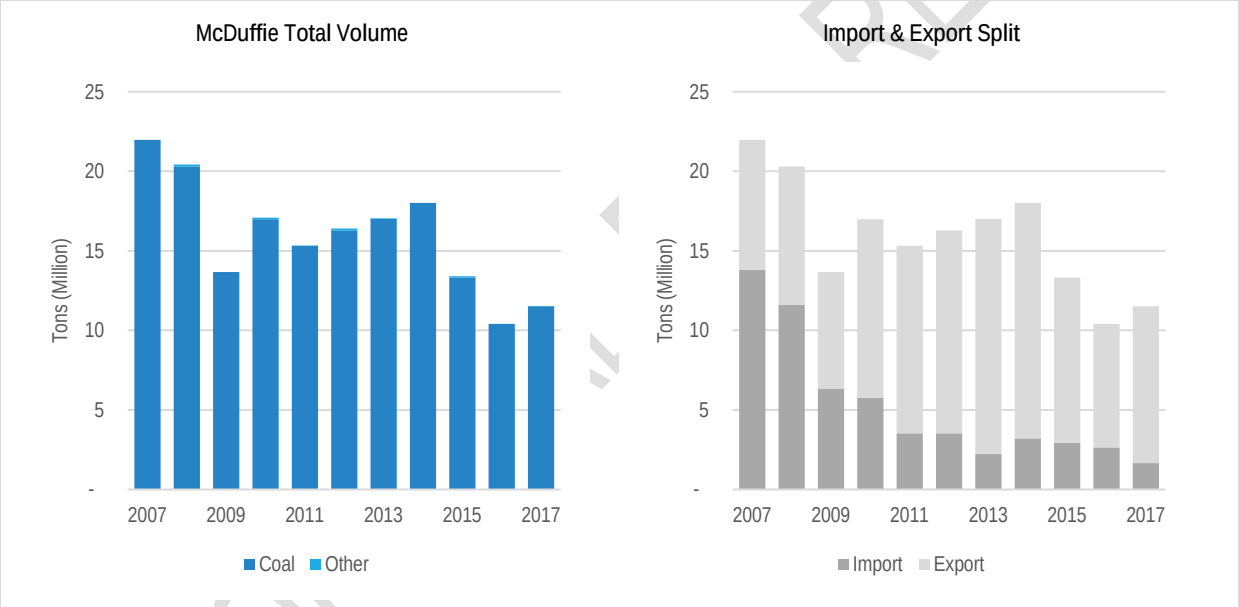
Fundamentally, there remains a continued need for both covered and uncovered storage area at the Main Docks. To support growth of the base industries, as well as cultivate new industrial business opportunities in Mobile and Alabama as a whole, the Port should remain flexible to be able to serve the varying storage requirements of the respective commodities.

Within the Main Docks a significant volume of this cargo is either received or shipped out by rail, with estimates ranging from 40 – 60% of the total volume. This underscores the importance of rail and the Terminal Railway (TASD[2]) to the Port and its customers, and the need to preserve efficient service on this mode of transport.

5.2.4 Coal

The 11.5Mt of coal traded through the McDuffie terminal was the third largest tonnage handled by a port within the US in 2017, trailing only Port of Virginia and Baltimore. However, movements through the Port have fallen substantially from the 20.0Mt handled in the mid-2000s with the decline being mostly attributable to the import volumes of thermal coal as seen in Figure 5-12. This is consistent with the national trend which has seen coal imports fall to just 20% of their 2007 levels.

However, exports of metallurgical coal through the Port have been growing by an average 2% annually over the past decade. Production from the Warrior, Drummond and Seneca mines in Alabama are the primary sources of this coal, with a small portion coming from Illinois.



Source: ASPA; M&N

Figure 5-12: ASPA McDuffie Terminal Tons

The global outlook for coal, in general, faces major headwinds led by the desire to substitute it with cleaner forms of energy. There are concerted efforts to do so which, coupled with the availability of cheap natural gas, has reduced coal consumption dramatically in Europe and the US. China too has actively sought to reduce dependence on coal but with cuts to domestic production it has continued to rely on imports to meet demand.

In the US, and at the Port of Mobile/McDuffie, imports of thermal coal are unlikely to be drivers of growth in the future. However, exports of metallurgical coal are a source of growth as global demand for steel continues to rise, with India as a potential strong source of growing demand in the coming decade. The US can continue to compete globally for this export market but is facing increasing competition from Australia, Mozambique and Mongolia. In order to continue to grow exports, the US producers will need efficient transportation infrastructure in place to keep prices competitive. The resulting coal projections for the Port of Mobile are provided in Section 5.4.

[2] Terminal Railway Alabama State Docks

5.2.5 Industry Tonnage

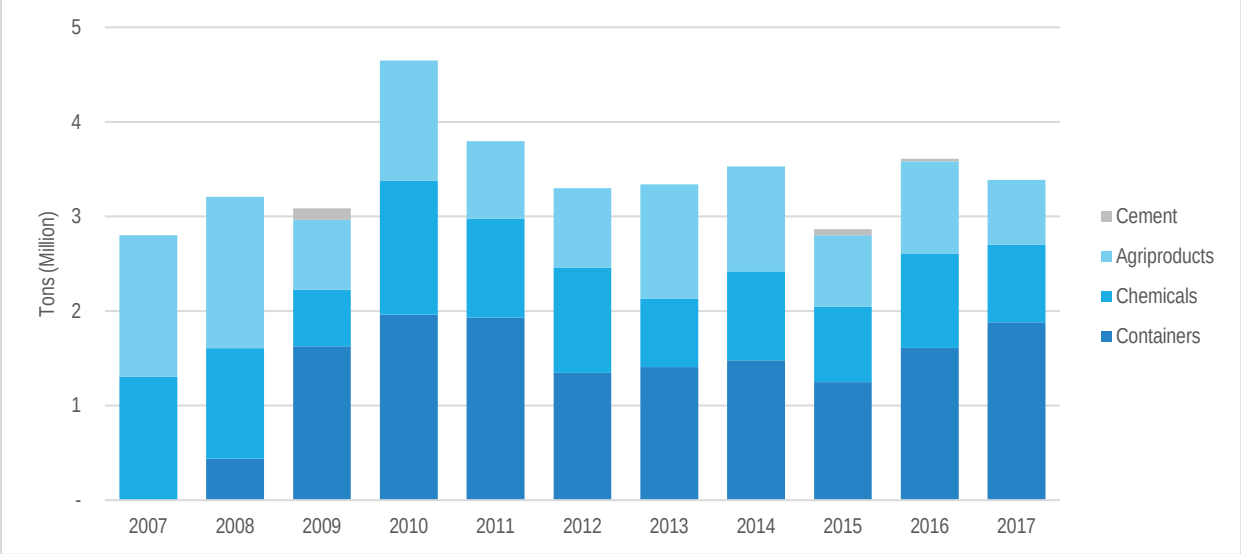
ASPA's industry tonnage is defined in the Annual report as cargo handled at the dedicated grain terminal (Agrex), dedicated cement terminal (Argos), the Liquid Bulk terminal (Theodore) and the Container terminal (APMT). While these are leased by private companies, with exception of the Liquid Bulk terminal, they fall under ASPA's ownership. The Port does generate revenues and to a lesser extent incurs expenses at these facilities.

As seen in Figure 5-13, containers have been the leaders of growth in recent years and are discussed in more detail in Section 5.5. At a high-level, these have been led by increased connectivity to Asia through the addition of new liner services at the Port which have brought an increase in imported containers. Continued growth on the import side is expected with the opening of the Walmart distribution center. Additionally, as a result of the increase in imports, the availability of empty containers near-port should prove to be supportive of driving export volumes through the terminal.

The chemical volumes have historically averaged 900,000 Mt per year. These are predominantly associated with the INEOS Phenol plant which uses the Liquid Bulk terminal to import base materials and export finished product. Phenols are used in a wide range of household products and are used in the manufacturing of plastics.

The Agribulk facility at the Main Docks is operated by Agrex and handles both outbound and inbound flows and can load/unload both trucks and rail cars. 2017 represented a low point in terms of export tonnage at 690,000 tons compared to a historical average of 1.0Mt.

The primary commodity handled is exported soybeans and while the Mobile facility lost share, nationwide export tonnage appears to have been stable. Overall the US export market could be further challenged by growing competition from Brazil and the Agribulk facility could see volume slip further without a new product flow. Nevertheless, population growth and food consumption suggest that the long-term outlook for global grain/feed are generally beneficial for ports.



Source: ASPA

Figure 5-13: ASPA Industry Terminals' Tons – 2007 to 2017

5.2.6 General Port Tonnage

The General Port tonnages consist of a range of bulk (liquid and dry) and breakbulk commodities. These are handled at a range of private terminals which have dedicated infrastructure to handle specific cargo types including storage tanks, conveyer systems and spooling systems.

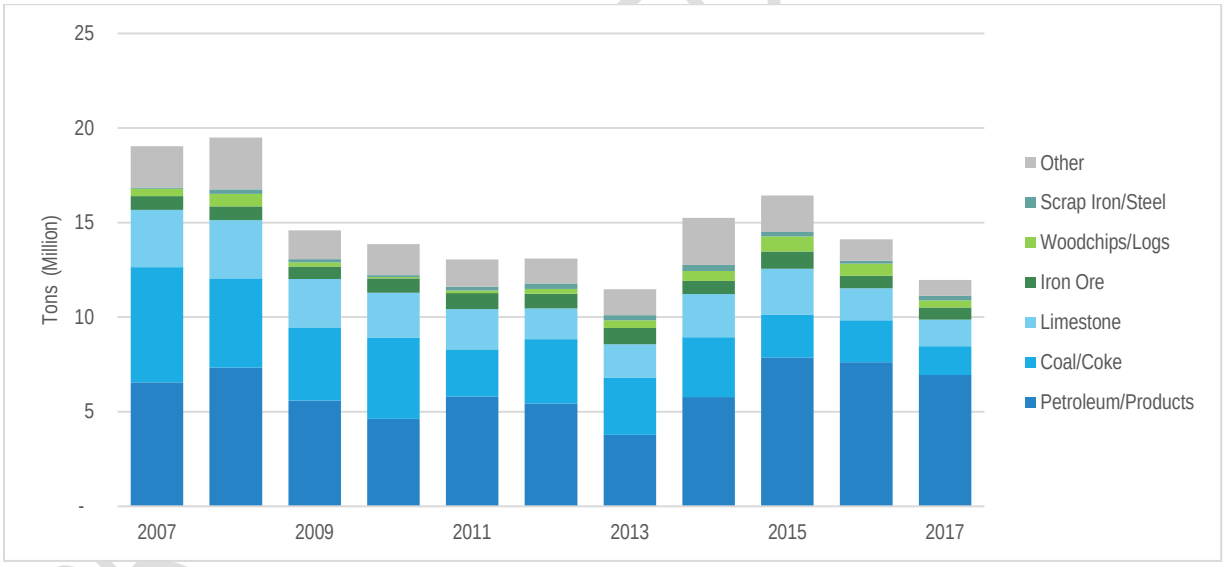
The terminals are in the Theodore Ship Channel located south of the Main Docks in the bay with most of the tonnage being generated on the Mobile River through the tank terminals. Some of the larger terminals include:

- Aker Subsea, Technip and Millard Services
- Core Industries, Vulcan Material, Mobile Bay Wood Chips, and Midstream Fuel

There is a diversified customer base with forest products, oil & gas (offshore) and construction clients serving as the core base. Total tonnage through these facilities is seen in Figure 5-14 to have reached 12Mt in 2017. Volumes, in total, are down from the mid-2000 levels, but most of this drop has been in coal, which was mainly imported to support production at the Lafarge-Holcim cement plant. Due to increased competition from domestic sources, and a use of alternative raw materials and fuels, demand for imported coal has declined overall. Martin Marietta Aggregates imports limestone into their terminal on the Theodore Ship Channel, but this traffic has also declined and is being partially replaced by domestic production.

A number of the private terminals lease property from ASPA including Vulcan Material, which is located on the Mobile River. Traditionally there has been roughly 700,000 tons of cement/clinker exported, with a good portion of these destined to US markets via barge. However, 2017 volumes were just 157,000 tons as domestic producers faced greater competition from imports.

Nevertheless, total volume, excluding coal, limestone and petroleum products, has historically ranged between 2Mt and 6Mt. Trend demand projections would suggest that this range should be maintained going forward. Certainly, with the available acreage in the area, any new dedicated liquid, dry or breakbulk facility would have a material impact on the total volume moving through the private terminals.



Source: ASPA

Figure 5-14: ASPA General Port Tons – 2007 to 2017

5.3 MAIN DOCK PROJECTIONS

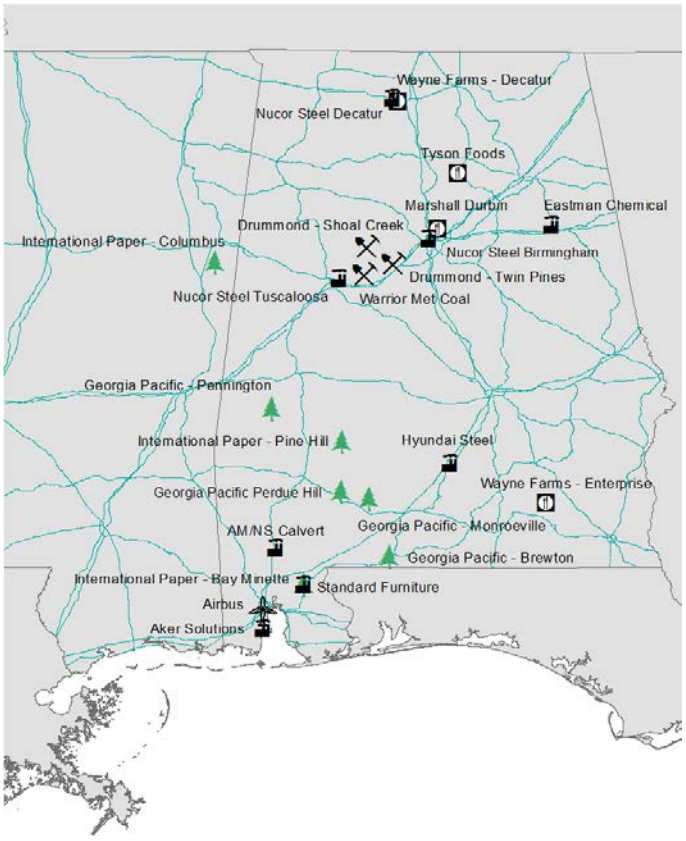
5.3.1 Introduction

To provide an indication of future infrastructure needs at the Main Docks based on the volume and type of cargo being transferred, this section provides volume projections of the primary commodities currently using these facilities. Volume projections are provided for:

- Iron & Steel
- Wood Pulp
- Lumber
- Paper Board
- Frozen Chicken
- Metals & Alloy

The projections reflect the US's overall trade of the respective commodities and incorporate the Port's traditional role/share of that trade. The projections also take into consideration the potential for new sources of production/consumption coming online, as identified by the investment being made in local industry, as well as the potential for future containerization of traditional bulk and breakbulk cargo.

As seen in Figure 5-15, the Main Docks key customers are located throughout the State of Alabama. These include forest products such as wood pulp at 400-500K tons per year; International Paper and Georgia Pacific, steel (AM/NS and Nucor), poultry (Wayne Farms and Tyson) and project cargo including Airbus, which currently moves plane components through the container terminal but will begin shipments through the main port complex in May 2018. Most notable is the AM/NS Calvert plant, which has been a driving source of growth in terms of total tonnage in recent years. The AM/NS plant produces approximately 1.1Mt annually. The Nucor Birmingham and Tuscaloosa facilities closest to the Port of Mobile produce approximately 550,000 and 850,000 tons, and the northern facility of Decatur has the capacity to produce over 2Mt per year.



Source: M&N

Figure 5-15: Location of some of Mobile's Key Customers

The Airbus plant, which assemblies the A320 aircraft is located on the 116-acre property of the Mobile Aeroplex at Brookley, began operations in 2015 and has been a major source of project cargo demand, moving plane modules and components through the Main Docks.

International Paper and Georgia Pacific, which are two of the world's leading forest products, pulp & paper companies, operate a number of mills close to the Port. International Paper's operations include Columbus, MS and Pine Hill, Al. Georgia Pacific's Perdue Hill facility has the capacity of processing approximately 4.5Mt of wood annually, that is used towards the pulp making process. Food production (poultry) is also a significant industry in Alabama. Two of the Port's customers include Wayne Farms (Enterprise & Decatur) producing an estimated 235,000 tons of product annually, and a Tyson Foods facility in Blountsville, AL which could potentially handle over 42M chickens per year. In order to continue serving and build on this base, the Port is currently improving and expanding its cold storage capabilities.

The services provided through the Main Docks are critical to the supply chains of these Alabama-based industries in that the Port is their link to international suppliers and customers, allowing them to compete for global markets.

5.3.2 Iron & Steel

US Trend: Consumption of steel is driven to a large extent by construction, the oil & gas industry and auto manufacturing, which collectively account for roughly 75% of the total. As seen in Figure 5-16, US steel consumption has been cyclical with recent-peak levels in 2014 being led by demand from the oil & gas and automotive industries. Following the slowdown in oil & gas, consumption fell off a bit but has recovered. The historical range has been between 90 – 120Mt per year, however, import demand could be impacted by proposed tariffs. Following the 2016 tariff increase on steel pipes, imports fell by 20% that year (also partially market led). Mexico has seen steady growth, averaging 3% gains, and has been the primary destination for exports shipped through the Port.

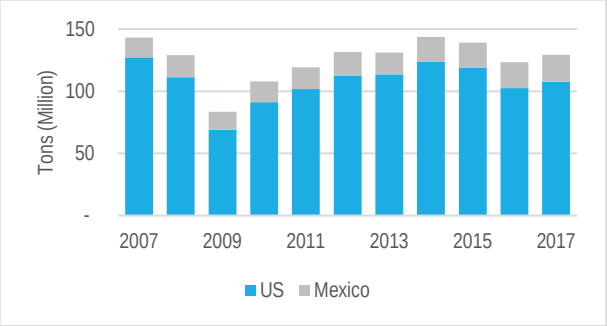


Figure 5-16: US & Mexico Steel Consumption

Port of Mobile Trend: The AM/NS Calvert steel plant has been the primary source of growth at the Port. Steel slabs are imported through Pinto Island and barged to the Plant where they are rolled into coils with a stated production capacity of 5.3Mt per year. Import volumes through the Port have been averaging roughly 4Mt per year and exports have risen to 1.1Mt in 2017, led by exports of coils including stainless steel. The majority of the export volumes are handled at the Alabama Steel Terminals facility which, according to management, is now approaching capacity.

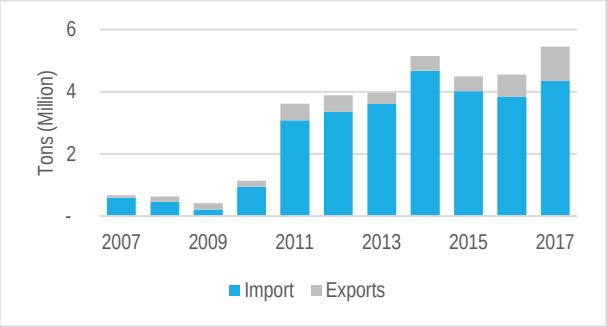
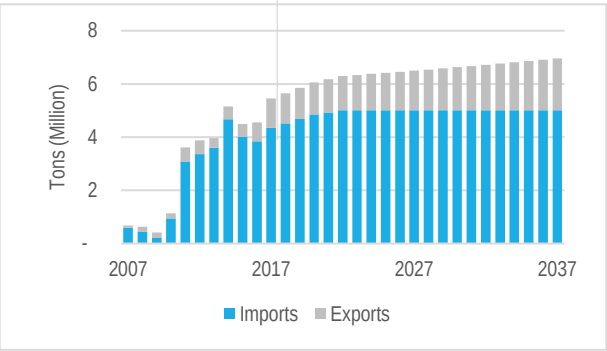


Figure 5-17: Port of Mobile Main Dock Steel Volumes (Import & Export)

As seen in Figure 5-18, it is considered[3] that total iron & steel volumes at the Port could approach 7.0Mt. Exports will continue to trend higher due to growing demand in Mexico from automotive and appliance manufacturers. Import volumes should remain near 5.0Mt without additional production capacity coming online. This level of imports is indicative of national consumption volumes trending at 120Mt per year. Steel demand in Alabama will increase following the completion of the Toyota/Mazda plant currently under construction in Huntsville. With a planned capacity of 300,000 units this would add incremental demand of roughly 165,000 tons of steel a year in 2021 which is included in the projections. Import tonnage would continue to be predominantly handled at the Pinto Island facility.



Source: USATO; ASPA; M&N

Figure 5-18: Port of Mobile Iron & Steel Projections

[3] *See 5.3.8 (Sensitivities) regarding the projected impact of the recently announced tariffs*

5.3.3 WoodPulp

US Trend: US trade in wood pulp totalled 10.4Mt in 2017 and has been growing by an average 2.5% annually since 2007. Exports are the largest flows (by weight) outnumbering import volumes by 3-to-1. Exports have traditionally been used for a variety of goods including paper, hygiene products and increasingly foods and textiles. Nevertheless, import volumes have been the faster sources of growth in recent years as a number of traditional paper mills have converted production to liner board for packaging, and to production of fluff pulp This has led to an increase in demand for eucalyptus pulp imported from Brazil. The overall versatility of use, and the abundant resource here in the US suggest that the outlook for long-term trend growth remains stable.

Port of Mobile Trend: At the Port's Main Docks, total wood pulp tonnage was reported as 826,000Mt in 2017. USATO data indicates that total tonnage in the Port-District was 1.5Mt last year. Breakbulk tonnage at the Main Docks is estimated to be 53% of the total volume shown in Figure 5-20, which implies that 47% was containerized.

Nationwide, the containerization of wood pulp has been closer to 59% of total volume suggesting that there could be additional containerization of the wood pulp trade at the Port.

However, much of the breakbulk volume at Mobile is currently imports, and these tonnages would be slow to convert to containers if the source ports in Brazil remain breakbulk.

Assuming that overall wood pulp demand continues to grow in line with the US at roughly 2.5% per year, and the rate of containerization is allowed to approach the national average, breakbulk volume at the Main Docks would remain near 750,000 – 850,000 tons per year, as long as adequate covered storage space remains available.

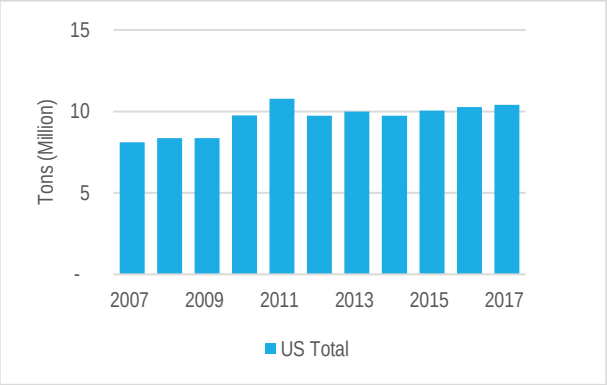


Figure 5-19: US Wood Pulp Trade (Import + Export)

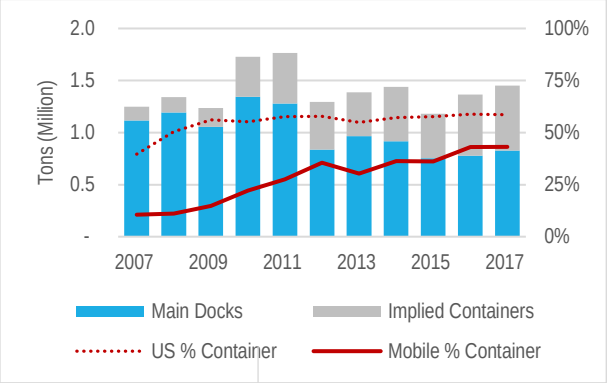
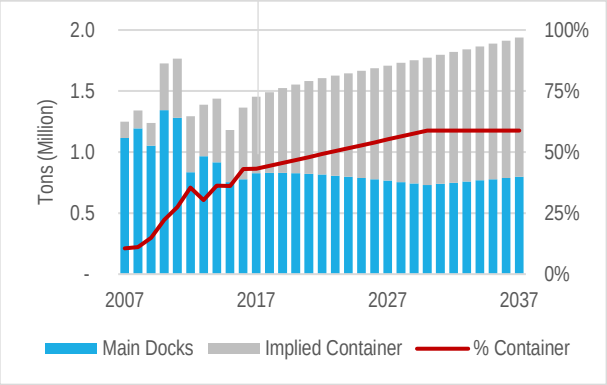


Figure 5-20: Mobile Wood Pulp Volume & % Containerized



Source: USATO; ASPA; M&N

Figure 5-21: Port of Mobile Wood Pulp Projections

5.3.4 Lumber

Port of Mobile Trend: The Port has traditionally served as an export gateway for locally sourced lumber/wood-products destined to the Caribbean. Total volume through the Main Docks has been cyclical with volumes dropping through 2014, led by below average storm activity in 2013 and 2014. Following active seasons in 2015 – 2017 export volumes have increased to support rebuilding efforts throughout various islands. On average, Figure 5-22 shows that some 250,000 tons of lumber are handled annually at the Main Docks.

As with the wood pulp volume, there is some impact of the containerization of sawn lumber. For comparison purposes, it is assumed that 34% of the total tonnage of sawn wood shipped through ASPA facilities and APMT is containerized with the share having risen from less than 20% in 2015. This compares to 67% of the exports of sawn wood nationally, according to the US Census statistics. This would imply that there could be additional containerization of the product handled at the Port.

However, given that many of the destination ports in the Caribbean lack the facilities to handle full container vessels, the capability to ship in breakbulk form works well for the regional market area.

Taking these factors into account, it is estimated that lumber exports through the Main Docks will continue to range between 200,000 and 350,000 tons per year. These volumes are assumed to be destined to the Caribbean market.

Figure 5-24 incorporates a 0.7% annual gain which is in line with the historical (2007 – 2017) overall US growth. With continued development of containerized service to/from Asia this could increase the tonnage moved through the container terminal.

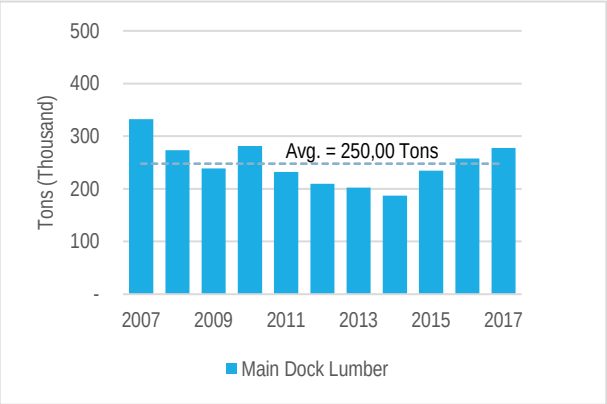


Figure 5-22: Main Dock Lumber (2007 – 2017)

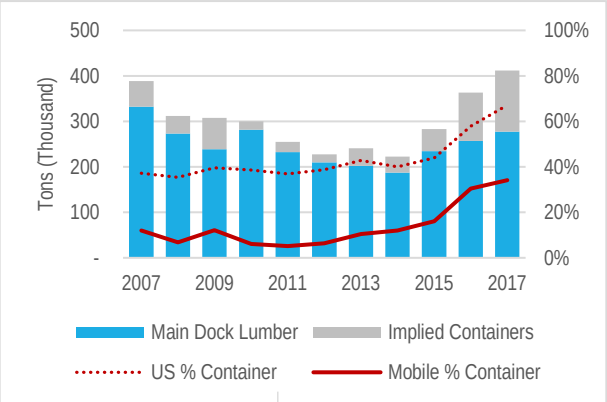
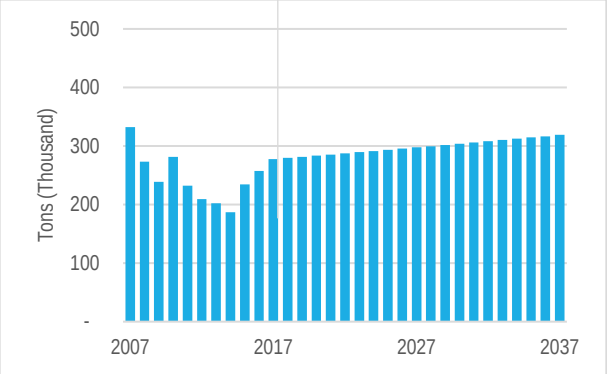


Figure 5-23: Port of Mobile Lumber Volume & % Containerized



Source: USATO; ASPA; M&N

Figure 5-24: Port of Mobile Lumber Projections

5.3.5 Linerboard & Paper

US Trend: Linerboard and paperboard are staple commodities of the US forest product sector. In 2017 the US exported roughly 4.3Mt of linerboard. The abundance of resources and mills in the US Southeast has made it the traditional lead-producer region of the country. Given such abundance, the largest export gateways in the US include Savannah (2.1Mt), Charleston (0.6Mt) and Gulfport (0.4Mt). It is used to manufacture cardboard boxes for packaging, and the primary destinations include China, Europe, Italy, Turkey, and Central America. With the proliferation of e-commerce, demand for packaging has increased along with parcel shipments. To meet growing demand both globally and domestically, US Southeast plants have and continue to invest in linerboard production capacity.

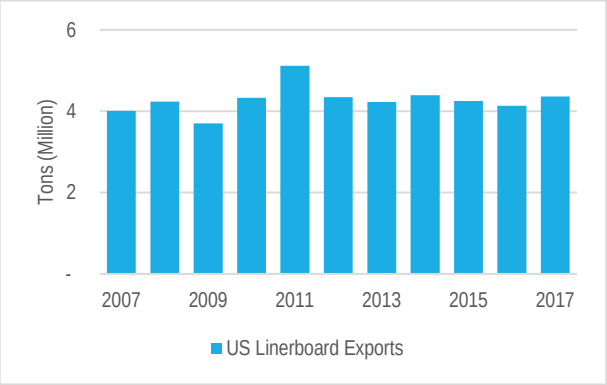
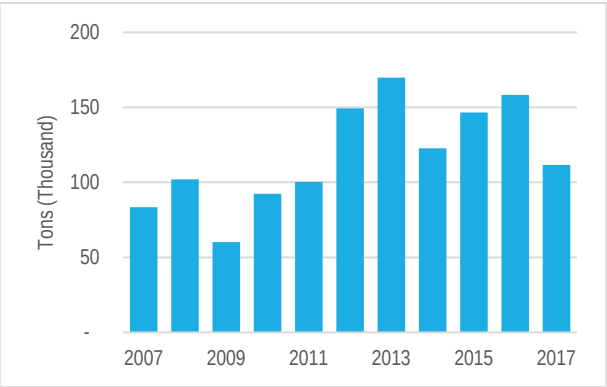


Figure 5-25: US Liner Board Exports

Port of Mobile Trend: At the Port's Main Docks, total tonnage of linerboard & paper totaled 111,529 tons in 2017, which was slightly below the recent annual totals which had been averaging as high as 170,000 tons. Within the immediate Alabama market several large investment programs have been undertaken by International Paper (IP) and Georgia Pacific (GP) to increase their respective production of packaging materials. This includes IP's announced $55 3 million in Riverdale and GP's $50 mm for its Brewton mill, which follows a recently completed $388 mm energy improvement plan there. Industry-wide liner mills are currently utilizing up to 90% of production capacity suggesting that new capacity will be welcomed to meet the projected demand.



Source: USATO; ASPA; M&N

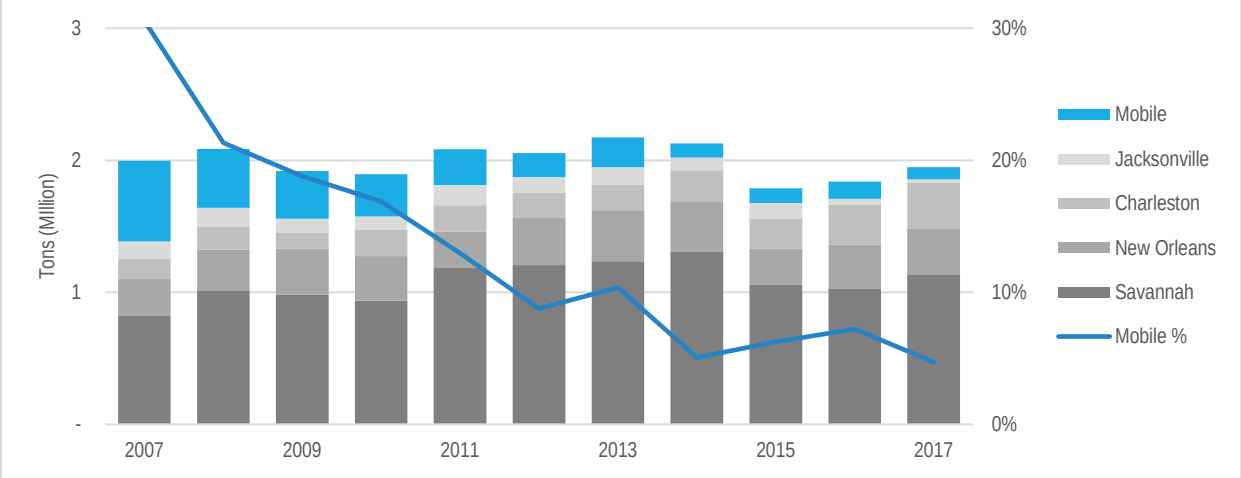
Figure 5-26: Port of Mobile Linerboard Exports

The potential for the Port of Mobile to increase its linerboard volumes is large, either through directing new capacity/production through its Main Dock and/or capturing volume from a competing Southeast port. However, it is noted that 75 to 85% of the existing volume leaving the Southeast is now containerized and new volume at Mobile will probably move over to the container terminal. Nevertheless, given producers desire for flexibility for shipping alternatives, it is estimated that there will continue to be demand for breakbulk shipping capacity. The ability to provide rail access and covered storage capacity should result in break bulk tonnages of at least 100,000 tons per year, with possible surges of up to 200,000 total tons, as indicated in Figure 5-26.

5.3.6 Frozen Chicken

US Trend: The US is one of the world's largest producers of Poultry with Alabama as the second largest producing state following Georgia. As such, the US Southeast/Gulf region collectively is one of the crucial export gateways for this product globally. The 2.0Mt of frozen poultry exported through the five ports listed below in Figure 5-27 accounted for 69% of the US's total 2.9Mt in 2017. This high regional market share of trade underscores the importance of the ports in the supply chains of the local producers.

Port of Mobile Trend: The Port has not been particularly successful in this market. Following the conversion of the Millard Refrigerated Services operation in Theodore to dry storage, the Port's dedicated cold storage facilities became limited to the Seaonus facility within the Main Docks and the Americold facility located outside the Port, adjacent to the Brookley Aeroplex. Total volume of exports has fallen from roughly 610,000 tons in 2007 to 91,000 tons in 2017, or just 5% of the regional export total, with Savannah, Charleston and New Orleans having picked up much of the total volume. The remaining trade at the Port Mobile is handled through the Seaonus facility which loads breakbulk vessels destined to Cuba, and stuffs containers for export through the APMT terminal. ASPA is currently in the process of working with a company to build an additional freezer facility that will be dedicated to blast freezing and packaging containers.



Source: USATO; ASPA; M&N

Figure 5-27: US Southeast Chicken Export Tonnage and Port of Mobile's %

It is estimated that roughly 69% of the total exports of poultry in 2017 were containerized, or roughly 2.0Mt. The remaining 900,000 tons were shipped in breakbulk form, with the top destinations of these being Cuba (180,000 tons), Hong Kong (137,000), Taiwan (65,000), Angola (55,000) and Guatemala (47,000) which collectively account for about half of the US breakbulk exports. In order for more breakbulk frozen product to transit the Main Docks, an additional service/customer would have to be picked from one of these potential importers.

The base case projection therefore assumes that tonnage remains near 100,000 tons per year through the Main Docks.

5.3.7 Metal & Alloy

US Trend: In Mobile, these products are predominantly unwrought aluminum ingots. At the national level, imports of unwrought aluminum have tripled over the last 10 years, from just over 1.0Mt in 2007 to 3.1Mt in 2017, with the strongest growth over the past two years, as presented in Figure 5-28. The growth has been led by a reduction in US production capacity, availability of cheap Chinese-produced imports, and growing demand from key consumption industries including automotive and aerospace.

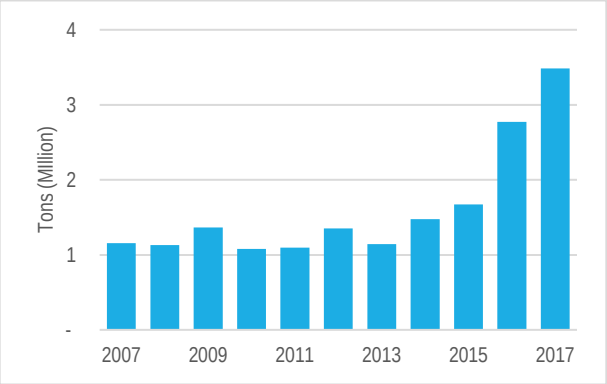
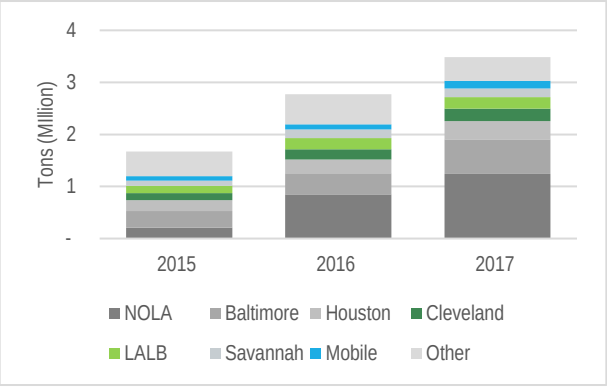


Figure 5-28: US Maritime Imports of Unwrought Aluminum

At the port-level, Figure 5-29 shows that New Orleans (NOLA) is the largest gateway (1.1Mt) followed by Baltimore (0.6Mt) and Houston (0.3Mt) and Savannah (0.2Mt). Of the top ports listed NOLA, Baltimore, Mobile and Cleveland (Toledo) are listed as London Metal Exchange (LME) approved warehouses, which permits these sites to be used as import gateways/storage when trading activity is high.



Source: USATO; ASPA; M&N

Figure 5-29: US Maritime Imports of Unwrought Aluminum by Port

Port of Mobile Trend: Similar to the national trend, import volumes through the Port have grown substantially over the last two years to approximately 150,000 tons in 2017, from just 50,000 in 2014. This suggests that demand through the Port will rise and fall with the US total; and could increase above trend should capacity become constrained at some of the larger gateways.

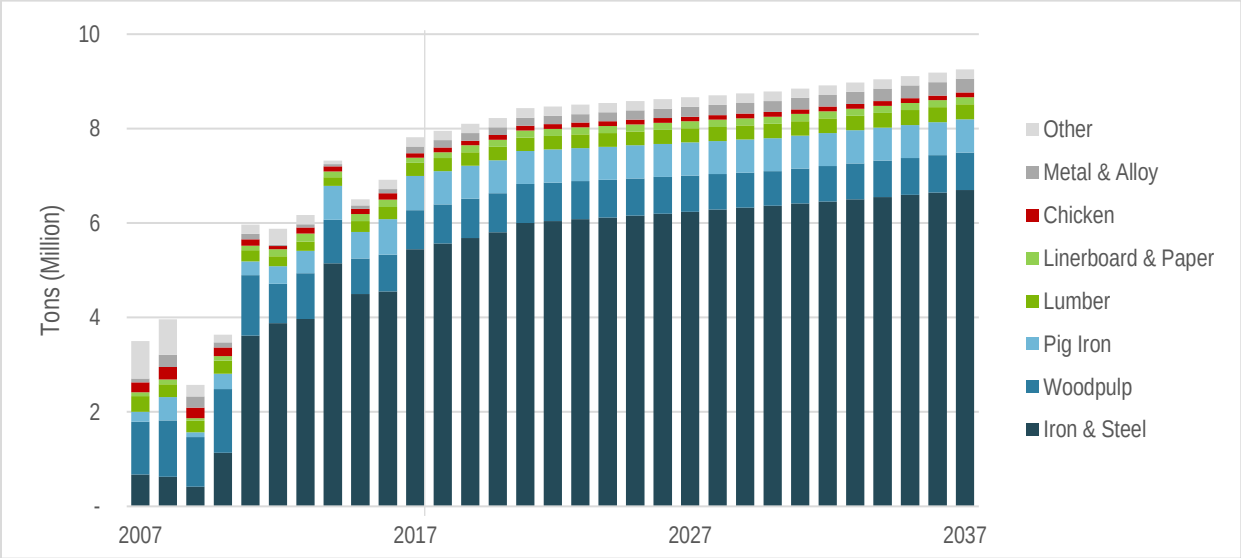
Assuming trend growth and putting aside the immediate impact of the current pronouncements regarding tariffs, it is estimated that imports of aluminum could continue to grow at a rate of 3-4% per year in line with national consumption trends. Total volume would approach 300,000 tons by 2037 assuming a stable 3.5% annual increase from 2017 levels.

5.3.8 Main Docks - Summary & Sensitivities

Base Case

Based on the outlooks for the individual commodities, it is considered that by 2037, total tonnage through the Main Docks could reach 9.3Mt, as illustrated in Figure 5-30 and itemized in Table 5-4.

Steel and related tonnage is projected to continue to be the largest by weight, but potential growth of other traditional breakbulk commodities including forest products and project cargo will also continue to generate demand for covered and uncovered storage capacity, heavy lift equipment and multimodal access.



Source: ASPA; M&N

Figure 5-30: Tonnage Projection for the Main Docks

As can be seen in in Figure 5-30, other important trade will continue to include forest products such as pulp, linerboard and lumber, as well as metal & alloys. A small volume of exported breakbulk chicken is assumed to remain but is contingent on the continued demand from Cuba or another Caribbean and/or South/Central American market for break bulk shipments. Additionally, 700,000 tons of pig iron imports are assumed in these Base trend projections, though demand could fall in response to increases in domestic production and/or increases in the preferred use of direct reduced iron (DRI). These risks and other considerations are reflected in the downside (Low) and upside (High) projection sensitives that follow.

Table 5-4: Tonnage Projection for the Main Docks

Commodity (Tons)	2017	2018	2022	2027	2032	2037
Iron & Steel	5,448,786	5,469,340	5,652,295	5,781,213	5,781,213	5,781,213
Wood pulp	825,977	828,875	816,046	765,880	749,656	798,153
Pig Iron	720,349	700,000	700,000	700,000	700,000	700,000
Lumber	277,756	279,682	287,522	297,631	308,095	318,927
Linerboard & Paper	111,529	125,000	150,000	150,000	150,000	150,000
Chicken	91,913	70,000	70,000	70,000	70,000	70,000
Metal & Alloy	147,494	152,656	175,177	208,055	247,104	293,482
Other	194,127	200,000	200,000	200,000	200,000	200,000
Main Dock Total	7,817,931	7,825,553	8,051,039	8,172,779	8,206,068	8,311,775

Source: M&N

Sensitivities

Table 5-5 summaries the key assumptions which were used to calculate the High and Low scenarios for the Main Docks movements. These then indicate the range of volume from peak to depressed demand for the respective commodities.

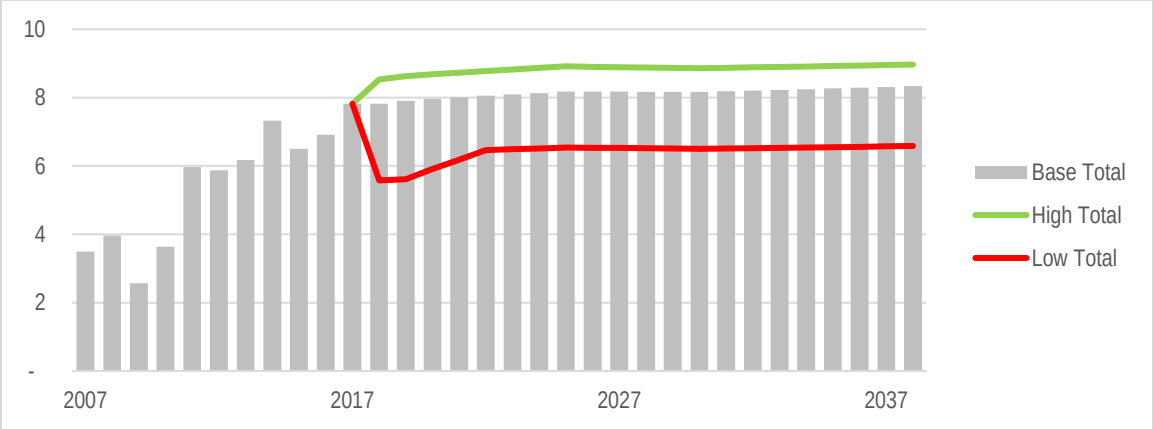
Table 5-5: Sensitivity Assumptions/Impact Summary

Commodity	High	Low
Iron & Steel	• Upside to the iron and steel projections would come from expanded capacity at the Calvert plant and/or a new customer for the steel coil. • The high estimate includes a 25% increase in the steel coil exports above the base case • Import demand of slabs is assumed to remained capped due to the plant capacity	• Import volumes fall by 1.3Mt in 2018, a roughly 30% decline as a result of a 25% increase on tariffs • Export coils fall by 25% on a similar order of magnitude in 2018 • Volumes become normalized over 2019/2020 but import tonnage never fully recovers as more volume is sourced domestically.
Wood pulp	• Import volumes are stronger as result of increased capacity on the AGR railroad as result of bridge upgrades being made. This allows for handling of 100 ton cars up from 70 tons. The high forecasts reflect tonnage 15% above the base case.	• Increased containerization of fluff pulp exports reduces breakbulk tonnage by an additional 15% below base • Import volume.
Pig Iron	• The upside case reflects volumes that are approximately 5% above the base. Current volumes are destined to a single plant (SDI Mississippi) and without a significant increase in production capacity and/or a new plant, demand would not be expected to increase. Given the strength of the $US, imports of pig iron remain favorable	• Should SDI decide to switch to domestically sourced pig iron or substitute this could negatively impact demand imported volumes through the port. To reflect this the projections assume import tonnage of roughly 350,000 tons or approximately 50% of 2017 volume.
Lumber	• Stronger than expected lumber trade could materialize should there continue to be active storm seasons in the Caribbean. US Aid policy and other factors could influence future flows, but long-term would expect normalized trade trends around the base. Therefore, a 10% increase is incorporated above the base case.	• The low case reflects the susceptibility of demand to weather in the Caribbean. Low storm activity could reduce demand by as much as 20-25% in a given year. Over the long-term trends would be expected to normalize. For planning purposes the low scenario assumes a 10% decrease relative to the base case
Linerboard & Paper	• If the Port can successfully attract 15% of IP's new production of 425,000 tons of linerboard in breakbulk form this would add incremental volume of roughly 65,000 tons through the Main Docks. This would be a significant increase above the base 125,000 tons. The AGR Railroad is upgrading bridges along their line out of Mobile which will enable the company to handoff 100 ton cars instead of 70 ton cars to BNSF Railroad	• Linerboard exports are predominantly containerized, Should future trade trend towards full containerization this could impact the tonnage handled at the Port. Depending on the container liner rates, volumes could fall by as much as 33% from the base.
Chicken	• A significant upside to the base projections of 100,000 tons of breakbulk poultry requires a change in trade policy.	• Breakbulk tonnage of poultry is at risk of losing out entirely to containerized shipments. This is through the broad underlying shift underway in the industry, and the potential for modernization in Cuba,
Metal & Alloy	• Expects that long-term that import volumes will continue to rise as aluminum in manufacturing and construction. For upside, it is assumed that import demand could trend near 300,000 tons per year, a 50% increase above the base estimate.	• Volumes may be driven lower by as much as 25% should tariffs take effect and deter imports. The low case assumes trend annual throughput of roughly 100,000 tons if containerization and domestic production replace import breakbulk demand. This would represent a 50% decline relative to the base estimate.

Source: M&N, 2018

The sensitivity projections for the Main Docks are summarized below in Figure 5-31. The upside outlook does not present significantly more volume than the Base, as much of the current total tonnage is accounted for by steel slab imports and coil exports. Without an increase in production capacity and or new power plants being serviced through the port, there will not be a large incremental steel volume coming the Port. Total throughput tonnage reaches 8.9.M tons by 2037 under the High assumptions, compared to 8.3M tons under the Base.

Under the Low projections total tonnage at the main docks falls to 6.6M tons in 2037. This reflects the negative impact that steel and aluminum tariffs could have on volume. While the most immediate effects appear near-term, until the early 2020s, some recovery in volume could be expected, with the most material impact on the import of steel slabs from Brazil.



Source: ASPA; M&N, 2018

Figure 5-31: Main Dock Sensitivity Projections

The projections by commodity under the High and Low scenarios are respectively are presented in Table 5-6.

Table 5-6: Main Dock Sensitivity Projections by Commodity

	HIGH					LOW				
Commodity (Tons)	2017	2022	2027	2032	2037	2017	2022	2027	2032	2037
Iron & Steel	5,448,786	6,005,645	6,166,793	6,166,793	6,166,793	5,448,786	4,798,945	4,895,634	4,895,634	4,895,634
Woodpulp	825,977	938,453	880,763	862,104	917,876	825,977	693,639	650,998	637,208	678,430
Pig Iron	720,349	735,000	735,000	735,000	735,000	720,349	350,000	350,000	350,000	350,000
Lumber	277,756	316,274	327,394	338,904	350,820	277,756	258,769	267,868	277,285	287,035
Linerboard & Paper	111,529	172,500	172,500	172,500	172,500	111,529	100,500	100,500	100,500	100,500
Chicken	91,913	70,000	70,000	70,000	70,000	91,913	0	0	0	0
Metal & Alloy	147,494	300,000	300,000	300,000	300,000	147,494	100,000	100,000	100,000	100,000
Other	194,127	240,000	240,000	240,000	240,000	194,127	160,000	160,000	160,000	160,000
Main Dock Total	7,817,931	8,777,872	8,892,449	8,885,302	8,952,989	7,817,931	6,461,854	6,525,000	6,520,627	6,571,598

Source: ASPA; M&N

5.4 MCDUFFIE COAL TERMINAL

The Terminal has experienced a decline in overall volume since the mid-2000s, mainly from the loss of import volumes as the Port went from serving six regional coal fired plants to only two.

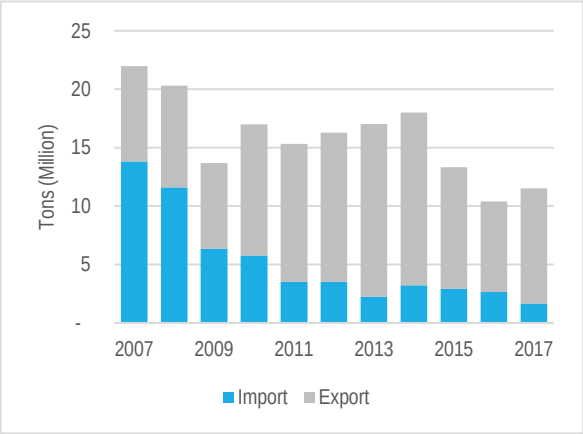
Imports through the Terminal have historically been thermal coal for Alabama-based power plants. With the low cost of natural gas, and the policy-driven need to reduce emissions, many of the coal-fired units have been converted to natural gas. Southern Company, the parent company of Alabama Power, which supplies about 2/3rd of the State's power, has reduced its number of coal fired plants from 23 to 10 across several states including Alabama.

There are currently four remaining plants in Alabama using coal including Barry (Mobile County), Lowman (Washington), Gorgas (Walker) and Miller (Jefferson). All are operated by Alabama Power except for Lowman. These are large plants with high capacities (1,200 – 2,600 MW) and could remain coal-fired given the company's desire to hedge between gas and coal processes across its portfolio.

In the near-term, future imports will continue to compete against domestic production, with an estimated 70-85% coming from domestic sources. As a result, a smaller range of 1.0 to 2.0Mt tons of imported coal could be expected.

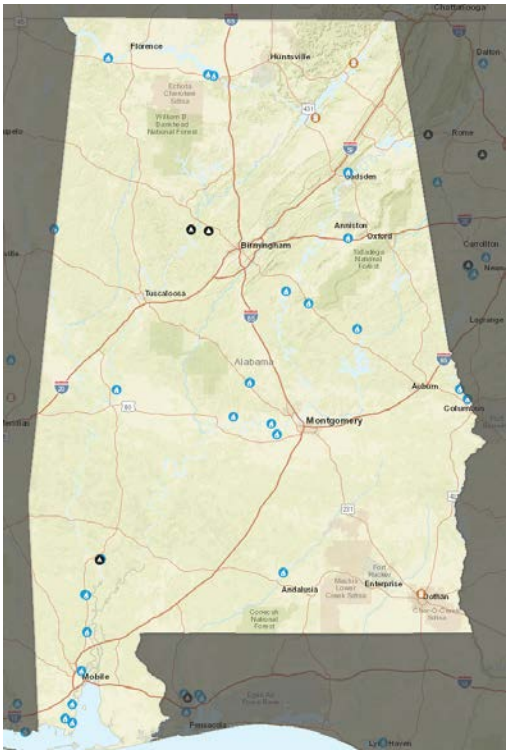
Continued global demand for steel should provide support of metallurgical coal exports through McDuffie. Much of the world's steel production continues to rely on the traditional oxygen-based production method and metallurgical coal. China, the world's single largest producer, is 95% reliant on oxygen-based production followed by Japan (78%) and India (43%).

As seen in Figure 5-34, India is not one of the traditional destinations for coal exports leaving McDuffie. accounting for only 80,000 tons of the 2.9Mt in 2017. However, it is a strong source of growth for the demand of steel, averaging 3% annually through 2040, and could prove to be a growing market for Mobile, albeit facing stiff competition from Australia and Indonesia.



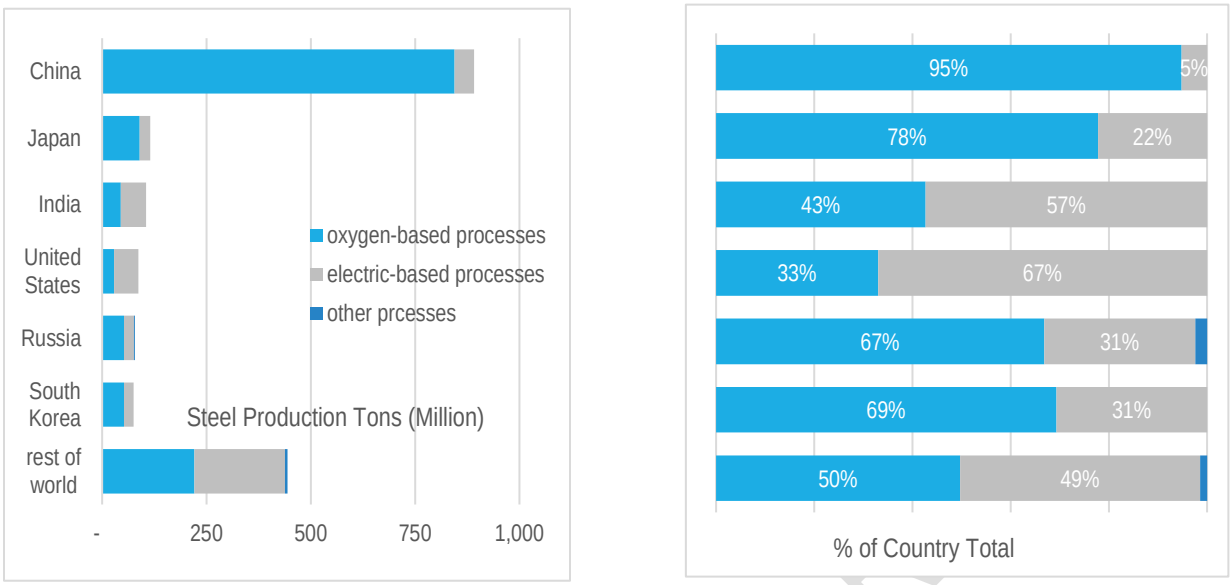
Source: ASPA;USATO, M&N

Figure 5-32: McDuffie Coal Terminal Import/Export



Source EIA

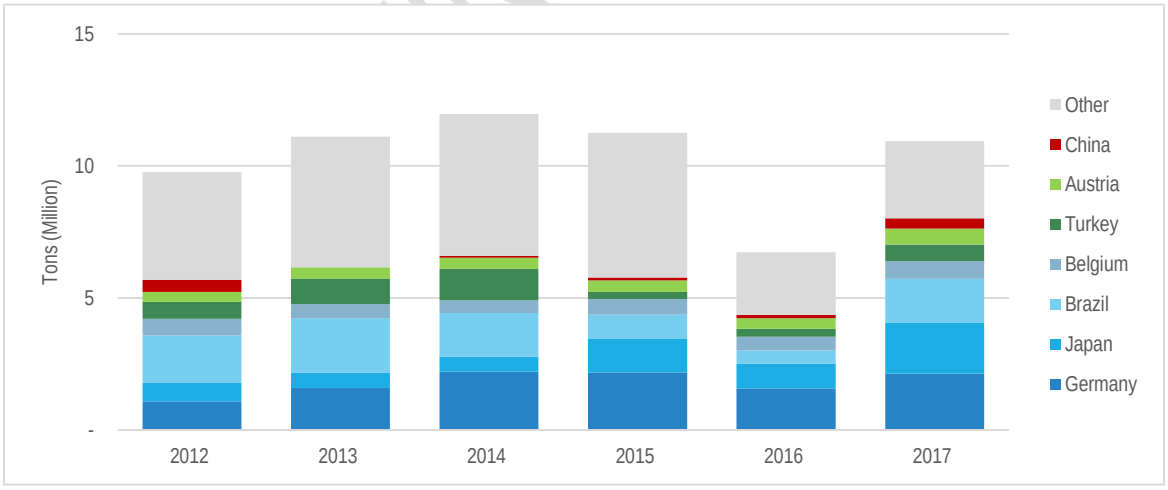
Figure 5-33: Alabama Power Plants (Coal & Natural Gas)



Source EIA

Figure 5-34: Steel Production by Country and Method

Figure 5-35 shows that the European nations served by McDuffie account for 58% of the total exports in 2017 including Germany, Belgium, Turkey, Austria, the Netherlands and Italy. The other large markets include Japan (17%), Brazil (15%) and China (4%). The UK was receiving roughly 1.7Mt of coal exports on average between 2012 and 2014, largely assumed to have been thermal, which has since fallen to below 100,000 tons. Overall exports were down in 2016 as prices fell and the $US appreciated against major competing currencies. A strong recovery followed in 2017 due to a number of factors, most notably the reduction in China's output which continued to support higher imports as well as a disruption to Australia's supply due to cyclone damage.



Source: ASPA, USATO; M&N

Figure 5-35: Destination of Coal Exports through McDuffie

The base case projection shown in Table 5-7 assumes that the total volume through McDuffie will range from 10.0 to 15.0Mt per year, with an average of 12.5 Mt. This includes continued imports of roughly 1.0Mt tons to local coal-fired plants, plus 11.5Mt in metallurgical coal exports. US coal will continue to face strong competition in Asia from Australia and Indonesia, whereas Europe and South America will be more accessible. The EU's production trends are similar to the US's showing overall declines from the Mid-2000s but appearing generally stable after the GFC at 160 – 170Mt per year. The same is true with South America at roughly 45Mt. Turkey and the Middle East show strong trends which could be supportive of longer-term growth.

Metallurgical coal is expected to continue to come predominantly from the Warrior Met Coal operations in Brookwood, AL. The company states it has production capacity for 8Mt per year from 300Mt of recoverable reserves. The Drummond mine in Shoal Creek, AL was recently sold, but is assumed that it will continue to a likely source of coal for McDuffie.

To a large extent the future of coal will continue to be driven by international policy and the baseline forecast does not anticipate any long-term significant shifts from today's global policies, including targeted emissions reductions in Europe, China and the US.

Table 5-7: Trend Projections for McDuffie

Movement	2017	2022	2027	2032	2037
Export	9,857,632	11,500,000	11,500,000	11,500,000	11,500,000
Import	1,656,121	1,000,000	1,000,000	1,000,000	1,000,000
Total	11,513,753	12,500,000	12,500,000	12,500,000	12,500,000

Source: ASPA, M&N

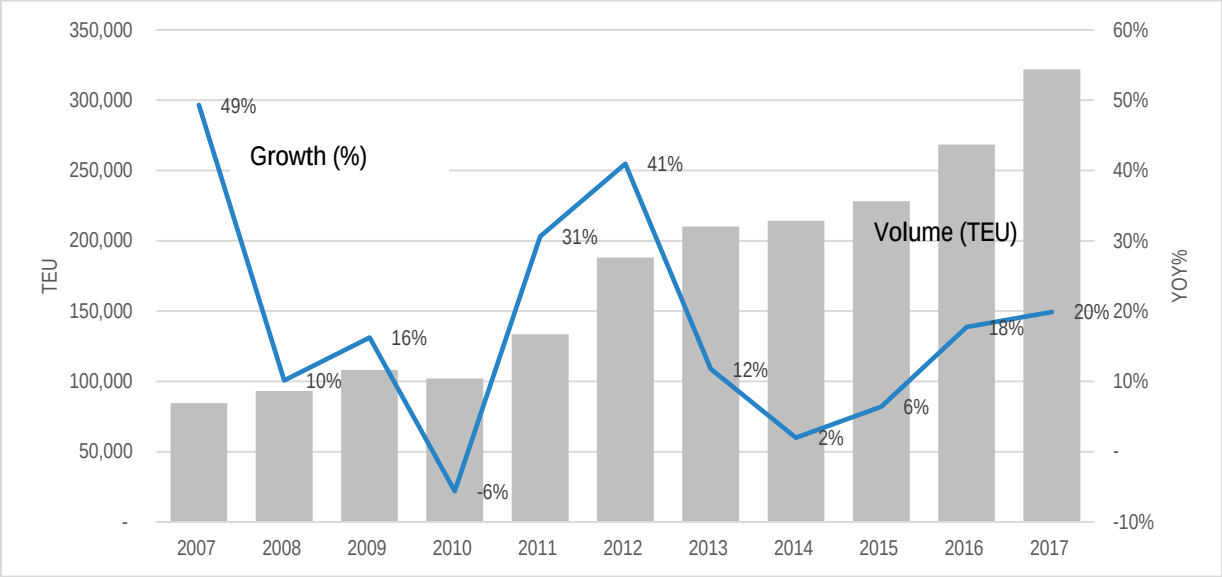
5.5 CONTAINERS

5.5.1 Introduction

This section evaluates the outlook for future growth at the container terminal operated by APMT. The analysis includes a review of the historical volume growth relative to other national gateways, and the US as a whole. In addition, a Least Cost Market Analysis [LCMA) is provided to evaluate the competitive reach of the Terminal into an extended hinterland market, based on estimates of the cost of serving inland locations. This LCMA analysis includes both the truck and rail served regions for which the Terminal competes or could serve. Estimates of future growth are derived from the trend growth of the underlying market, assumed capture of market share and continued containerization of traditional breakbulk and bulk commodities as discussed in earlier sections of this report.

5.5.2 Comparative Performance

Container volume through the APMT Terminal has shown strong growth since opening in October 2008 and passed 310,000 TEU in 2017. As seen in Figure 5-36, trade through the Terminal has grown by an average of 15% annually, marked by two periods of accelerated growth, in 2011-2013 and 2015-2017. The earlier period was market by a surge in containerized exports of pulp, chicken and iron & steel products, and the more recent period by imported containers including auto parts and consumer products. This most recent increase has been supported by increased services to/from Asia.



Source: APMT; AAPA; M&N

Figure 5-36: TEU Volumes at Main Docks + APMT – 2007 to 2017

To put the growth at the Terminal in perspective,Table 5-8 shows the average growth for US ports as a whole, the leading coastal gateways and the Gulf region in detail. Some of the discernible trends include the US East Coast (NYNJ, Savannah and Charleston) generally outperforming the US West Coast (LA/LB), which reflects increased all-water service from Asia via the Suez and Panama Canals, the US Southeast being a regional leader due to favorable demographic and manufacturing trends, and Houston and Mobile being leaders in the Gulf; with the growth at Mobile far outpacing that of the national and regional averages.

Compared to individual ports, the average 11.9% annual growth rate in Mobile ranks highest of those identified, albeit from a very low initial base. LALB, the largest port complex in the US, grew by an average annual rate of 2.9% while NYNJ, the largest East Coast gateway, grew by 3.5%. The US Southeast has been the strongest performer on a regional basis with both Savannah and Charleston approaching 7% average annual gains. Within the Gulf, Houston remains the largest container gateway handling roughly 2.5M TEU in 2017, followed by New Orleans (0.5M TEU). The Port of Gulfport remains a key import gateway for chilled-perishable fruits and vegetables but has struggled to maintained positive growth.

While this strong performance at The Port of Mobile does start from a comparatively low base, it is nevertheless impressive, and indicative of the potential to continue to build

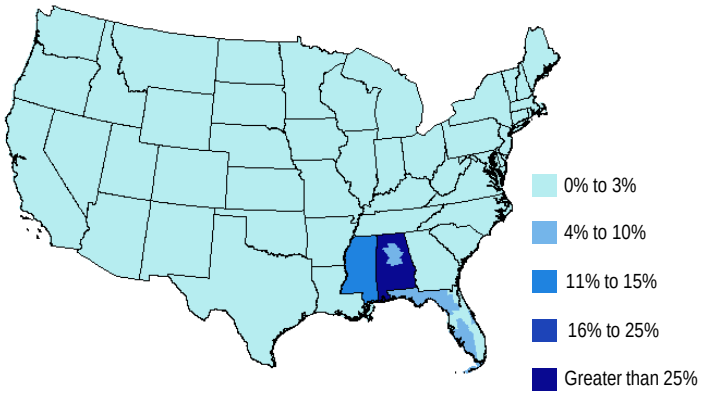
Table 5-8: Container Growth by Region/Port 2010 - 2017 (TEU)

Region/Port	2010	2017	*CAGR*
US	35,693,221	45,142,197	3.4%
Southeast			
Savannah	2,825,179	4,462,122	*6.7%*
Charleston	1,364,504	2,177,551	*6.9%*
Gulf			
Houston	1,817,169	2,250,987	*3.1%*
New Orleans	427,518	521,842	*2.9%*
Mobile	146,761	321,928	*11.9%*
Gulfport	223,740	190,894	*-2.2%*
NYNJ	5,292,025	6,739,605	*3.5%*
LALB	14,095,401	16,858,591	*2.6%*

Source: AAPA, APMT, M&N; Green indicates above the national average

volume. The growth through the Gulf Coast ports, including Mobile, should continue to be led by the following long-term drivers:

- Access to base industries including forest product and meat for which the US is a global leader
- Growing high-value manufacturing base including autos, airplanes and oil & gas equipment
- Gas/Energy-rich area which supports wide range of gas and petrochemical products including plastics and resins
- Growing population base and developing consumer product logistics (distribution centers)
- Increased North-South trade with South/Central America
- Increased direct Asian cargo through the expanded Panama Canal



Source: FAF; M&N

Figure 5-37: Origin and Destination of Mobile Container Movements

As such, the Port of Mobile is on the offensive and in a favorable position with regards to the container trade. Where many national gateways which have more mature, traditional markets find themselves competing in order preserve market share, the Port is currently in the process of capturing share within its local market and seeking to compete more aggressively in a more expansive discretionary market, as discussed below.

5.5.3 Existing Market

Local Market

As of 2017 most of the trade handled through the container terminal is truck-based, suggesting the facility currently serves a local market with limited penetration into a rail-served hinterland market. Just 1.1% or 3,500 TEU of the total volume utilized rail in 2017, according to APMT management. Therefore, the recent strength of the Port of Mobile's container trade indicates that the Port has been actively capturing share within its local market, which predominantly consists of Alabama, Mississippi, and portions of western Florida.

The local market identified in Figure 5-37 presents an overview of the origin and destination of the Port's container trade using the Federal Highway Administration's (FHWA) Freight Analysis Framework (FAF) data set. The FAF data provides detailed estimates of the volume (by SCTG commodity code) of freight transferred between regions (132 US FAF Regions) by mode (truck, rail, water, pipeline, air and combination).

The FAF analysis indicates that the Mobile container trade composition is 70% from Alabama, 15% from Mississippi, 10% from Florida and 5% from other. This is consistent with the qualitative estimates M&N received from stakeholders during the interview process for the Master Planning effort. Therefore, the outlook for future growth through Mobile will continue to be contingent on underlying, organic growth of and capture within the local market) and the ability to extend reach into a discretionary market.

Local Market Share

It is estimated that the size of Alabama and Mississippi's container import and export market was roughly 840,000 – 995,000 TEU in 2017, including empties. This estimate is based from the FAF analysis and combined with US Census Data that provides import/export trade by

containerized and non-containerized weight as well as port container statistics, to provide an indication of the throughput volume of containerized cargo to/from individual markets for a given container port. The second estimate is made taking the real GDP share of the respective states and allocating total US container trade proportionally. The GDP-based estimate should collectively reflect the consumer, manufacturing, and construction activity which accounts for the majority of container trade in the US as follows:

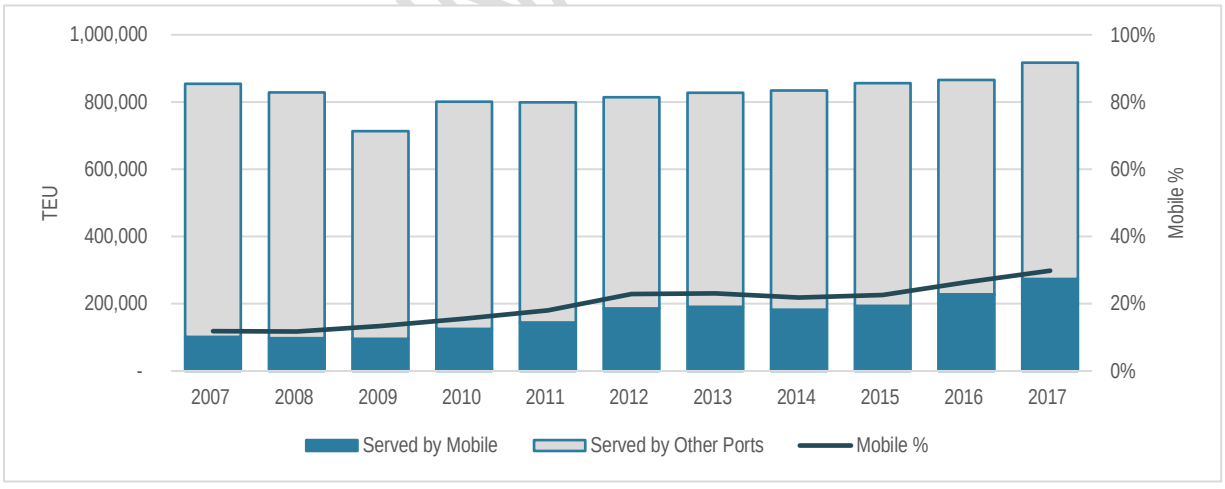
- Alabama @ 1.1% of national GDP x 45.1M TEU = 550,000 TEU
- Mississippi @ 0.6% of national GDP x 45.1M TEU = 290,000 TEU.

Table 5-9: Estimates of Alabama and Mississippi Container Market (Full TEU)

Source	Alabama	Mississippi	2-State Total
FAF-Based TEU	610,000	385,000	995,000
GDP-Based TEU	550,000	290,000	840,000
Average	580,000	337,500	917,500

Source: M&N

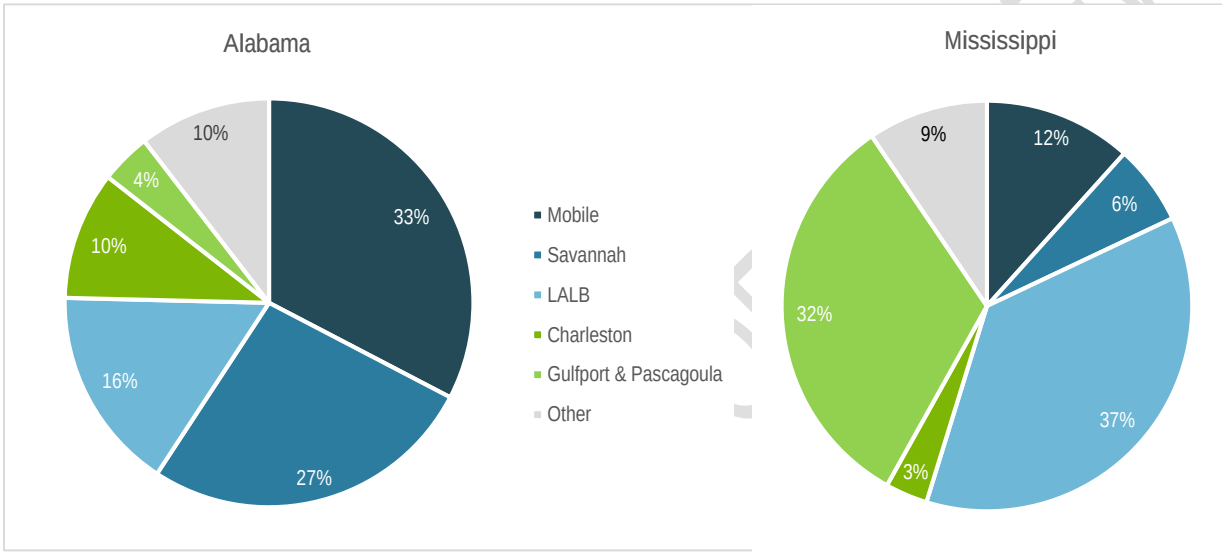
It is in these two states that the majority of the Port's container trade is currently concentrated, and it is also in these two states where the Port enjoys its greatest cost-competitive advantage. Therefore, the potential to continue to increase the capture of "local" market share will most likely come from within these states. Given 85%+ of the 321,928 TEU total for the container terminal in 2017 was destined to/from Alabama or Mississippi, it would indicate that the Port now maintains a 30% share of this total market as shown in Figure 5-38. This would imply that over the past decade the Port has been able to add about 20% share of the local market since 2007 which in turn suggests that upside potential remains.



Source: M&N

Figure 5-38: Container Volumes in Mobile, Alabama and Mississippi

The respective port shares of Alabama and Mississippi, as presented in Figure 5-39, show how contested this market is by Gulf, East and West Coast ports. Within Alabama, the Port of Mobile appears to hold about 33% of the total loaded import + loaded export volume, followed by Savannah (27%), LALB (16%) and Charleston (10%). These Southeast ports (namely Savannah and Charleston) are well positioned to compete for share within Alabama, particularly in the northern industry heavy counties. Huntsville, AL to Mobile is about 360 miles compared to 430 to Savannah and 500 to Charleston. Within Mississippi, the Port maintains about 12% market share, with LALB (37%) and the combined Gulfport/Pascagoula (32%) representing the largest gateways. Southeast ports do not appear as competitive to this market, with LALB winning a significant share of the import cargo.



Source: FAF; USATO; M&N

Figure 5-39: Port Share of Total TEU to/from Alabama and Mississippi (Loaded Containers)

Despite Mobile's growth, the presence of ports such as LA/LB and Savannah which have leveraged intermodal connections to extend their respective hinterland markets will continue to compete aggressively for share within the Gulf Coast states. This has been particularly the case with time-sensitive consumer related products from Asia which typically enter the US through the Southern California ports and are railed across-country to US Midwest, Gulf and East Coast markets. Even with the development of consumer-facing distribution centers in/around Mobile suggesting that some of this traditional dominance is being lost, and that the Port of Mobile's market share capture will likely continue, it is probable that both the West and East Coast ports are likely to remain key gateways into Alabama and Mississippi.

As a benchmark within the Gulf, it is estimated that the Port of Houston averages approximately 50 – 60% of the total trade in Texas. In the local Houston market, the port's share is estimated at close to 70% while in Dallas, a significant hub for intermodal rail from the West Coast, the port's share is closer to 40%. These differentials reflect the competitive nature of moving freight by different modes.

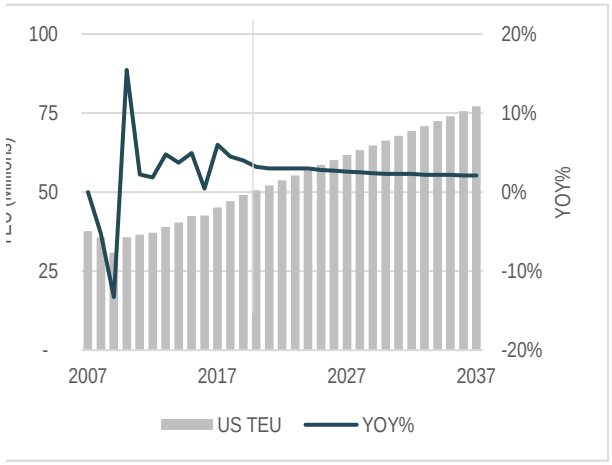
For the Port of Mobile, it again suggests that there continues to be upside potential to secure share in the local market and seek out competitive hinterland markets utilizing the ICTF. The competitive position of the Port of Mobile in both the local and extended hinterland markets is presented in the following section.

5.5.4 Container Projections

The baseline container projections for the APMT terminal are based on assumptions of growth in the underlying market, the Port's continued capture in its local market and the potential for additional containerization of traditional breakbulk commodities. The potential impact of higher ICTF volumes and expanded inland connections or container facilities are not included in the baseline projections but represent a strong potential upside for the Port.

5.5.5 US & Gulf Trends

As seen in Figure 5-40, It is estimated that US container trade could grow by an average of 3.3% annually from 2017 through 2025. This would represent an average 1.5X multiplier to US GDP growth of 2.2%[4] over that time. Clearly, there are likely to be periods of cyclical performance, perhaps even recessionary, but for the purposes of long-term planning this level of growth is indicative of an average trend performance.



Source: M&N

Figure 5-40: US Trend Container Projections

During this period imported containers are projected to remain the largest volumes, supported by consumer, manufacturing and construction related items. With a renewed interest in protecting US manufacturing, any offset in the import of finished products could be offset by the need to import manufacturing inputs to support production. Despite remaining lower in total volumes, the growth of exports could in fact accelerate and begin to approach the trend of import growth rates. The International Energy Agency (IEA) recently projected that the US will become the world's single largest oil producer by 2023, surpassing Russia. This, along with the robust growth in associated natural gas, will support an array of petro-product derivatives including plastics and resins. Additionally, further containerization of bulk agriculture commodities could continue to be leading sources of growth for exports.

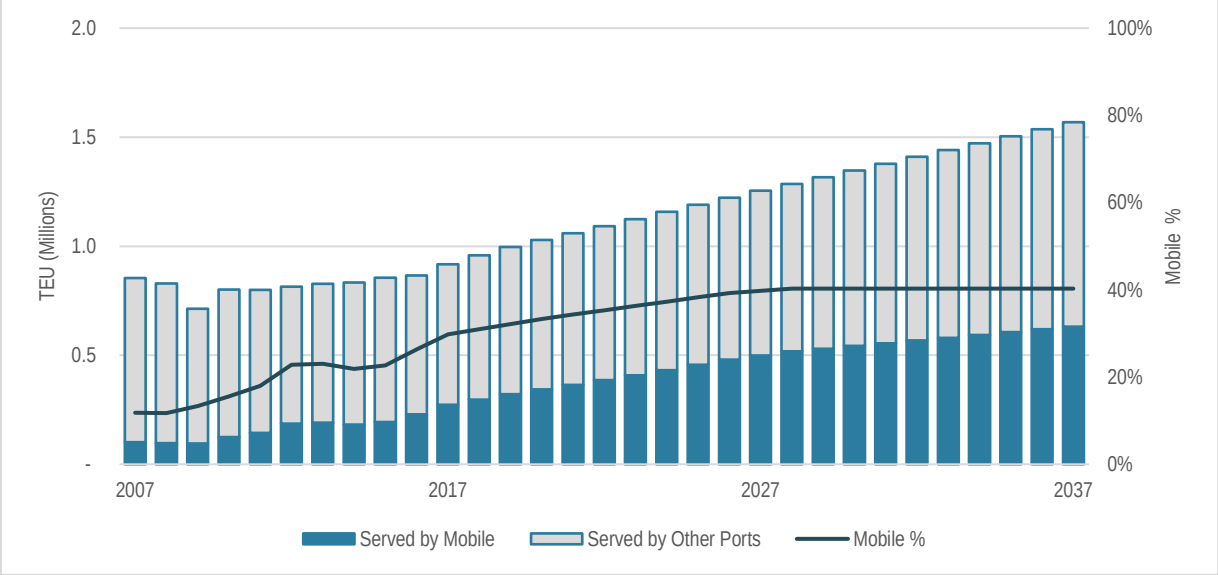
The Alabama/Mississippi market could grow from the estimated 917,500 TEU in 2017 to approximately 1.5M TEU by 2037, as presented in Figure 5-41. This assumes that the two states can continue to grow in line with the rest of the country and maintain their collective share of 1.8% of the national GDP. This would imply the same projected average annual growth of 3.3% between 2017 and 2025. In recent years this combined local market did not keep pace with the national average, slipping from 1.9% of US total GDP in 2007. This slight underperformance was primarily the result of the strong growth in the oil and gas sector following the GFC, which provided stronger growth on several large states including Texas, Pennsylvania and North Dakota. Given the outlook for more tempered growth in this sector going forward, coupled with the influx of high-value manufacturing in the local market, it is reasonable to expect that Alabama and Mississippi will grow with national trends.

All indications show that the Port of Mobile's capture within the local market is likely to continue given the momentum it has generated and the increased number of ocean carrier services it has been able to offer. The forecast then assumes that the Port's share will grow from 30% in 2017 to roughly 40% by 2027, as shown in Figure 5-41.

Once this level of market penetration is reached, capture is expected to be capped as the competition intensifies for more discretionary volume in markets such as those in northern-Alabama. As a result, container trade destined to/from the local market through the Port of Mobile

[4] *Consensus GDP estimates for 2018 – 2020 from the Philadelphia Federal Reserve's Survey of Professional Forecasters Q1 2018*

would grow from an estimated 274,000 full TEU in 2017 to 632,000 by 2037. Assuming that these volumes account for 85% of the total APMT traffic, this would imply a port total 743,000 TEU by 2037, excluding empties.

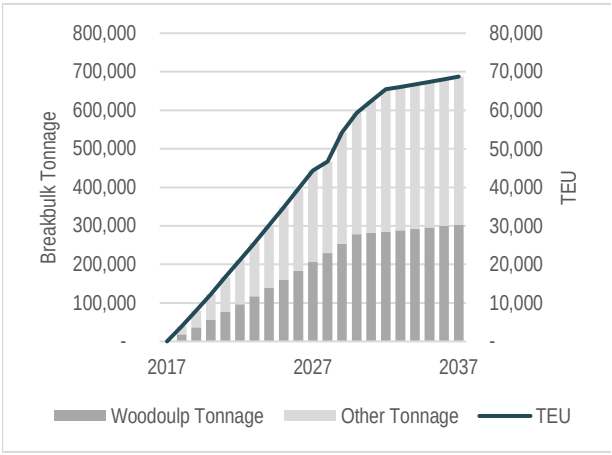


Source: M&N

Figure 5-41: Projection of Mobile & Other Port Container movements in Alabama and Mississippi

5.5.6 Containerization Trends

In addition to the local market volume, it is likely that continued containerization of breakbulk products will also contribute to the growth of container volumes through the Port. This containerization trend could potentially add 45,000 TEU by 2027 and 70,000 TEU by 2037 to the trend projections, as presented in Figure 5-42.



Source: M&N

Figure 5-42: Assumed Containerization of Breakbulk Products

The outlook for future containerization-related volumes is based on the following assumptions:

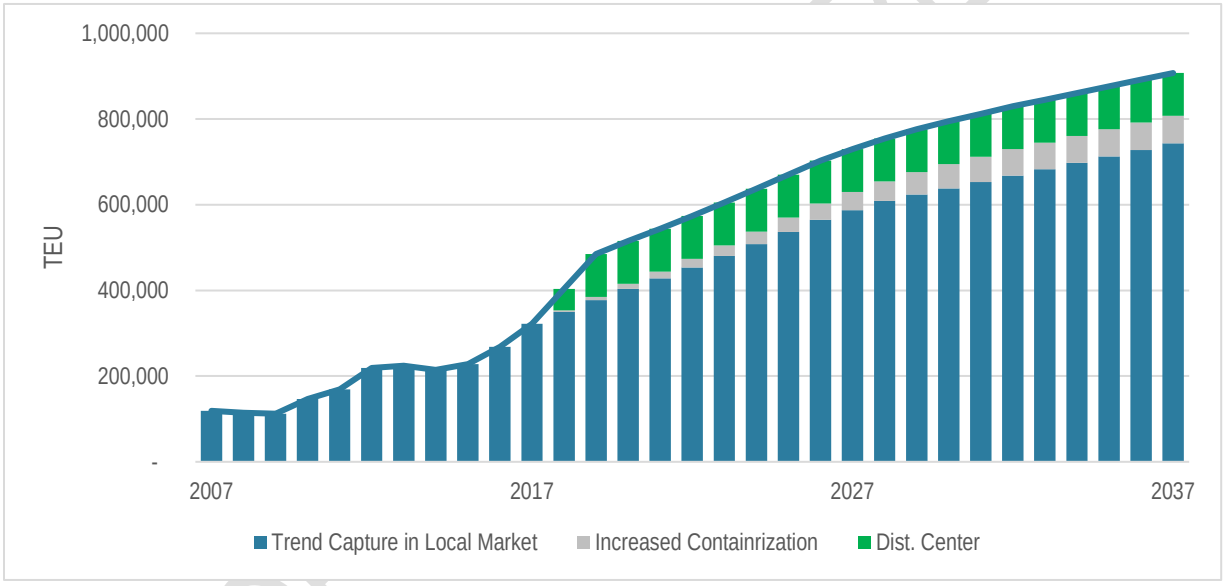
- Wood pulp: The projections developed in Section 5.3 suggest that containerized tonnage share of total tonnage will increase from 43% in 2017 to a peak of 58% by 2029. This implies that approximately 210,000 tons of containerized wood pulp will be added to the container volumes being handled by 2027. Assuming 10 tons of cargo per loaded TEU, this would equate to 21,000 TEU of wood pulp trade.
- Other: An annual increase of 0.3% would be reasonable for containerization of the projected remaining break bulk tonnage handled at the Main Docks, up to a max of 5% by 2032, excluding the wood pulp, steel and pig iron. This implies that by 2027

roughly 240,000 tons of other commodities will be containerized. Again assuming 10 tons/TEU, this would equate to an additional 24,000 full TEU being handled at the container terminal.

Since empties will depend very much on overall import/export splits, they are not included in this initial assessment of the container projections.

5.5.7 Projections

Estimates of future throughput at the container terminal, indicate that total volume could approach 730,000 TEU by 2027 as a result of local market capture and moves from break bulk to containerization. Based on public information and figures from ASPA, 50,000 TEU are then added to reflect a half year of operation of the Walmart DC in 2018. For 2019, 50,000 loaded import and 50,000 export TEU from Walmart are added to the baseline projections. Should additional big-box DCs be developed nearby, these too would bring incremental volume to the terminal.



Source: M&N

Figure 5-43: TEU Projections for Mobile/APMT

6 MARKET EXPANSION POTENTIAL

6.1 INTRODUCTION

This section evaluates potential for new business areas for the Port above and beyond the baseline cargo projections. It also reviews some of the initiatives being pursued by ASPA and regional ports to gain or improve access to commerce and industry within their respective or potential areas of market capture.

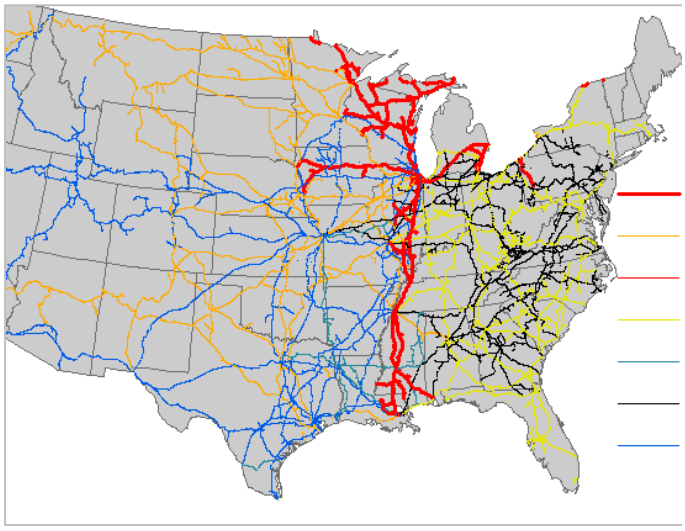
6.2 LEAST COST CONTAINER MARKET ANALYSIS

A Least Cost Market Analysis (LCMA) is first presented to identify the favored gateway(s) to serve hinterland markets. The analysis models the entire import or export logistic chain for multiple competing ports from origin to final inland destination. This involves estimating the ocean voyage cost, port costs, and inland transportation costs, either by rail or by truck. The model then computes costs for an origin/destination pair to/from all US counties via major competing ports. This process is repeated twice, once for rail moves within the US and again for truck-only moves. Once all the costs are computed, each county can be assigned a port-mode combination with a mode of either rail or truck, dependent on which one serves that county at the lowest cost. The cost components used in the LCMA modelling are elaborated below:

- Inland Costs (IC) – are the costs involved in delivering a container to its destination, either by truck or by intermodal rail
- Terminal Handling Costs (THC) – with respect to import moves, these are the costs associated with moving a box off a vessel, positioning it in the terminal yard, and processing it out the terminal gate.
- Ocean Cost (OC) – a separate model calculates the ocean voyage cost of shipping a single container. This model takes into account many factors such as vessel size, sailing distance, speed, port rotations, fuel costs and canal tolls.

This analysis portrays conditions as of March 2018, including the average vessel size per ocean string calling the respective ports as well as the published intermodal schedules linking the ports to the inland rail hubs. This is done in effort to best replicate the market environment in which the ports compete. It is recognized that there are limitations to the LCMA analysis and it is recommended that the maps and conclusions should be considered as indicative and not as absolute.

For this analysis the model output consists of LCMA mapping for the two dominant trade lanes currently served by the Port, North Asia and Central/South America. The analysis also includes a map of “pre” and “post” ICTF construction to demonstrate how the facility helps improve the competitive reach of the Port into more extensive, discretionary markets.



Source: M&N

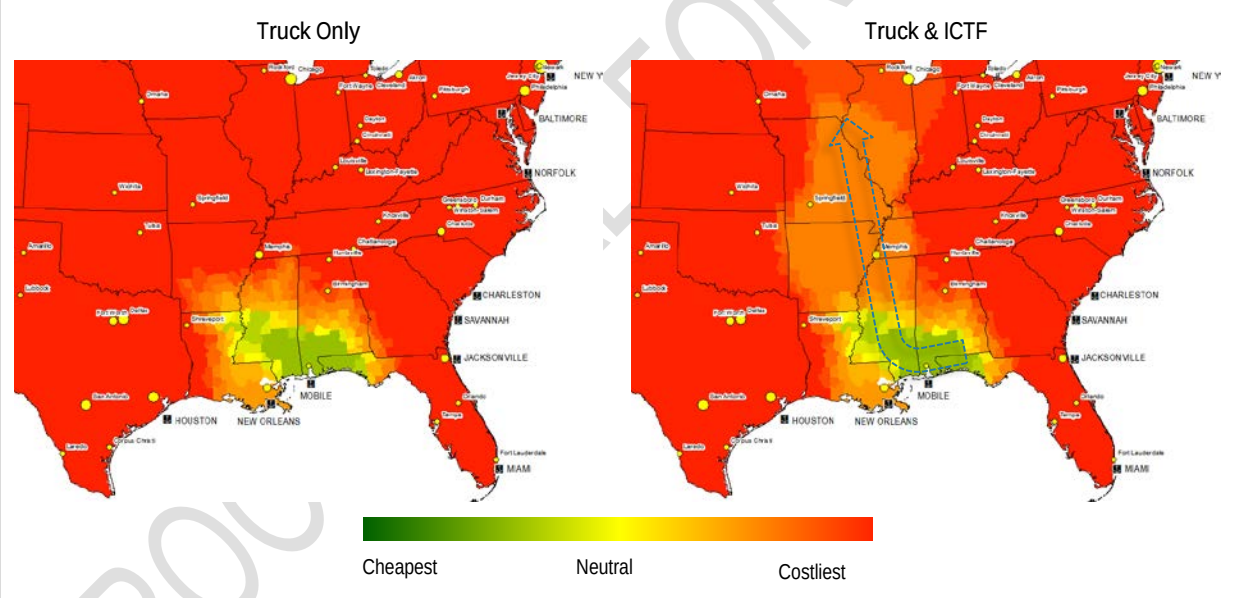
Figure 6-1: Regional Class 1 Rail Routes

The CN route, denoted in red in Figure 6-1 should be leveraged to extend reach northward into the US Midwest, while connectivity to the major east-west lines could allow for expansion into broader markets.

6.2.1 Competitive Market Reach

Mobile enjoys the strongest competitive position, relative to North Asia and South/Central America gateways, in Southern Alabama, Mississippi and Western Florida, as illustrated in Figure 6-2 and Figure 6-3. These figures illustrate the cost differential of moving a container through the Port relative to the least-cost gateway. The regions denoted in shades of green are those in which the Port of Mobile serves as the gateway port in the calculated low-cost logistics route, including ocean & inland costs for the particular trade lane. The regions denoted in yellow and orange are those in which the Port is competitive and can either match or is slightly more expensive then the lowest-cost logistics route. The regions in red are where it is increasingly more difficult for the Port to compete, and where there is low-cost alternative which could be substantially less expensive than the route through Mobile.

The analysis appears to confirm in part why the ports of LALB, Savannah and Charleston all have a sizable share of Alabama's market. Though it is known that imports through Mobile are destined to the northern half of the State, including Birmingham and Huntsville, it remains a hotly contested market. For import volumes arriving from Asia, intermodal moves through the West and East Coast ports into important regional hubs such as Memphis and Atlanta can competitively enter the northern Alabama market. These ports also currently have the advantage of receiving larger vessels on their Asian services which average 14,171TEU at LA on the Pearl River service and 13,386 TEU at Savannah (the SAX) compared with 6,766 TEU at Mobile (the PEX3). The larger vessels allow for a lower vessel cost on a per-TEU basis, explaining the advantage of shipping containers through LA and Savannah while also implying that should Mobile begin receiving larger vessels its inland competitiveness will improve.



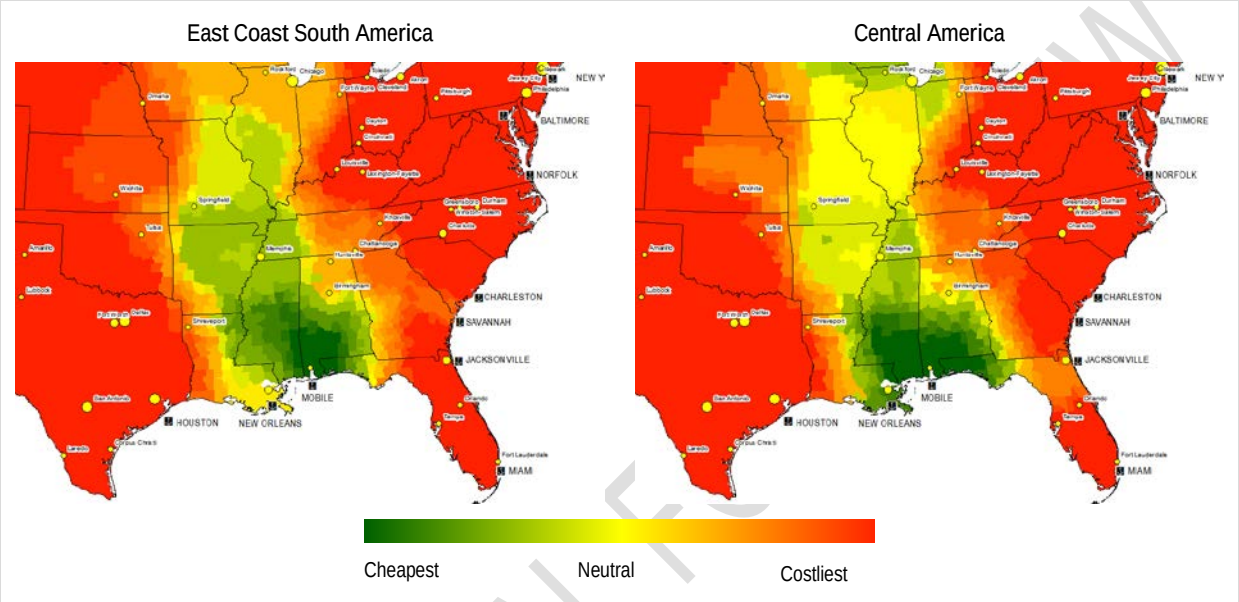
Source: M&N

Figure 6-2: North Asia LCMA (Cost Differential)

The impact of the ICTF is clearly visible in the right-side map in Figure 6-2 and both maps in Figure 6-3. This facility allows for Mobile to improve its competitive position for markets throughout the South and Midwest regions of the US. Utilizing the CN network as the foundation for rail connectivity, rail moves can easily access the major hubs in Memphis, St. Louis, Chicago and as far north as Minneapolis/St. Paul. This system extends into Canada linking with the Port of Prince Rupert in British Colombia in the west and Montreal all the way to Halifax in the

east .For the Asian trade lane, the Port does not become the outright low cost option, but does slide to a more neutral position, meaning that it could be more expensive but not likely prohibitive as is the case with the northern Alabama market.

For the South/Central American trade lanes, the Port is estimated to clearly be the low-cost option for a larger area. APMT does not currently have a direct service with South America and thus this offers upside potential should the company successfully attract one. There are three services which call ports in the Caribbean/Central America including the TP18, TA3 and CTB.



Source: M&N

Figure 6-3: South/Central America LCMA with ICTF (Cost Differential)

Through the ICTF connectivity, Mobile's competitive position improves in a region which collectively accounts for roughly 9% of the US market, or 4.1MTEU (across all trade lanes), based on the population and concentration of goods producing/consuming activity located within each region. This underscores the strong potential that the development of a rail-based business at the container terminal represents. Should Mobile be successful at attracting even a small share of this volume, it would add considerably to the level of containers handled at the Port.

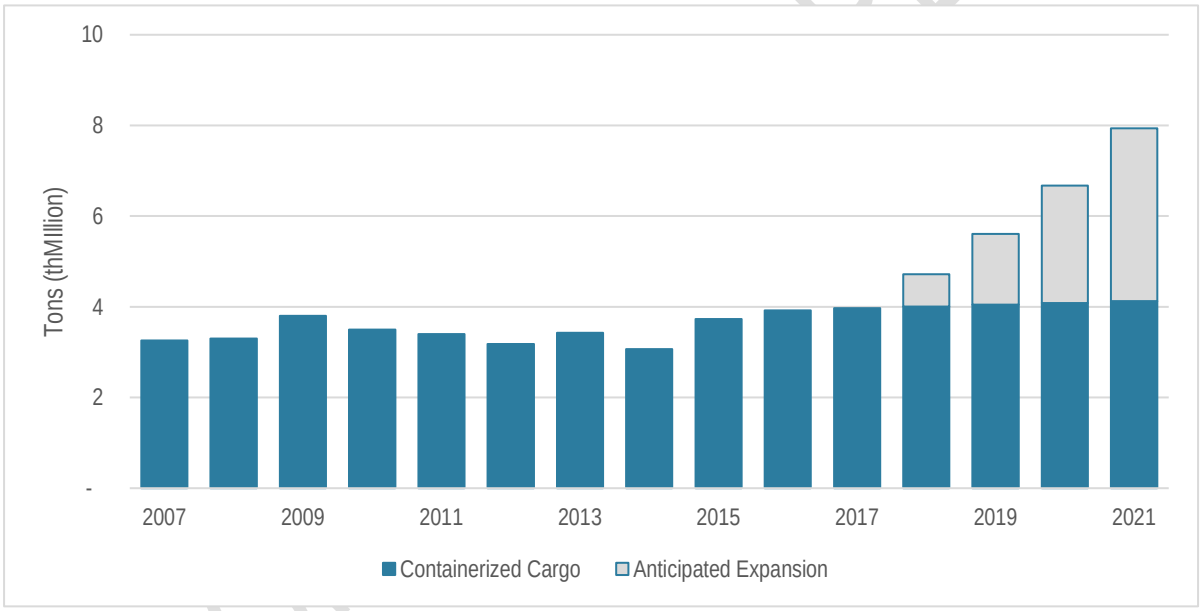
6.3 NEW OR ENHANCED COMMODITY POTENTIAL

Demand for protein exports from the US is well supported by the global population growth, and wealthier consumer bases in developing Asia and South America which have increasing propensity to eat meat. The US is the second largest global exporter of frozen chicken, accounting for 15% of the market, trailing Brazil's 40%, and therefore should continue to see strong export demand for this product. The US Southeast/Gulf states comprise the focus region, as they are the leading producers/exporters of frozen chicken. It is considered that the tonnage of US frozen chickens will continue to grow at an average 3-4% annually as a result of the on-going changes in the underlying market. In addition, there could also be potential for the import of marine products from Central and South American economies such as shrimp or other seafood.

Within the focus region, the Ports of Savannah, Charleston and New Orleans collectively accounted for 92% of the total export tonnage of frozen chicken moving through region's ports in 2017, up from 64% in 2007. This capture in market share has resulted from a confluence of factors including connectivity to production locations, increased containerization and number of container services as well as development of new dedicated cold storage facilities.

6.3.1 Resins

Market Overview: The resin industry manufactures the base materials for plastic products through a chemical process at resin plants. These facilities are concentrated in the Gulf region of the US due to the access to relatively cheap stocks of natural gas which is used in the process. Exports are expected to show strong growth in the future as the US ramps up production and volume continues to move in high quantities to Asia. According to some estimates from JOC, production of PE resin is expected to increase by an additional 9 million metric tons per year in North America by 2021, resulting in an increase in exports of about 500,000 TEUs of synthetic resin per year over that time period or approximately double the current volume. This would be a boost to growth which has been relatively flat in recent years, as seen in Figure 6-4, and reflects a potential scenario in which 2017 volumes are doubled by 2021.



Source: USATO; M&N

Figure 6-4: Containerized US Resin/Polymers Exports, 2007-2017

The strong projected growth in resin/polymer exports is supported by the recent and planned expansion of production capacity as production as presented in Table 6-1, which indicates 6.4M tons of potential new production by 2019.

Table 6-1: Resin Production Expansion in the Gulf

Type of Facility	Owner/Operator	Area/Location	Annual Capacity	Start of Operations
Polyethylene Resin Production (will be fed by a steam cracker in Baytown)	Exxon Mobile Chemical Co.	Mont Belvieu, TX	1.4 Mt	2017
Ethylene and Plastics Plant	Dow DuPont	Freeport, TX	1.5 Mt	2017
Polyethylene Resins	Chevron Phillips Chemical	Old Ocean, Texas	1 Mt	2017
Polyethylene Resins	Sasol	Lake Charles, LA (expected to ship through port of Houston/New Orleans)	1.5 Mt	2018
Company Headquarters/Monoethylene Glycol (MEG) Plant and Ethane Cracker Complex	Lotte Chemical (Westlake Chemical is co-investing in the cracker complex)	Lake Charles, LA	1 Mt	2019

Source: Plastics News; Chron; S&P Global Platts; JOC; Louisiana Economic Development (LED)

According to S&P Global Platts, eight new crackers and 14 polyethylene plants are expected in the Gulf Region through 2019 with further announcements expected which could lead to annual market surplus of 8.2 million metric tons over the next ten years. The west and southeast coast ports are competing for this expected increase in resin production. Rail lines such as UP and BNSF are preparing for additional volume to the west coast while lines such as CSXT and NS are preparing to serve ports such as Savannah. A new bulk-to-container packaging center in Dallas, TX is being built for that exact purpose. Expected to open in the third quarter of 2018, the facility operated by Katoen Natie will be 250,000 sf.t with plans to expand to 2.5 million sf.t in the future. This facility will be serviced by UP and will containerize bulk shipments of synthetic resins from gulf coast facilities to be railed to the west coast and shipped to Asia. Reports from JOC suggest BNSF may have similar plans to take advantage of the growing market while CSXT and NS are also attempting to handle a greater share of resin exports that exit the US via the southeast US. As of right now, the west and east coasts are being heavily considered as alternatives to the gulf ports due to the greater number of Asian services.

Facilities: New production facilities and expansions are being constructed primarily in Texas with additional facilities in Louisiana. Companies with plans to expand production include ExxonMobil, Dow Chemical, Chevron Phillips, Ineos Sasol, Formosa Plastics USA, and Indorama Ventures which completed an expansion of its resin facility in Decatur, AL in 2015 (Figure 6-5). Warehousing companies and rail lines (such as the joint project between UP and Katoen Natie in Dallas previously discussed) are taking advantage of this growth in production by investing in bulk-to-container warehouses that receive the bulk shipments from the supplier and containerize it for export. A&R Logistics is currently building a 200,000 sf.t warehouse, with plans to possibly expand it to 500,000 sf., located at the port of Savannah and serviced by NS and CSXT. The Port of Houston currently handles most of containerized exports of resin from the US, however, given such a large increase in US production and capacity constraints at Houston over the new few years, shippers are looking for additional routes. Houston is investing $1.3 billion in improvements in order to handle the additional volume, but shippers are looking for alternative routes using bulk-to-container packaging centers and intermodal rail via the West coast, East coast, New Orleans, and Mexico.

Source: Indorama Ventures

Figure 6-5: Indorama Ventures PET Resin Manufacturing Facility in Decatur, AL

6.4 AUTOS & RO/RO

Development of the $60M dedicated RoRo facility at the Port of Mobile is well advanced, with the PPP agreement now signed with JV partners Terminal Zarate and SAAM. Additionally, with the recent announcement of $12.7 mm from the US Department of Transportation TIGER grant program, and $29 mm from the RESTORE act, it would indicate that the broader transportation community recognizes the potential/significance of this project. This section presents some of the underlying market conditions in which the new terminal will operate.

6.4.1 Market Trends

Sales of new passenger vehicles reached a record high of 17.5 million units in 2016 with a slight decline to 17.2 million units in 2017. The overall demand for new vehicles has been supported by stable growth in US employment and income sectors since the GFC. The driver of sales has been light trucks (pickups, SUVs, etc.) which now account for approximately 65% of total sales in the US. A sharp decline in the price of fuel following the recession has been a significant reason behind this renewed interested in light trucks as fluctuations in gasoline prices tend to sway consumer interest towards either light trucks or fuel-efficient vehicles.

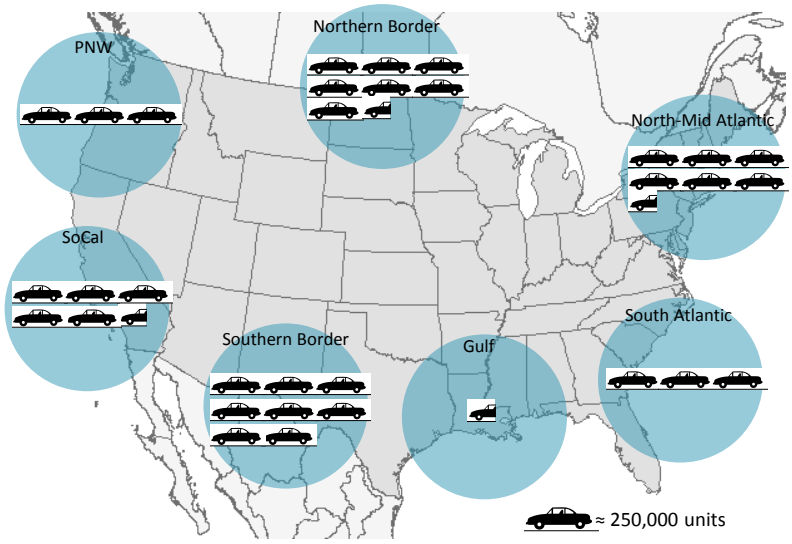
Of these sales, domestically produced vehicles represent the largest volumes, accounting for roughly 60% of the total, with the remaining 40% split between land-based and sea-based imports (produced internationally). The split between land and sea-based volumes tends to be about even at 3.5M units each per year.

Traditionally, vehicles produced in Canada and imported across the border represented the single largest gateway, but more recently this has shifted south such that vehicles produced in Mexico and imported across the southern border have been become the largest, as seen in Figure 6-6. In terms of the sea-based volumes, the regions which have traditionally supported the largest volumes include the high population centers of the US Northeast/Mid Atlantic and Southern California, which supported trade of vehicles produced in Japan, Korea and Europe.

Nevertheless, as population demographics have generally become more favorable throughout the South, particularly in the Southeast, the growth sales in these states have supported growth in import volumes through many of the regional ports including Charleston, Savannah and Jacksonville, which collectively handle roughly 800,000 units per year. By contrast, imports through the Gulf Coast ports is limited, collectively handling roughly 125,000 import units. With good connectivity to strong demand populations, the growing importance of Mexico as a source, as well as the continued growth of the South's role as an auto production center in the US (Figure 8-2), offers a significant opportunity for a Gulf Coast port to develop a new RoRo gateway.

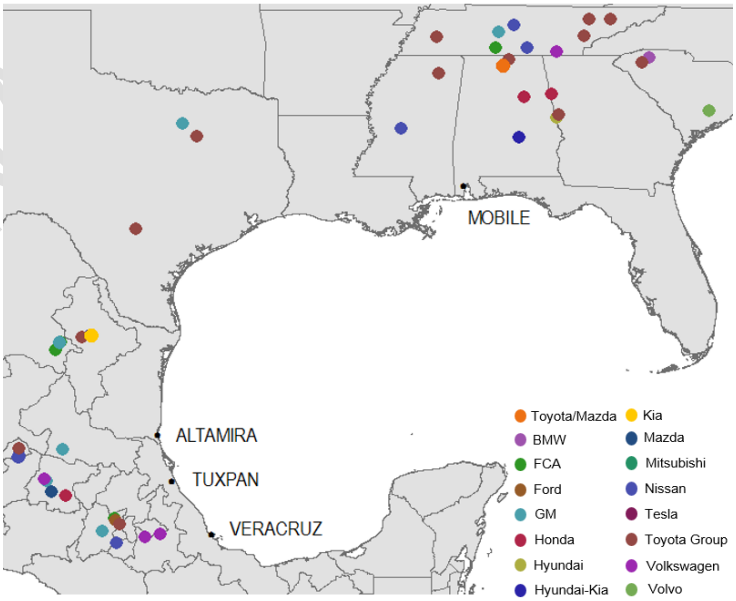
As such it is not surprising that the Port of Mobile's project was recognized through the TIGER grant and the RESTORE Act programs, as one which can benefit both the regional and national economies.

To expand on the potential to support export volumes through the Port of Mobile can be contextualized within the overall US production/export market and the growing role of the Gulf and Southeast regions.



Source: USATO; M&N

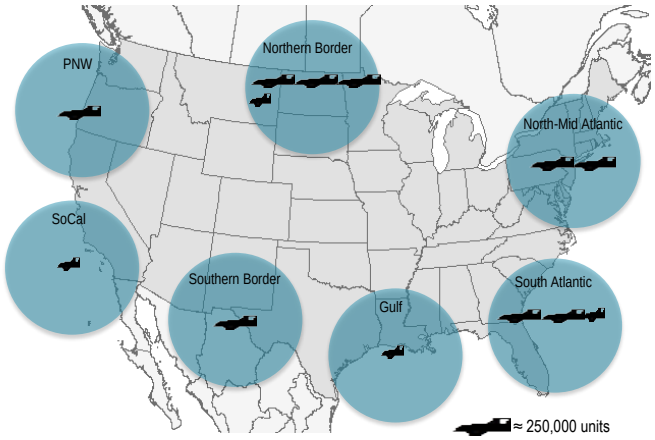
Figure 6-6: Auto Imports into US by Point of Entry, 2017



Source: M&N

Figure 6-7: Auto Production in US and Mexico, Major OEMs

Total US production of vehicles stands at roughly 11.9M units, of which approximately 2.0M (18%) are exported. Over the past three decades these regions have become a production hub for vehicles, as plants in the Midwest closed and new ones opened in the lower-cost states of the South. As a result, the Southeast Ports have become the largest gateways for sea-based exports from the US, as seen in Figure 6-8, accounting for about 33% of total exports (Savannah, Charleston and Jacksonville combined). The top markets for US sea-based exports are Europe (26% of total), North/East Asia (26%), and the Middle East (22%). Cars destined to these markets should be able to be competitively served through the Gulf Coast.



Source: USATO; M&N

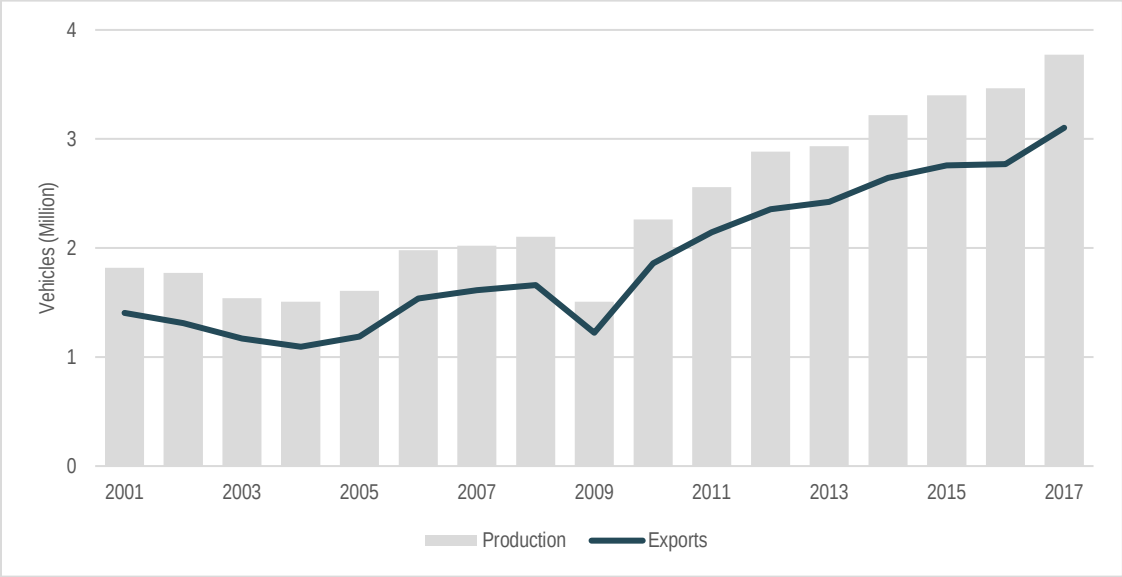
Figure 6-8: Auto Exports from the US by Point of Exit, 2017

For the Port of Mobile the most likely plants which could be served, based on proximity include those in Alabama, Mississippi and western-Tennessee. Alabama currently ranks third in the in the US in terms of vehicle exports trailing just Michigan and South Carolina. Mercedes is the single largest exporter from the State, followed by Honda and Hyundai. With the development of the announced Toyota-Mazda plant in Huntsville, which will have production capacity for 300,000 units, local production/exports will likely increase further supporting Alabama's role as an industry leader. The Port of Mobile's new RoRo Terminal could help facilitate trade from this plant.

6.4.2 Mexico's Role

Mexico continues to establish itself as a global leader in vehicle production, and with the US as its target international market, the Port of Mobile could become a gateway for imports.

Mexico produced 3.8M vehicles in 2017, of which 3.1M (82%) were exported, as illustrated in Figure 6-9. The growth of both production and exports have been impressive over the past two decades rising from 1.8M units produced in 2001 and exports of 1.4M, which represents about 5% annual growth for both. This growth has been fueled by investment from global auto manufacturers which have developed assembly plants in/around central Mexico, including Mexico City, San Luis Potosi and Guanajuato and northern Mexico in Coahuila, Nuevo Leon and Baja.

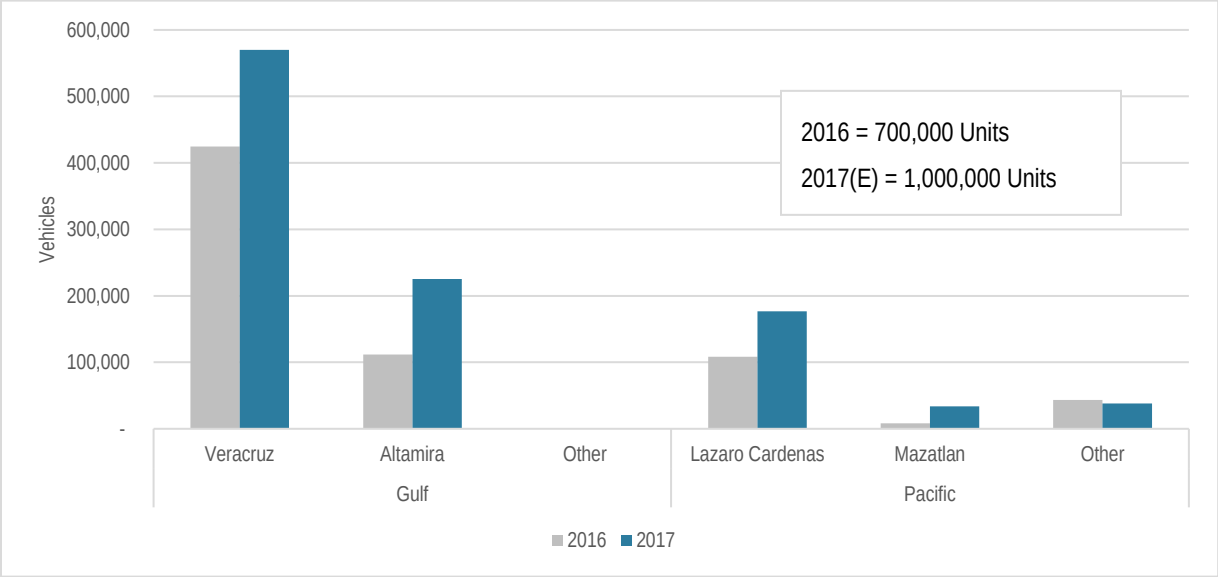


Source: AMIA; M&N

Figure 6-9: Mexico - Vehicle Production & Exports

The US has traditionally accounted for roughly 75% of the total export volume, making it the most important market for vehicles produced in Mexico. In 2017, 2.3M vehicles were exported to the US, compared to 1.5M domestic (Mexico) public sales. This means that competitive/efficient access into the US market is critical. Currently, the majority of import volumes destined to the US (75% or about 1.7M vehicles) are carried by either truck or rail across the US's Southern boarder (including Laredo, TX, El Paso, TX and Nogales, AZ), with the remaining 25% (or 700,000 units) imported via the maritime ports. The top US ports that receive that largest share are San Diego CA (22% share), Jacksonville-Tampa FL (22%), Davisville RI (16%), and Baltimore MD (16%). Despite this dominance of land-based flows, there is a transition underway within Mexico which is seeing more of the export volumes being transferred via sea. As these sea-based imports continue to grow this could and this can offer a significant opportunity for the Port of Mobile to enter into this trade.

In 2016 Mexico exported approximately 700,000 vehicles via its sea-ports to all markets. In 2017, that figure is estimated to have risen to roughly 1.0M units. As a share of total exports, sea-based volumes are estimated to have risen to 34% of the total from 25% the year before. The largest export gateways are on the Gulf Coast (gulf) at the ports of Veracruz and Altamira.). Veracruz is estimated to have exported approximately 565,000 vehicles in 2017, and Altamira 225,000. These Gulf ports combined account for about 76% of Mexico's total sea-based exports and would be the "natural" gateways for exports destined to the US Gulf, East and even Midwest markets. Veracruz has traditionally served as the export gateway for the assembly plants located in the central region of the country including Volkswagen, Honda and GM, whereas Altamira has begun to compete more aggressively for new production plants coming online in the North. Most recently the driver of growth through Altamira has been the Kia Pesqueria (Nuevo Leon) plant, which began operations in May of 2016. Current production levels are at about 240,000 units annually, with the majority exported through Altamira, with plans to reach full capacity of roughly 400,000 units.



Source: SCT; M&N

Figure 6-10: Mexico Sea-Based Exports by Port

While the strong growth in Mexico's auto production and export may decelerate in the coming years as the market matures, there continues to be a good opportunity for US maritime ports to become integrated in this supply chain. Should even a small share of the land-based moves shift to sea, this would represent a significant gain in sea-based exports where 5% of land-based moves in 2017 would equal about 85,000 vehicles. There have been long-standing issues with security on Mexico's rail network, which has resulted in theft of cargo from trains, although not specifically autos, and any continued actual or perceived negative impacts on service/security could result in additional shifts to sea.

6.4.3 Implications for The Port Of Mobile

The new ro/ro terminal at the Port of Mobile is strategically placed to serve as a gateway for both import and export vehicles. As part of the Port's application for the TIGER grant, it was estimated that vehicles shipped through the Port of Mobile originating from the markets where the Port could best compete could save an average of 207 miles if transferred by truck or 161 miles if transferred by rail, compared to the next low-cost alternative. This area includes the core target area of Alabama and portions Mississippi and Tennessee, but extends as far west and north as Arkansas, Missouri and Kentucky. This ability to reduce transportation distances between the point of production or consumption and the Port should allow it to market itself as a competitive alternative to existing logistic routes.

Import volumes appear most likely to come Mexico, Europe and Asia, and exports, of newly manufactured vehicles destined to Latin America, the Middle East, Europe and Asia.

Source: M&N

Figure 6-11: Future Site of RoRo Terminal

Not discussed in this report but used exports destined to Africa, the Middle East and Latin America could also be a potential market opportunity. This can be a sizable volume with the US exporting a total of roughly 650,000 used passenger vehicles in 2017.

It is understood that the intended first phase at the new RoRo Terminal will allow for the handling of up to 139,000 units per annum. This would appear sufficient to handle an initial "start-up" volume, assuming even a frequent weekly service transferring 1,500 to 2,000 units per trip.

6.5 NEAR-DOCK DEVELOPMENT ALTERNATIVES

The property shown in Figure 6-12 which is situated north of the ICTF is programmed for Value Added and Distribution (VAD) development and this analysis examines some of the value-added operations/developments which have proven to be successful at anchoring existing and increasing new streams of freight movement throughout US ports. The focus is on off/near-dock operations which could potentially be constructed within or close to the ASPA value added area, the APMT container terminal and the ICTF, thereby serving as catalysts for incremental volume growth at both that facility as well as the intermodal rail.

The following opportunities or operations are evaluated:

- Dedicated cold storage & related services[5]
- Transload/Cross Docking
- TransFlo (Bulk to Container)
- Resins

[5] (M&N Would note that the as of September 2018, a contract with MTC Logistics has been signed to develop a dedicated cold storage facility in the value added area. This facility will be roughly 350,000 square feet, and is expected to open in Q3/Q4 2020

Other industries/opportunities will certainly present themselves as potential complimentary developments in and around the Port's facilities. Therefore, each alternative should be considered in the context of available land, utilities, connecting infrastructure and evaluated independently for desired financial return to the Port Authority/State and/or business partners. The following analysis provides the rationale as to why the projects may be considered, and some of the attributes of these facilities affiliated with other US Ports.

Source: ASPA

Figure 6-12: General Locations of Potential Value-Add Developments

6.5.1 Cold Storage

Within the focus region, the Ports of Savannah, Charleston and New Orleans collectively accounted for 92% of the total export tonnage of frozen chicken moving through region's ports in 2017 up from 64% in 2007. This capture in market share has resulted from a confluence of factors including connectivity to production locations, increased containerization and number of container services as well as development of new dedicated cold storage facilities. These facilities generally offer an array of services including blast freezing (the ability to freeze a product that enters the facility within a short period of time), transloading and consolidation of freight, labelling and customs services. The largest off-dock facilities are generally both rail and truck served to allow for multimodal handling and are located close to major interstates.

Of the three noted ports, Savannah has the most dedicated cold storage space with approximately 877,320 square feet, followed by Charleston at between 450,000 and 600,000 sf. and New Orleans at 287,000 sf..

Lineage Logistics, Ricon

- 255,600 sf.
- Blast freezing, transloading and freight consolidation; import/export and custom labelling/stamping
- Rail & Truck Served

ARGO/Nordic Cold Storage

- 2013 Commencement; 200,000 sf. ($30mm)
- 2016 expansion added 200,000 sf., adjacent to original facility
- Chilled storage capacity of 50,000 tons
- Blast Freezing 5,000 tons per week

Source: Lineage Logistics; NOCS

Figure 6-13: Savannah Cold Storage Facilities

Savannah's cold storage facilities are located off-dock and support volume that moves through the Garden City Terminal. Operators include Gulf States, Lineage Logistics with locations in Savannah and Rincon, GA, ARGO/Nordic Cold Storage, and PortFresh Logistics, a 100,000 sf. dedicated import facility. The AGRO/Nordic facilities in Pooler, GA, about nine miles from the terminal are the largest collectively at about 400,000 sf. – as presented in Figure 6-13, with the Rincon facility being the single largest at 255,000 sf.. According to Lineage Logistics, this warehouse specializes in protein products and food service distribution with additional services including, but not limited to: frozen storage; refrigerated storage; blast freezing; intermodal shipping; transloading shipping; and transportation/drayage services. Lineage also operates a second, smaller, facility in Savannah of 166,720 sf.

There are three dedicated cold storage facilities serving the Port of Charleston, with Lineage, New Orleans Cold Storage (NOCS) and ARGO operating one each. The Lineage facility is the largest at 188,000 sf and is located about 16 miles from the Port. The NOCS facility is second largest at 134,000 sf, followed by the ARGO 121,000 sf operation. Both the NOCS and ARGO facilities are off dock as well. Most of the volume handled at these warehouses is destined to the Wando Welch Container Terminal at the Port of Charleston. The Port has recently invested $14 million in upgrading reefer handling capabilities by developing a refrigerated cargo service area at Wando Welch. This includes 120 new reefer plugs, bringing the port total to 1,700 total and a canopied area to create shade while processing.

Lineage Logistics, Palmetto Commerce Parkway

- 2016 opening; 188,000 sf.
- Blast freezing, transloading and freight consolidation; import/export and custom labelling/stamping
- Rail (4 doors) and truck (30 doors) served

NOCS South Atlantic Facility

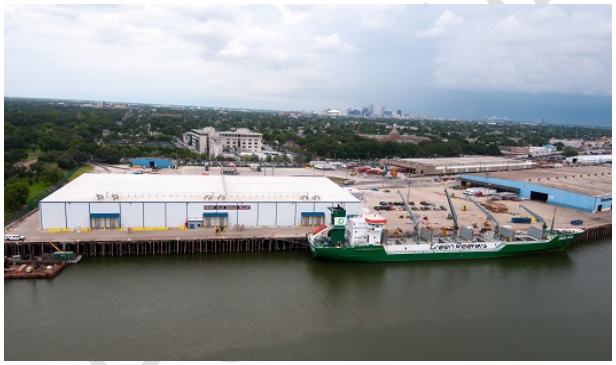
- Built in 1987, capacity doubled in 2015 to 134,000 sf.
- 600 tons of daily blast freezing capacity
- Rail (2 car siding) and truck (26 doors) served

Source: Lineage Logistics; NOCS

Figure 6-14: Charleston Cold Storage Facilities

New Orleans has two on-dock facilities both of which are operated by NOCS. The newest of these is the Henry Clay Wharf located on the Mississippi River adjacent to the Port's main container terminal (Napolean Ave.). This facility is 127,000 sf., with the ability to blast freeze almost 640 tons of product a day. The Jourdan Road terminal is approximately 160,000 sf. with the ability to blast freeze 600 tons daily. The facility sits on a six-acre property with 3 berths and short line rail access to the major rail roads.

Henry Clay Wharf Terminal,



- 2012 Opening; 127,000 sf.
- 640 ton daily blast freezing capacity
- 2 Vessel berths (1 mile to the container terminal)
- 20 dock doors
- Rail (shortline) and truck served

Jourdan Road Terminal

- Built in 2003, repaired after Hurricane Katrina (2005)
- 160,000 sf.
- 600 ton daily blast freezing capacity
- 3 Vessel berths
- Rail (shortline) and truck served

Source: NOCS

Figure 6-15: New Orleans Cold Storage Facilities

6.5.2 Transload warehousing

Market Potential: The process of transloading cargo upon arrival at port has been steadily increasing over the past decade, a trend that has been one of the drivers behind the increase in demand for overall warehouse construction – caused by the need for greater flexibility and focus on last-mile delivery. This increase in warehouse activity is being pushed by consumer demand for faster transit times and reliability. Same-day service and the need for flexibility are creating the need for beneficial cargo owners (BCOs) to deconsolidate imported containers upon arrival at the port and distribute the cargo as information on logistical and consumer needs are constantly being updated in real time. The long-term planning that would result in an international container being shipped directly from the foreign origin to the domestic destination is being swapped for the ability to make adjustments to shipment plans after the container arrives at port and to switch the cargo into a '53 domestic container – a process that also allows more cargo to be moved in fewer boxes and more international containers to be immediately available for use by ocean carriers after avoiding a lengthy inland voyage.

In the future, trucking costs could further drive the need for transloading and distribution centers to be located closer to the port. Typically, this process for imports takes place at distribution centers within a 50-mile radius of any given US container port. Growing truck rates caused by the mandate of Electronic Logging Device (ELD technology and truck shortage could shrink the range in which BCOs are willing to transload shipments, pushing the range even closer to the port until the cost to rent or build a new warehouse is roughly equal to the extra cost to ship cargo to a warehouse further inland. Further population growth and consumer spending within the US would undoubtedly drive this trend further as distribution services compete on faster transit times and reliability.

TradePort Logistics Facility, Savannah

- 720,000 sf.
- 70,000 sf. for transload facility/650,000 sf. for fulfilment center
- 100 docking doors available
- Services will include: Port Drayage, Transloading , Import/Export Consolidation and Deconsolidation, Warehousing

NRS Facility, Savannah

- 140,000 sf.
- 180 docking doors (90 on each side of the facility)
- 510 parking spots available for boxes
- Located four miles from port

Source:TradePort Logistics;NRS

Figure 6-16: Examples of Transload Facilities

Warehouse Characteristics: The size and number of transload/distribution warehouses within a given area of a port varies widely depending on the availability of land and level of volume that moves through the port. The average size when considering the number of docking doors typically falls around 8,000 sf. of warehouse space per docking door, however, the type of facility will vary depending on the type of services provided. Services available, other than transloading, typically include cross-dock logistics (transfer of cargo from form of transport to another

with no storage necessary), storage, packaging, and trucking/intermodal services. These services are either done exclusively by a BCO that leases warehouse property or through an arrangement in which a logistics operator works the facility for an exclusive client or multiple clients.

The Port of Savannah has multiple near-dock facilities and operators throughout its immediate port area including TradePort Logistics, RBW Logistics, Damco, Port Logistics Group, and National Retail Systems (NRS), with facilities averaging over 3,000,000 sf. in size with over 40 docking doors available per facility. Charleston, Jacksonville, and New Orleans are also ports with transloading warehouse. Operators include, Tri-Modal, Blackmon, St. George Logistics, Commercial Warehousing, Grimes Warehousing, Kearney, Better Boxing Company, Dupuy Storage & Forwarding and others. New projects on the West Coast include the Port of Oakland, which is in the process of building a 440,000 sf. facility expected to open in 2019 and provide near-dock transloading operations.

6.6 INLAND OPPORTUNITIES

Where the major container shipping companies traditionally selected Ports of call based on overall markets and import/export potential, their strategies and choices are now being increasingly dominated by the needs of the big box retail companies, Amazon and other major clients. For these companies, as well as smaller businesses, the inland transport cost can be the largest component at both ends of the delivery chain, followed by ocean shipping costs with Port costs often as low as 10% of the total door to door costs. As the importance of these major clients has grown, together with the emphasis on total cost refinements, the major clients essentially dictate the Port of choice to the ocean carriers for their business.

Ports typically responded by providing the facilities to handle the vessels deployed on specific services, but are now working with state agencies, rail and trucking companies to minimize inland transport and handlings costs for the carrier's major clients and also to encourage the establishment of consolidation or dry ports to aggregate container volumes for multiple clients and large-scale manufacturing activities such as the car assembly plants in Alabama and Georgia.

The success of APMT and the availability of the ICTF have changed the profile of ASPA from a break bulk and coal port to a major regional container port, while the statewide and regional economic growth offers attractive cargo opportunities to Mobile and other ports in its competitive area.

This section examines both the threats to ASPA from competing ports and evaluates options to enhance overall port traffic and container moves from the region, primarily by focusing on the inland transport chain.

6.6.1 Regional Inland Terminals

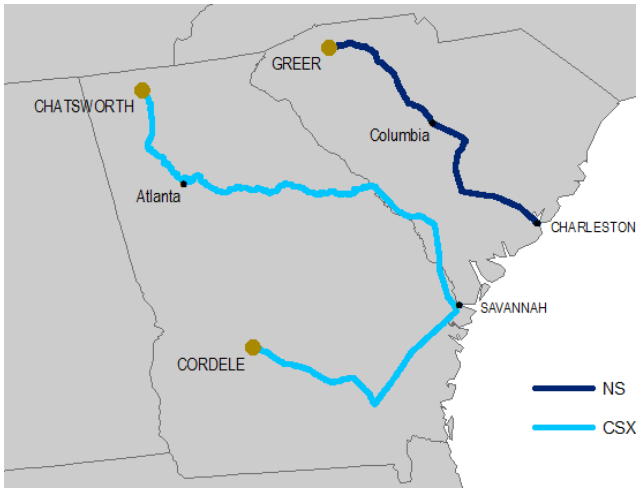
Inland ports or consolidation or distribution centers allow vertical the extension and integration of port services further inland and closer to the final consumer, which in turn enhances value generation abilities and provides an opportunity to fill empty containers with regional exports.

With inland ports integrated into the logistics chain, ports can maintain a high level of control on scheduling, management and pricing of the operation. These inland terminals can be financed and operated in a number of ways including private funding, public funding, or some sort of public-private partnership, and generally cost much less per TEU than the waterfront facilities.

When connected to specific ports, and serviced by either rail or trucks, the terminals expand the market reach of a given port while also acting as a container depot located at various points along the rail line or highway network. Where sufficient volume can be captured, the inland rail terminal reduces the number of trucks on the roadways. Typically, markets that are dominated by rail are further inland than truck markets, due to both the time and cost to market as well as available facilities to transfer multi-modal cargo.

Two examples of ports that have invested in Inland Port facilities are Savannah and Charleston with Inland consolidation centers that directly compete for current and potential Mobile market reach.

Greer - South Carolina Port Authority: The Port of Charleston's facility opened in 2013 and is located approximately 212 miles from the port in Greer, SC. Serviced by Norfolk Southern (NS), the facility is located along interstate 85 between Charlotte and is open 24/7 for the handling of international containers. Equipment includes five RTGs, one top lifter, three empty handlers, and additional storage space for empty containers.



Source: M&N

Figure 6-17: Inland terminals Associated with Charleston & Savannah

Source: Alex Hicks, The State

Figure 6-18: Greer

Source: CXS Industrial Development

Figure 6-19: Chatsworth

Chatsworth (Appalachian Regional Port) – Georgia Port Authority (GPA): One of two Inland Ports connected to Savannah, the Chatsworth facility is expected to open in 2018 and is located approximately 388 miles from the port in the Northwest pocket of Georgia. The Port was completed through a partnership between GPA, Murray County, and CSX with the intent to "provide cost savings, traffic mitigation, and additional operational services benefiting shippers, truckers and steamship lines." The purpose of the facility is to target the markets of Georgia, Alabama, Tennessee, and Kentucky as well as reduce truck miles on the roadways. It is on 42 acres of land with easy access to Interstate 75 and US 411 with direct rail service to Savannah provided by CSX. It will have a capacity of 50,000 TEU with plans to double that in 10 years and is anticipated to remove 355 truck miles from Georgia highways per container move by rail to the Regional Port (an estimated 40,000 annual truck moves).

Cordele - Georgia Port Authority (GPA): The Cordele Inland Port is another dry port connected to the Port of Savannah. Operated by Cordele Intermodal Services (CIS), the facility is 200 miles from the Port of Savannah and offers a direct rail route to the Garden City Terminal that is operated by CSX (and additional short-line services). With the possibility to expand to 1,200 adjacent acres, the 40-acre facility is less than one mile from Interstate 75, Georgia Highway 300, and Georgia Highway 280. The target market for this facility is southwest Georgia, southern Alabama, and western Florida. Primarily an export center, the facility has goals to become balanced in the future. In 2016, CIS made an agreement with Kia to import auto parts via short line from the Port of Savannah to the inland facility and then trucked approximately two hours to its plant in West Point, Georgia (JOC, 2016). The agreement calls for about 30,000 TEUs annually which will double the number containers already handled at the facility. This a slight deviation from what the facility has done historically – which has primarily been exports of cotton peanuts, and forest products.

Source: JOC

Figure 6-20: Cordele Inland Terminal

6.7 INLAND CONSOLIDATION & DISTRIBUTION

The analysis included in this section will outline the rationale and approach to pressuring the development of an inland terminal as a means to extending the competitive reach of the Port into more contestable hinterland markets. The proposed target region extends from northern Alabama and Mississippi, into central and western Tennessee (Nashville and Memphis) and eastern Arkansas based on the competitive analysis presented in Section 6.1.

6.7.1 Market Drivers and Trends in Inland Port Development

The cost of rail is becoming more competitive relative to truck, even for shorter distances. This has allowed for rail-served inland ports to increasingly become a more effective tool for ports to established fixed service-points within their respective "local/captive" markets, and to extend the boundaries of these markets.

Whereas historically, for any distance under 500 miles from the Port of origin, was designated a "truck market", in general terms, 300 miles is now considered to be a more competitive range. Since 2012 truck prices have grown at a faster pace compared to intermodal rail (3.1% truck vs. 0.8% rail), as illustrated in Figure 6-21. The higher cost of trucking has been led by a number of factors including driver shortages and the implementation of Electronic Logging Devices, which reduce the number of total hours a driver can operate within a 24-hour window. As a result, rail could continue to become more competitive should these price trends continue.

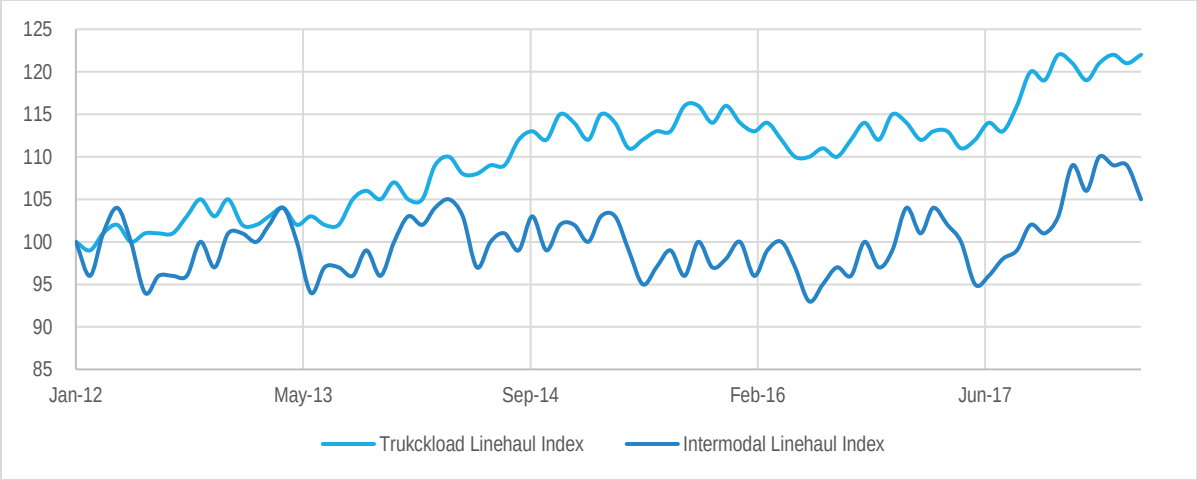


Figure 6-21: Truck and Intermodal Rail Price Index

In addition to the identified trend of increasingly competitive rail prices, there are several other benefits of the inland ports which are driving demand for their development:

- Input costs: Land and labor tend to be more expensive at ports compared to inland locations. This allows for more competitive operations (labor) and ability to acquire additional property need to for expansion at lower costs.

- Capacity and congestion: Inland ports can reduce near-port truck congestion and provide additional storage capacity away from the ocean terminal. This is beneficial for the immediate area which surrounds a maritime port, which often is in proximity to residential, commercial and industrial clusters which share the same road networks. Reducing road congestion is often cited as a leading means to improve the overall social and environmental impact of a port on the broader region.

- Hinterland markets: Long-distance transportation modes (rail/barge) can provide cost competitiveness against trucks hence improve port's cost competitiveness. This effectively allows a port to extend its competitive border and access new markets

- Supply chain management: Easier to integrate into beneficial cargo owners' supply chains. These locations can serve as dedicated logistic centers for individual supply chains, allowing them to adjust to and accommodate for the specific needs of regional economies and distribution networks. These facilities can serve multiple functions within supply chains
    - Satellite terminals:
      Mainly to avoid congestion and provide services that are becoming too expensive at the port. Container Transferium in the Port of Rotterdam is an example of a satellite terminal
    - Freight distribution clusters (load centers):
      Provide warehousing, distribution and logistics services
    - Transshipment facilities
      Serve as point transfer between modes and/or lines (rail-to-rail, rail-to-truck or rail-to-barge)

- Policy and regulations: Inland Ports are also used as tools to induce economic development in a region. These facilities serve as catalysts for both direct and indirect engines of economic growth (employment, income, tax revenue e.g.). Like warehousing operations, the job profiles of the individuals employed at inland ports can vary in skill sets.

6.7.2 Additional Considerations

There are multiple criteria are influential to the success of inland ports that must be considered when evaluating the potential locations and ownership structure of the facility:

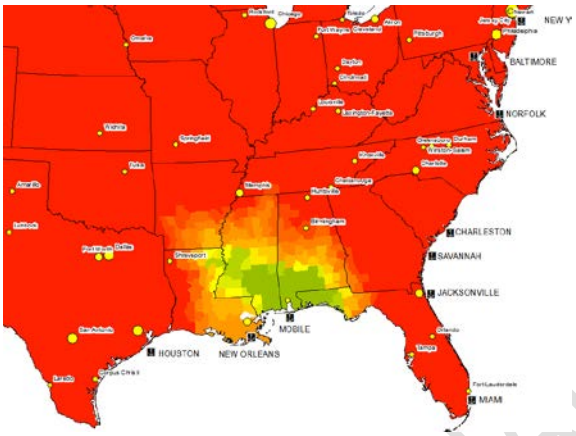
- Site and situation: Access to areas of significant population/industrial density help ensure that demand for a high volume of freight will continue to be sourced to/from the immediate market
- Massification: Use of high capacity corridors (rail and barge) and consolidation/deconsolidation, will help encourage that freight is moved en masse (unit train e.g.) to help keep the transportation costs on a per unit basis as competitive as possible
- Reconciling cargo flows: Effective repositioning and triangulation of empty containers could help exports maintain access to much needed empty containers
- Trade and transactional facilitation: Foreign Trade Zones (FTZs) promote an array of commercial, assembly and industrial activities in a highly concentrated area.
- Governance: An inland facility can be developed and operated under port authority jurisdiction or alternatively by a private third-party entity. Both enjoy positive merits and should be considered in the context of the broader financial feasibility of the project.

Owned and Operated by the Port	Third Party Owned and Operated
• Better price setting power for the port • Full integration of inland port into terminal operating system • Could be a lengthy process since port must provide equity and/or take on debt	• Same BCO experience as port owned and operated • The investment is off the port's balance sheet hence the project can move ahead faster • TOS integration might not be as seamless • Port has less control over pricing • Contract negotiations may be more complex (more parties involved)

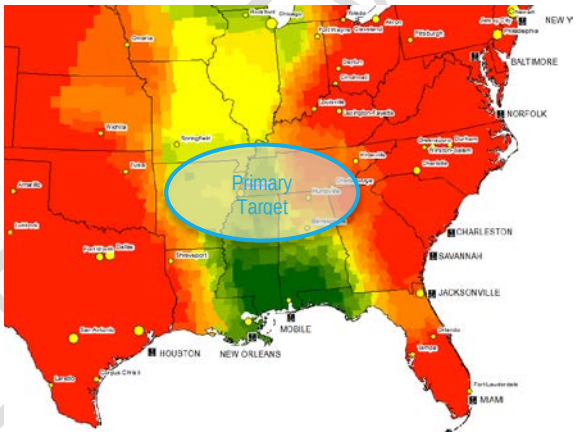
6.8 OPPORTUNITIES FOR MARKET EXPANSION

The objective is to improve the competitive reach of the Port beyond the traditional market capture area described earlier. Effective use of rail, coupled with an incentive program could extend addressable boundaries. The northern Alabama market, including Huntsville, will continue to be targeted aggressively by the ports of Savannah and Charleston. However, as can be seen in Figure 6-22, ASPA can continue to serve this market competitively directly by truck. Therefore, in terms of generation of new business, the location of new inland port may be best situated north of this area and potential west, perhaps in southern Tennessee. This would extend Mobile's competitive market north into the hub of Memphis.

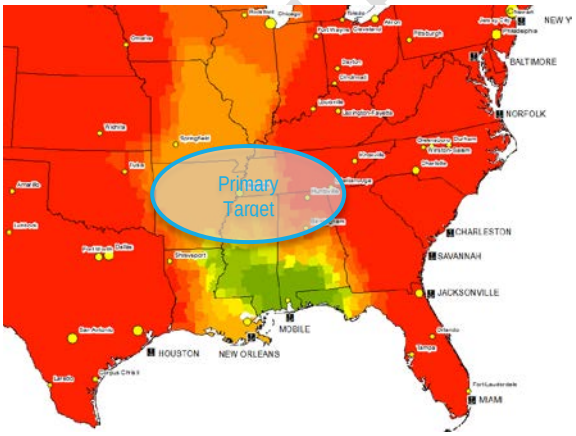
North Asia Base – Truck Only



Central America → With Intermodal



North Asia → With Intermodal



East Coast South America → With Intermodal

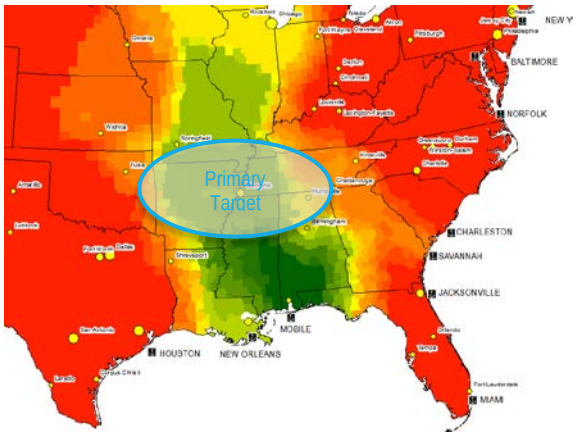


Figure 6-22: Demonstrative Improvements to Mobile's Competitive Market

Based on a preliminary transport cost analysis, it is estimated that the current size of the Primary Target market of northern Alabama, portions of western Tennessee, northern Mississippi and southern Arkansas totals roughly 1.2 – 1.4 million loaded TEU per year. While the Port of Mobile currently serves about 15% of this market, predominantly with volumes destined to/from northern Alabama and Mississippi, the dominant port gateway is LALB, the leading source of North Asian imports into the region. Savannah and Charleston account for 23% and 13% of the market respectively. It is from these two facilities, both of which have been actively developing inland port gateways, that Mobile could best hope to challenge for new market share.

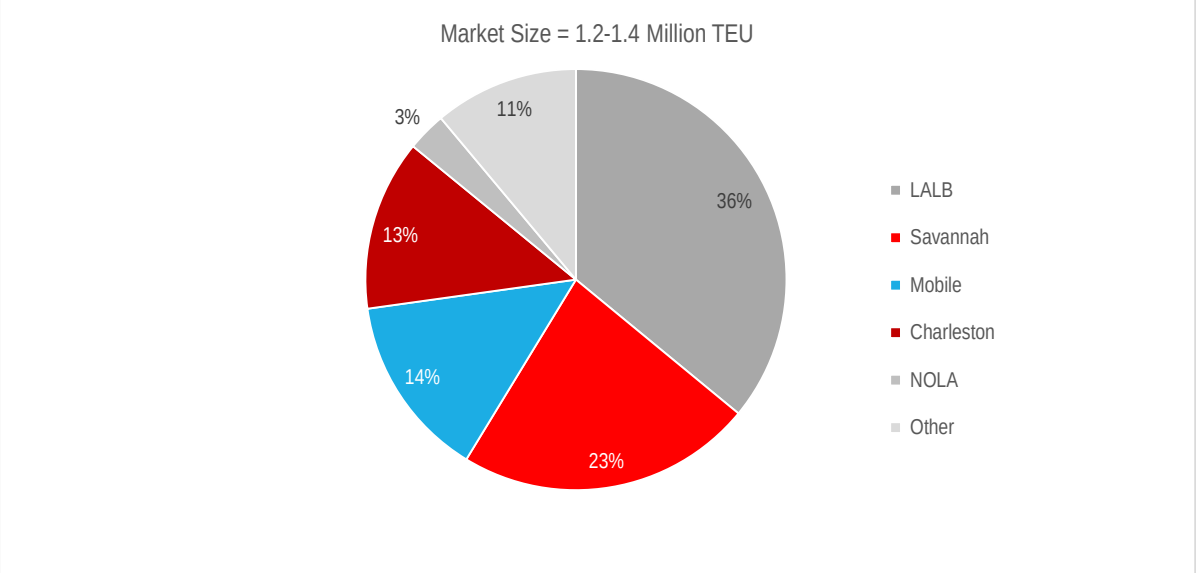


Figure 6-23: Current Distribution of Trade (by Port) in the Primary Target Region

6.9 POTENTIAL APPROACH TO SITE EVALUATION

To evaluate the feasibility of establishing an inland port, it is recommended that a market study, coupled with a financial analysis be used to determine which sites would offer the strongest potential return on investment. As part of the market study, truck GPS data, as illustrated in Figure 6-24, could be used to identify the current flow of trucks to/from specific locations within the study region. This analysis will show where the strongest demand for freight movement currently exists, relative to the potential development. Additionally, the primary routes taken, traffic patterns, can be identified to help assess whether the inland location would align with, or compete against, dominant flows.

Some of the additional steps to the market evaluation include:

- Location of Current Inland Ports: Provide a survey of existing inland ports which could potentially serve the same market as the proposed inland port. Investigate public sources of information to identify any planned facility that could be serving the same market. Model the potential cost of serving the market through the proposed inland port, compared to these competing facilities.
- Current Cargo Flows: Estimate the total international inbound and outbound freight traffic for the proposed facility's potential market based on Freight Analysis Framework (FAF) and Carload Waybill Sample data at aggregate level (FAF Region or BEA Statistical Area).

- County Level Production and Consumption: Disaggregate inbound and outbound flows, estimated in prior task, into demand for freight transportation based on county specific production and consumption across the entire regional area impacted by the project.
- Estimate of Market Potential: Estimate the potential market size of the new facility for international volumes. The international demand will be estimated by evaluating the competitiveness of the proposed inland port.

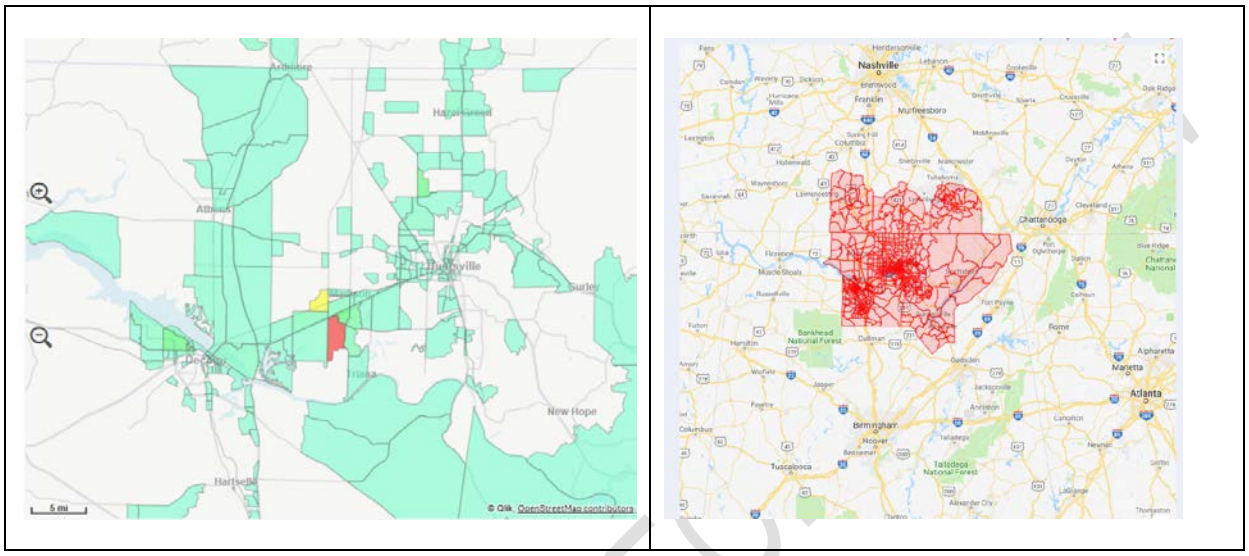


Figure 6-24: Example of Truck Destination Data for Primary Target Market (Streetlight Data)

6.10 CONCLUSIONS – MARKET ASSESSMENT

6.10.1 Current Situation

The combination of a combination of niche market break bulk cargoes and the development of new special purpose terminals has given the Port a sound base to support the Alabama economy and plans for economic expansion. As such, the Port is still in expansion mode, as compared to many regional ports and competitors that are seeking to protect existing levels of business.

The role now served by the Port has allowed for:

- Traditional, regionally located, forest product-based industry including pulp and lumber to remain globally competitive
- New steel (coils and pipe), as well as oil & gas (umbilical) manufactures to locate in/around Mobile
- New high-value manufacturing/assembly plants including auto, aeronautical and ship building developing/around Mobile and Alabama
- New container handling & distribution centers to increase local market share, with a view of extending into more distant but cost-competitive hubs including Memphis and the US Midwest markets, leveraging the Port's connectivity to five Class 1 railroads
- Continued transitioning to future markets as evidenced by the development of a dedicated roll-on/roll-off (RoRo) terminal for consumer passenger vehicles on property once used for the shipment of coal
- Potential threats to auto parts imports and vehicle exports from new inland terminals in neighboring states

- Potential to expand capture area for Mobile containers by the development of inland consolidation centers at strategic locations within the state.

6.10.2 Base Cargoes

In terms of market potential for the base cargoes handled through the Main Docks, Pinto Island, McDuffie, AST and APMT all but coal volumes show potential for steady but unspectacular growth based on the macro, micro and regional market assessments.

Specifically, this analysis indicates the following business expectations for the base cargoes:

- Main Docks - Steady growth. Risk on Pulp & Paper (containerization)
- Coal – Stable but uncertain in the long term. Declining imports and exports unlikely to reach terminal capacity
- APMT – Good Potential, needs full imports & Intermodal traffic and expansion of market beyond current areas
- AST – Steady Growth, some tariff concerns & potential market shifts
- Pinto Island – Steady Growth, some tariff concerns and end user changes. Future risk for imports could come from substitute products including domestically produced slabs
- RO/RO – Fits ASPA strategic targets
- Overall - Solid base, opportunities for new business

6.10.3 New Business Potential

While this study indicates steady growth for the transitionally commodities handled at the Main Docks, new business will primarily come from containerized cargoes.

The mid to long term throughput capacity of the APMT container terminal is currently estimated to be 1.5 million TEU, as compared to the current throughput of demand of 403,000 TEU. However, with the ICTF and value-added areas, rail connections, plus the deep draft Navigation project, there is significant potential for new business, in much the same way as Savannah developed in the early 2000s.

In order to achieve this growth, increased market reach is required, mainly through the expansion of traffic beyond the reach of the currently truck dominated market radius of 250 to 350 miles, together with the establishment of inland consolidation centers that can serve as the point of transfer and document processing for customers that are distanced from the Port itself.

This market assessment shows that the areas north and west of Huntsville offer significant potential for new business capture and are essentially out of reach of the aggressive development of inland terminals serving the Charleston and Savannah ports.

6.10.4 Coal

As import coal volumes have declined with the regional utilities switches to NG fuels and are unlikely to return. The market assessment shows that exports should be stable at some 11.50 MTPA, and there may be some new export market potential following the completion of the deep draft Navigation project. As a contributor of some 40% of ASPA revenues, coal will continue to be a staple commodity, but it is most unlikely that the full design capacity of 30 MTPA will be required within the foreseeable future.

7 ASSETS ASSESSMENT

7.1 FACILITIES CONDITION

A walk-thru visual inspection of the existing terminals was conducted to obtain an assessment of the current overall condition of the berths, sheds, cargo handling equipment, and open storage areas. The purpose of this assessment was to verify changes in assets since the more detailed assessment in 2007, and to identify constraints applicable to the 2018 facility requirements update.

7.2 BERTHS ASSESSMENT

The characteristics of the Main Docks berths are summarized in Table 7-1. The berths throughout the complex are concrete construction with uniform live load capacities ranging from 600 psf to 1,500 psf, except for the pig iron dock that has a load capacity of 3,000 lb/ft2. New steel sheet pile walls have been installed behind most of the original timber and concrete bulkheads.

It is recognized that many of the existing wharves were designed for previous generations of break bulk vessels and smaller bulk carriers. However, they still offer considerable flexibility for the baseline cargoes projected in Section 5.3.8, and ASPA has recently initiated a program for upgrade or restore the working berths. Pier C North was recently reconstructed and now has a load capacity of 1500 lb/ft2 and work is expected to commence in 2019 on the reconstruction of Pier B.

Finally, the former Bulk handling berth will be incorporated into the new Ro/Ro facility, also expected to commence construction in early 2019.

Table 7-1: Main Docks – Characteristics of Wharves (2018)

Berth	Length (ft)	Depth (ft)	Load Capacity (lb/ft2)	User	Comments
Berth 2	900	40	1,000-1,500	ASPA	
Berth 3	500	40	1,000	ASPA	Narrow Apron width
Berth 4	500	40	1,000	ASPA	Narrow Apron width
Berth 5	500	40	1,000	ASPA	Narrow Apron width
Berth 6	500	40	1,000	ASPA	Narrow Apron width
Berth 7	670	40	1,000	ASPA	Narrow Apron width
Berth 8	580	40	1,000	ASPA	
RO/RO Berth	130	40		ASPA	
Pier A South	570	40	800	ASPA	
RO/RO Ramp	120	40		ASPA	
Pier A River Wharf	350	40		ASPA	
Pier A North	1,500	40	1,000	ASPA	
Pier B South	1,540	40	400-1,000	ASPA	To be reconstructed
Pier B River Wharf	650	40		ASPA	To be reconstructed
Pier B North	1,610	40	600	ASPA	To be reconstructed
Pier C South	1,530	40	600	ASPA	To be reconstructed
Face of Pier C	810	40		ASPA	
Pier C North	1,400	40	1,500	ASPA	Recently reconstructed
Pig Iron Dock	640	28	3,000	ASPA	
Pier D	800	40	500	AGREX	Grain Elevator
Pier E	1,100	40	1000-1300	ASPA	ASPA/Alabama Steel
Rail Ship Unloading				ASPA	
Bulk Handling Plant	1,543	40		SAAM/Murchinson	Convert berth to RoRo
Pier D2	700	40	1,000	AST	ASPA/Alabama Steel
Total	19,143				
ASPA	15,000				
Total area (Serviceable or upgraded)	9,670				

Source: ASPA/M&N - 2018

7.3 SHEDS & WAREHOUSING

The characteristics of the sheds pertinent to terminal operations are summarized in Table 7-2. Most of the sheds are metal buildings with concrete slab on grade. Sheds 3 and 4 are certified for storage of food grade fluff pulp and generally reserved for that cargo. However, all sheds are mutli-use, except for the refrigerated storage, depending on floor capacity and the current ASPA maintenance program. Under this program, the Pier B South warehouse will be out of service during the berth reconstruction.

The Unit 19 and Pier 8 warehouses are both in poor condition and consideration has been given to demolishing both and using the area for increased open storage.

As a result, the total available storage space in mid-2018 is calculated to be 2.21 million sf., excluding Unit 19 and the Pier 8 warehouses. Pier B out of service during the berth construction and floor reconstruction of the shed at Pier C would reduce the available storage area to 1.52 million sf for about 12 to 24 months.

Table 7-2: Characteristics & Condition of Sheds at the Main Docks (2018)

Shed	Area (ft2)	Height (ft)	Current Use	Load Capacity (PSF)	Condition	Comments
Transit Shed 3	100,000	20	Fluff Pulp	500-1000	Good	
Transit Shed 4	100,000	20	Fluff Pulp	500-1000	Good	
Transit Shed 6	100,000	21	Lumber	500-1000	Good	
Transit Shed 7	100,000	21	Pulp	500-1000	Good	
Transit Shed 8	100,000	21	Sand	500-1000	Fair	
Unit 19 Warehouse	*37,000*	*20*	*Lumber*	*800*	*Poor*	*Exc. From Serviceable Area*
Pier 8 Warehouse	*68,000*	*20*	*Sand & Lumber*	*800*	*Poor*	*Exc. From Serviceable Area*
Refrigerated Warehouse	120,000		Refrigerated Storage		Good	
Warehouse A-18	69,000	16	Metal Products	800	Fair	Converting to central maintenance
Pier A North Warehouse	205,500	20	Lumber	1,000	Good	
Center A Warehouse	50,000	20	Lumber	800	Fair	
Pier B South Warehouse	175,200	24	Pulp, Paper	800	Fair	Pier B will be taken out of service during reconstruction. Warehouse will remain operable
Pier B North Transit Shed	274,500	20	Forest Products	800	Good	
Pier C South Transit Shed	410,000	28	Pulp, Paper	1,000	Fair	Floors need to be reconstructed
Pier D Transit Shed	47,500		unused	800	Fair	
Pier E	253,800	20	Lumber, Metals, Project Cargo	1,000	Good	
Total Serviceable Area	2,210,500					

Source: ASPA/M&N 2018

7.4 OPEN STORAGE

Open storage areas at the Main Docks are fragmented, with only the area behind Pier 2 being of a relatively efficient configuration. As seen inTable 7-3, some 23.2 acres are on dock, and in parcels of less than 2.25 acres, except for the 6.50-acre area at Pier C North. Based on the access and configuration of the open storage areas, it is considered that the useful total area for ASPA cargo is now on the order of 35 acres, with 23.20 acres being off dock storage and not limited by the wharf loading capacities.

Table 7-3: Available Open Storage area at the Main Docks (2018)

Location	Area (Acres)	Use	Comments
Berth 2	7.25	aluminum	
Berths 3,4, 5	14.03	aluminum	Narrow, split by access road to Pier 2
Pier A North	2.75	misc.	on dock
Pier B South	1.85	misc.	on dock
Pier B River Wharf	0.40	misc.	on dock, narrow
Face of Pier C	1.40	misc.	on dock, narrow
Pier C North	6.50	misc.	on dock
Pier D pig iron dock	2.23	pig iron	
Pier D & D2	14.30	grain, steel coils	AGREX / Alabama Steel Terminal
Pier D/E	2.20	misc.	Isolated from main docks area
Pier E	1.10	ro/ro & project	Future dedicated ro/ro
Total Area	54.01		
Available for ASPA cargo	37.48		
Available excluding pier ends	35.68		
Total off dock storage	23.18		

Source: ASP/M&N - 2018

7.5 APMT CONTAINER TERMINAL

The container terminal is being developed in five phases, with Phase III now well advanced and a current estimated capacity of 650,000 TEU per year. At this time, the total berth length is 2,000 ft, with a backland area of approximately 125 acres. A drive through visit to the terminal in March 2018 showed the berth, yard area and buildings to be in good condition, as would be expected given its construction in 2008. Work is now complete on the 20-acre yard expansion, to accommodate the expected additional demand from the new Walmart facility.

7.6 GARROWS BEND INTERMODAL YARD (ICTF)

The Garrows Bend ICTF was completed in 2016 and is managed by APM Terminals – Mobile in conjunction with the container terminal. The facility connects to the CSX line at the eastern end of the yard, but the western connection to the main line has yet to be completed. A drive through inspection of the terminal in March 2018 showed work being completed on the gate entry and vehicle processing equipment and ongoing maintenance on one of the two RTG units. As expected given the recent construction, the overall condition of the pavement, rail and equipment is good to excellent. Utilization level was relatively low with much of the unpaved area being used for chassis storage.

7.7 MCDUFFIE COAL TERMINAL

A detailed evaluation of the Coal terminal is outside the scope of this Master Plan update, but both the facility and the land area are critical elements of the ASPA operations and financials. The three-berth terminal has two ship loaders and can also transfer coal to barges in the Garrows Bend area. The facility covers some 130 acres, excluding the rail loop that also skirts the City of Mobile water treatment station. With a capacity of 30 million tons per year, and a storage capacity of some 2.50 million tons, the terminal is currently moving some 12 million tons annually, which is not expected to approach its designed handling capacity during the forecast period.

With 45 ft of water depth at the berth face and access channel, McDuffie is limited to Panamax vessels with a maximum load capacity of some 75,000 tons or partial loads of some 120,000 tons onto Cape Size ships which require a water depth of 50 ft to accommodate a fully loaded capacity of some 130,000 to 150,000 tons.

7.8 PINTO ISLAND STEEL TERMINAL

The 87-acre terminal came on line in 2010 and has three on dock cranes that can offload steel slabs and load directly to barges or move to the yard area for later transfer. The dock has a length of 1,000 ft and a depth of 45 ft, in common with the container terminal and McDuffie. As a relatively new facility, the overall condition was seen to be good to excellent.

7.9 ALABAMA STEEL TERMINAL (AST)

AST was completed in late 2014 and includes an 182,000 sf specialized shed to handle steel coils that are delivered by truck for export. Estimated annual capacity of the terminal was stated to be close to 2.00 million tons with some 1.2 million tons being moved in 2017.

8 NEEDS TO MEET DEMAND

8.1 OVERVIEW

At the time of the last Master Plan in 2008, the Port was essentially a multipurpose operation, except for the McDuffie coal terminal. The container terminal was at the design stage, as was the Pinto Island steel terminal and studies were ongoing for potential ro/ro terminal locations at the main docks or in Theodore.

In 2018, there is a clear move towards unitization and specialization of the Main Docks and other assets, with APMT and the Pinto Island terminals at full operation. Steel coils are handled at the Alabama Steel leased area and the proposed ro/ro terminal is being developed on the site of the old Bulk Plant. Refrigerated storage is also available, and several sheds have been certified to accept and store food quality fluff pulp.

As a result, the available multi-purpose areas and shed space in the Port has changed and will almost certainly be further modified in the future as cargo unitization and special handling requirements are introduced to more of the commodities passing through the Port.

The following discussion then presents the updated capacity estimates of the ASPA berths and storage units in the Main Docks area.

8.2 CAPACITY ASSESSMENT

Capacity can be plotted against the cargo forecasts to determine the need and timing for facility improvements to meet market demand. The capacities of the existing terminals were evaluated to determine what improvements will be necessary to accommodate the growth of the targeted cargoes. These targeted cargoes include:

- Aluminum
- Autos
- Coal
- Containers
- Liner Board and Pulp
- Lumber
- Miscellaneous break bulks
- Pig Iron
- Poultry
- Project Cargoes
- Steel

The following process was used to perform the capacity evaluations:

- Identify and quantify the physical assets at each terminal that can limit throughput, including:
  - Access and quayside channel depths
  - Number of berths and berth length
  - Cranes and loaders/unloaders
  - Open storage areas
  - Shed space and use criteria
  - Gate lanes (containers)
  - Rail access and track lengths
- Determine the maximum throughput at each terminal for the targeted cargoes based on existing assets, identified constraints, and current operating practices.
- Plot existing throughput capacity versus forecasted growth.
- Determine incremental facility improvements required to 2037.

8.2.1 Containers

The following assessment reviews the Phase III and future development capacity of the terminal, as published by APMT and ASPA.

Berth Transfer – The terminal currently has 2,000 linear feet of berthing with a quayside depth of 45 ft. For a facility with semi-random ship arrivals and a pattern that tends to favor certain days of the week for vessel calls, 55% to 65% berth occupancy is considered to be the point at which congestion or queuing can occur for berth space. On this basis, the berth capacity is estimated at 650,000 TEU, which matches the figure estimated by APMT for the Phase III development. However, container carriers now operate on relatively rigid arrival and departure schedules and the old concept of berth occupancy ceilings is now replaced by sophisticated simulations based on the slot availability and specific characteristics of the carrier and route. As a result, the berth occupancy of many terminals is on the order of 85% before congestion becomes an issue. If applied to the APMT and the typical maximum applied, estimated berth capacity of the terminal would be on the order of 750,000 TEUs. When the berth is extended 400 ft at the north end, a Panamax and a New Panamax vessel can be docked concurrently.

Container Cranes – The terminal offers two Ship to Shore (STS) container cranes rated at 22 containers across and two cranes at 18 across. Using rule of thumb industry averages and the current Lift/TEU ratio of 1.8, this offers a crane transfer capacity of some 800,000 TEU per year.

Container Yard - The capacity of the container yard is primarily a function of average container dwell times and the yard equipment and handling system employed. The current operation is based on reach stacker equipment which is generally considered to have lowest density

of the various yard equipment systems. With a current static capacity of 31,000 TEU, the Phase III expansion will offer 650,000 TEU annual capacity by the end of 2019. As the original yard equipment reaches its useful economic service life sometime about 2020, it is expected that the terminal will be fully converted to medium density operation[6] with an estimated capacity close to 1.00 million TEU.

On completion of the full five phase development, APMT has estimated that the ultimate capacity will be on the order of 1.5 million TEU. This is considered to be a reasonable expectation, assuming that the appropriate equipment is installed.

The maximum throughput capacities derived for the five-phase expansion of the APMT terminal are presented in Table 8-1, below.

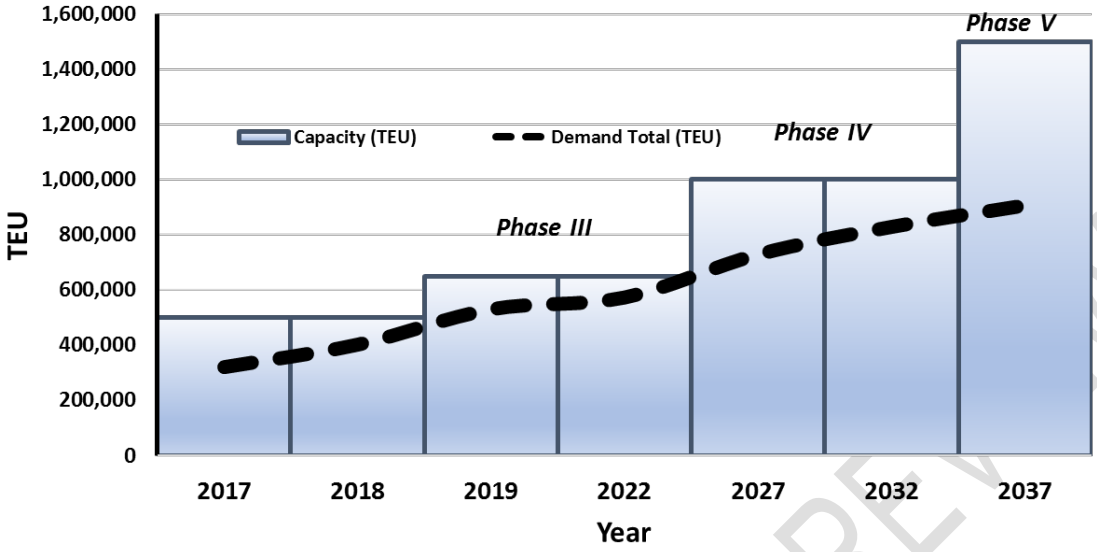
Table 8-1: APMT Container Terminal Capacity

Element		Asset	Maximum Throughput (TEU)
Phase 1 & II	Wharf	2,000 LF	500,000
	Container Cranes	4	
	Container Yard	95 Ac Gross, 66 Ac Net	
	Gate	9 Inbound & 4 Outbound	
Phase III	Wharf	2,400 lf	650,000 to 1.00 MTEU
	Container Cranes	6	
	Container Yard	104 Ac Net	
	Gate	9 Inbound & 4 Outbound	
Phase IV	Container Yard	RTG conversion	1,000,000
Phase V	Wharf	2,750 lf	1,500,000
	Container Yard	125 ac Net	
	Equipment	Cranes – 8, Possible RMGs	

Source : APMT/M&N 2018

Figure 8-1 plots the estimated demand against capacity at each of the development phases projected for the Container terminal. This would indicate that the Phase V expansion program should accommodate demand to beyond 2037. However, the nature of the container market is that new cargo tends to arrive in "blocks" similar to the recent boost in throughput from the Walmart regional center. At the same time, any expansion beyond Phase V will require the acquisition, conversion or creation of new waterfront land with the appropriate back up area and intermodal connections.

[6] Typically, an RTG system will be used for full containers with empty units block stacked and placed by high lift empty handlers.



Source: APMT/ASPA/M&N 2018

Figure 8-1: APM terminal – Demand against future capacity

Given the current land use in the river, the expansion of the container facilities beyond the existing area is likely to be challenging and time consuming and should be initiated on completion of the Phase IV expansion in 2025.

Essential elements of a future container terminal to meet the new generation of container vessels include:

- Average Berth lengths of 1,300 ft
- Capability to place up to five cranes to work one vessel
- Terminal acreage of approximately 50 acres per berth
- High capacity Intermodal yard
- State of the art environmental controls on air pollution
- Good highway and main line rail connections

While Mobile is well placed to serve as the entry point from the Panama Canal to the central and southern U.S. due to its connection with the major railroads and Interstate routes, it is clear from the above that significant infrastructure improvements and investment will be needed to accommodate potential additional container demand after completion of the Phase V expansion.

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8.2.2 McDuffie

According to ASPA technical evaluations, the capacity of McDuffie Coal Terminal is 30 million tons per year, with a static storage capacity of 2.5 million tons. The forecasts presented earlier in this report indicate a long-term average of some 10 Mt per year to beyond, with fluctuations of some 50% being possible in the shorter term. Even with the expected throughput of 14.5 million in 2019, the projected demand will clearly be well within the existing capacity of the facility. This in turn implies that there should be potential to restructure the facility and operations to align the operating and maintenance costs with the expected throughput and generate an improved financial bottom line for the terminal and ASPA.

8.3 MAIN DOCKS

8.3.1 Wharves

The computation of the overall berth transfer capacity of a multi-purpose break bulk port such as Mobile is challenging since the throughput of a specific berth is a function of the commodity being handled, packaging of the cargo and the equipment used. Since most of the ASPA berth can and are used for multiple commodities, the average throughput of a specific location can vary greatly.

For the Main docks, it is reported that the equivalent throughput of a typical 800 ft general cargo berth can vary from a low of 250,000 tons to close to 1.00 million tons per year, with the upper limit reflecting a high level of unitization as is used for the pulp movements at the Port. Based on the current mix of commodities at the Port and the varying lengths of the berths, it is considered that an average annual capacity of 425 tons/ft is realistic for the ASPA break bulk berths.

Table 7-1 indicated that the main docks total 18,943 ft in length, with 15,000 ft used for ASPA cargoes. This then translates to a current throughput capacity of 6.375 million tons. During the proposed Pier B reconstruction work, the available berth length drops to 9,670 ft and the installed transfer capacity will drop to 4.10 million tons.

As seen in Table 8-2 below, break bulk throughput for the ASPA handled commodities is expected to be relatively stable at 3.0 to 3.2 million tons per year over the forecast period, with then indicates that the installed capacity of the Main docks wharves will be sufficient to meet demand to beyond 2037. Perhaps more importantly, it also indicates that the Port would not be expected to lose traffic due to capacity constraints during the rehabilitation work planned for Pier B.

Table 8-2: ASPA Break bulk berth capacity to 2037

	2018	2022	2027	2032	2037
Demand (S-Tons)	3,002,314	3,067,641	3,060,462	3,093,751	3,199,458
Berth Length (ft)	15,000	9,670	15,000	15,000	15,000
Capacity (S-Tons)	6,375,000	4,109,750	6,375,000	6,375,000	6,375,000

Source: M&N 2018

8.3.2 Warehousing & Sheds

The sheds at the Main Docks are basically metal buildings with concrete floor slabs that can be used to store a mixture of cargoes. Therefore, capacity to accommodate future break bulk throughput is first evaluated from a terminal wide perspective. In practice, certain sheds may not be suitable for all products, due to floor loading and other limitations, but for the global analysis, it is assumed that any deficiencies in this respect can be rectified within the existing shed footprint.

Table 7-2 indicates a total shed space of 2.21 million sf, with 175,200 sf expected to be out of service during the berth reconstruction work at Pier B. Refrigerated storage area is 120,000 ft, which will give an available multipurpose area in 2019 to 1.915 million sf. It is assumed that the floor reconstruction of the Pier C south shed would be programmed to follow the completion of the Pier B work, which would then bring the available multipurpose warehousing area to 1.68 million sf in about 2020. Assuming that the Unit 19 and Pier 8 warehouses would be

demolished on completion of the work, due to their poor condition, the long term available shed space will be 1.985 million sf on completion of the Pier C work and Pier C South shed floor replacement.

For the purposes of the capacity assessment, it is assumed that all the non-refrigerated sheds can be used for the main commodities moving over the ASPA docks. Food quality fluff pulp can only be stored in sheds certified to receive it, but ASPA operations staff report that extra certifications can be obtained if demand exceeded the capacity of Shed 3 and 4, which are the two areas now used for this commodity.

Table 8-3 shows the key characteristics of the principal commodities requiring covered storage while Table 8-4 to Table 8-6 present the output from the storage model and the comparison with the requirements generated by the baseline cargo forecasts.

For simplification, the total storage area is used to determine requirements, rather than an assessment of individual sheds, since most of the sheds can be used for various products, depending on demand. The implication of this assumption is discussed below.

Table 8-3: Input to Covered storage capacity model

Commodity	Units	Baled Pulp	Fluff Pulp	Lumber	Lin Bd Paper	Misc Steel	Frozen Chicken	Other
Unit Density (stowed)	lbs/ft3	50	33	45	22	225	27	50
Module height	ft	5	5	5	4	4	5	4
Floor load/module	lbs/ft2	250	163	225	250	900	133	200
Modules stacked	units	3	3	3	4	1	3	3
Floor Load	lbs/ft2	750	488	675	1,000	900	400	600
Peaking Factor		1.20	1.20	1.20	1.20	1.20	1.20	1.20
Sorting Factor		1.10	1.10	1.10	1.10	1.10	1.10	1.10
Average Dwell Time	days	30	45	90	30	60	15	60
Net Storage Factor	ST/ft2	3.45	1.50	1.04	4.61	2.07	3.69	1.38
Floor area Net to Gross		0.60	0.60	0.5	0.6	0.5	0.67	0.5
Gross Storage Factor	ST/year/ft2	2.07	0.90	0.52	3.88	1.04	2.47	0.69

Source: M&N 2018

Table 8-4: Covered Storage Requirements for Dry Products 2018 to 2037 – (ft@)

Commodity	Baled Pulp	Fluff Pulp	Lumber	Lin Bd Paper	Other	Total - Required (ft2)	Available (ft2)	Surplus/Shortfall (ft2)
Storage Factor	2.07	0.90	0.52	3.88	0.69			
2018	168,767	532,868	377,609	32,216	102,315	1,213,776	1,915,000	701,224
2022	156,712	546,412	388,194	38,660	102,315	1,232,293	1,985,000	752,707
2027	144,658	518,408	401,843	38,660	102,315	1,205,883	1,985,500	779,617
2032	120,548	555,992	415,970	38,660	102,315	1,233,486	1,985,500	752,014
2037	96,438	665,595	430,595	38,660	102,315	1,333,603	1,985,500	651,897

Source: M&N 2018

Table 8-5: Storage Requirements for Refrigerated products (2018 to 2037)

Year	Demand		Available (ft2)	Surplus/Shortfall (ft2)
	tons	ft2		
2018	70,000	37,209	120,000	82,791
2022	70,000	40,483	120,000	79,517
2027	70,000	40,483	120,000	79,517
2032	70,000	40,483	120,000	79,517
2037	70,000	40,483	120,000	79,517

Source: M&N 2018

Table 8-6: Storage Requirements for AST Steel coils (2018 to 2037)

Year	Demand		Available	Surplus/Shortfall
	tons	ft2		
2018	1,200,000	169,521	182,000	12,479
2022	1,330,520	187,959	182,000	(5,959)
2027	1,374,363	194,152	182,000	(12,152)
2032	1,422,325	200,928	182,000	(18,928)
2037	1,474,761	208,335	182,000	(26,335)

Source: M&N 2018

Conclusions – Covered Storage

The storage model indicates a current surplus of space of some 700 – 750,000 sf, based on the overall dry cargo shed availability, dropping down to 575,000 sf during the reconstruction of the shed at Pier C south. However, as noted above the model assumes that any cargo can be stored in any shed.

While this is theoretically possible, it is not practical as cargo lots may exceed the available space in one or more sheds. Alternatively, the berth may be distant from the shed area or customers can be unwilling to have cargo spread over several sheds.

The current policy of allowing extended dwell times is a major factor in attracting cargo to Mobile and the results of the capacity assessment indicate that the available shed space at the main docks will permit the continuation of this practice as long as the referenced rehabilitation work is undertaken in a timely manner.

The overall conclusion from the assessment is that shed space at the Main Docks is relatively tight if the existing dwell times are maintained but can be managed within the operational planning processes currently in place at ASPA.

Refrigerated space appears to be adequate for the forecast period, although the recent announcement of the 300,000 sf MCT refrigerated warehouse at Brookley may change this assessment.

The shed evaluation also confirmed the comments from AST representatives that expansion will be needed shortly at the terminal if the recent growth of steel coil movements is maintained.

8.3.3 Open Storage

As noted in Section 7.4, the open storage areas in the Main Docks are scattered with the main continuous area behind Berths 2 to 4. At this time, the primary product stored outside is aluminium, which is shipped as break-bulk cargo in the form of T-bars, rods, billets, and ingots. This cargo is either palletized or bundled and is usually stored behind Berth 2 in the former container yard. The area requirement is a function of product segregation, maximum stacking height, and dwell times which in turn are controlled by shape, stability, and pavement load capacity. Dwell times are highly variable, particularly if the products are traded on the metals exchange and typically range from 45 to 60 days.

Other products stored in the open areas are steel products moving across the ASPA docks, mainly steel shapes and components, totalling some 635,000 tons per year, and approximately 83,000 tons of lumber representing about 30% of the total moved annually.

Table 8-7 shows the key characteristics of the principal commodities requiring covered storage while Table 8-8 presents the output from the storage model and the comparison with the requirements generated by the baseline cargo forecasts. Finally, Table 8-9 shows the open space requirements for overflow storage of steel slabs at Pinto island.

As for the covered storage assessment, the total storage area is used to determine requirements, rather than an assessment of individual areas, since most of the spaces can be used for various products, depending on demand.

Table 8-7: Input to Open storage capacity model

Storage Type	Units	Aluminum	Lumber	Pig Iron	Misc Steel
Unit Density (stowed)	lbs/ft3	133	45	57	225
Module height	ft	4	5	10	4
Floor load/module	lbs/ft2	533	225	571	900
Modules stacked	units	1	4	1	1
Floor Load	lbs/ft2	533	900	571	900
Peaking Factor		1.20	1.20	1.20	1.20
Sorting Factor		1.10	1.10	1.10	1.10
Average Dwell Time	days	75	90	20	60
Net Storage Factor	ST/ft2	0.98	1.38	3.95	2.07
Floor area Net to Gross		0.5	0.5	0.6	0.5
Gross Storage Factor	ST/year/ft2	0.49	0.69	2.37	1.04

Source: M&N 2018

Table 8-8: Open Storage Requirements for ASPA commodities 2018 to 2037 – (acres)

Commodity	Aluminum (Acres)	Lumber	Steel Products (ASPA)	Other	Required (Acres)	Available (Acres)	Surplus/Shortfall (Acres)
Gross Storage Factor	0.49	0.69	1.04	0.69			
2018	6.89	2.77	13.64	0.78	17.21	37.50	20.29
2022	8.18	2.86	14.14	0.78	17.79	37.50	19.71
2027	9.72	2.97	14.14	0.78	17.89	37.50	19.61
2032	11.54	3.07	14.14	0.78	18.00	37.50	19.50
2037	13.71	3.18	14.14	0.78	18.10	37.50	19.40

Source: M&N 2018

Table 8-9: Open Storage Requirements for Pinto Island Terminal, 2018 to 2037 – (Acres)

Year	Storage Area Demand (tons)	Area Required (Acres)	Available	Surplus/Shortfall (Acres)
2018	720,000	0.99	7.50	6.51
2022	720,000	0.99	7.50	6.51
2027	720,000	0.99	7.50	6.51
2032	720,000	0.99	7.50	6.51
2037	720,000	0.99	7.50	6.51

Source: M&N 2018

Conclusions – Open Storage

The assessment shows that in overall terms, the Port has sufficient space to accommodate demand to beyond the forecast horizon of 2037. However, aluminum and steel products can only be stored at the off-dock locations, due to high floor loading, which then reduces the space for those commodities to 23 acres. Under this limitation, Table 8-8, indicates that the demand for open space for aluminum and steel products could exceed capacity by 2027. As noted earlier, the bulk of the steel slabs moving through the Pinto island terminal are loaded directly onto barges, with the storage area being used during peak times or to adjust to a lack of barges or arrival peaks. Since this double handling is obviously undesirable as a regular procedure, there does not appear to be a need to expand the Pinto island storage capacity within the overall forecasting horizon.

9 NAVIGATION REQUIREMENTS

9.1 SHIP SIZE TRENDS

The completion of the 3rd Locks project at the Panama Canal was expected to set a new standard for container vessel maximum size on major routes. However, vessel sizes have grown beyond the 11,000 TEU limit of the new Locks, with some 450 ships in the 18,000 to 21,000 TEU size range already in service and 130 more on order, as of January 2018.

However, the loaded draft of these Ultra Large Container ships is from 50 to 55 ft and deployment is restricted to high-volume long-distance routes between major centers.

For many mid-size and secondary hub ports in the US and internationally, the 8,000 to 9,000 TEU container vessel has now become the standard for a container ship size. As such, the APMT terminal in Mobile is already receiving vessels in the 9,000 TEU size range and the ability to accommodate these or larger ships will be critical to achieving the growth projections as overall volumes increase for the Port.

9.2 NAVIGATION ACCESS

Like many ports in the region, Mobile and ASPA are responding to the trend in container vessel size with plans to deepen the Federal channel to 50ft, as discussed later in this report. The deeper channel draft will also benefit McDuffie by permitting full load access to many Cape size[7] or large bulk carriers that could be advantageous to its ability to compete for export coal volumes.

The depth at the APMT berth face is currently maintained at 45 ft, and it is assumed that this would be increased to 50 ft once the Navigation channel improvements are complete. According to the design information on file, no major structural upgrades will be required to allow the deeper dredging, although maintenance dredge volumes could increase slightly.

In summary, the ongoing program to deepen the main navigation channel to 50 ft responds to the range of vessels expected to call at the APMT terminal in the foreseeable future and could also benefit the McDuffie terminal in terms of competitiveness for its export volumes.

[7] Cape Sized vessels generally have a loading capacity of 120,000 to 180,000 tons and a fully loaded draft of 50 to 55 ft.

10 DEVELOPMENT PROGRAM

10.1 CONTAINERS

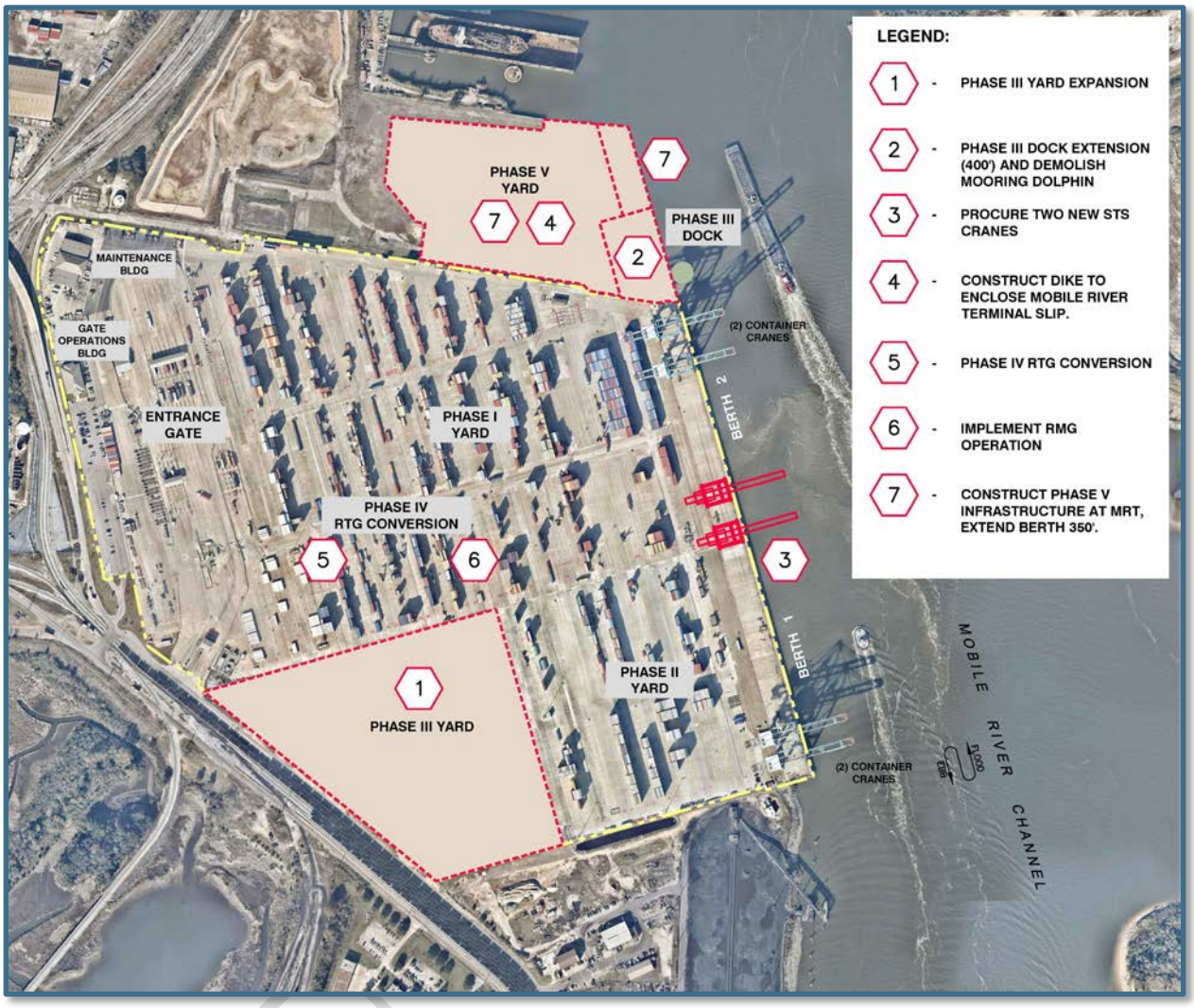
APMT is implementing a long-term development program to respond to the projected growth in containers. Accordingly, APMT is in the middle of a 5-phase development program to expand capacity. Purchase of the 35.3-acre Mobile River Terminal that borders the north side of the existing terminal provides the opportunity to extend both the berth and container yard (CY). The scope and timing of each phase is summarized in Table 4.1.

Table 10-1: APMT Capacity Expansion Program

Phase	Improvements	Completion Date
1	Construct 2 Berths, 64 acres CY, Entrance Gate, and Support Bldgs. Procure 2 STS Cranes.	2008
2	Construct 20.7 acres CY.	2017
3A	Construct 21.2 acres CY.	June 2019
3B	Extend Berth 400' upriver.	April 2020
4	Convert to RTG Operation. Procure 2 STS Cranes.	TBD
5	Reclaim 35 acres. Construct CY.	TBD

Source: M&N 2018

Phase 3A improvements are being funded by APMT. Phase 3B design and construction is being funded by ASPA but will be repaid through future lease payments. The Development program is depicted in Figure 10-1.



Source: APMT/ASPA/M&N - 2018

Figure 10-1: APMT Development Program

The phased development of the APMT facilities will meet projected demand until beyond the forecast horizon of 2037. However, the elimination of the Panamax vessel size limitation on the Panama Canal has increased the "workhorse" vessel size to 8,000 to 9,000 TEU, which could necessitate additional dredging at the berth face once the Deep Draft project is completed.

While this would essentially be undertaken within the existing dredge maintenance program, it might increase the sedimentation rates and volumes and exacerbate the concerns of the management and cost of placement of the dredged material.

10.2 PINTO ISLAND

The Pinto island terminal is operating within its design capacity and as a relatively new construction, is considered to be in good condition. The current vessel size is considered by the users to meet the requirements for the near and midterm future and no upgrades or expansion is required to meet the projected volumes set out in Table 5-4 of this report.

Source: ASPA/M&N

Figure 10-2: Pinto Island Steel Terminal

10.3 ALABAMA STEEL TERMINAL

The Alabama Steel Terminal concession includes existing Pier D and a 182,000 SF shed built for storage of steel coils and it is reported that the shed is operating at near capacity. To accommodate projected growth, AST plans to expand the shed by an additional 150,000 SF eastward as indicated in Figure 10-3. It is likely that this expansion will be incremental and will be funded by the concessionaire.

Source: M&N 2018

Figure 10-3: Alabama Steel Expansion Program

10.4 RO/RO TERMINAL

In 2018, ASPA signed an agreement the Terminal Zarate and SAAM companies joint venture in to develop a new 57-acre RoRo Terminal at the site of the former Bulk Handling Plant. Funding for the ASPA part of the $60 million investment comes from the recently acquired Tiger Grant funds of $14 million and construction is expected to get underway in early 2019.

A concept layout plan for the new RoRo Terminal is depicted in Figure 10-4.

Source: ASPA/M&N

Figure 10-4: New Ro/Ro terminal at former Bulk Plant location

10.5 MAIN DOCKS PROJECTS

10.5.1 Wharves

There is no pressing need for additional berth length or new berths at this time. However, several of the existing wharves require rehabilitation and/or upgrading to meet the projected commodity demand and acceptable service and safety levels. Almost all of the berths at the Main Docks are over 70 years old and were designed for a dredge depth of 40'. The berths are typically concrete pile caps and cross walls supported by concrete piles with either steel or concrete sheet pile walls and a concrete deck.

The incidence of broken/missing piles and deterioration of sheet pile walls and substructure members has progressed to the point that reconstruction is required. Berths South B, River B, North B, and South C have been identified as the ones most in need of reconstruction. The berths will be designed to accommodate a dredge depth of 40' due to the limits of the I10 Harbor tunnel and the aprons will have a uniform live load of 1,000 psf.

10.5.2 Warehousing

As seen in Section 7.3, there is a modest shed capacity surplus at this time, but this also depends very much on the commodity to be stored and the availability of a sufficiently large area for a specific cargo at the most efficient location. At the same time, additional capacity can be achieved by reducing dwell times for certain products, but this does reduce the attraction of Mobile for forest products and other commodities.

Inspection of the sheds indicates that they are in fair to good condition, except for South C Transit Shed, Unit 19 Warehouse, and Pier 6 Warehouse. The floor slab in South C Transit Shed needs to be replaced with a new reinforced concrete floor slab that is designed for forest products handling equipment. Warehouses Unit 19 and Pier 8 are small and outdated and it is recommended that they be demolished. The area can then be converted to open space to increase the open storage area.

As was seen in Table 7-2, the shed at Pier B South is currently out of service during rehabilitation of the berth structure, and ASPA plans to reconstruct the floors at the Pier C South transit shed.
No additional square footage of shed space appears to be necessary to accommodate the forecasted potential market under the following assumptions

- South C Transit Shed Floor Replacement
- Demolish Unit 19 and Pier 8 Warehouses/Repave
- Floor loadings of the sheds can meet the demand for steel products
- Long dwell time cargo such as lumber would be moved off terminal when demand for shed space approaches capacity, or dwell times reduced

10.5.3 Open Storage

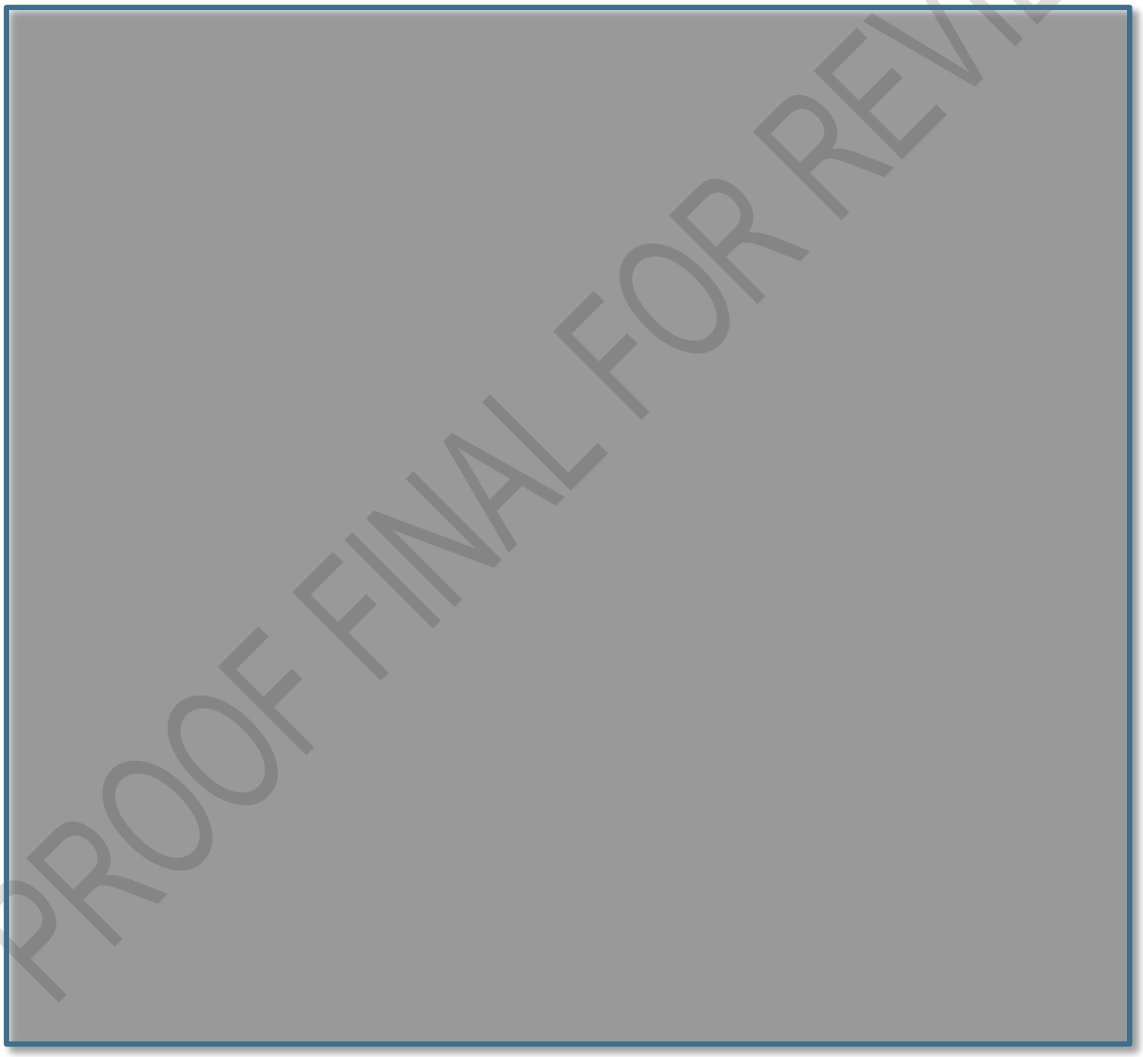
Little can be done to expand the open storage areas which are decreasing in size as the new ro/ro terminal is developed and the AST concession is no longer available for ASPA cargo. The reduction has been compensated to a degree by the transfer of the Berth 2 containers to APMT, but as seen in Section 8, the open storage areas can come under pressure from time to time as a result of seasonal peaks and extended dwell times. The proposed demolition of Unit 18 warehouse and the Pier 8 shed will add another 2.5 acres of open storage. However, given that the overall projections of demand are relatively flat, this concern is best handled by operational and non-capital-intensive solutions.

10.5.4 Gate Entrance

The main gate offers two lanes in and two lanes out. The gate operates as a manual security check for inbound/outbound trucks and inbound POV's to the main docks, AST and the proposed Ro/Ro terminal. At this time, truck queuing is controlled by an appointment system that is linked to a remote lot. However, space limitations restrict the gate sizing and configuration and an improved gate clearance process would be beneficial for the regular users of the leased or concessioned areas.

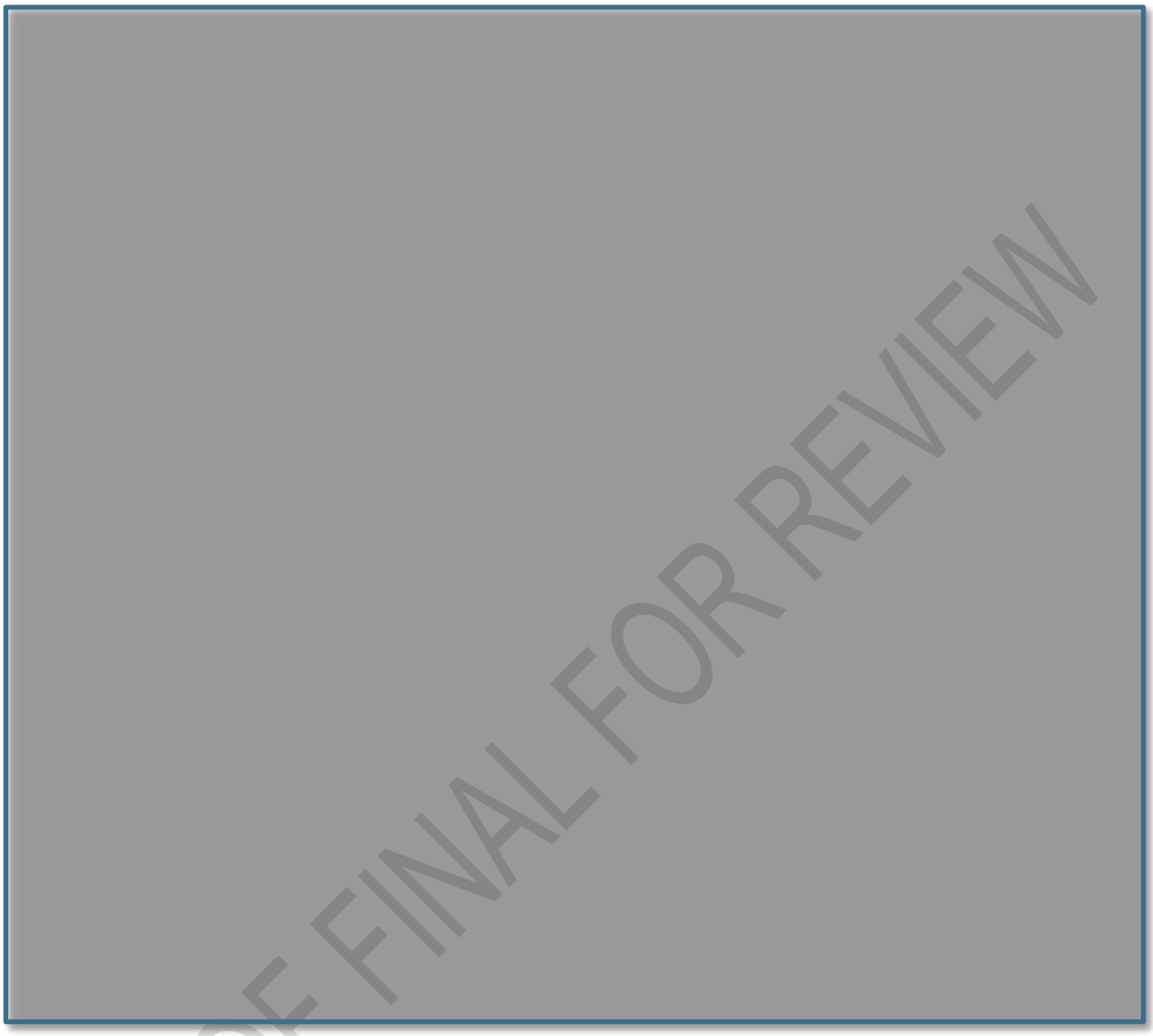
Since containers are no longer handled at the Main Docks, there is no need for a processing infrastructure. Consequently, it is suggested that the gate can be modernized and partially automated by installing credential readers, CCTV cameras and new booths that are protected from weather by a canopy. Gate capacity would remain at two lanes each direction with oversize outer lanes.

The proposed improvements at the Main Docks are shown in Figure 10-5 and Figure 10-6 below.



Source: ASPA/M&N 2018

Figure 10-5: Main Docks Berths & Sheds Improvements – Sheet 1



Source: ASPA/M&N 2018

Figure 10-6: Main Docks Berths and Sheds Improvements – Sheet 2

10.6 GARROWS BEND ICTF

The Garrows Bend site has adequate area to expand capacity by constructing additional working and storage tracks. Preliminary design has also been completed on constructing an inter-terminal truck overpass that will connect Garrows Bend ITCF to the APMT container terminal.

Two infrastructure projects remain to be completed from the original land reclamation and ICTF construction projects:

- Extend the rock armor further up the slope along the dike fronting Garrows Bend
- Divert the off-terminal (City) storm drainage that is currently being carried by "temporary" HDPE pipes under the ICTF into a new open channel.

The open channel will discharge into an existing box culvert that is under the lead rail tracks diversion channel as depicted in Figure 10-7

10.7 VAD DEVELOPMENT

The purchase of the Armstrong World Industries (AWI) property increases the total area of the Value-Added Distribution (VAD) tract north of Garrows Bend ITCF to 104.8 acres, excluding the Frascati parcels, as shown in Figure 10-7. The Frascati parcels are being developed by a private entity into a refrigerated warehouse facility. ASPA is applying for "brownfields" designation of the VAD tract, which would make this area eligible for "clean-up" grants and development incentives. ASPA is responsible for demolition of the AWI plant structures, which will be necessary to develop this parcel. The intent remains to lease the VAD parcels to private entities for development of marine-related manufacturing and logistics facilities. No specific subdivision plan has yet been established for this initiative.

Source: ASPA/M&N 2018

Figure 10-7: Garrows Bend ICTF and VAD Area expansions

10.8 MCDUFFIE

The McDuffie coal terminal was seen in Section 8.2.2 to have an installed capacity on the order of 30 million tons per year, but long demand is not expected to exceed 15 million tons annually during the forecast period. In the longer term, it seems unlikely that coal export volumes will increase significantly, implying that the terminal is now oversized to meet the projected long-term demand. At the same time, the operating revenue from McDuffie is currently over 40% of the total income for ASPA, but it is understood that operating profit is marginal at the current levels of activity.

While not included in the scope of this Master Plan, it does appear that some restructuring of the terminal to better match the expected demand could be beneficial to the overall profitability of ASPA as a whole. Given the current customer base, long term contracts and market expectations, a detailed operational, equipment and facility study would be needed to evaluate any potential changes, but these might include equipment, stockpile or operational reorganization to closer match demand and optimize operating expenses.

10.9 STRATEGIC PROJECTS

The market and capacity evaluations clearly show that the Port is doing well and is increasing its local capture of the Alabama and regional container market. However, several of the initiatives from neighbouring states and Port Authorities have the potential to dilute future growth with an emphasis on the development of new inland consolidation centers with access to economic activity areas in the east and north of Alabama.

It is strongly recommended that ASPA initiate its own expansion program to increase its market share for containerized cargo beyond the current radius of some 250 miles. The work done since 2007 has laid the foundation for the establishment of Mobile and ASPA as major players in the national port system. However, to increase, volumes and attract new services to Mobile, it is now the right moment to explore the potential to implement transport chain improvements with new or ASPA sponsored inland container centers or consolidation terminals with improved intermodal connections.

10.10 NAVIGATION AND DREDGING

10.10.1 Federal Channel Project

The Federal channel serving Mobile is divided into four segments as shown in Figure 10-8 which also indicates the authorized and existing dimensions. The proposed project includes:

- Deepening the entire channel to 50'
- Widening 3 miles of the Lower Bay Channel by 100'
- Expanding the turning basin

ASPA is the non-federal sponsor for this $388M project with an expected contribution requirement of $150 million. The Draft Study Report with the Environmental Impact Statement was released by the Mobile District USACOE in July and a Record of Decision is anticipated to be presented in November 2019.

Source: ASPA/USACE 2018

Figure 10-8: Mobile Harbor Federal Navigation Project

10.10.2 Dredged Material Placement

ASPA is responsible for maintaining the access channels from the Federal channel to the berths. The annualized dredging volume is estimated to be 382,600 cubic yards (cy) based on the actual dredging volumes recorded from terminal projects spanning 2014 through 2018, as shown in Table 10-2.

Table 10-2: Maintenance Dredging History 2014-2018

Terminal	Quantity (CY)
Main Docks / Blakely	671,161
APM Terminals - Mobile	79,952
Pinto Island Terminal	133,334
McDuffie Terminal	1,028,572
TOTAL	1,913,019
Annualized over 5-Years	382,600

Source: ASPA- 2018

ASPA is also responsible for placement of the dredged material within a containment facility. As shown in Figure 10-9, there are three ASPA-owned dredged material containment facilities (DMCF) located within the harbor. The 225-acre Mud Lakes DMCF receives material from the Main Docks while the Pinto Island DMCF and McDuffie Island DMCF, which offer aggregate 103 acres of capacity, receive material from MCT, McDuffie Coal Terminal, and Pinto Island Terminal.

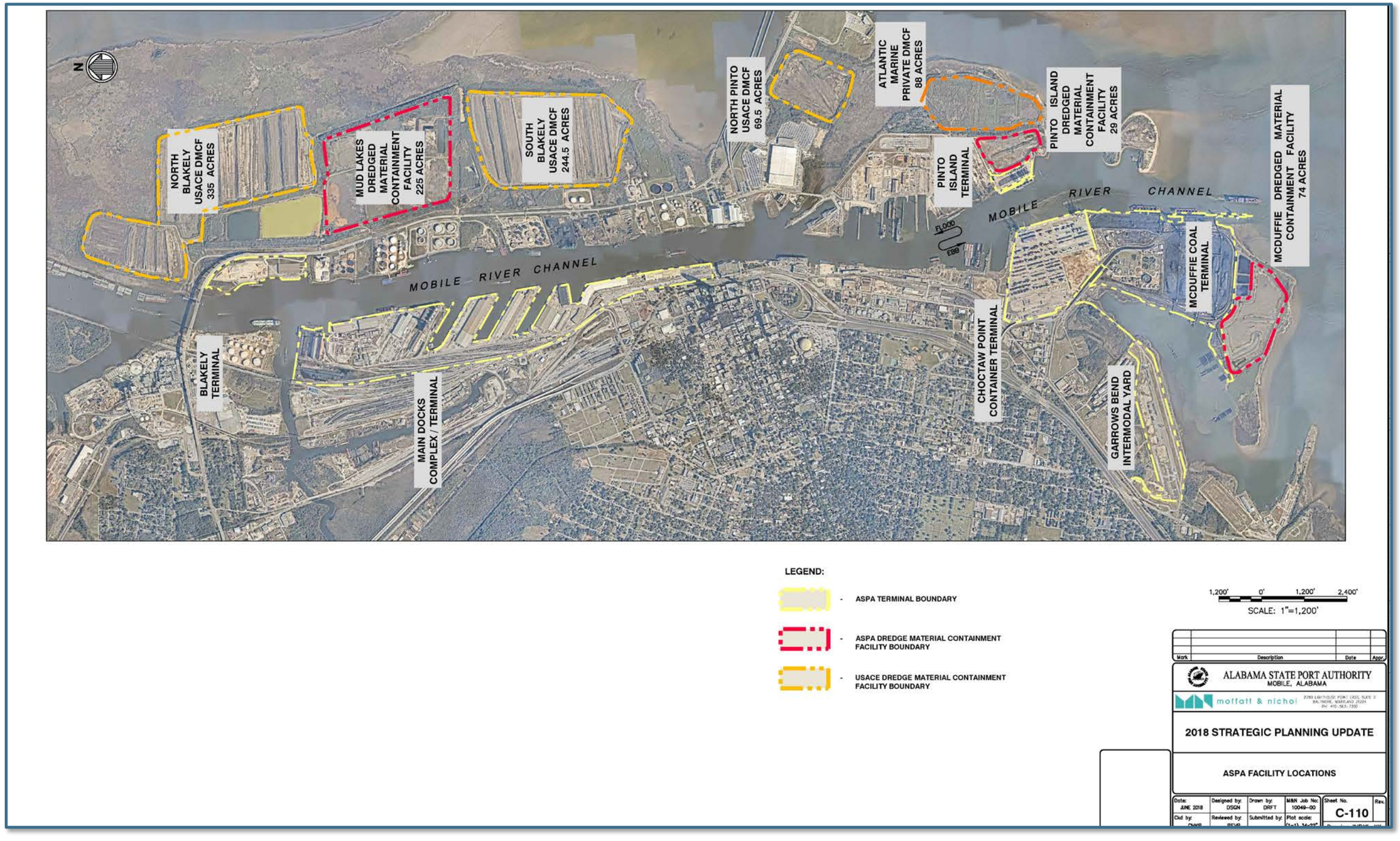


Figure 10-9: Upper Bay Dredged Material Placement Sites

Both lower harbor sites are currently filled to capacity and in order to create space for maintenance dredge projects, dried dredge material must be excavated, then hauled to an inland disposal site. This significantly increases the cost of dredging, as summarized in Table 10-3 and the lack of available placement capacity adds between $3.85M to $8.47M to the annual maintenance dredging cost.

Table 10-3: Dredged Material Placement Costs

Dredge Cost	Historical Cost / CY	Reclaim Capacity Cost / CY	Present Day Cost / CY	Projected Annual Cost
Low	$7.00	$10.00	$17.00	$6,504,000
High	$10.00	$22.00	$32.00	$12,243,000

Source: ASPA/M&N 2018

Notes: Based on Annual Dredge Volume = 382,600 CY

Resolution of this placement capacity problem is one of the key issues facing ASPA. Options for construction of new containment sites in the Harbor and Upper Bay are very limited and face significant regulatory hurdles. Alternate solutions, such as capacity recovery and beneficial reuse, i.e. marsh or island creation, have been investigated and implemented at a number of other locations and would seem to be necessary for Mobile. The Poplar island project in the Chesapeake Bay is often cited as a good example of beneficial use of dredged materials but took many years to evaluate and gain the required approvals.

With the trend to large vessels and the potential to handle deeper draft ships at an improved Pier B, APMT and McDuffie, it is clear that this issue will increase in importance to the overall financial returns and capital investment capacity of ASPA. It therefore follows that any new large scale or long-term solutions to the handling of the maintenance dredging requirements should anticipate a lengthy pre-implementation period and the preliminary studies should be initiated as a matter of urgency.

10.11 RECOMMENDED DEVELOPMENT STRATEGY

The market assessment and recent developments at the Port clearly show that ASPA is in expansion mode, while many of its competitors are working to protect their cargo bases.

As an agency of the State of Alabama, ASPA can now extend its economic presence in the state to enhance the expansion of the PPPs and public facilities to connect with the internal industrial and economic development of the state.

10.11.1 Main Docks

With the cargo projections indicating steady but relatively modest growth for the main docks commodities, the existing berths offer sufficient capacity to meet demand to well beyond the forecast horizon of 237. However, several of the wharves require rehabilitation. In particular, Pier C North was recently reconstructed and now has a load capacity of 1500 lb/ft2 . Estimates have been prepared for the reconstruction of Pier C South and Pier B but the expected cost of the work is high, at some $148.0 million and the benefits of these projects are being re-evaluated at this time.

Warehouse space is also seen as adequate but requires careful management to meet customer demands and maintain attractive dwell times. Required work is limited to the floor replacement of the shed at Pier C south, at a cost of $4.51 million.

10.11.2 McDuffie

In spite of the decline in import volumes, export demand at McDuffie remains steady, albeit at less than 50% of the reported installed capacity of the coal terminal. As a critical element of the ASPA financials, this may be an appropriate time to evaluate the short and long term needs and operations at the terminal in an effort to enhance its profitability.

10.11.3 Market Expansion

The work done since 2007 has laid the foundation for the establishment of Mobile and ASPA as major players in the national port system, and ASPA should now focus on the next phase of its expansion program to increase its market share for containerized cargo beyond the current radius of some 250 miles.

In line with the general trend to the extension of cargo handling services beyond the immediate port boundaries, it is now the right time to explore the potential to implement transport chain improvements with new or ASPA sponsored inland container centers or consolidation terminals with improved intermodal connections.

Based on a preliminary transport cost analysis, it is estimated that the current size of the Primary Target market of northern Alabama, portions of western Tennessee, northern Mississippi and southern Arkansas totals roughly 1.2 – 1.4 million loaded TEU per year.

To evaluate the feasibility of establishing an inland port, it is recommended that a market study, coupled with a financial analysis be used to determine which sites would offer the strongest potential return on investment.

10.12 INVESTMENT PROGRAM

Table 11-2 shows the estimated cost of the ASPA capital improvement projects discussed in the previous section of this report expressed in 2018 dollars. The expansion of the next phase of the APMT terminal will also be funded by ASPA, but the costs will be reimbursed through an adjusted concession payment schedule. This and other expected capital costs are listed in Table 11-3

It should be noted that a number of Federal and other grants have been received or are pending, which will defray the bottom line ASPA total of $155.49 for the overall capital investment program.

The estimated costs for the rehabilitation of Pier B are taken from estimates provided by a consultant's condition inspection and report that was recently completed for ASPA.

Table 10-4: ASPA Main Docks Improvement Cost Requirements

Project	ASPA Cost ($millions)
Pier B South & Pier B River (50%) Rehabilitation	$42.97
Pier B North & Pier B River (50%) Rehabilitation	$46.96
Pier C South Rehabilitation	$57.73
South C Transit Shed - Floor Replacement	$4.51
Demolish Unit 19 & Pier 8 Warehouse/Repave	$1.71
Upgrade Entrance Gate	$1.61
Total Costs ($2019)	$155.49

Source: ASPA/M&N 2019

As can be seen from Table 11-2 ,the most recent estimates for the rehabilitation of the Pier B and C wharves is high, at some $148.0 million and in light of the demand-capacity projections, ASPA is re-evaluating the benefits of these projects at this time.

Table 10-5: Other Capital Improvement Investment Requirements

Area	Project	ASPA Cost ($millions)
Main Docks	New RoRo Terminal	$55.80 /1
APMT	Phase 3 Dock and CY Extension	$29.10
Garrows Bend ICTF	Diversion Channel	$3.00
	Extend Dike Armoring	$6.00
VAD	Armstrong World Industries Demolition	$2.50
Total Cost ($2019)		$96.40

Tiger and Restore Grants will provide $41.50 million of the ASPA requirement for the Ro/Ro terminal

Source: ASPA/M&N 2019

Given the concerns over the expected costs for the rehabilitation of Piers B and C south, ASPA has not yet finalized the priorities and scope for the short to mid-term investment program outlined in Table 11-2. However, the Ro/Ro project is underway and the APMT expansion will proceed independently of the Main docks work items, as will the Mobile Harbor Navigation Project and maintenance dredging projects.

11 SUMMARY & CONCLUSIONS

11.1 ASPA IN 2019

Alabama State Port Authority (ASPA) has undergone a major change in its governance, core businesses and development strategy over the past 18 years. Formerly a coal and forest products port, with no clearly defined commercial, management or investment strategy, the then Alabama State Docks Department (ASDD) faced major fluctuations in its basic commodity movements at the same time as the growth of Asian economies were placing heavy demands for container facilities at key entry ports in the U.S.

The planning work undertaken in the early 2000s identified a strong opportunity for Mobile to take advantage of its excellent highway and main line rail connections to the mid-west and other destinations and ASPA embarked on the development of the Mobile Container Terminal (APMT) and logistics complex in 2001.

At the same time, the demand for coal imports and exports surged from a low of 9.7 million tons in 2002 to over 20 million tons in 2007, and then down to the current level of some 12 million tons, dispelling any expectations that the McDuffie location will be available for conversion to other marine activities in the near to mid-term future.

Mobile also became one of the two main forest products ports in the U.S., sharing the handling of paper and other commodities with the Port of Baltimore. Finally, a number of key tenants are now occupying the Middle Bay Port that was acquired in the 1990s.

11.2 MARKET ASSESSMENT

11.2.1 Main Docks

Based on the outlooks for the individual commodities, it is considered that by 2037, total tonnage through the Main Docks could reach 9.3 million tons (Mt), as illustrated inTable 11-1..

Steel and related tonnage is projected to continue to be the largest by weight, but potential growth of other traditional breakbulk commodities including forest products and project cargo will also continue to generate demand for covered and uncovered storage capacity, heavy lift equipment and multimodal access.

Other important trade will continue to include forest products such as pulp, linerboard and lumber, as well as metal & alloys. A small volume of exported breakbulk chicken is assumed to remain but is contingent on the continued demand from Cuba or another Caribbean and/or South/Central American market for break bulk shipments. Additionally, 700,000 tons of pig iron imports are assumed in these Base trend projections, though demand could fall in response to increases in domestic production and/or increases in the preferred use of direct reduced iron (DRI).

Table 11-1: Tonnage Projection for the Main Docks

Commodity (Tons)	2017	2018	2022	2027	2032	2037
Iron & Steel	5,448,786	5,469,340	5,652,295	5,781,213	5,781,213	5,781,213
Woodpulp	825,977	828,875	816,046	765,880	749,656	798,153
Pig Iron	720,349	700,000	700,000	700,000	700,000	700,000
Lumber	277,756	279,682	287,522	297,631	308,095	318,927
Linerboard & Paper	111,529	125,000	150,000	150,000	150,000	150,000
Chicken	91,913	70,000	70,000	70,000	70,000	70,000
Metal & Alloy	147,494	152,656	175,177	208,055	247,104	293,482
Other	194,127	200,000	200,000	200,000	200,000	200,000
Main Dock Total	7,817,931	7,825,553	8,051,039	8,172,779	8,206,068	8,311,775

Source: M&N, 2018

11.3 COAL

The base case projection for coal assumes that the total volume through McDuffie will fluctuate around an average of 12.50Mt per year. This includes continued imports of roughly 1.0Mt tons to local coal-fired plants, plus 11.5Mt in metallurgical coal exports. US coal will continue to face competition in Asia from Australia and Indonesia, whereas Europe and South America will be more accessible. Metallurgical coal is expected to continue to come predominantly from the Warrior Met Coal operations in Brookwood, AL. with a production capacity for 8Mt per year and 300Mt of recoverable reserves. The Drummond mine in Shoal Creek, AL is assumed to continue to be a likely source of coal for McDuffie.

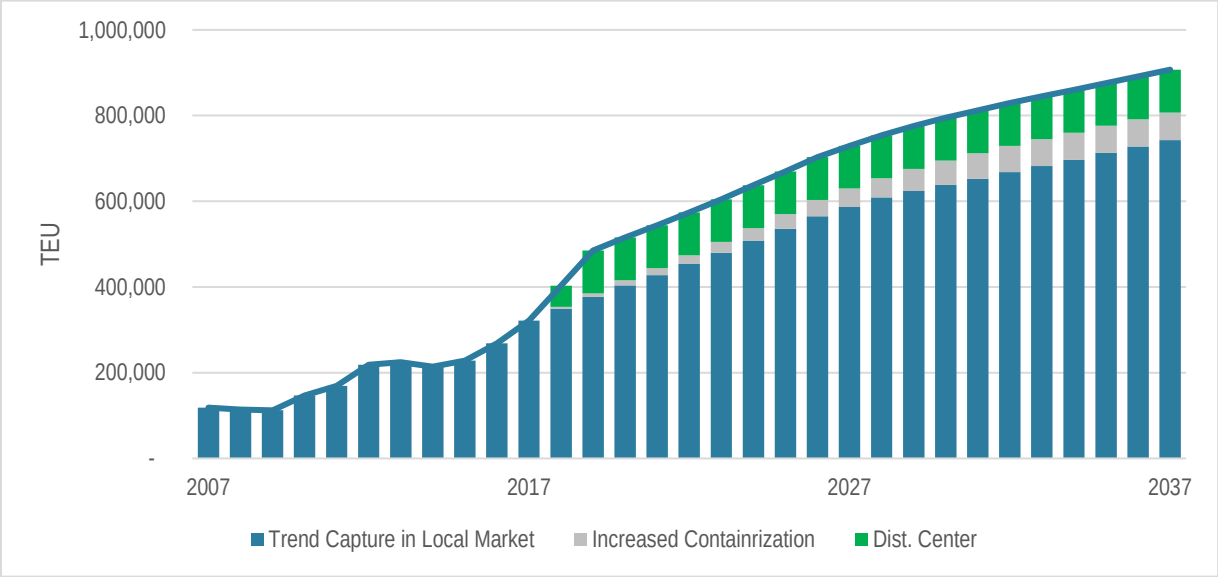
To a large extent the future of coal will continue to be driven by international policy and the baseline forecast does not anticipate any long-term significant shifts from today's global policies, including targeted emissions reductions in Europe, China and the US.

11.4 CONTAINERS

All indications show that the Port of Mobile's capture within the local market is likely to continue given the momentum it has generated and the increased number of ocean carrier services it has been able to offer. The forecast then assumes that the Port's share will grow from 30% in 2017 to roughly 40% by 2027, as shown in Figure 11-1: TEU Projections for Mobile/APMT

Once this level of market penetration is reached, capture is expected to be capped as the competition intensifies for more discretionary volume in markets such as those in northern-Alabama.

Estimates of future throughput at the container terminal, indicate that total volume could approach 730,000 TEU by 2027 as a result of local market capture and moves from break bulk to containerization. Should additional big-box DCs be developed nearby, these too would bring incremental volume to the terminal.



Source: M&N

Figure 11-1: TEU Projections for Mobile/APMT

11.4.1 New Business Potential

While this study indicates steady growth for the transitionally commodities handled at the Main Docks, new business will primarily come from containerized cargoes.

The mid to long term throughput capacity of the APMT container terminal is currently estimated to be 1.5 million TEU, as compared to the current throughput of demand of 403,000 TEU. However, with the ICTF and value-added areas, rail connections, plus the deep draft Navigation project, there is significant potential for new business, in much the same way as Savannah developed in the early 2000s.

In order to achieve this growth, increased market reach is required, mainly through the expansion of traffic beyond the reach of the currently truck dominated market radius of 250 to 350 miles, together with the establishment of inland consolidation centers that can serve as the point of transfer and document processing for customers that are distanced from the Port itself.

11.5 ASSETS ASSESSMENT

11.5.1 Main Docks

Many of the existing wharves were designed for previous generations of break bulk vessels and smaller bulk carriers. However, they still offer considerable flexibility for the baseline cargoes and ASPA has recently initiated a program for upgrade or restore the working berths. The former Bulk handling berth will be incorporated into the new Ro/Ro facility, also expected to commence construction in early 2019.

Most of the warehouses are metal buildings with concrete slab on grade. Sheds 3 and 4 are certified for storage of food grade fluff pulp and generally reserved for that cargo. However, all sheds are mutli-use, except for the refrigerated storage, depending on floor capacity and the current ASPA maintenance program.

As a result, the total available storage space in mid-2018 was calculated to be 2.21 million sf., excluding Unit 19 and the Pier 8 warehouses. The Pier B rehabilitation program and floor reconstruction of the shed at Pier C would reduce the available storage area to 1.52 million sf for about 12 to 24 months.

11.6 CONDITION ASSESSMENT

11.6.1 Wharves

Several of the existing wharves require rehabilitation and/or upgrading to meet the projected commodity demand and acceptable service and safety levels. Almost all of the berths at the Main Docks are over 70 years old and the incidence of broken/missing piles and deterioration of sheet pile walls and substructure members has progressed to the point that reconstruction is required. Berths South B, River B, North B, and South C have been identified as the ones most in need of reconstruction.

11.6.2 Warehouses

With the exception of the Unit 19 and Pier 8 Warehouses, and the South C Transit Shed, the warehouses are in relatively good condition. It is expected that ASPA will demolish the Unit 19 and Pier 8 and it is planned to replace the floor of the transit shed at Pier C south.

11.7 NEEDS TO MEET DEMAND

At the time of the last Master Plan in 2008, the Port was essentially a multipurpose operation, except for the McDuffie coal terminal. The container terminal was at the design stage, as was the Pinto Island steel terminal and studies were ongoing for potential ro/ro terminal locations at the main docks or in Theodore.

In 2018, there is a clear move towards unitization and specialization of the Main Docks and other assets, with APMT and the Pinto Island terminals at full operation. Steel coils are handled at the Alabama Steel leased area and the proposed ro/ro terminal is being developed on the site of the old Bulk Plant. Refrigerated storage is also available, and several sheds have been certified to accept and store food quality fluff pulp.

11.7.1 Wharves

The main docks wharves total 18,943 ft in length, with 15,000 ft used for ASPA cargoes. This then translates to a current throughput capacity of 6.375 million tons. The Pier B reconstruction work would reduce the available berth length to 9,670 ft and the installed transfer capacity will drop to 4.10 million tons.

Break bulk throughput for the ASPA handled commodities is expected to be relatively stable at 3.0 to 3.2 million tons per year over the forecast period, which indicates that the installed capacity of the Main docks wharves will be sufficient to meet demand to beyond 2037. Perhaps more importantly, it also indicates that the Port would not be expected to lose traffic due to capacity constraints during the rehabilitation work planned for Pier B.

11.7.2 Covered Storage

The storage model indicates a current surplus of space of some 700 – 750,000 sf, based on the overall dry cargo shed availability, dropping down to 575,000 sf during the reconstruction of the shed at Pier C south.

However, the capacity model assumes that any cargo can be stored in any shed. While this is theoretically possible, it is not practical as cargo lots may exceed the available space in one or more sheds. Alternatively, the berth may be distant from the shed area or customers can be unwilling to have cargo spread over several sheds.

The current policy of allowing extended dwell times is a major factor in attracting cargo to Mobile and the results of the capacity assessment indicate that the available shed space at the main docks will permit the continuation of this practice if the referenced rehabilitation work is undertaken in a timely manner.

The overall conclusion from the assessment is that shed space at the Main Docks is relatively tight if the existing dwell times are maintained but can be managed within the operational planning processes currently in place at ASPA.

Refrigerated space appears to be adequate for the forecast period, although the recent announcement of the 300,000 sf MCT refrigerated warehouse at Brookley may change this assessment.

The shed evaluation also confirmed the comments from AST representatives that expansion will be needed shortly at the terminal if the recent growth of steel coil movements is maintained.

11.7.3 Open Storage

The assessment shows that in overall terms, the Port has sufficient space to accommodate demand to beyond the forecast horizon of 2037. However, aluminum and steel products can only be stored at the off-dock locations, due to high floor loading, which then reduces the space for those commodities to 23 acres. Under this limitation, the demand for open space for aluminum and steel products could exceed capacity by 2027.

The bulk of the steel slabs moving through the Pinto island terminal are loaded directly onto barges, with the storage area being used during peak times or to adjust to a lack of barges or arrival peaks. Since this double handling is obviously undesirable as a regular procedure, there does not appear to be a need to expand the Pinto island storage capacity within the overall forecasting horizon.

11.8 NAVIGATION REQUIREMENTS

11.8.1 Federal Channel

For many mid-size and secondary hub ports in the US and internationally, the 8,000 to 9,000 TEU container vessel has now become the standard for a container ship size. As such, the APMT terminal in Mobile is already receiving vessels in the 9,000 TEU size range and the ability to accommodate these or larger ships will be critical to achieving the growth projections as overall volumes increase for the Port.

Like many ports in the region, Mobile and ASPA are responding to the trend in container vessel size with plans to deepen the Federal channel to 50ft, as discussed later in this report. The deeper channel draft will also benefit McDuffie by permitting full load access to many Cape size or large bulk carriers that could be advantageous to its ability to compete for export coal volumes.

The depth at the APMT berth face is currently maintained at 45 ft, and it is assumed that this would be increased to 50 ft once the Navigation channel improvements are complete. According to the design information on file, no major structural upgrades will be required to allow the deeper dredging, although maintenance dredge volumes could increase slightly.

In summary, the ongoing program to deepen the main navigation channel to 50 ft responds to the range of vessels expected to call at the APMT terminal in the foreseeable future and could also benefit the McDuffie terminal in terms of competitiveness for its export volumes.

11.8.2 ASPA berth Access & Maintenance

Both lower harbor sites are currently filled to capacity and in order to create space for maintenance dredge projects, dried dredge material must be excavated, then hauled to an inland disposal site. This significantly increases the cost of dredging, and the lack of available placement capacity adds between $3.85M to $8.47M to the annual maintenance dredging cost.

Resolution of this problem is one of the key issues facing ASPA since options for construction of new containment sites in the Harbor and Upper Bay are very limited and face significant regulatory hurdles.

With the trend to large vessels and the potential to handle deeper draft ships at APMT and McDuffie, it is clear that this issue will increase in importance to the overall financial returns and capital investment capacity of ASPA. Alternate solutions, such as capacity recovery and beneficial use, such as. marsh or wetlands creation have been investigated and implemented at a number of other locations and would seem

to be an option for Mobile. However, any new large scale or long-term solutions to the handling of the maintenance dredging requirements should anticipate a lengthy pre-implementation period and the preliminary studies should be initiated as a matter of urgency.

11.9 INLAND OPPORTUNITIES

Where the major container shipping companies traditionally selected Ports of call based on overall markets and import/export potential, their strategies and choices are now being increasingly dominated by the needs of the big box retail companies, Amazon and other major clients. For these companies, as well as smaller businesses, the inland transport cost can be the largest component at both ends of the delivery chain, followed by ocean shipping costs with Port costs often as low as 10% of the total door to door costs. As the importance of these major clients has grown, together with the emphasis on total cost refinements, the major clients essentially dictate the Port of choice to the ocean carriers for their business.

Ports typically responded by providing the facilities to handle the vessels deployed on specific services, but are now working with state agencies, rail and trucking companies to minimize inland transport and handlings costs for the carrier's major clients and also to encourage the establishment of consolidation or dry ports to aggregate container volumes for multiple clients and large-scale manufacturing activities such as the car assembly plants in Alabama and Georgia.

The success of APMT and the availability of the ICTF have changed the profile of ASPA from a break bulk and coal port to a major regional container port, while the statewide and regional economic growth offers attractive cargo opportunities to Mobile and other ports in its competitive area.

11.10 CAPITAL EXPANSION PROGRAM

11.10.1 Containers (APMT)

The phased development of the APMT facilities will meet projected demand until beyond the forecast horizon of 2037. However, the elimination of the Panamax vessel size limitation on the Panama Canal has increased the "workhorse" vessel size to 8,000 to 9,000 TEU, which could necessitate additional dredging at the berth face once the Deep Draft project is completed.

11.10.2 Pinto Island

The Pinto island terminal is operating within its design capacity and as a relatively new construction, is considered to be in good condition. The current vessel size is considered by the users to meet the requirements for the near and midterm future and no upgrades or expansion is required to meet the projected volumes set out in Table Error! No text of specified style in document. 1 of this report.

11.10.3 Alabama Steel Terminal

The Alabama Steel Terminal concession includes existing Pier D and a 182,000 SF shed built for storage of steel coils and it is reported that the shed is operating at near capacity. To accommodate projected growth, AST plans to expand the shed by an additional 150,000 SF eastward as indicated in Figure 10 3. It is likely that this expansion will be incremental and will be funded by the concessionaire.

11.10.4 RO/RO Terminal

In 2018, ASPA signed an agreement the Terminal Zarate and SAAM companies joint venture in to develop a new 57-acre RoRo Terminal at the site of the former Bulk Handling Plant. Funding for the ASPA part of the $60 million investment comes from the recently acquired Tiger Grant funds of $14 million and construction is expected to get underway in early 2019.

11.10.5 Main Docks

Wharves

There is no pressing need for additional berth length or new berths at this time. However, several of the existing wharves require rehabilitation and/or upgrading to meet current loading requirements and safety levels, with Berths South B, River B, North B, and South C identified as the ones most in need of reconstruction.

Warehousing

There is a modest shed capacity surplus at this time, but this also depends very much on the commodity to be stored and the availability of a sufficiently large area for a specific cargo at the most efficient location. At the same time, additional capacity can be achieved by reducing dwell times for certain products, but this does reduce the attraction of Mobile for forest products and other commodities.

No additional square footage of shed space appears to be necessary to accommodate the forecasted potential market under the following assumptions

- South C Transit Shed Floor Replacement
- Demolish Unit 19 and Pier 8 Warehouses/Repave
- Floor loadings of the sheds can meet the demand for steel products
- Long dwell time cargo such as lumber would be moved off terminal when demand for shed space approaches capacity, or dwell times reduced

Open Storage

Little can be done to expand the open storage areas which are decreasing in size as the new ro/ro terminal is developed and the AST concession is no longer available for ASPA cargo. The reduction has been compensated to a degree by the transfer of the Berth 2 containers to APMT, but as seen in Section 8, the open storage areas can come under pressure from time to time as a result of seasonal peaks and extended dwell times. The proposed demolition of Unit 18 warehouse and the Pier 8 shed will add another 2.5 acres of open storage. However, given that the overall projections of demand are relatively flat, this concern is best handled by operational and non-capital-intensive solutions.

10.5.4 Gate Entrance

it is suggested that the gate can be modernized and partially automated by installing credential readers, CCTV cameras and new booths that are protected from weather by a canopy. Gate capacity would remain at two lanes each direction with oversize outer lanes.

11.10.6 Garrows Bend ICTF

The Garrows Bend site has adequate area to expand capacity by constructing additional working and storage tracks. Preliminary design has also been completed on constructing an inter-terminal truck overpass that will connect Garrows Bend ITCF to the APMT container terminal.

Two infrastructure projects remain to be completed from the original land reclamation and ICTF construction projects:

11.10.7 VAD Development

The purchase of the Armstrong World Industries (AWI) property increases the total area of the Value-Added Distribution (VAD) tract north of Garrows Bend ITCF to 104.8 acres, excluding the Frascati parcels which are being developed by a private entity into a refrigerated warehouse facility.

The intent remains to lease the VAD parcels to private entities for development of marine-related manufacturing and logistics facilities.

11.11 INVESTMENT PROGRAM

11.11.1 Capital Improvement Projects

As shown in Table 10-5, the expected cost of the Main Docks capital improvement projects is $155.49 million, based on the most recent estimates. Other expected capital costs are listed in Table 11-3. Within these commitments, expansion of the next phase of the APMT terminal will also be funded by ASPA, but the costs will be reimbursed through an adjusted concession payment schedule.

Funds from a number of Federal and other grants have will defray the bottom line ASPA cost element of the Ro/Ro terminal and potentially other projects within the overall improvements program. However, no estimates are included for the development of an inland consolidation or distribution center or other projects designed to expand the capture area of the Port and its tenants, since there is no specific project to use as a calculation base..

Table 11-2: ASPA Main Docks Improvement Cost Requirements

Project	ASPA Cost ($millions)
Pier B South & Pier B River (50%) Rehabilitation	$42.97
Pier B North & Pier B River (50%) Rehabilitation	$46.96
Pier C South Rehabilitation	$57.73
South C Transit Shed - Floor Replacement	$4.51
Demolish Unit 19 & Pier 8 Warehouse/Repave	$1.71
Upgrade Entrance Gate	$1.61
Total Costs ($2019)	$155.49

Source: ASPA/M&N 2019

Table 11-3: Other Capital Improvement Investment Requirements

Area	Project	ASPA Cost ($millions)
Main Docks	New RoRo Terminal	$55.80 /1
APMT	Phase 3 Dock and CY Extension	$29.10
Garrows Bend ICTF	Diversion Channel	$3.00
	Extend Dike Armoring	$6.00
VAD	Armstrong World Industries Demolition	$2.50
Total Cost ($2019)		$96.40

Tiger and Restore Grants will provide $41.50 million of the ASPA requirement for the Ro/Ro terminal

Source: ASPA/M&N 2019

11.11.2 Investment Schedule

As can be seen from Table 11-2 ,the most recent estimates for the rehabilitation of the Pier B and C wharves is high, at some $148.0 million and in light of the demand-capacity projections, ASPA is re-evaluating the benefits of these projects at this time.

Given these concerns, ASPA has not yet finalized the priorities and scope for the short to mid-term investment program outlined in Table 11-2. However, the Ro/Ro project is underway and the APMT expansion will proceed independently of the Main docks work items, as will the Mobile Harbor Navigation Project and maintenance dredging projects.

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