A Jackson Air Logistics Complex and Aerotropolis: Strategic Guidelines and Development Actions

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Executive Summary

Airport development and economic development are going hand-in-hand throughout the U.S. and around the world. Jackson-Evers International Airport (JEIA) has excellent potential to attract business and drive economic development in Rankin County and throughout the greater Jackson metropolitan area. The phased evolution of its Mississippi Air Cargo Logistics Center (MACLC), future Airport Parkway, the completion of the East Metro Highway Corridor (and nearby 400-acre East Side office/industrial park along and near a planned parallel taxiway adjacent to Runway 16L/34R), and the planned extension of this East Runway to 12,500 feet, along with JEIA's 2,242 acres designated as a Foreign Trade Zone pose rich opportunity.

With this opportunity in mind, Rankin First (the Rankin County Economic Development Authority) commissioned this report to provide the vision, strategic guidelines, and action-specific recommendations for JEIA to become a catalyst for business recruitment and local and regional economic growth. Pivotal to the vision, strategy and actions, is developing JEIA into a significant multimodal air logistics center that will drive airport-linked commercial development on its property and substantially beyond airport perimeters, creating a Jackson Aerotropolis.

Cornerstoning JEIA's logistics development will be the phased evolution of the Mississippi Air Cargo Logistics Center where $20 million Phase I was completed in late 2004. Specific attraction will therefore be focused on the best way to develop future phases along with providing reinforcing strategies and guidelines for Rankin County and broader Jackson metro area commercial development.

To set the context for this vision and strategy for a full-scale Mississippi Air Logistics Center and Jackson Aerotropolis, the initial chapter (1) discusses their underlying business rationale and competitive logic, (2) provides concrete examples of air logistics hub/Aerotropolis success elsewhere (as well as describes some that have not obtained success to date), and (3) discusses the credibility and viability of successfully transforming JEIA into a successful air logistics center that powers local, regional and state-wide economic development.

Following the introductory chapter covering the above issues, three additional chapters offer, in order, the (1) infrastructure, (2) business plan, and (3) implementation plan guidelines to assist those who will design, develop, and manage future phases of the MACLC to generate the greatest local, metropolitan, and state economic impact. Critical success factors are presented as well as target industries specified. To attract newer, high growth, higher value-adding industries, it is stressed that the relative importance of traditional tax incentives

by government will be superseded by logistical capabilities of the airport and its connected areas offering firms quick and efficient access to national and global suppliers and customers.

The report concludes with 25 recommendations and action steps to be followed by public sector agencies responsible for JEIA, Rankin County, and the greater Jackson Metropolitan area to successfully develop the MACLC and broader aerotropolis. Those recommendations and action steps focus on required hard and soft infrastructure as well as the business and commercial aviation (both passenger and cargo airlines) recruitment strategies to be pursued to provide connectivity, speed, and agility to area firms: the three emphasized factors for their gaining competitive advantage in the 21st century. The recommendations also address infrastructure and facility phasing and marketing strategies along with the public and private sector options for developing, operating, and managing the future expanded MACLC and East Side Business Park while promoting and coordinating extended Jackson Aerotropolis development. Finally, they address necessary environmental and social factors such as aesthetics in the airport area and liquor by the drink if the full economic development potential of JEIA and the Jackson Aerotropolis are to be achieved.

Chapter 1

Competitive Logic for a Jackson Air Logistics Complex and Aerotropolis

I. Introduction: Development Challenges and Strategic Response

Rankin County and the greater Jackson metropolitan area are at a critical junction in their economic development trajectories. Some encouraging signs suggest a sunny future. Yet, there are clouds looming on the horizon as competing regions in the South are upping their incentive antes for new investment and jobs while global outsourcing remains powerful. Strategic decisions and development initiatives taken today will determine the future direction the region goes in terms of business competitiveness, industrial mix, job creation, and citizen quality of life.

Critical issues are at stake. Will Rankin, Hinds and Madison Counties transition successfully to high-tech, automotive, and more information-intensive business services sectors? Will both their traditional manufacturing and emerging high-tech and white-collar service industries be able to compete effectively, domestically and worldwide, in the globally integrated, speed-driven marketplace? Will the metropolitan area fully capitalize on Jackson-Evers International Airport (JEIA) and excellent multimodal surface transportation infrastructure to attract more investment and create high quality jobs? Finally,

will commercial development near the airport and throughout Rankin County be economically efficient, attractive, and environmentally sustainable, becoming an enduring magnet for workers and residents alike?

All these issues, of course, are inextricably interwoven. Taken together, they will help determine the economic fate of the Rankin County and the greater Jackson metropolitan area. It is therefore imperative that they be addressed with both strategic vision and coordinated action. This requires, first, a solid understanding of the new drivers of 21st century business competitiveness, job creation, and economic development. Second, the Jackson Municipal Airport Authority (JMAA), in partnership with Rankin First, other Jackson area economic development authorities and regional business organizations, must implement an integrated set of strategies, policies, and programs to harness and leverage these new competitive drivers for the entire region's economic advantage.

Regarding new commercial realities, it is already clear that an increasingly fast-paced, globally networked economy is changing the rules of industrial competition and business location. These rules are being altered by a catalytic convergence of digitalization, globalization, aviation, and time-based competition. Speed, agility, and connectivity have become the mantra of many of the world's most successful firms. Despite record oil prices and financial difficulties airlines and other transportation service providers are currently facing, few knowledgeable people predict anything but growing importance of these factors and the heightened role of aviation in the future.

All of this taken together is creating a new economic geography with commercial airports driving and shaping business location and urban development in the 21st century as much as highways did the 20th century, railroads in the 19th and seaports in the 18th. Airports are becoming key nodes in time-critical manufacturing, distribution, and commercial systems and engines of a local economic development, attracting air commerce-linked businesses of all types to their environs. These include, among others, just-in-time manufacturing and distribution, e-commerce fulfillment and third-party logistics firms; hotel, tourist, and exhibition complexes; and business parks that house offices of air-travel intensive professionals such as consultants, auditors, and high-tech industry executives.

As more and more aviation intensive businesses cluster near these airports and along transportation corridors radiating from them, a new urban form is emerging—the Aerotropolis—stretching 15–20 miles outward from the airports. With the airport serving as a multimodal transportation and logistics nexus, strings and clusters of business and technology parks, industrial parks, distribution centers, information and communications technology (ICT) complexes and tourist attractions are forming around the airports and along connecting surface transportation corridors. Even cities and development zones located as far as 60 minutes drive from some airports are experiencing accelerated economic growth, as will be documented later.

Such development is occurring because of the connectivity and accessibility advantages commercial airports (especially these that have developed as multimodal air logistics hubs) provide to business and business people in the new speed-driven, networked economy. Airport development and economic development are going hand-in-hand throughout the U.S. and around the world.

Jackson-Evers International Airport (JEIA) has good potential to attract business and drive economic development throughout the Jackson metropolitan area. The phased evolution of its Mississippi Air Cargo Logistics Center, the future completion of the East Metro Highway Corridor (and nearby 400-acre East Side office/industrial park along and near a planned parallel taxiway adjacent to Runway 16L/34R), and the planned extension of this East Runway to 12,500 feet along with JEIA's 2,242 acres designated as a Foreign Trade Zone pose rich opportunity.

With this opportunity in mind, Rankin First (the Rankin County Economic Development Authority) commissioned this report to provide the vision, strategic guidelines, and action-specific recommendations for JEIA to become a catalyst for business recruitment and local and regional economic growth. Pivotal to the vision, strategy and actions, is developing JEIA into a significant multimodal air logistics center that will drive airport-linked commercial development on its property and substantially beyond airport perimeters, creating a Jackson Aerotropolis.

Cornerstoning JEIA's logistics development will be the phased evolution of the Mississippi Air Cargo Logistics Center where $20 million Phase I was completed in late 2004. Specific attraction will therefore be focused on the best way to develop future phases along with providing reinforcing strategies and guidelines for Rankin County and broader Jackson metro area commercial development.

To set the context for this vision and strategy for a Jackson Air Logistics Complex and Aerotropolis, the remainder of this chapter will (1) discuss their underlying business rationale and competitive logic, (2) provide concrete examples of air logistics hub/Aerotropolis success elsewhere (as well as describe some that have not obtained success to date), and (3) discuss the credibility and viability of successfully transforming JEIA into a successful air logistics center that powers local, regional and state-wide economic development.

Following this introductory chapter covering the above issues, three additional chapters offer, in order, the (1) infrastructure, (2) business plan, and (3) implementation plan guidelines to assist those who will design, develop, and manage future phases of the MACLC to generate the greatest local, metropolitan, and state economic impact. Critical success factors will be presented as well as target industries specified. To attract newer, high growth, higher value-adding industries, it is stressed that the relative importance of traditional tax incentives by government will be superceded by logistical capabilities of the airport and its

connected areas offering firms quick and efficient access to national and global suppliers and customers.

The report concludes with 25 recommendations and action steps to be followed by public sector agencies responsible for JEIA, Rankin County, and the greater Jackson Metropolitan area to successfully develop the air logistics hub and broader aerotropolis. Those recommendations and action steps focus on required hard and soft infrastructure as well as the business and commercial aviation (both passenger and cargo airlines) recruitment strategies to be pursued to provide connectivity, speed, and agility to area firms: the three emphasized factors for their gaining competitive advantage in the 21st century. The recommendations will also address infrastructure and facility phasing and marketing strategies along with the public and private sector options for developing, operating, and managing the expanded air logistics center and East Side Business Park while promoting and coordinating extended Jackson Aerotropolis development.

II. Business Case for a Jackson Air Logistics Complex/Aerotropolis

In his influential book, *The World Is Flat: A Brief History of the Twenty-first Century*, Thomas Friedman makes it clear that an increasingly fast-paced, globally networked economy is changing the rules of business location. With speed, agility, and connectivity becoming the mantra of many of the world's

most successful firms, airports and their surrounding areas have become key nodes and magnets for time-critical manufacturing, distribution, and corporate enterprises that require speedy access to distant suppliers, customers, clients and partners nationally and globally. Aviation networks operate as the new physical Internet connecting supply chains and business people quickly and efficiently across distant airport nodes. As a result, airport development, business development and regional economic development are going hand-in-hand throughout the U.S. and around the world.

Driving much of this development process is the growing importance of fast-cycle logistics, especially that which utilizes air express and more traditional air cargo. In fact, the 21st century is becoming the "Fast Century". Customers in both U.S. and international markets are demanding speedy and reliable delivery of products, often with distinctive features. An industrial advantage is thus being gained by firms that respond flexibly and rapidly to their domestic and global customers, delivering lower cost, higher-quality (often customized) products quickly and efficiently over great distances.

For example, high-tech manufacturers must be able to access national and global networks of suppliers of materials, components and sub-assemblies in order to obtain the best-quality components at the lowest possible price. Likewise, contract drug and medical testing often requires 24-hour turnaround from source to test site and often back to source, the latter usually done electronically.

At the same time, increased flows of information worldwide are leading to rapid changes in customer demands. Companies that can detect these changes, design and produce the desired products and services, and deliver them more quickly than their competitors will capture market share. Since speed also reduces warehousing and inventory costs, stock-outs and remaindered goods, the speed advantage becomes a cost advantage as well.

Fast-cycle logistics as a new competitive tool is being further validated by marketing research which shows that, worldwide, consumer tastes and product demands are changing much more swiftly today than was the case in prior decades. Indications are that such shifts will accelerate even faster in the decades ahead, resulting in situations where products that are "hot" one month may become obsolete just a few months later. Such is already happening in the fashion clothing industry and with digitized devices like iPhones where delivery time to the retail shelf (or now directly to the customer) frequently separates market winners from losers.

The implications of these trends for fast-cycle logistics strategies are already evident. Adapting to growing market demands for flexibility and speed, companies such as Acer, Boeing, Dell, Nissan, Nokia, and Siemens are reengineering their sourcing and distribution systems to become much more agile and customer responsive. They now compete not only on price and quality but also on the basis of speedy, reliable delivery, and after-sales support (sometimes including repair and return) of their products. They manage complex

networks that encompass the entire value chain of suppliers, distributors, and customers often across national borders.

Mandating such changes are rapid and relentless worldwide technological, political, and economic transformations. Modern transportation, telecommunications, and goods-producing technologies have spread throughout the globe. Trade policies are being liberalized and new markets opened. Communist and former socialist countries such as China, Russia, Poland, and Vietnam have entered the capitalist marketplace with vigor. Huge wage differences between advanced industrial and developing countries have resulted in much wider geographic dispersion of component manufacturing sites, places of assembly, and of final sale. With rising workforce skills in developing nations and rapid cross-border technology transfer, countries such as Brazil, China, India, Malaysia and Poland have achieved much greater levels of economic output and now produce highly sophisticated products.

International customers have also become far more sophisticated and demanding. They have available an unparalleled variety of products from all over the world. They are able to assess and identify value, and are therefore highly selective in purchasing. They expect quality, competitive pricing, and reliable delivery. They also want customization of the products they buy, and they want these customized products right away, not in two to six months. For many purchases, not even two to six weeks is fast enough.

E-Commerce and Order Fulfillment

The rise of e-commerce further heightened time-based competition and the importance of airports. As late as 1995, sales through the Internet were essentially zero. According to Forrester Research, 166 million packages were shipped in 1999 by Internet retailers (e-tailers), with approximately 70 percent going by expedited delivery. By 2003, e-tailers were shipping 1.1 billion packages annually. This has grown to nearly 2 billion packages in 2006.

These statistics reflect the growth on on-line sales. On-line retail sales in the U.S. alone were $172 billion in 2005 and are expected to grow to $329 billion in 2010, according to Forrester Research. Many of the products that Forrester sees as growing in popularity are likely shipped by air such as health products and consumer electronics. Even the U.S. Postal Service is benefitting from the boom in B2C shipments. With email and on-line bill-paying cutting significantly into revenues, e-commerce fulfillment has helped the Postal Service achieve five straight years of strong profits between 2003 and 2007, along with a rapid growth in USPS subcontracting to air express and air cargo carriers.

Despite the death of thousands of "dot coms" between 2001 and 2004, it is near consensus among economic and business forecasters that e-commerce will flourish in the future. Most of this explosive growth is expected to be business-to-business (B2B), supply-chain transactions where materials and components will be ordered through the Internet and quickly shipped to next-stage producers. Manufacturers already are able to electronically access an

international network of suppliers in order to acquire the best-quality materials and parts at the lowest possible price. The introduction of e-marketplaces (auctions, aggregators, bid systems, and exchanges) is greatly expanding B2B e-commerce: Forrester Research estimates that e-marketplaces currently account for up to two-thirds of B2B supply-chain transactions, depending on the industry, capturing 42 percent of online industrial trade and an average 28 percent of all business-to-business trade. Many suggest that with the wide-spread introduction of Enterprise Resource Planning (ERP), these e-commerce figures will go much higher in the near future. According to e-markets, B2B e-commerce which stood at $551 billion in 2003 expected to reach $1.3 trillion in 2008.

The expansion of the B2B e-commerce and direct-to-customer Internet orders has placed a particular premium on speed and reliability in the delivery process. To meet these new imperatives in order fulfillment, e-commerce distribution centers are being built near air express hubs that have speedy, reliable shipping networks. Air express hubs actually extend the business day for e-commerce and other forms fulfillment by allowing shippers to take orders for expedited national or global delivery as late as 11:00PM. Dozens of such e-retailers have located their fulfillment centers near Memphis International Airport, about 250 miles north of Jackson, to leverage FedEx's world-wide air express services. The same trend holds for Louisville International Airport and Indianapolis, where numerous companies have also sited e-commerce and other

fulfillment centers near these air express hubs. Even the Piedmont Triad Airport in Greensboro North Carolina is attracting time-sensitive distribution firms to its surrounding counties with the announcement that FedEx will be establishing a mid-Atlantic sort facility there in 2010.

Complementing airport-linked fulfillment centers are flow-through facilities for perishables (either in the physical or economic sense), just-in-time supply-chain and emergency parts provision centers, and reverse logistics facilities for the repair and upgrade of high-tech products such as notebook computers and mobile phones. The clustering of such time-critical goods facilities near air-express airports is stimulating further expansion of air cargo, less-than-load (LTL) trucking, freight forwarders, and third party logistics providers (3PLs) along major highways with quick accessibility to these airports.

Speedy, reliable delivery of products over long distances has become so critical to the new economy that air commerce is quickly becoming its logistical backbone. According to the International Air Cargo Association, nearly forty percent of the value of world trade now goes by air, and the percentage has been steadily rising. Air logistics, which includes air cargo, air express, and their supporting logistics services represented a $250 billion industry in 2007. It is expected to nearly triple by 2025, while international air-express shipments are expected to increase at least four-fold during this period (Boeing Company, 2007).

Already, air cargo and air express are the preferred modes of international shipping of higher value to weight B2B transactions in microelectronics, medical instruments, mobile telephones, high-end fashion clothing, pharmaceuticals, optics and small precision manufacturing equipment, as well as many perishables such as seafood and fresh cut flowers (see the global supply-chain model of Dell Computer's Texas facilities in Exhibit 1.1). Even lower value to weight B2B product distribution including fashion apparel and seasonal toys are becoming time-sensitive and increasingly shipped by air.

The growing importance of air commerce to the U.S. economy is illustrated in Exhibit 1.2. It shows that by 2006, the value of U.S. exports by air substantially exceeded the value of exports by vessel. When detailed industry groups were broken out, new economy sectors such as microelectronics, pharmaceuticals, and medical devices had more than 80 percent transported globally by air. Such industries, as will be described later, are increasingly gravitating to airport areas.

III The Importance of Air Passenger Service

It's not just impatient boxes that cluster around airports. As the world's service economy also shifts into fast-forward, these airports are becoming magnets for corporate offices, and professional facilities that require executives and staff to undertake frequent long-distance travel. Airport access is likewise a

powerful attraction to information-intensive industries such as consulting, advertising, legal, medical, and financial services, data processing, accounting and auditing, which often send out staff to distant customers' sites or bring in their clients by air. This has been particularly the case at larger commercial airline hubs which offer greater choice of flights and destinations, more frequent service, and more flexibility in rescheduling.

With the shortest time between two distant locations being either a non-stop or one-stop flight, the accessibility commercial air passenger service provides has become essential to attracting business meetings and conventions, trade shows, exhibitions and merchandise marts. Such long-distance accessibility has made them attractive locations for large venue tourism and entertainment venues (e.g., theme parks, Formula 1 race tracks, etc.).

High-tech workers and airports also increasingly reinforce each other. With intellectual capital supplanting physical capital as the primary factor in 21st century wealth creation, time has taken on heightened importance for today's knowledge workers as has the mobility of these workers over long distances. Research (Erie, Kasarda, McKenzie, and Molloy, 1999) in the U.S. has shown that high-tech workers travel by air 400 percent more frequently than workers, in general, giving rise to the term "nerd birds" for aircraft connecting techie capitals such as Austin, Boston, Raleigh-Durham and San Jose.

Some observers have suggested that advances in Internet access, videoconferencing, and other distributed communications technologies will

diminish the need for air travel. The evidence indicates that telecommunications advances often promote additional air travel by substantially expanding long-distance business and personal networking that lead to future face-to-face meetings. (See Business Week, August 20–27, 2007 cover story "The Future of Work" for illustration of this.) In point of fact, every significant advance in telecommunications technology has led to greater travel beginning with Alexander Graham Bell's first words over his newly minted telephone: "Watson, come here, I need you."

Others have suggested that prolonged economic downturns, record-high jet fuel prices, and environmental concerns such as greenhouse gases, will permanently diminish air commerce, in general, and passenger travel, in particular. This does not seem likely since the business imperatives giving rise to the growth of air commerce and business travel (speed, agility, and long-distance connectivity) are increasing in importance. From 2004 to 2007, air cargo and air passenger travel rebounded strongly from their 2001 to 2003 cyclical dips and, as will be noted in a moment, are forecasted to grow substantially in the decades ahead, despite another likely significant dip this year.

The current 4.5 billion passengers traveling annually world-wide are thus conservatively forecasted to grow to over 8 billion within 15 years, with air cargo projected to grow at even faster, nearly tripling in this time period. In the U.S., the FAA forecasts that over 1 billion passengers will board commercial aircraft annually by 2015 (compared with approximately 700 million in 2007). With likely

growth of air taxis and very light jets, there is strong reason to believe that the 21st century will indeed become known not just as the Fast Century but also as the Aviation Century. The FAA estimates that in the next dozen years, general aviation will rise to over 60 million passengers annually, a trend of particular importance to Jackson's Hawkins Field.

IV Economic Impact and Job Creation at and Around Airports

Nowhere is the impact of airports becoming greater than the centerpiece of the new economy—high-tech. With this sector's supply-chains and employees increasingly geared to speed, connectivity, mobility, and global access, commercial air service has become essential to the location of many information and communications technology (ICT) firms and other high-tech facilities. Clusters of ICT and high-tech companies are therefore locating along major airport corridors, such as those along the Washington, D.C. Dulles Airport access corridor in Northern Virginia and the expressways leading into and out of Chicago's O'Hare International Airport. Dulles's and O'Hare's experiences are being replicated across the U.S., and throughout the world. Even smaller commercial airports such as Fort Worth Alliance (Texas) and Huntsville (Alabama) are attracting high-tech firms to their property and environs.

Regarding overall economic development, numerous studies from the U.S. and around the world document the remarkable impact of airports on job

creation and economic development. To summarize just a sample of large and smaller airports:

- To Jackson's north, Memphis International Airport (world headquarters of FedEx) is responsible for over 160,000 jobs in the metropolitan area. One of four jobs in the Region is tied to the airport, which has an annual economic impact of $22 billion. Air cargo and air express operations account for 95 percent of the airport's economic impact and regional job generation. I will return to Memphis and its implications for Jackson later in this chapter.

- In the 26-mile commercial corridor linking Washington, D.C.'s two major airports—Reagan National and Dulles International—employment grew from 50,000 in 1970 to nearly 1 million by 2006. Among the companies located along the airport corridor near Dulles are America Online, Computer Associates, Nextel Communications, Cisco Systems, and EDS. So substantial has development been around the airport that the metropolitan Washington Airport Authority recently purchased 400 acres outside the fence but adjacent to its 400 acre air cargo complex for joint development with a private master developer.

- LA/Ontario California International Airport, which is the west coast regional air express hub for UPS, has been the engine of major growth in Southern California's Inland Empire. Over 10 million square feet of logistics and distribution space have been added annually around the airport and along nearby I-10 and I-15 Interstates. Now class A office clusters and tourist attractions are following.

- Indianapolis International Airport has had a growing impact on the Indianapolis Region. So successful has its FedEx regional hub been that in 2006 it announced a $214 million expansion of its cargo operations there which will add over 600,000 square feet to FedEx's existing 1.9 million square foot facility. When finished later this year, FedEx will be employing nearly 5,000 workers in Indianapolis, up from just 368 employees when the hub opened in 1998.

- In the Philippines, Subic Bay Freeport is rapidly expanding around a former U.S. naval air base that was converted to commercial use in 1993. Since FedEx located its Asia/Pacific regional hub at Subic Bay in 1995, over 200 firms—employing 54,000 workers—have located there, generating almost $2.5 billion in investment. Between 1995 and 2005 the annual value of exports from Subic Bay jumped from $24 million to $1.3 billion. Acer has opened its largest personal computer assembly facility in the world at Subic Bay; the facility relies heavily on air freight for its supply-chain management. Nearer to Manila, the former U.S. Clark Air Base is attracting tens of thousands of information and communications technology and other high-tech manufacturing jobs as it has evolved into an air cargo hub with commercial passenger service, as well.

- In Penang, Malaysia air cargo has created a "Silicon Island" contributing immensely to job creation near the airport. Dell Inc. manufactures 100% of its laptops in Malaysia. The company relies heavily on air express in its Malaysian facility sourcing and exports, having over 2,000 employees alone there, with $5 billion in its sales originating from Penang. Its firm clustering impact has also been huge as 70 Dell suppliers have either manufacturing centers or distribution centers at Penang, providing parts and components.

- Viracopos Airport in Campinas, Brazil, is a regional air cargo hub offering commercial passenger service about 90 miles miles from Sãn Paulo. Viracopos has greatly contributed to Campinas becoming the second fastest growing high tech area in all of Latin and South America, with investments in microelectronics and information and communications technology (ICT) totaling $7 billion in the past 10 years. Fifty Fortune 500 companies have located high tech manufacturing facilities in Campinas, including IBM, Motorola, Lucent/Alcatel, Samsung, and Texas Instruments making it the Silicon Valley of South America.

The impact of airport-induced job growth on land use in the vicinity of airports is likewise substantial. Recent research at UNC's Kenan Institute of employment growth in the suburban rings of U.S. metropolitan areas showed that areas within six miles of airports are adding jobs much faster than the overall job-growth rate of the suburban ring within which the airport was located. While most of the employment is concentrated near the airport or along major connecting highways within 15 to 20 minutes of the airport, research at Massachusetts Institute of Technology's International Center for Air Transportation documents that impacts occur up to 60 miles from airports with air connections significantly facilitating a region's access to suppliers, markets, ideas and capital (EconSouth, 2003).

V The Rise of the Aerotropolis

Emerging corridors, clusters, and spines of aviation-linked businesses are giving rise to a new urban form—the Aerotropolis—an airport-integrated region. The airport functions as a multi-modal transportation hub and commercial nexus of this diffuse urban region, analogous to the function central business districts (CBDs) play in the traditional metropolis (see Exhibit 1.3 for a generic illustration). Indeed, under the rubric of Airport Cities, some of these airports have assumed the very same roles of metropolitan CBDs by becoming regional intermodal surface transportation nodes and significant employment, shopping, meeting and entertainment destinations in their own right, a real potential for JEIA's proposed inside-the-fence East Side Business Park and nearby surrounding developments such as AeroPlace.

Reflecting the new economy's demands for connectivity, speed and reliability, the Aerotropolis is optimized by corridor and cluster development, wide lanes, and fast movements. JEIA, Rankin County, and the greater Jackson region, as will be described later, have much of the requisite highway infrastructure in place with some existing and future choke points that will be addressed.

Although most aerotropolises have so far evolved largely spontaneously —with insufficient transportation infrastructure or previous nearby development often creating arterial bottlenecks—in the future many need to be improved

through strategic infrastructure planning. For example, at full future development, (as was illustrated in the Aerotropolis exhibit), dedicated expressway links (aerolanes), such as the approved Jackson Airport Parkway, and commuter rail (aerotrains) will efficiently connect airports to the downtown nearby and more distant business and residential clusters. Special truck-only lanes should be added near airport air cargo areas, airport expressways and nearby interstate highways, as should be improved highway interchanges to reduce congestion. Seamlessly connected multi-modal infrastructure such as that proposed by DMJM-Harris for JEIA will accelerate airport transfers of people and goods, improving transport system effectiveness and further influencing land values, business development, and resulting urban form.

Community and neighborhood mixed-use residential clusters following new urbanism principles are being developed within the greater Jackson area. The objective is to enhance social interaction and provide a sense of human scale in the larger urban complex. A major portion of this urban complex that is located in the JEIA area will constitute the future Jackson Aerotropolis.

The metric for determining future land value and particular business locations will be time-cost access to the airport and the airport's connectivity to distant markets. Over time, firms of various types will bid against each other for airport accessibility predicated on the utility each gives to the related combination of time and cost of moving people and products to and from the airport and the extensiveness of the airport's flight networks to major hubs. Land

values, lease rates, and commercial use will no longer be measured by traditional bid-rent functions that decline linearly with spatial distance from the primary node (here, the airport) but by the time and cost of moving goods and people to and from the airport from alternative sites via connecting highway and potential intermodal rail facilities.

To many, this new land use and structure may appear simply as additional sprawl along main airport transportation corridors. Yet, the aerotropolis is actually a highly reticulated system based on time-cost access gradients radiating outward from the airport. In short, the three "A's" (accessibility, accessibility, accessibility) will replace the three "L's" (location, location, location) as the most important industrial and business location organizing principles. Of course, accessibility and location are closely related with optimal business location determined by frequency of use of the airport.

Airport-linked commercial clusters and spines are already taking on distinct spatial form around major hub airports such as Chicago O'Hare, Dallas-Ft. Worth, Miami, New York Kennedy, Washington-Dulles, Hong Kong International, Korea's Incheon, London Heathrow, Paris Charles de Gaulle, Amsterdam Schiphol, and Dubai International. As noted, in the United States, even small or city airports—such as Alliance Airport near Ft. Worth, Texas; Huntsville, Alabama; and Ontario, California Airport—are generating mini-aerotropolises in the form of airport-linked business cluster and spine development. For example, Alliance Airport alone has attracted over $4 billion in

commercial investments since 1994 to its expansive 16,000-acre development area. Similar development is happening at and around Hahn Airport about 100 miles west of Frankfurt, Germany (to be elaborated later).

Those in the air cargo industry know that the battle for air freight is won on the ground—not the air—with good highway connections key. This is why most of the leading air express and air cargo airports also have excellent expressway links and on-site or nearby truck cross-docking facilities. These highway/air cargo synergies are often reinforced by nearby intermodal rail facilities and sometimes by good waterborne movements, making a handful of airport regions like Jacksonville, Fl, Memphis, and Seatac quadramodal (air, highway, rail, and water transit). In the following case summaries I describe the multi-modal air logistics/Aerotropolis synergies utilizing specific cases of airport-driven development in the U.S. and Europe. I found that the scale, resources and governance structure of Asian and Middle-Eastern airports were so different from the JEIA/Rankin County context that I decided to focus on airport-driven developments in the U.S. and Europe. I will commence with larger airports to illustrate the specific components of airport-driven commercial development to show the types of businesses attracted to airports, then shift to smaller airports more similar to JEIA.

Dallas–Fort Worth

DFW is the cornerstone of Metroplex, the fastest growing region of Texas (see Exhibit 1.4). It's regional economic impact is estimated to be $19 billion in 2006. The airport property itself is enormous—18,000 acres, covering parts of 4 cities and two counties, and exceeding the size of Manhattan Island. Airport officials plan to take advantage of the airport's vast size by developing nearly 6,000 acres for commercial use over the next 20 years.

Airport property development is targeted to six key areas as shown in Exhibit 1.5. Two are for planned air cargo expansion (East Air Cargo, which has hundreds of developable acres, and West Air Cargo which anchors most current cargo facilities). With DFW's 2006 cargo throughput standing at 758,000 metric tons, it is pursuing cargo growth aggressively. In particular, Airport management is pressing hard for additional wide-body passenger and cargo flights to Asia (especially China) and to Europe. They have also formed partnerships with commercial real estate firms such a Trammell Crow and air cargo oriented REITs such as AMB to construct “high velocity flow-thru” cargo facilities in its west cargo area. Such large commercial real estate companies not only have expertise in state-of-the-art cargo facility development, but they also bring with them a rich network of potential cargo and other commercial tenants.

International Commerce Park (see Exhibit 1.6) is targeted to light industrial, freeway commercial, and flex office development. It currently has 264 acres leased with 115 remaining for industrial/commercial development.

A retail/hospitality/entertainment complex is planned on the northwest corner of the airport. Covering nearly 200 acres it will contain mixed use retail, restaurants, garden offices, a hotel and entertainment facilities (see Exhibit 1.7).

Bear Creek Office Park is an 1,800 acre tract with open space amenities being marketed primarily as a corporate campus site (see Exhibit 1.8). Because of natural streams and floodplain in this park, substantial open space must be maintained. The land-use plan thus calls for two 18 hole championship golf courses along with wildflower meadows and heavy tree cover. It is felt that this environment will be optimal for office development just minutes from the airport terminals, with open-space amenities desired by today's knowledge workers. A smaller amount of shielded light industrial and mixed use development may also be in this large tract's future.

Passport Park, being renamed SouthPoint, is a 600 acre hybrid development at the southeastern end of the airport (see Exhibit 1.9). Designed to be DFW's southern gateway this mixed-use development is proposed to accommodate a wide variety of users including hotel, retail and restaurants to light industrial and garden office development. Like other airport property that falls in municipalities (here Irving and Euless) property taxes are shared between

the airport and the municipalities. Plans calls for an aesthetic, natural environment between buildings with established trees and native landscaping.

In addition to a substantial amount of terminal retail, hotels have become pivotal to DFW's airport city environment. These include the Hyatt Regency DFW and the new Grand Hyatt attached directly to its largest passenger terminal. A third Hyatt (or alternative managed hotel) is planned for Passport Park. Today, 65 percent of DFW's revenue comes from non-aeronautical activities.

Airport hotels featuring meeting rooms and concierge business support services are increasingly acting as virtual headquarters and are shaping a new business meeting style. This is highlighted from the following paragraph extracted from the August 20-27, 2007, issue of *Business Week* on the future of work.

> The fact that virtual connections still need to be balanced with face-to-face contact places the airport squarely in the path of modern urbanism. Consider the experience of Sage Software Inc., a $1 billion company which sells software to help businesses run better. It has 30 locations throughout the U.S., the result of a nine-year acquisition spree, but no headquarters. So its eight-member executive team, scattered from Tampa, Fla., to Irvine, Calif., fly once a month to Dallas. There they check into the Grand Hyatt DFW in terminal D for two days of meetings. Everyone can get there for a 1 p.m. start, work until 6 p.m., get dinner together, and then work all day the next day until 5 p.m., when they run for the next flight home.

While DFW is evolving as a new urban core of Metroplex, its economic reach and impact extends many miles out along nearby Interstates and

expressways. Two excellent examples of this are Infomart and Market Center, both of which are located on the I-35 corridor to DFW. Infomart is a huge, ultra-contemporary merchandise mart for information and communication technology (ICT) companies. Market Center—a cluster of six large buildings that contain nearly seven million square feet of display space for fashion clothing and home merchandise—is the world's largest wholesale merchandise mart. Hundreds of thousands of buyers and vendors fly into Dallas annually to conduct business at Infomart and Market Center. In 2006, Market Center alone attracted buyers and vendors from all 50 U.S. states and 84 countries, who purchased 300,000 airline seats and filled 720,000 nearby hotel rooms while conducting an estimated $7.5 billion in wholesale transactions.

As will be noted later, there is no way imaginable that Jackson could develop airport-linked business clusters on this size. DFW (and other large hub airports) are described hear to illustrate the nature of on-site and off-site airport commercial development to provide readers of what to look towards, albeit on a much smaller scale.

Detroit

Detroit leadership is acutely aware that they are spiraling down economically and that bold steps must be taken to overcome the likely continuing decline in its automotive manufacturing sector and other traditional

industries. In a regional assessment of its assets to compete in the new economy, one clearly stood out—the metropolitan area's aviation connectivity.

Detroit Metro Airport (DTW) is the sixth busiest airport in the U.S. in terms of takeoffs and landings serving 145 nonstop destination in the U.S., Europe, Asia, and Latin America. Seven miles from DTW is Willow Run Airport (Detroit's original municipal airport) that has become a significant air cargo airport that is home to numerous charter cargo airlines, including the nation's leading on-demand heavy-lift cargo carrier.

Just to the south of DTW's runways and along and near the NAFTA I-94 corridor connecting DTW to Willow Run, the assessment showed that there were 25,000 acres of undeveloped land (see Exhibit 1.10). A public-private leadership group was formed (now called the Detroit Region Aerotropolis Steering Committee, similar to Memphis' Aerotropolis Leadership Committee) to encourage zoning and development plans to leverage the two airports to attract new industry to the broader airport area and serve as a nucleus of renewed regional economic development and business competitiveness.

Over the past three years I have given a number of presentations to this group on the aerotropolis concept. From these presentations, the steering committee put together Exhibit 1.11 which illustrates how my generic model might be adopted to specific commercial and residential land uses, including the creation of a ring road with two aerotropolis corridors (I-94 and Ecourse Road).

The I-94 corridor is also the main connecting highway between Ann Arbor and downtown Detroit of which the aerotropolis region falls in-between. The Committee hopes to leverage the substantial biosciences and medical device development along the highway between the airport and Ann Arbor and the advanced manufacturing research and development on the portion of I-94 connecting the airport to downtown Detroit.

In early 2006, the University of Michigan School of Architecture and Design along with participation from the MIT and Wharton design and business schools conducted a Detroit Region Aerotropolis Charrette, involving over 100 faculty and graduate students. Since pictures may each say 1,000 words, Exhibits 1.12 to 1.17 are summary renderings of the outcome of the charette. These outcomes include: (1) cross-jurisdictional planning with emphasis on green space/aesthetics and building standards, especially gateways and along major airport connecting roads, (2) clearly defined aerotropolis subareas for developing or redeveloping with a few early successes generated, (3) aviation-themed public art at gateways, (4) emphasis on cluster rather than strip commercial development along airport corridors, and (5) preservation or reclamation of green space. Where possible "new urbanism" live/work environments should also be created to foster sense of neighborhood or community with efficient public transit (including regional commuter rail) to add convenience and reduce road congestion, and define the aerotropolis core area (see Exhibit 1.17).

One of the issues that concerned the Aerotropolis leadership group was how to overcome the image of Detroit as an unattractive, old industry "Rust Belt" region. Most commercial development around DTW neither effectively leveraged the connectivity the airport offered, nor was it physically attractive—much of it being clusters of less expensive hotels and strips of conventional small stores and service establishments (convenience, gas station, auto body shops, adult), with some older factories and warehouses along the connecting highways.

When 1,300 acres just south of DTW was acquired by the airport authority and Wayne County for noise mitigation for the fifth runway, plans were drawn up to use this as a new image-building gateway to DTW to signal Detroit's emergence into the new 21st century economy. Designated as the Pinnacle AeroPark, its physical layout, green space, and commercial facilities provide a much more appealing and contemporary "front door" to the Detroit region by air travelers (see Exhibit 1.18)

The project is designed with the physical features, site amenities, and support services to attract and support clusters of research and high tech firms, Class A office buildings, value-adding logistics and transformation centers as well as exhibition, education, and meeting facilities in an aesthetically pleasing and functionally integrated fashion. Amenities and support services proposed include, among others, luxury hotels, conference facilities, fitness centers, a

championship golf course, jogging and biking trails, upscale shopping, restaurants, and a high-speed telecommunications infrastructure.

Wayne County, the initiator of the project, is envisioning the Pinnacle as a "business location with wings" fully leveraging the project's propinquity to Metro Airport to provide tenants and users with excellent national and global air access. Their assumption is that time-pressed executives and professionals whose responsibilities require frequent travel to branch facility, partner, or client sites will have access in minutes to DTW's passenger terminals.

Firms who frequently bring in their clients by air for meetings, presentations or direct service can host them with one day round trips, avoiding the costs of overnight stays. Those clients or colleagues needing to remain for longer periods will have available, convenient on-site amenities such as first-class hotel accommodations, golf, fitness centers, and quality restaurants and shopping. These amenities would also be available to international or other long-distance travelers connecting through Metro and as an attractive "airport city" destination for local residents.

To attract high-tech goods-processing firms, supply-chain management and value-adding logistics service providers will be targeted. As the FedEx hub at Memphis has demonstrated, in many new-economy industries, hours and not days, are sometimes of critical importance to meeting market objectives. Examples here include medical and pharmaceutical laboratory testing facilities,

organ banks, and lost credit card reproduction, all of which depend on rapid shipping turn-around.

To appeal to today's knowledge-workers and new economy industries, the Pinnacle plans to blend efficient business form and function with on-site amenities. Carefully planned and aesthetically integrated clusters of flex-tech, research and development, clean light manufacturing, and value-adding logistics/transformation (as opposed to big-box warehouse and distribution) facilities will radiate from the core. These facilities, which will be developed following covenants, restrictions, and quality construction design standards, will have contemporary, architecturally appealing facades with buildings interspersed with biking and pedestrian trails. The Pinnacle's distinctive roundabout serving as the town center, landscaped green space, and campus-like clusters of commercial facilities will be highly visible to millions of U.S. and international passengers flying into and out of Metro each year, acting as a reinforcing 21st century visual complement to the new $1.2 billion McNamara terminal that most will pass through (see Exhibit 1.19).

Numerous studies have documented that knowledge-workers and their high tech firms frequently seek architecturally distinctive, planned campus-like settings that are relatively self-contained and provide green space and opportunities for active recreation. Incorporating such land use,, the Pinnacle hopes to set the standard for Detroit Region Aerotropolis development and go a long way toward transforming the commercial use of the airport area. Its

planned site design, architectural features, and anticipated commercial tenants would no doubt markedly improve the appearance of the airport area while helping change southeastern Michigan's image from a region of traditional manufacturing to a location for high tech firms.

In terms of commercial use, initial Pinnacle planning showed approximately 25 million square feet (576 acres) devoted to “flex tech” buildings that will enable customized allocation and periodic reallocation of administration, research, laboratory testing, engineering, production, and materials processing either under one roof or in one concentrated area. Approximately 4.7 million square feet (109 acres) are allocated for value adding logistics/transformation facilities that conduct supply chain management, kitting, sequencing, reconfiguration as well as information technology functions for tracing and tracking goods flows around the world. There are also 3.6 million square feet (83 acres) allocated for commercial development, and 2.9 million square feet for Class A offices. The remaining acres are designated for landscaped open space, recreation, and rights-of-way (see Exhibit 1.20).

At full development, phased over an estimated 15-year time-frame, the Pinnacle was forecasted to generate approximately 25,000 full-time jobs, including 13,000 in office, research, and technology, 7,500 in logistics, and 4,300 in retail/commercial. It is anticipated that this project will evolve into the central business district (or airport city) of the broader Detroit Region Aerotropolis.

Kansas City

Kansas City International Airport (KCI) encompasses 10,200 acres in a low density suburban setting, 20 miles northwest of downtown Kansas City. In 2006, the airport had just over 10 million passengers and handled about 130,000 metric tons of cargo; small by major city airport standards.

For the three decades since KCI opened it has been counted upon to attract business and drive economic development in the northern part of the metropolitan area. Yet, in the eyes of many, results have been disappointing. Airport-linked commercial development has been slow to evolve. Most of the 10,000 acres that fall within KCI's boundaries remains vacant despite the fact that nearly the entire airport has been designated as a Foreign Trade Zone. Moreover, even with its excellent highway connectivity, only a handful of distinct KCI-linked business clusters can be identified in its outlying reaches.

Initial planning for a KCI aerotropolis three years ago, supported by the airport and the Platte County Economic Development Council, included combining existing commercial development just east of the airport with proposed new development that will constitute the KCI Business District, or core Airport City (see Exhibit 1.21).

With the KCI Business District (Airport City) established, clusters of hotel, retail, office, industrial logistics, and residential units are anticipated to develop outward from the airport along nearby interstates and state highways. According to Platte County officials, there are approximately 10,400 acres of

industrial/office park development (off-airport) in the airport area recommended land use plan. Development proposals are in place on 3,200 acres and these plans provide: 14.5 million square feet of office, 17.8 million square feet of logistics/industrial and 2.6 million square feet of retail. Hotel clusters and mixed-use residential are also planned. Combined commercial and industrial development is expected to employ 90,000 workers. Exhibit 1.22 illustrates the type of Aerotropolis development which would be expected to occur near KCI over the next five to ten years.

A major inside-the-fence business park, known as KCI Business AirPark, has also been planned and is being developed by Trammell Crow on 640 acres in the southeastern sector of the airport (see Exhibit 1.23). It is designed to simultaneously leverage the aviation and air cargo infrastructure of KCI, along with its excellent nearby highway systems, to provide time-sensitive manufacturers, distributors, and logistics service providers with efficient sourcing, production, and distribution. Initial industry targets are high tech (especially semiconductors), aerospace components, cargo distribution and third-party logistics providers.

The site is divided into four development areas. The first two (the airfreight and hanger areas) were directly tied to the primary airport functions. As such, they are purposely isolated from other uses to provide a greater measure of security. The other two areas provide for a more standard office

distribution and industrial development. The site area, building area and building type are illustrated and detailed in Exhibit 1.24 and the table below.

Development type	Site area	Building area	Building type
Airfreight	300 acres	2,240,000 sq. ft.	2 story
Maintenance/Hanger	65 acres	462,000 sq. ft.	1 story
Office/Distribution/Industrial	207 acres	1,763,300 sq. ft.	1 story
Office	69 acres	1,254,500 sq. ft.	2 & 3 story

At present, master developer Trammell Crow is still evaluating target firms and, to my knowledge, none have been sited. While optimism remains with airport management and local officials, the thirty-year history of limited airport area development shows that aerotropolis formation does not always occur at and around airports, even if sufficient open land exists. In particular, aviation connectivity to key markets often needs to reach a critical mass for substantial airport-driven development to occur and be sustained. This has proven to be the case in numerous other locations in the U.S., especially cargo-oriented airports such as North Carolina's Global TransPark and the Southern California Logistics Airport in Victorville, about 100 miles east of Los Angeles.

European Airport City and Aerotropolis Experiences

Europe has been a pioneer in the airport city model, with Amsterdam Schiphol first introducing this approach to airport and airport area development

in the late 1980s. Others have followed and are beginning to expand their airport cities into full fledged aerotropolises. Here I describe Amsterdam Schiphol as exemplary.

Amsterdam Schiphol

Amsterdam Schiphol is the leading European airport city and is clearly driving a greater Aerotropolis. Its grounds employ 62,000 people daily—far more than the 50,000 resident criteria to attain metropolitan central city status in the U.S. Two major expressways link the airport to downtown Amsterdam and the broader urban area. A modern train station, directly under the air terminal, efficiently connects travelers to the city center and the rest of the Netherlands.

Schiphol's passenger terminal, incorporating modern retail plaza design elements, contains expansive, well-appointed shopping and entertainment arcades accessible both to travelers and the general public. By combining terminal design with mall design, Schiphol has substantially increased revenues through concession rents and passenger purchases. In fact, the airport often attracts Amsterdam residents who come to shop and relax in its public section, especially on Sundays when most city retail stores are closed. Schiphol's terminal even has a a branch of the Rijksmuseum where passengers can view famous Dutch Masters' paintings.

A 100,000 sq. ft. multimedia aviation theme park (Dreamport Schiphol) is being developed on the terraces of Schiphol terminal. Partnering and co-

branding with KLM and Boeing, Dreamport Schiphol will highlight aviation progress and be a leisure experience for travelers and airport visitors.

Directly across from Schiphol's passenger terminal is the 4 million sq. ft. World Trade Center with meeting and commercial facilities and regional headquarters of such firms as Thomson-CFS and Unilever. A Sheraton and a Hilton hotel adjoin this complex (Exhibit 1.25). Surrounding Schiphol (near the airport fence) are large tracts of land being developed for office, leisure, light industrial, and logistics purposes (see Exhibit 1.26). These include Schiphol South-East and Schiphol Logistics Park for cargo distribution and 3PLs; Anthony Fokker Business Park and Schiphol Eizenhof with 1.4 million sq. ft. and 1.8 million sq. ft. of offices, respectively; Schiphol-Rijk for time-sensitive light industrial and the Schiphol Golf and Business Center for sports, golf and leisure activities that are to complement a corporate office campus on the site.

Providing further logistical advantage, the A4 and A9 high-speed motorways are both within a mile and a half of the airport center. Radiating from Schiphol along these motorways are strings and clusters of business parks, logistics parks, high-tech industrial parks, distribution centers, information and telecommunication complexes, and wholesale merchandise marts such as the famous Aalsmeer Flower Auction Market—all of which are airport-intensive users. Exhibit 1.27 illustrates the synergies between Schiphol's Airport City and its broader regional Aerotropolis.

An excellent example of airport-Aerotropolis development synergy is Amsterdam Zuidas within a southern reaches of the city of Amsterdam, about six minutes by airport expressway or airport express train to Schiphol's passenger terminal. Zuidas is a 21st century airport "edge city" containing over 10 million sq. ft. of class A office space and retail, along with a large mixed-use commuter rail terminal with a World Trade Center above it. This airport edge city is the home of the world headquarters of both ABN Amro and ING banks and numerous regional corporate headquarters that heavily rely on Schiphol airport. In good measure because of the airport and its multimodal commercial mix, over 1,000 international companies have chosen the Amsterdam region as a place to invest and create jobs, many of which located in downtown Amsterdam, not just Zuidas.

Schiphol's experience illustrates that as the aerotropolis forms and evolves, it is a reinforcer of downtown investment and business vitality, rather than a competitor. We have seen this in Asia (Hong Kong, Singapore, etc.), the U.S. (Atlanta, Chicago, Miami, etc.) and throughout Europe.

As one concrete U.S. example, Boeing located its world corporate headquarters in downtown Chicago, rather than the O'Hare area, even though most of its commercial activities it deals with, including the headquarters of United Airlines, are in the immediate airport area.

Yet, the airport area (if properly developed and maintained) has become so attractive to office and time-sensitive industries that it often commands the

highest commercial rents in the metropolitan region. This can be seen in Exhibits 1.28 and 1.29 which present the office rents (Eu/m^2/yr) and industrial rents for 2006 in the immediate Schiphol area compared to those of Amsterdam city center and other outlying locations. In fact, research on industrial rents around the globe show that the highest are found adjacent to London's Heathrow airport.

Smaller U.S. and European Air Logistics Hub/Aerotropolises

Ontario, California

Commercial growth surrounding Southern California's Ontario Airport—an emerging air logistics hub that cornerstones a major urban complex 40 miles east of Los Angeles—offers an excellent contemporary illustration of multi-modal logistics and aerotropolis development synergies. The airport (recently renamed LA/Ontario International Airport) is at the nexus of major east-west and north-south interstate highways I-10 and I-15, with the Burlington Northern–Santa Fe intermodal rail yards nearby. The ports of Los Angeles and Long Beach are connected by interstate highways and rail lines. Between 2000 and 2006, over 60 million square feet of warehouse, distribution, and light industrial space were added adjacent to the airport and along Interstates 10 and 15 radiating out from it, led by e-commerce fulfillment and distribution facilities

ranging up to 1 million square feet in floor space. With commercial clusters rapidly developing around the airport and outward along I-10 and I-15, Ontario is emerging into a full-fledged aerotropolis.

Enhancing Ontario's air logistics and aerotropolis development is the growth of air express transportation services at and around Ontario Airport. During 2007, UPS, whose west coast regional hub is at Ontario Airport, handled over 700 million pounds of freight while FedEx carried over 100 million pounds. This express service was boosted by another 100 million combined pounds carried by BAX Global, Menlo Worldwide and Airborne (now DHL/ABX) Express. Ontario's development as a regional air express airport has greatly contributed to making its broader "Inland Empire" area one of the fastest growing employment regions in the United States, where tens of thousands of jobs are being created annually.

Alliance, Texas

Another regional air express airport/aerotropolis example is Fort Worth (Texas) Alliance Industrial Airport, where 15,000 acres span two counties and include portions of four cities. Promoted as the nation's first industrial airport by Ross Perot's company, development began in 1988 with the objective of serving business and commercial users rather than passengers. From the beginning, multi-modality was emphasized, especially quick and efficient access to regional and national markets via interstate highways and intermodal rail connections. A

major development driver was put in place in 1997 when FedEx opened its southwest regional hub at Alliance. Since then, over 100 major companies (33 from the Global 500 largest) have located at and around Alliance; such as AT&T, Nokia, BFGoodrich Aerospace, Bell Helicopters, Gulfstream, Zenith Electronics, Nestle Distribution, and Dell Inc. Alliance offers a Foreign Trade Zone, an enterprise zone with further city and state incentives, a world trade center, state-of-the-art fiber optics and telecommunications, and a special inventory tax exemption, as well as efficient U.S. customs services.

As a result of its wide variety of present and expected future tenants and users, such as time-sensitive manufacturers and distributors, third-party logistics providers, retailers, international firms and aviation-related companies, Alliance is partitioned into geographic sectors geared to different tenant needs and requirements. These developments include:

- *Alliance Center*, a 2,600-acre high-density business complex that encircles the airport and is geared primarily towards aviation-related enterprises that require direct taxiway access.

- *Alliance Commerce Center*, a 300-acre business park for manufacturing and high-tech firms, which has served as a starting point for several small and mid-sized companies that have expanded into larger facilities throughout Alliance.

- *Alliance Air Trade Center*, a 52-acre air cargo development with direct access to the Alliance Airport runway system, direct access to Interstate 35W, and nearly adjacent to the BNSF intermodal facility. It has over

250,000 square feet of warehouse space available for intermodal cargo and international air freight companies.

- *Alliance Gateway*, a 2,400-acre distribution, manufacturing and office sector which provides parcels of land for constructing large-scale facilities such as warehouses and is designed to accommodate large distribution and industrial firms. It also has convenient access to Dallas/Fort Worth International Airport via State Highway 170.

- *Alliance Advanced Technology Center*, a 1,400-acre complex that is becoming one of the nation's premier technology hubs for major companies from around the world.

- *Heritage Reserve at Alliance*, which is integrated into a woodlands greenbelt and offers locations for research and development facilities in a natural setting.

- *Westport at Alliance*, a 1,500-acre industrial and distribution sector located directly adjacent to Burlington Northern Santa Fe Railway's main north/south line and Intermodal Center. It caters to shippers needing rail access and other multi-modal transportation options.

- *Alliance Crossing*, a 170-acre retail complex that is designed to accommodate retailers, restaurants and other service-oriented firms needed to service the areas increasing population base as well as employees and visitors of Alliance.

Alliance's commercial success has been attributed to its excellent multi-modality, a variety of economic incentives it provides to tenants, its attracting a substantial number of third-party logistics (3PL) providers who offer

manufacturers, distributors and retail shippers with value-added services including packaging, labeling, inventory management, transportation and transportation tracking as well as returns management. Alliance also provides educational and technical training facilities for companies located at its complex, including conference and teleconference facilities.

All firm recruitment and real estate development is managed by a private company, Hillwood Development. Of the $4.8 billion invested in Alliance thus far, 97 percent has been from private sources. According to the Alliance website, this translates into over 20,000 permanent jobs at the complex and $150 million annually in local property taxes generated.

Rickenbacker, Ohio

A former U.S. air force base, Rickenbacker went into service as a commercial air cargo airport in 1980. Despite being the 1980's hub for the air cargo firm, Flying Tigers (now part of FedEx), Rickenbacker did not obtain success until the 1990s when a new public-private management model was put in place and a new marketing strategy developed based on the "Inland Port" concept.

Rickenbacker's success thereafter rested largely with efficient and cost-effective handling and distribution of supplies and finished goods, in contrast to more costly, less efficient handling at alternative (often larger) airport complexes that lacked multi-modality and as efficient logistics operations. The airport is

strategically located to serve national markets, and it has excellent access to major interstate highways and intermodal rail facilities. Like Alliance, Rickenbacker operates in a Foreign Trade Zone. It also has special state and federal tax exemptions such as those on inventory, abatement on real estate taxes for improvements to land and buildings as well as a subsidy of $3 million per year from local governments. In addition, the State of Ohio has committed $65 million in revenue bonds for future facility improvements.

Economic development around Rickenbacker since the early 1990s has been remarkable. The airport serves as the logistics hub of a 15,000-acre development zone (nearly identical to Alliance), called the Rickenbacker Area. This area contains over 20 million square feet of state-of-the-art logistics and distribution space, employing 15,000 workers. Despite the national and global downturn in air cargo between 2001 and 2003, Rickenbacker continued to experience robust air cargo growth.

Rickenbacker provides tenants and users with a 500,000-square-foot cargo terminal (which is being continuously expanded), modern materials handling equipment and logistics services, and direct airfield access to freight forwarders, third-party logistics providers and time-sensitive manufacturers and distributors who are advantaged by airside access. As one example, Excel Logistics, one of the world's largest supply chain management companies, operates a 230,000 square foot one-stop shop facility that includes customs brokerage, airfreight forwarding, intermodal operations, value-adding logistics services, and

warehousing. Rickenbacker's logistics and fulfillment firms are undergirded by state-of-the-art fiber optic loops, high-speed data circuits, and teleconference facilities.

To further spur commercial development, Rickenbacker formed a partnership with Duke Realty in late 2005 to develop 1,200 acres of prime industrial land in the airport area. The partnership will also help with the development of Rickenbacker Global Logistics Park which will be near the new Rickenbacker Intermodal Facility scheduled to open later in 2007.

As mentioned above, Rickenbacker's development success can be attributed in large part to its management strategy implemented in 1991 with the establishment of the Greater Columbus Inland Port Commission to promote trade through developing and leveraging logistics services and intermodal infrastructure. The Inland Port Commission is an exemplary public-private partnership made up of city, county, state and federal representatives from the public sector and the Greater Columbus Chamber of Commerce and individual manufacturers, shippers, logistics providers, and others from the private sector. Cost-benefit analyses have shown that for every U.S. dollar of public investment in Rickenbacker, three dollars in private investment have resulted with twenty-five dollars in regional economic impact, estimated to be nearly $3 billion in 2006.

Huntsville (Al) Multimodal Complex

Huntsville International Airport (HSV) cornerstones a successful 6,080-acre multimodal transportation complex (air, highway, and rail) known as the Port of Huntsville. In addition to the airport, the multimodal complex is made up of the International Intermodal Center and Jetplex Industrial Park.

Though serving only approximately one million air passengers annually, Huntsville International Airport has become a significant global air cargo hub. It has a 12,600 ft. runway that serves cargo aircraft bound for the U.S., Central America, Europe, and Asia along with a parallel 10,000 ft. runway used for passenger and cargo aircraft. Air cargo at HSV has grown from 53,174 metric tons in 1999 to 167,888 tons in 2006, nearly 90 percent of which is international.

Key to the growth of air cargo at HSV is a strong partnership the airport formed with international freight forwarder Panalpina. Panalpina started at HSV in 1990 with single weekly B747 air freighter to Europe operated by Luxembourg-based all cargo airline, Cargolux. This service has now expanded to eight weekly flights to Europe and two to Hong Kong, via both Cargolux and Atlas Air Freighters. The airport also serves multiple sites in Central America.

Recognizing that freight forwarders and third-party logistics providers are key to generating an airport's demand for air freighter service, the Huntsville International Airport Authority aggressively recruited these including BAX Global, Eagle Global Logistics, Expeditors International, Kuehn+Nagel, Panalpina, and UPS Supply Chain Solutions. It worked. These freight forwarders

and 3PLs also boosted cargo activity at the complex's International Intermodal Center and the Jetplex Industrial Park.

Adjacent to the airport, the International Intermodal Center provides at a single location the opportunities for firms to transfer, store, and distribute products via rail or truck. In 2007 this intermodal rail center had a record 43,903 lifts, which constituted a six percent increase over 2006. The chief driver of this growth in lifts was the expansion of automotive manufacturing in North Alabama.

The 4,000+ acre Jetplex Industrial Park provides direct runway access as well as access to the intermodal rail facility, a U.S. Customs port of entry, a foreign trade zone and industrial bond financing for new tenants. This expanding multimodal industrial park is divided into six sections to meet various needs of business from heavier industries such as diesel engine manufacturing to just-in-time distribution facilities. Boeing and Chrysler are among Jetplex's growing number of major tenants.

Combining the airport with the intermodal rail center and Jetplex Industrial Park has made Huntsville International Airport the fastest growing air cargo market outside of Asia, and third fastest in the world. Its annual economic impact is well over US$1 billion annually. Huntsville is a model that all multimodal air logistics complexes should examine.

North Carolina Global TransPark

The North Carolina Global TransPark (GTP) was conceptualized as a multi-modal industrial airport designed to support manufacturing, distribution, agribusiness, and transportation-related companies. A comprehensive planning effort was completed in 1994 with the objective of fully integrating air, rail, road, and nearby sea transportation capabilities to serve the logistics requirements of industrial and distribution tenants and users.

The GTP encompasses 5,000 acres in eastern North Carolina, 70 miles east of the Research Triangle Park and 40 miles from the Atlantic coast. At full infrastructure build-out (forecasted to be around 2025), the project was planned to have two long-range parallel runways, a state-of-the-art central cargo processing area, an intermodal rail terminal, a dedicated system for transporting cargo throughout the GTP, internal road networks, and upgraded connections to regional road and rail systems. Two deepwater ports are located approximately one hour away by rail and highway. Thousands of acres within the GTP are currently available for private, industrial, manufacturing and distribution facilities.

As of March 2007, less than 500 people are employed at the GTP which is disappointing to many. Locational problems created severe constraints. As noted, the North Carolina Authority selected a relatively isolated low-income region of the state as the site of the GTP in part to spur job growth, income and overall economic development of a declining region. This location has posed a

number of liabilities. First, the highway system and related transportation and telecommunications infrastructure were not well developed to the site. The GTP is over 40 miles from the nearest interstate highway and developing limited access connectors to the interstate will take at least a decade. The lack of interstate highway accessibility dissuaded a number of early targeted manufacturing firms from locating at the GTP. In addition, the runway at the Kinston Jetport (the GTP) was only 8,000 feet long, and therefore unable to handle the take-offs and landings of large cargo aircraft.

Securing the environmental approvals and federal and state financing to extend the runway to 11,500 feet took four and a half years. These approvals and financing came in late 1997 and 1998 and the runway extension was completed in late 2002 which was the middle of a major air cargo downturn period. Without federal environmental approvals (which, as noted previously, involved a full EIS) and a sufficient runway length for fully loaded all cargo aircraft to land and take-off, it was impossible to recruit major cargo airlines and therefore the firms that would use them.

The lack of a nearby developed industrial base in the poorest part of the state further discouraged a number of air cargo firms. The North Carolina GTP found itself in a chicken and egg situation that is now only beginning to be resolved through transfer of activities and responsibility to a major private sector commercial real estate development firm (Duke Realty) and private sector

development consultants and logisticians (Longistics) operating the Foreign Trade Zone covering much of the airport.

The GTP had some near misses with respect to major industrial recruitment in the past five years. For example, it came in second in site competition for both the Boeing 787 final assembly facility and FedEx's Mid Atlantic hub. However, this past May (2008) it secured a trophy tenant when Spirit Aerospace Systems selected the GTP to produce the fuselage of the new A350 extra-wide body jet, among other components. Spirit will be investing $580 million in its production facility, creating over 1,000 high-paying jobs.

Southern California Logistics Airport

Another effort to create an air cargo/industrial airport that has faced similar difficulties is Southern California Logistics Airport (SCLA) located at the former George Air Force Base in Victorville approximately 100 miles northeast of Los Angeles. The developer of SCLA, Sterling Enterprise, has entitled 64 million square feet for commercial and industrial development. Thus far, the firm has leased out 1 million square feet to air cargo and logistics providers, as well as for distribution facilities of major companies such as Boeing and General Electric.

The former air base, like the GTP, has faced a number of challenges. It is considered too isolated for air express activity and its local industrial base is not strong enough to provide sufficient origin and destination air cargo. There is also intense competition from other nearby "Inland Empire" airports, including

Ontario, San Bernardino, and March Air Base. Los Angeles International and Ontario have a solid grip on freight forwarders, who are reluctant to move to SCLA, despite its cost advantages and major incentives provided. Since freight forwarders account for the vast majority of traditional (non-express) air cargo, this has proven to be a liability that SCLA has yet to overcome.

Europe: Vatry and Frankfurt Hahn

I have already described the evolution of an Aerotropolis around Amsterdam's Schiphol Airport. Considerable airport-driven commercial development is also occurring around Paris' Charles de Gaulle Airport and London's Heathrow, the latter exhibiting the most expensive industrial space in the world around it.

There are also a number of smaller cargo-oriented airports using air logistics to attract industry. These include Vatry Cargo Airport in the Champagne Region of France, about 100 miles north of Paris. It has been trying to position itself as a logistics hub and third airport of the greater Paris Region. Vatry commenced operations in March 2000 following a seven million euro investment by local authorities and advertised itself as "the first multimodal 100% cargo center in Europe." In 2002, Vatry handled 6,100 tons of freight and had a total of 10,300 aircraft movements. It is near the center of major trucking in Europe linked to the French motorway network (A26 and A4). Prologis, a major

U.S. real estate investment trust focusing on logistics and distribution centers is building a substantial complex at Vatry. Overall, development at Vatry has been slower than many anticipated with the primary reason given as its distance from Paris and paucity of freight forwarders and 3PLs in the vicinity.

A primary cargo airport in Germany at Hahn, about 100 miles from Frankfurt, is likewise positioning itself as an industrial airport. This former U.S. airbase has consistently raised its freight tonnage from just 5,500 tons in 1997 when it opened to over 130,000 tons in 2004. Frankfurt AG (now known as FraPort) has taken a major equity stake (73%) in Hahn and the airport has been renamed Frankfurt-Hahn.

A number of 3 PLs are active at Frankfurt-Hahn. The airport features a five-lane road feeder system with integrated truck cross-docking facilities along with complete logistics services including all documentation and processing of special cargo. The airport also features 24/7 operation and is the German base of a number of air cargo charter companies, including the Western European hub of Volga-Dnepr Heavy Lift. It likewise serves as the European hub for Antonov (Russia) and as the German base for low-cost passenger carrier Ryanair.

Frankfurt-Hahn received a major boost in September 2004 when British Airways commenced weekly B747F flights to Johannesburg, Africa and Hong Kong. In November 2005, it added two more weekly flights to Hong Kong. Russia's Aeroflot has also made Hahn its European cargo hub with four DC10Fs stationed there currently offering 12 weekly fights to Moscow, Beijing, Shanghai,

and Tokyo. Scheduled cargo flights are also now offered by Egypt Air, Air Armenia, Iran Air, Turkey's MNG Airlines, and Royal Jordanian.

Hahn's success in attracting air cargo companies, which is driving nearby airport-linked industrial development, is due to its fast and efficient cargo handling and lower costs compared to Frankfurt International Airport and other large European airports. Hahn also has the advantage of being located within four to six hours trucking time of major European markets.

Once Hahn's air cargo traffic began to boost airport-related industrial development, additional air passenger demand was created. Annual passenger traffic expanded from just 29,000 in 1998 to 1.5 million in 2002, to 2.8 million passengers in 2004, and on up to 3.7 million passengers in 2006. Although much of this passenger growth resulted from Irish low-cost carrier RyanAir establishing Hahn as its German hub, a number of other new European carriers have started passenger service at Hahn, as well, over the past three years.

With both cargo and passenger demand at Hahn soaring, in 2004 the state of Hesse took a 17.5 percent stake in the airport (leaving Fraport with a 65 percent majority share) with the other 17.5 percent share held by the state of Rhineland-Palatinate. These three shareholds have committed themselves to investing 42 million Euros (about 80 million dollars) from 2005 to 2009 to improve airport infrastructure and further expand cargo and passenger capacity.

Jackson Air Logistics Complex/Aerotropolis Potential—Credibility, Viability and Challenges to Success

JEIA, Rankin County and the greater Jackson metropolitan area are well endowed with logistics assets. Although the airport is not a hub, it is reasonably well connected to a number of major U.S. hubs placing it one stop away from most significant markets in the country and to many global markets.

From a regional logistics standpoint, Jackson is strategically positioned near the geographic center of the South within overnight trucking to one-third of the U.S. markets. Two of the nation's key interstate highways (I-20 running east and west from Texas to South Carolina and I-55 running north and south from Illinois through Louisiana) intersect in Jackson about seven miles from JEIA. Jackson's highway accessibility is complimented by the presence of numerous less-than-load (LTL) and full-load trucking firms.

Kansas City Southern and the Canadian National Railway converge in Jackson. Both major railroad companies maintain primary rail yards in Jackson connecting the metro area with both north-south and east-west Class I rail service.

Multimodality is further enhance by the river port of Vicksburg, 45 miles west of Jackson via I-20 and Highway 61. The Port of Vicksburg provides the full complement of water shipping facilities and services including berths, gantry and mobile cranes, loaders, stevedore and drayage services, as well as U.S.

Customs brokers. A rail and road loop at the port allows direct loading from barges to truck or rail, including sealed barges for efficient international ocean shipping via New Orleans.

JEIA, itself, is centrally situated between North and South America. This make the airport potentially an excellent air cargo transhipment point from the the Caribbean, and Central and South America, as well as Mexico. With Miami, Atlanta, Chicago and DFW becoming increasingly congested and more costly, both Latin American and Asian air cargo carriers will likely begin looking for alternative U.S. air gateways. This has already boosted international air freighter server at Huntsville, Alabama, and Rickenbacker, Ohio (discussed previously) and can provide a propitious opportunity for JEIA to attract Asian and Latin American cargo carriers.

A second pivotal factor for logistics efficiency is state-of-the-art telecommunications for tracking and controlling products shipped. Here, Jackson excels offering superior telecom and IT services through such companies as Nextel, Comcast, MegaGate Broadband, and Deltacom.

Seven four-year colleges are located within 30 miles of JEIA along with a number of community colleges offering targeted education and training programs. Opportunities for logistics concentrations exist. The labor force is steadily growing with wages and local salary levels that are highly competitive with most other U.S. markets.

Rankin County, itself, is a strong growth node, with its resident population exploding from 115,000 in 2000 to approximately 140,000 in 2007. During this period, the County's retail sales growth has led the state with a 90 percent increase (from $1.7 billion in 2000 to $3.2 billion in 2007). Aside from DeSoto County just across the state border from Memphis, Rankin County also registered the largest number of in-migrants between 2000 and 2007.

Site consultants regularly recognize the Jackson metro area as having one of the most pro-business constituencies in the country. The State of Mississippi also an attractive set of tax incentive programs to recruit and keep industry.

Yet, a 2004 study conducted for the MetroJackson Economic Development Alliance on the perceptions of the metro area by outside site location consultants and corporate executives found that negative perceptions exist among these two critical groups of outsiders. These include Jackson and the state being viewed as "poor," "backward," "Intolerant," and "uneducated." Related to this was an outsider perception of the Jackson area having poor public schools and a poorly skilled workforce.

Whereas there is a basis for some of these negative perceptions, hard data show that for a number of locations in the airport region, this is not the case. For example, Rankin County has one of the highest average household incomes in Mississippi (approximately $70,000) and highest average education attainment levels (14.6 years).

In addition to removing misapprehensions about Jackson as a place to work, live, and be educated the region's logistics assets need to be continuously upgraded and promoted. This involves coordinated cross-jurisdictional planning, developing, and marketing of the Jackson region as a whole to create integrated multimodal infrastructure and logistics brand. Coordinated regional actions are also required to maximize long-term benefits to individual jurisdictions of aerotropolis development. For example, without established industrial recruitment protocols between jurisdictions, firms choosing to loccate in the Jackson Aerotropolis and broader region will often play the cities/counties off one another to the detriment of the local jurisdictions, their taxbases, and ultimately their citizens. I will focus on this critical issue later in the report.

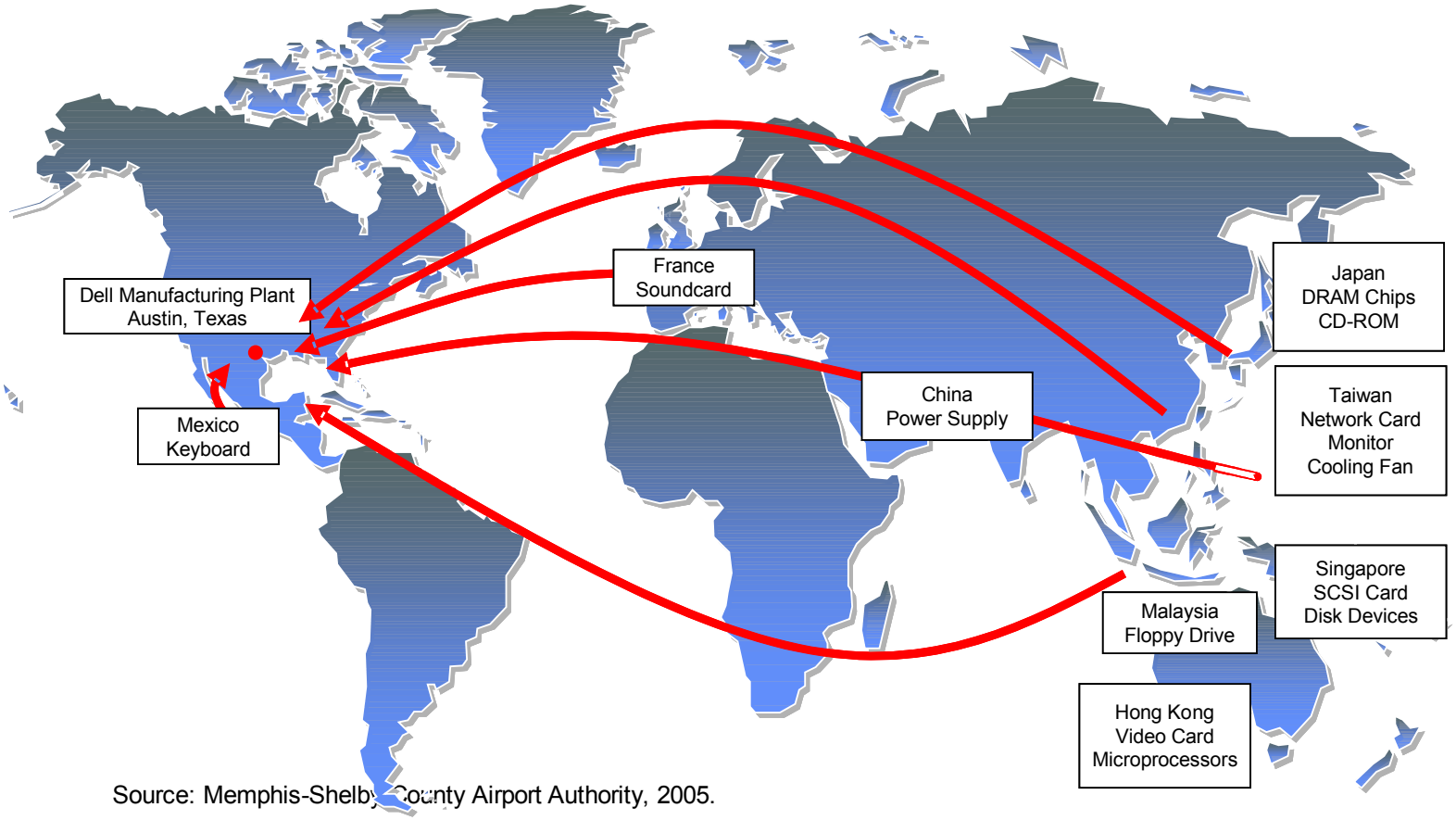
Returning to the Jackson Aerotropolis as a regional business draw and brand, the area's multimodal infrastructure can be its primary asset if appropriately capitalized upon. Evidence suggests that a Jackson Aerotropolis, cornerstoned by a multimodal air logistics complex at and around JEIA, could be the most promising engine for local and regional job creation and economic development for many decades to come. As this occurs, it is likely that numerous commercial features similar to these described previously at and around air logistics centers and aerotropolises elsewhere will take place at JEIA and its extended airport region.

In point of fact, there is little doubt that an aerotropolis in some form will emerge and grow around JEIA. *The critical question is: will it emerge and grow in an*

intelligent manner so that development is economically efficient, aesthetically pleasing, and environmentally sustainable, bringing jobs and an improved quality of life to residents of the entire Jackson Metro area? Or will it emerge and grow in a spontaneous, haphazard, unsightly, and ultimately unsustainable manner as has occurred around so many commercial airports in the U.S. to date, which will substantially impede the potential benefits not only to areas proximate to JEIA but to the entire Jackson region?

The following three chapters will provide the infrastructure and facility plan guidelines, businesses plan guidelines, and implementation plan guidelines to better leverage JEIA, in general, and its air cargo logistics center, in particular, for the economic well-being of the entire region. These guidelines will reinforce the need for coordinated region-wide planning and actions, the absence of which will preclude Rankin County and the broader Jackson metro area from achieving the full development potential that JEIA and other regional logistics assets can offer.

Exhibit 1.1
GLOBAL SUPPLY CHAIN—DELL COMPUTER TEXAS FACILITIES



Source: Memphis-Shelby County Airport Authority, 2005.

Source: Abbey, Twist and Koonmen. 2001

Exhibit 1.2
UNITED STATES TOTAL AIR AND VESSEL EXPORTS FOR
1990, 1997 AND 2006, BY VALUE (IN MILLIONS OF US$)

	1990	**1997**	**2006**
TOTAL VALUE	$260,927	$444,127	$644,892
AIR VALUE	$110,321	$219,751	$336,536
VESSEL VALUE	$150,605	$224,376	$308,356

GROWTH	**90–97**	**97–06**	**90–06**
TOTAL VALUE	70.2%	45.2%	147.2%
AIR VALUE	99.2%	53.1%	205.1%
VESSEL VALUE	49.0%	37.5%	104.7%

Source: U.S. Department of Commerce
Merchandise Trade Files.

Exhibit 1.3
AEROTROPOLIS SCHEMATIC

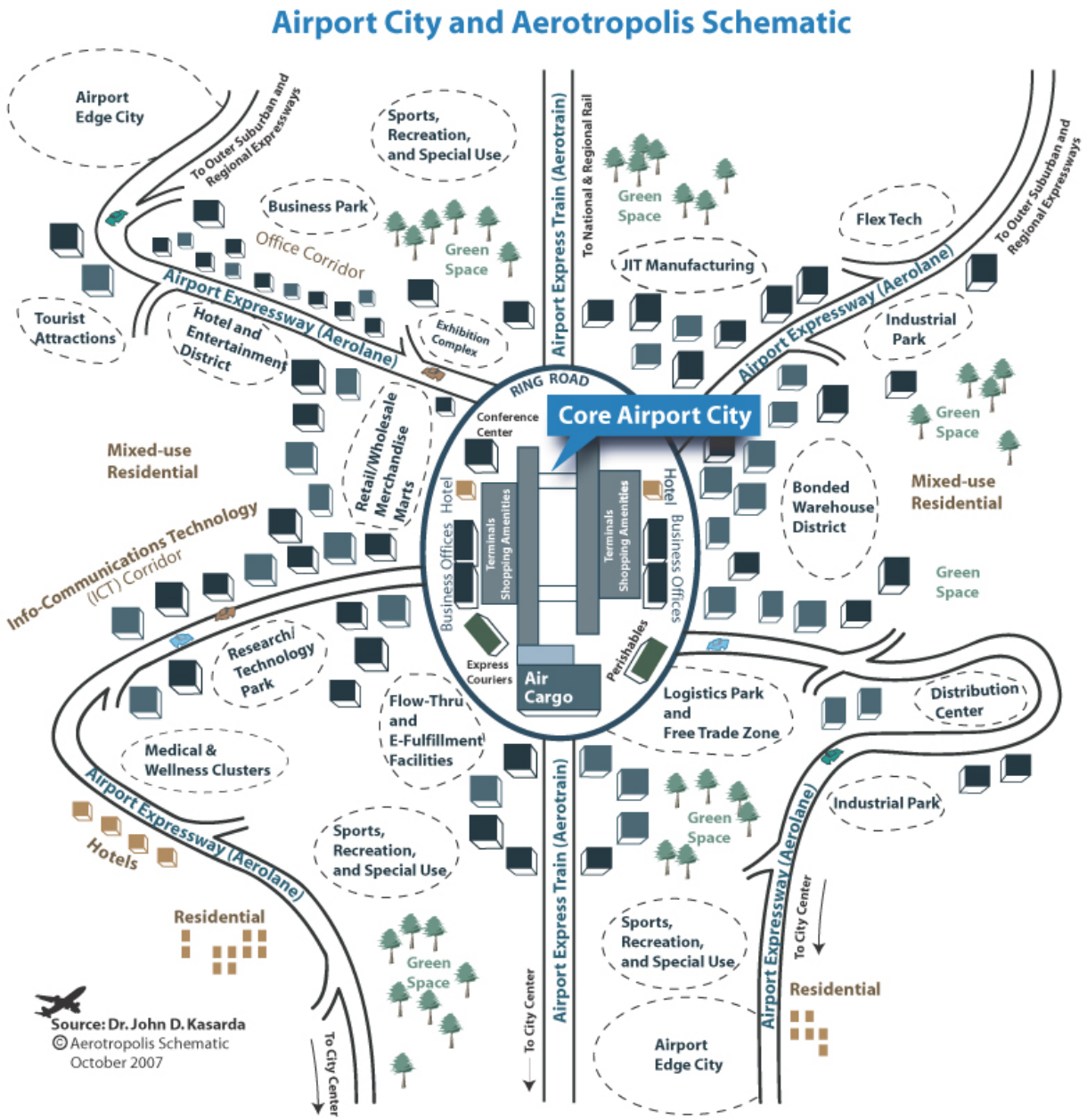
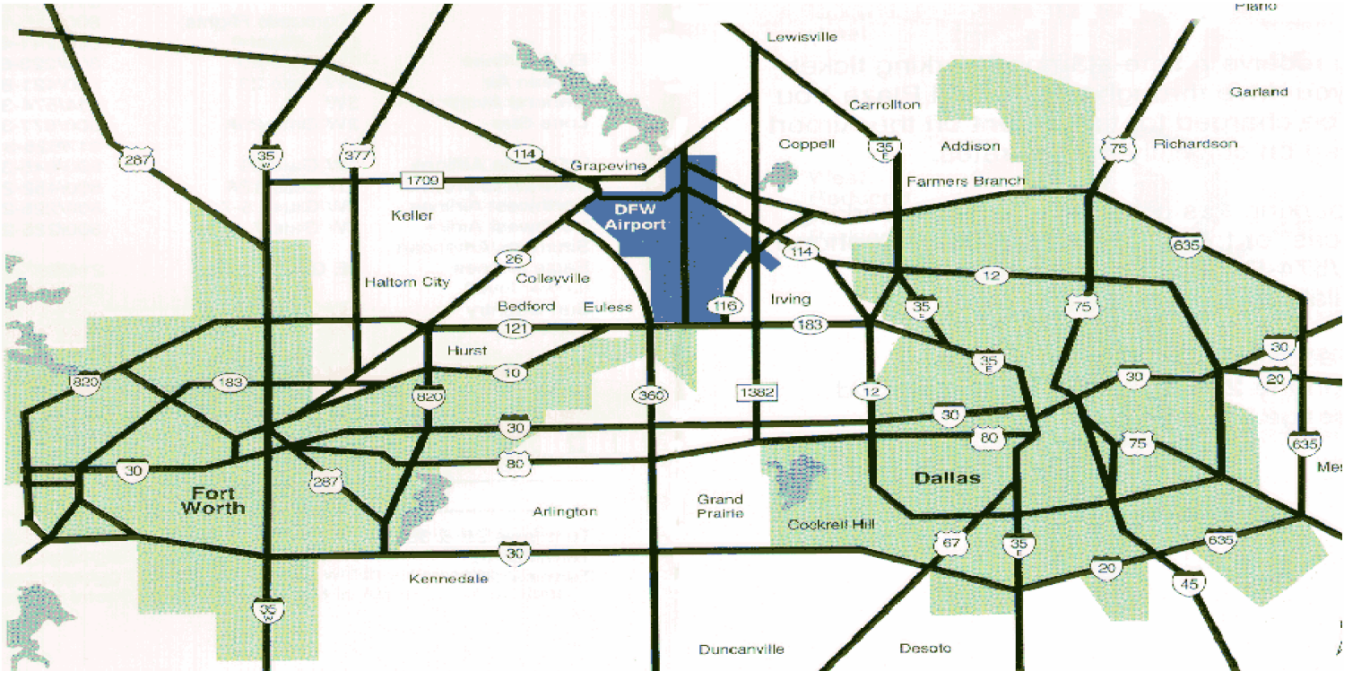
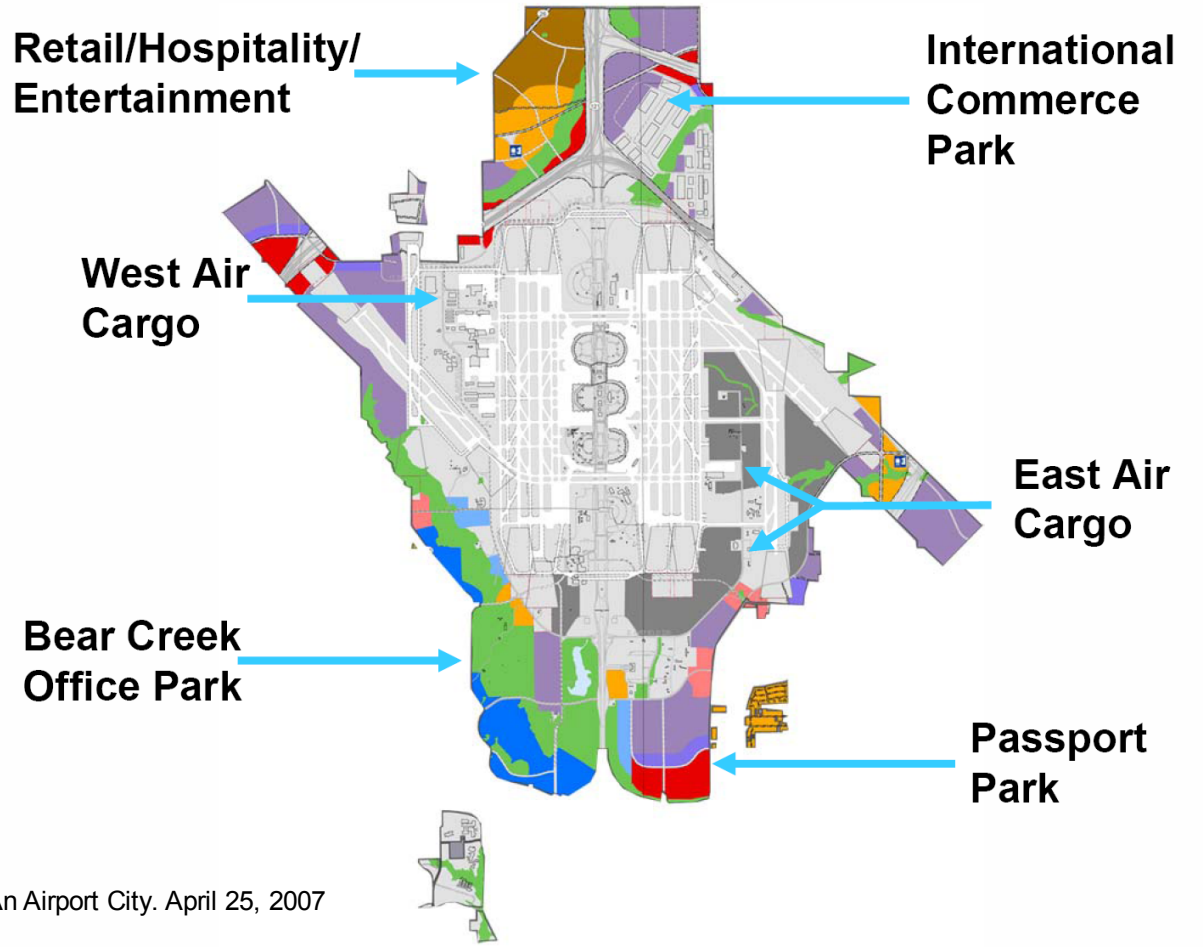


Exhibit 1.4
DFW AIRPORT OVERVIEW—DFW AIRPORT IS LOCATED IN BETWEEN THE CITIES OF DALLAS AND FORT WORTH, AND IS LARGER THAN MANHATTAN ISLAND



Source: DFW—An Airport City. April 25, 2007

Exhibit 1.5
DFW AS AN AIRPORT CITY—DFW IS FOCUSED ON SIX KEY AREAS OF COMMERCIAL DEVELOPMENT



Source: DFW—An Airport City. April 25, 2007

Exhibit 1.6
DFW AS AN AIRPORT CITY—INTERNATIONAL COMMERCE PARK

Industrial | Freeway Commercial | Flex Office

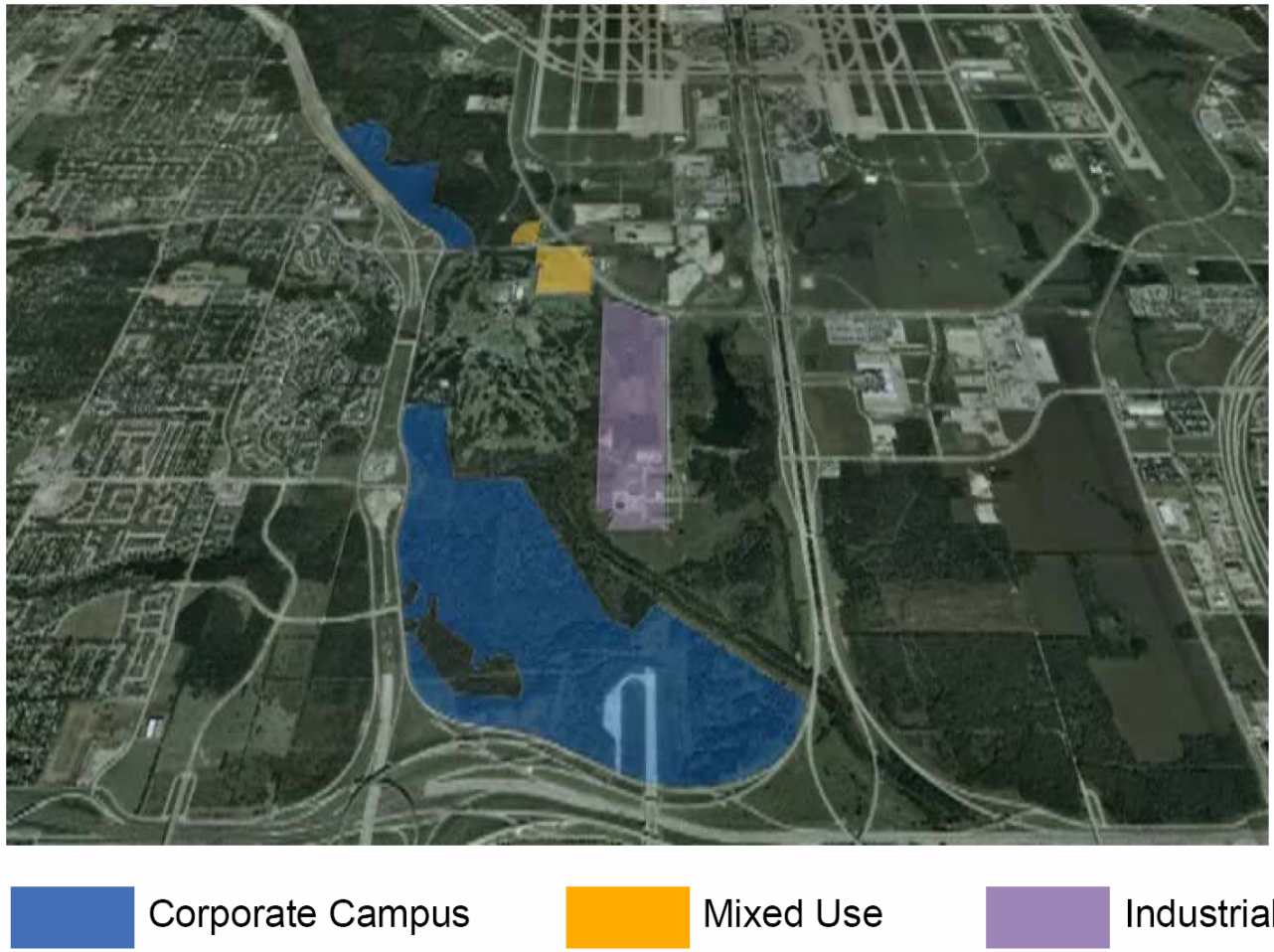
Source: DFW—An Airport City. April 25, 2007

Exhibit 1.7
DFW AS AN AIRPORT CITY—RETAIL/HOSPITALITY/ENTERTAINMENT

Retail/Hospitality/Entertainment Mixed Use

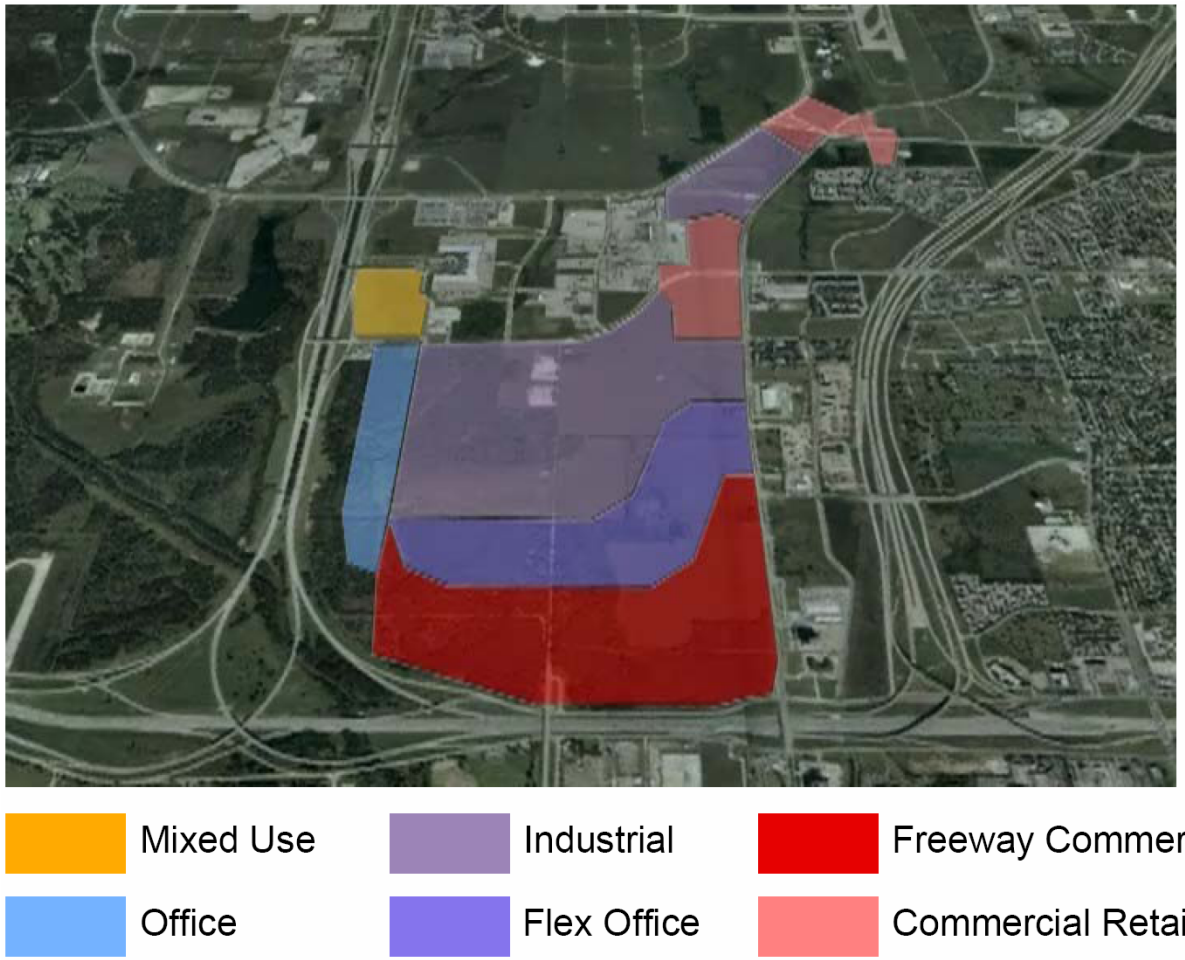
Source: DFW—An Airport City. April 25, 2007

Exhibit 1.8
DFW AS AN AIRPORT CITY—BEAR CREEK OFFICE PARK



Source: DFW—An Airport City. April 25, 2007

Exhibit 1.9
DFW AS AN AIRPORT CITY—PASSPORT PARK (SOUTHPOINT)



Source: DFW—An Airport City. April 25, 2007

Exhibit 1.10
PROPOSED CORE OF DETROIT REGION AEROTROPOLIS
25,000 ACRES OF DEVELOPMENT POTENTIAL

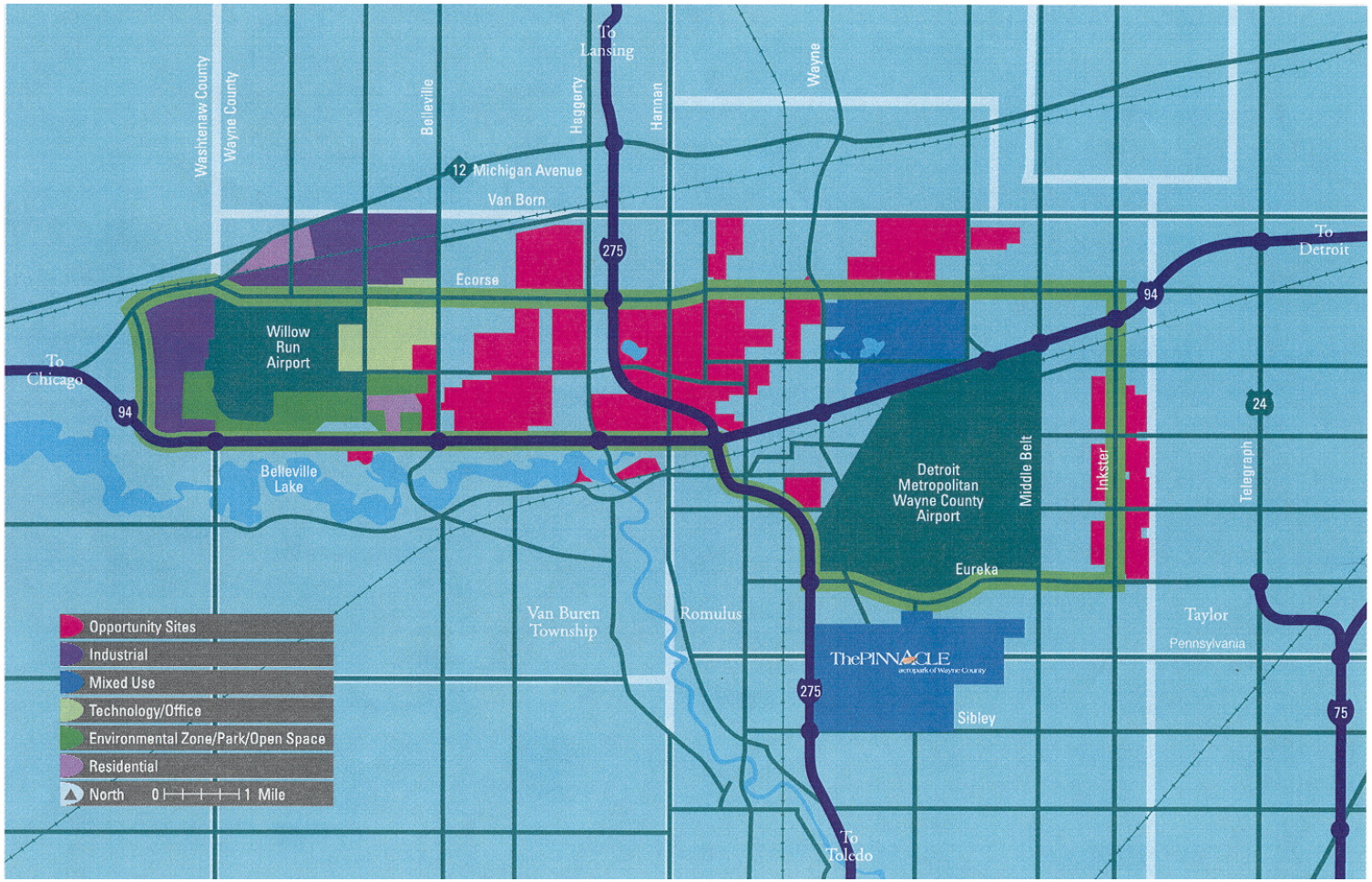


Exhibit 1.11
DETROIT REGION AEROTROPOLIS CONCEPTUAL MODEL

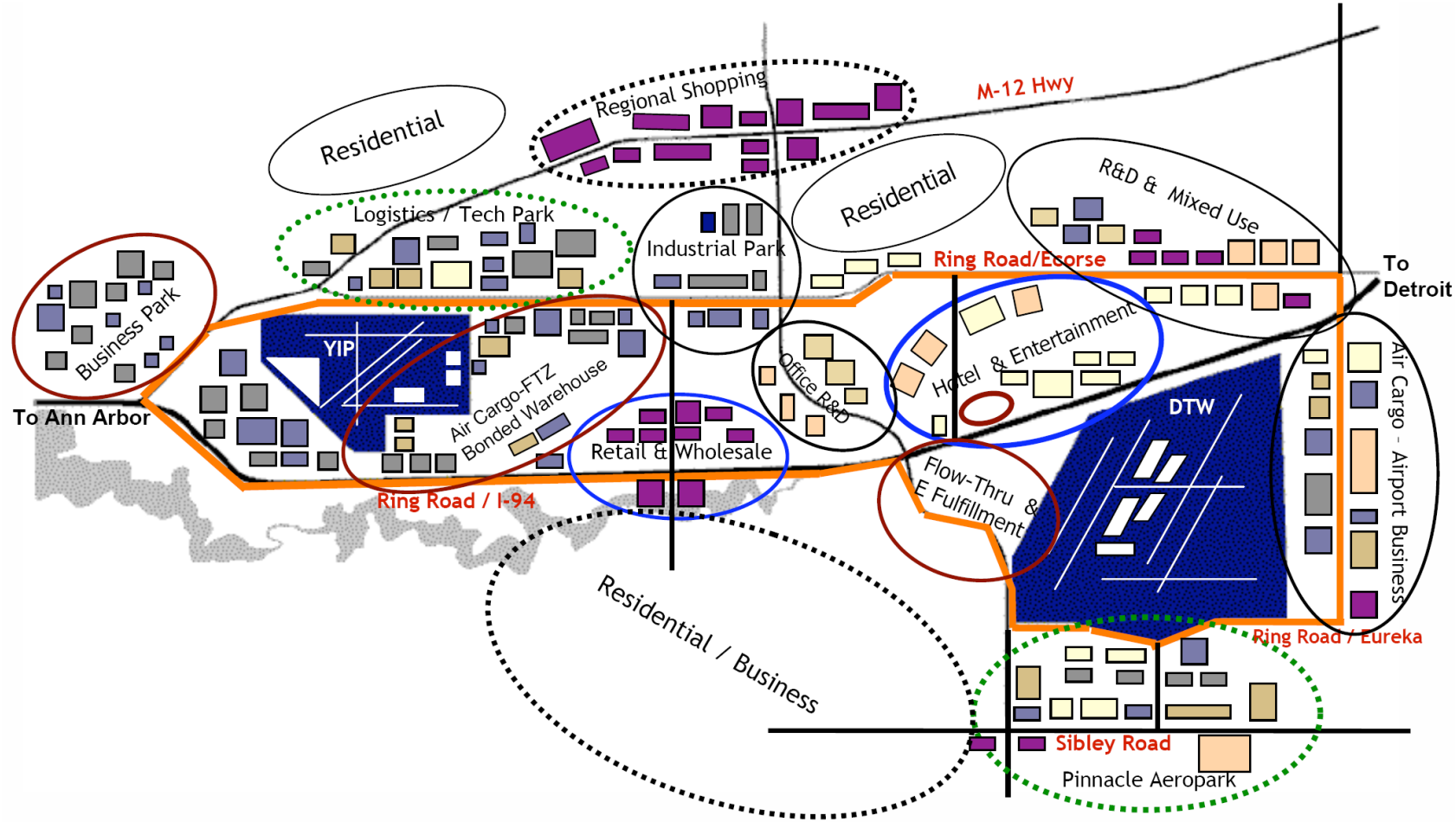


Exhibit 1.12
2006 AEROTROPOLIS CHARRETTE VISIONS

A Conceptual Plan

Respect Existing Communities

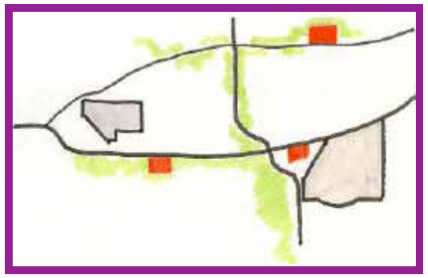


Exhibit 1.13
2006 AEROTROPOLIS CHARRETTE VISIONS

Improve Transit Linkages

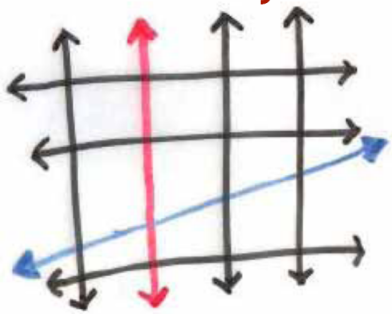
Research & Design Center

Live/Work

Retail Center & Public Space

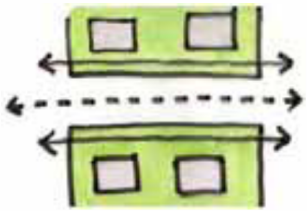
Bike & walking trails

Integrate Mobility & Sustainability



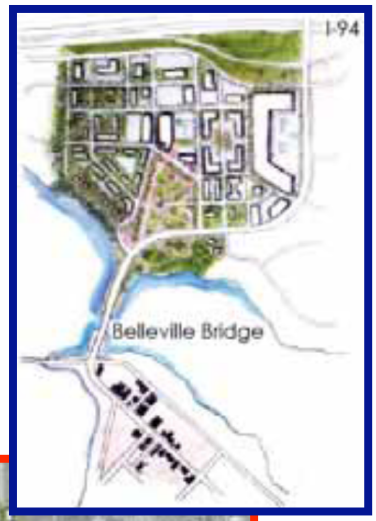
Build a Variety of Sustainable Uses and Designs - Including Green Building Design

Exhibit 1.14
2006 AEROTROPOLIS CHARRETTE VISIONS



Study Connections

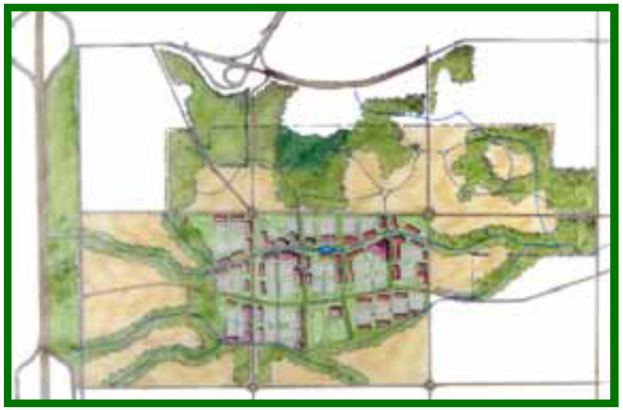
Provide Good Connectivity



Design in Quality Open Space

Exhibit 1.15
2006 AEROTROPOLIS CHARRETTE VISIONS

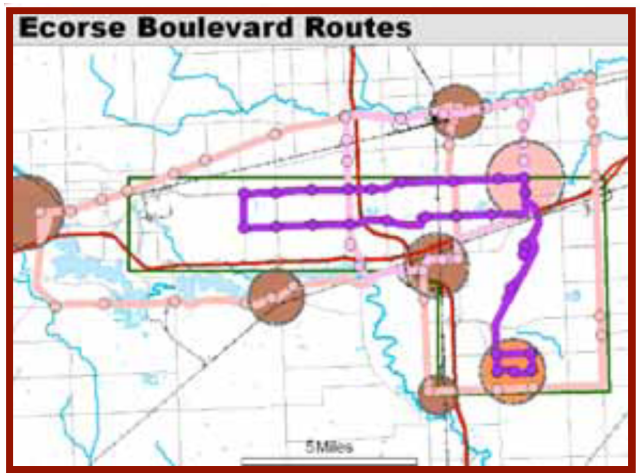
The Pinnacle AeroPark

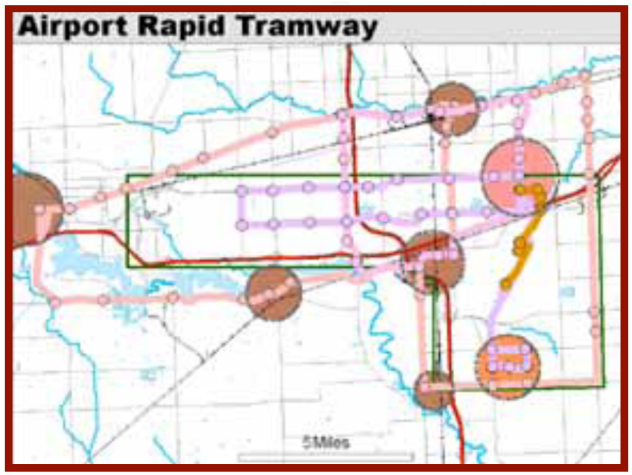


The Concourse along Ecorse

A Vision of Things to Come?

Exhibit 1.16
DETROIT AEROTROPOLIS PUBLIC TRANSIT LINKAGES





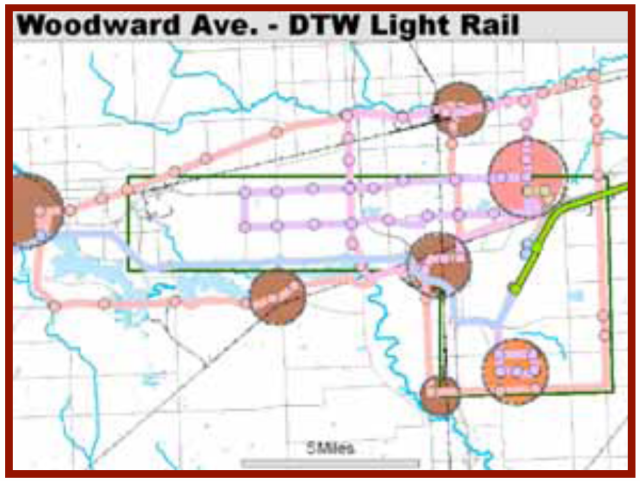


Exhibit 1.17
PUBLIC TRANSIT LINKAGES

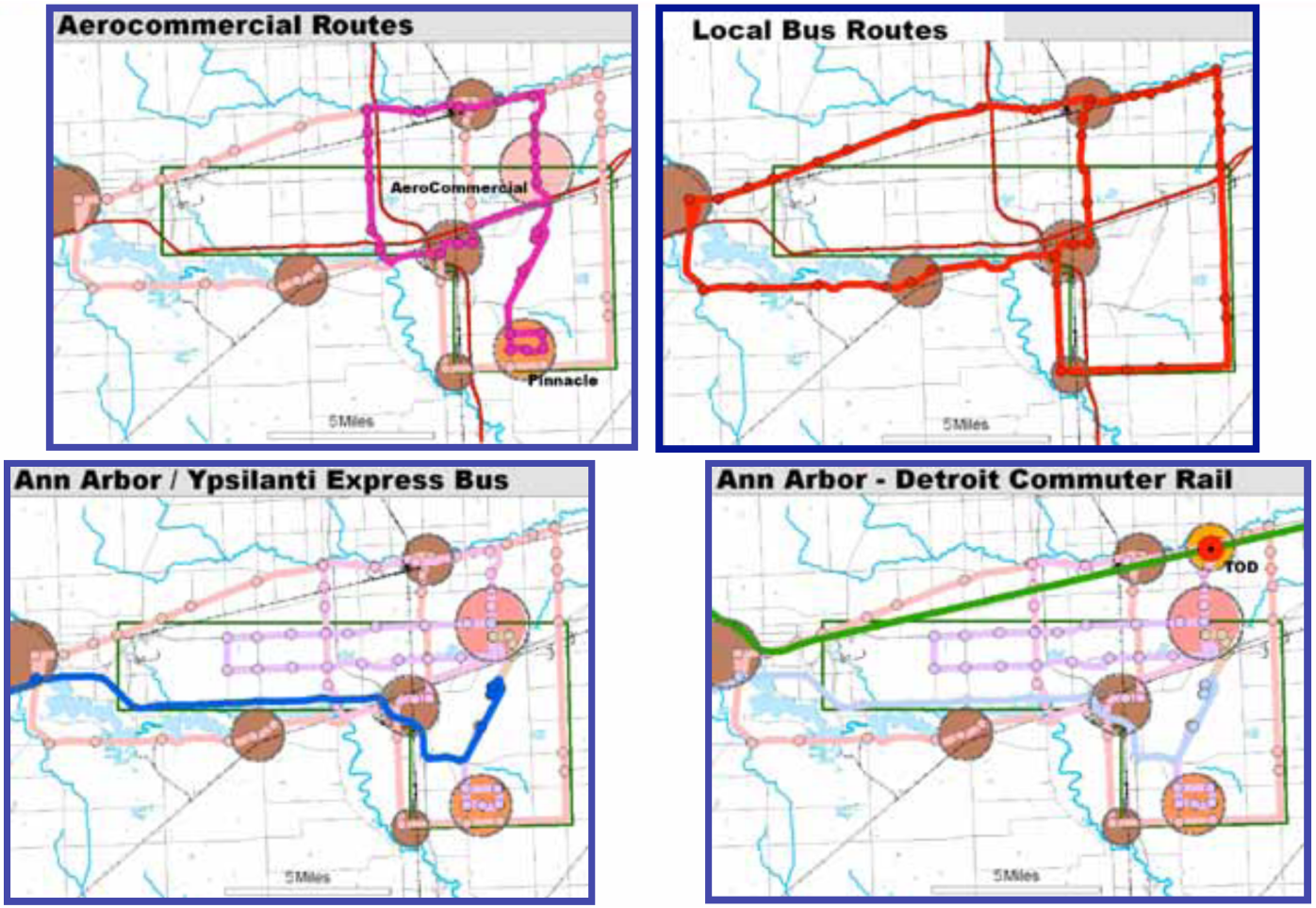
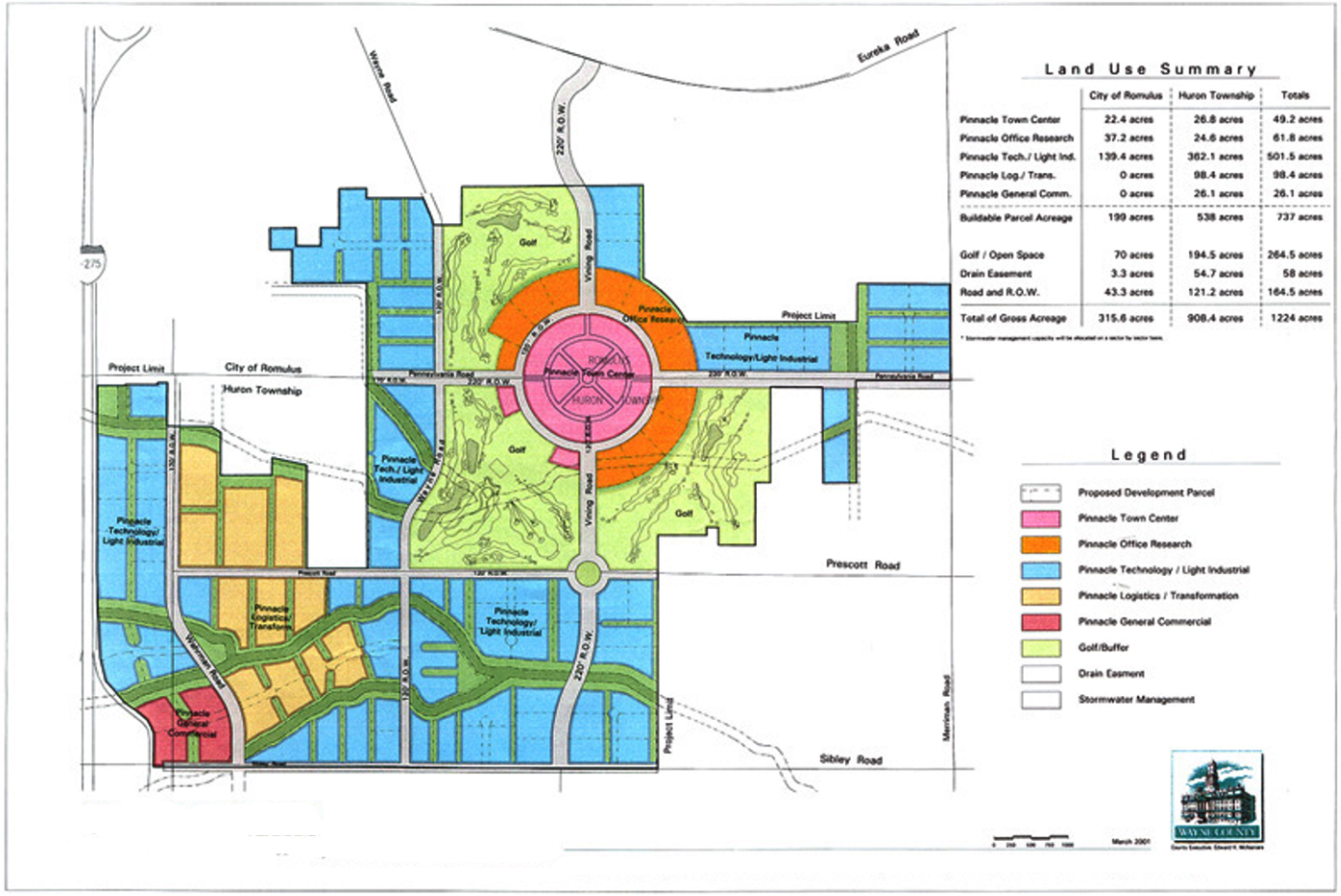


Exhibit 1.18
AERIAL VIEW OF THE PINNACLE AEROPARK

Exhibit 1.19
THE PINNACLE AEROPARK: DTW'S NEW FRONT DOOR

Exhibit 1.20
PINNACLE AEROTROPOLIS COMMERCIAL CLUSTERS AND LAND USE



	City of Romulus	Huron Township	Totals
Pinnacle Town Center	22.4 acres	26.8 acres	49.2 acres
Pinnacle Office Research	37.2 acres	24.6 acres	61.8 acres
Pinnacle Tech./ Light Ind.	139.4 acres	362.1 acres	501.5 acres
Pinnacle Log./ Trans.	0 acres	98.4 acres	98.4 acres
Pinnacle General Comm.	0 acres	26.1 acres	26.1 acres
Buildable Parcel Acreage	199 acres	538 acres	737 acres
Golf / Open Space	70 acres	194.5 acres	264.5 acres
Drain Easement	3.3 acres	54.7 acres	58 acres
Road and R.O.W.	43.3 acres	121.2 acres	164.5 acres
Total of Gross Acreage	315.6 acres	908.4 acres	1224 acres

Source: Wayne County Departments of: Jobs & Economic Development / Airports / Public Services / Management & Budget; and SKW.

Exhibit 1.21
KCI BUSINESS DISTRICT & ECONOMIC DEVELOPMENT INCENTIVES

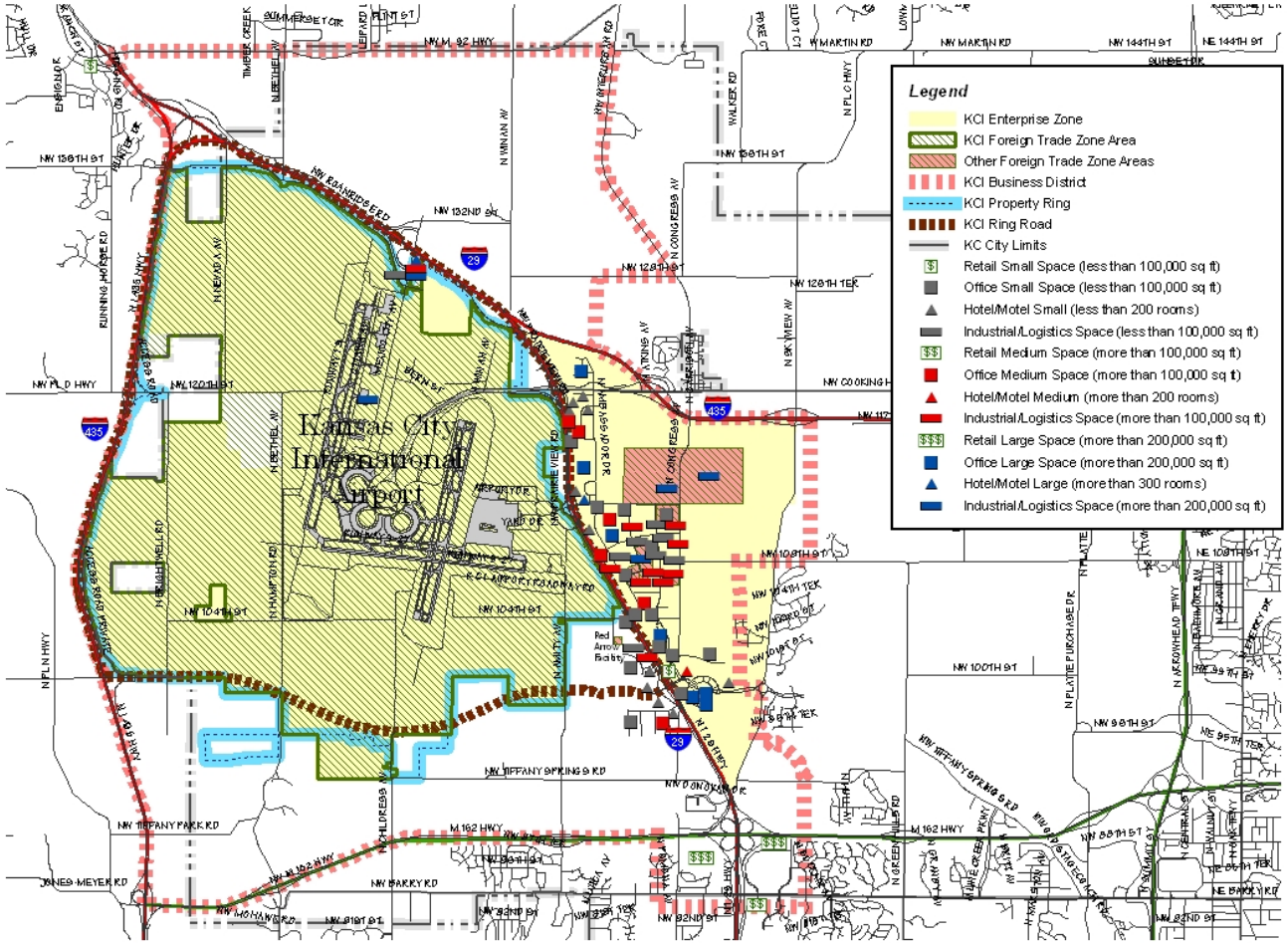


Exhibit 1.22
KCI AIRPORT PROPERTY AND SURROUNDING AREA WITH PROPOSED CLUSTERS

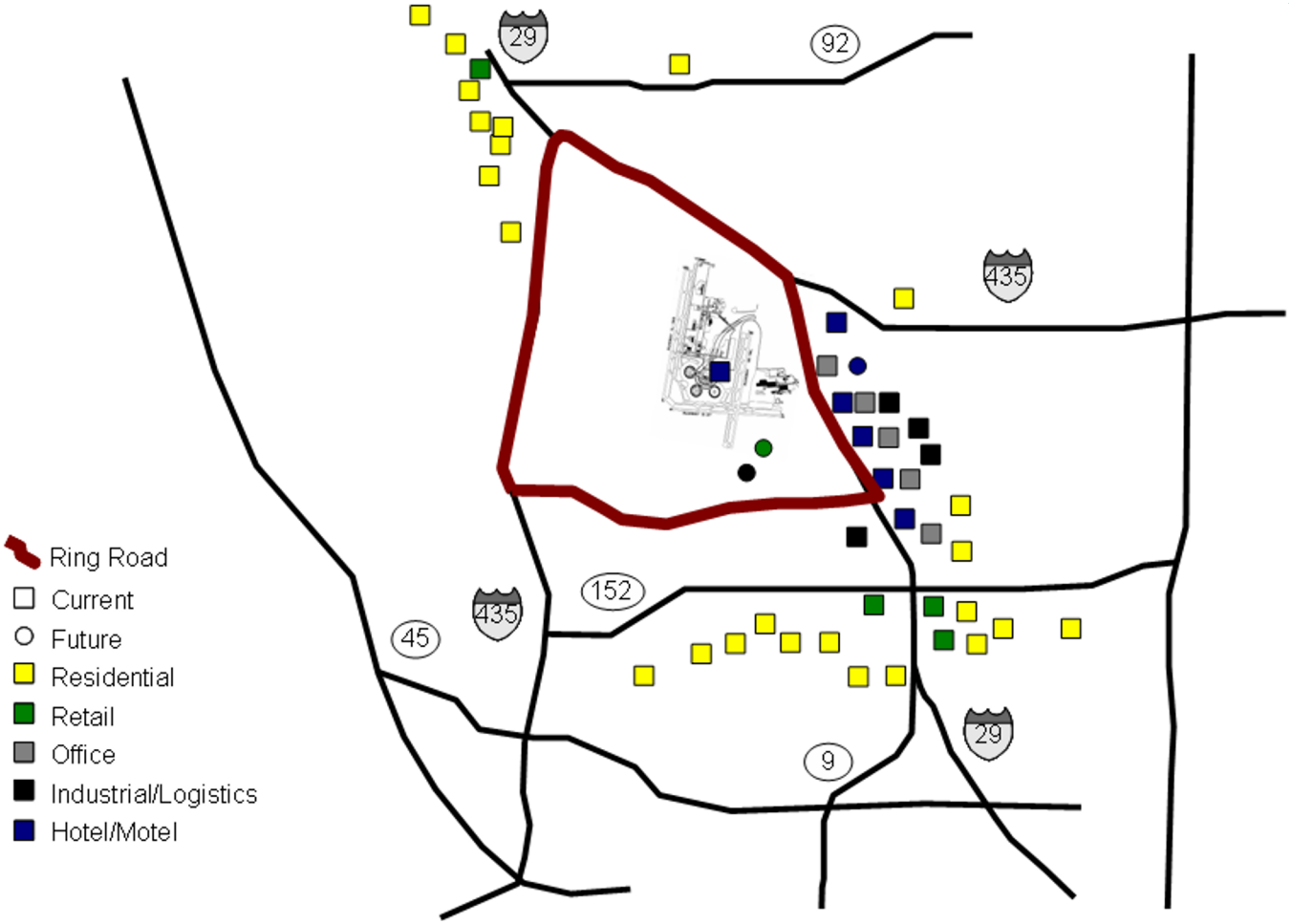


Exhibit 1.23
LOCATION OF KCI BUSINESS AIRPARK

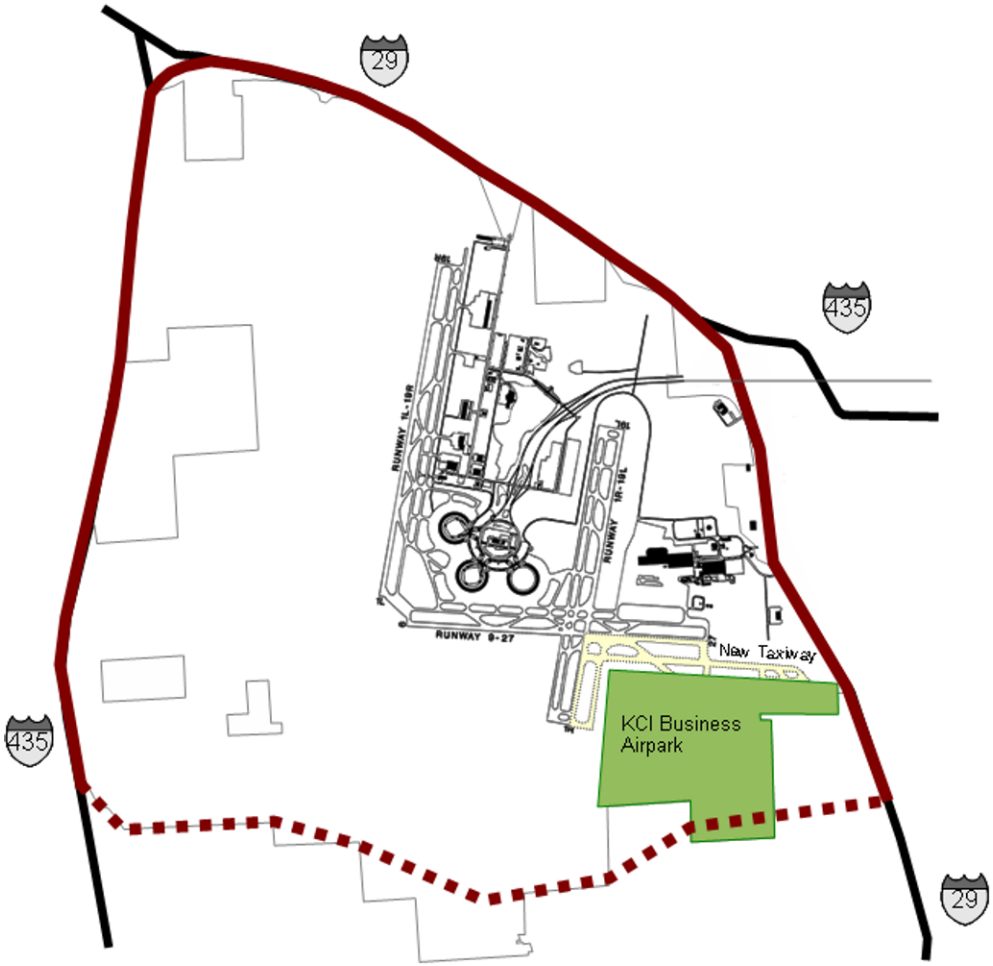
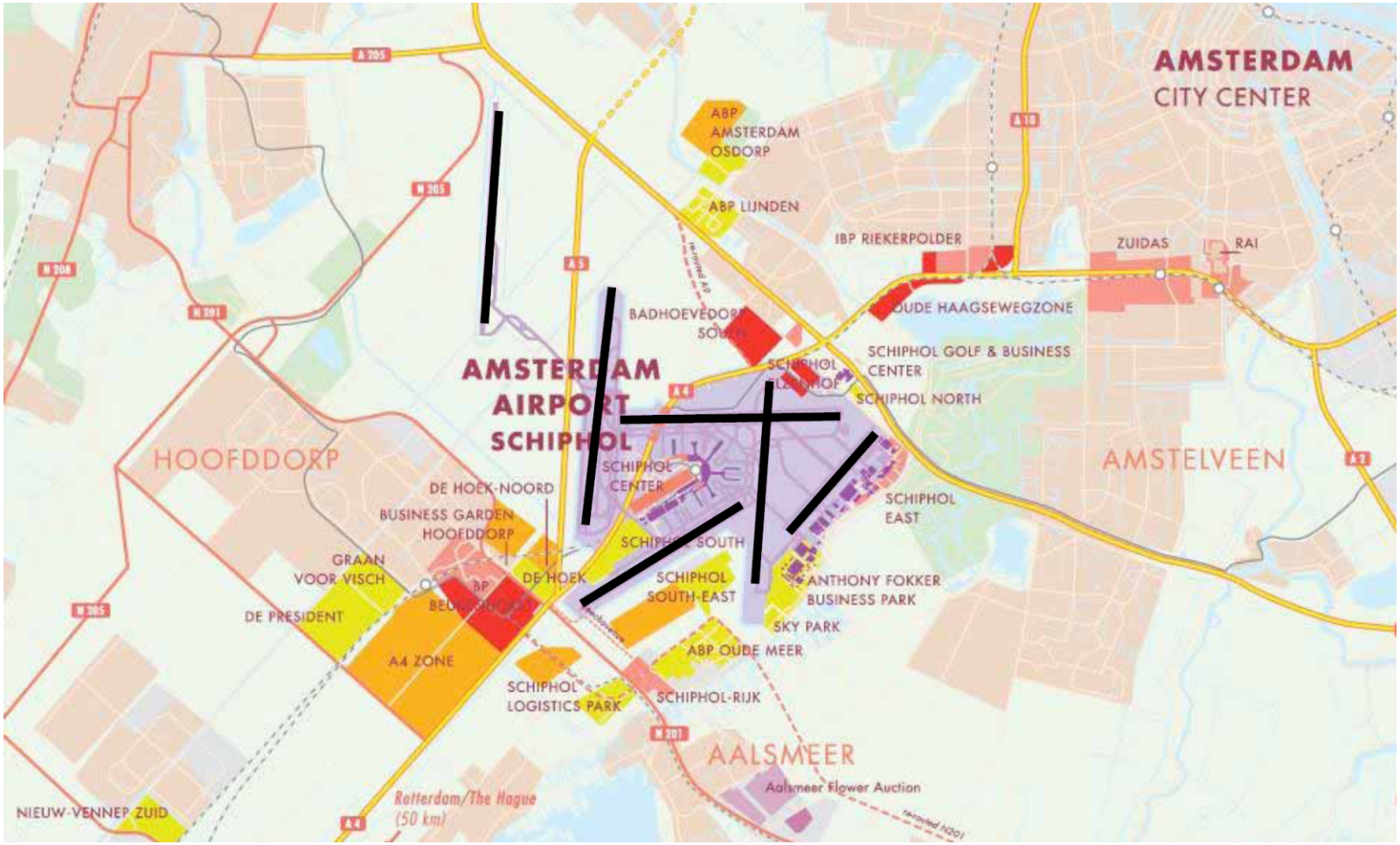


Exhibit 1.24
LOCATION OF KCI BUSINESS AIRPARK CONCEPTUAL MASTER PLAN

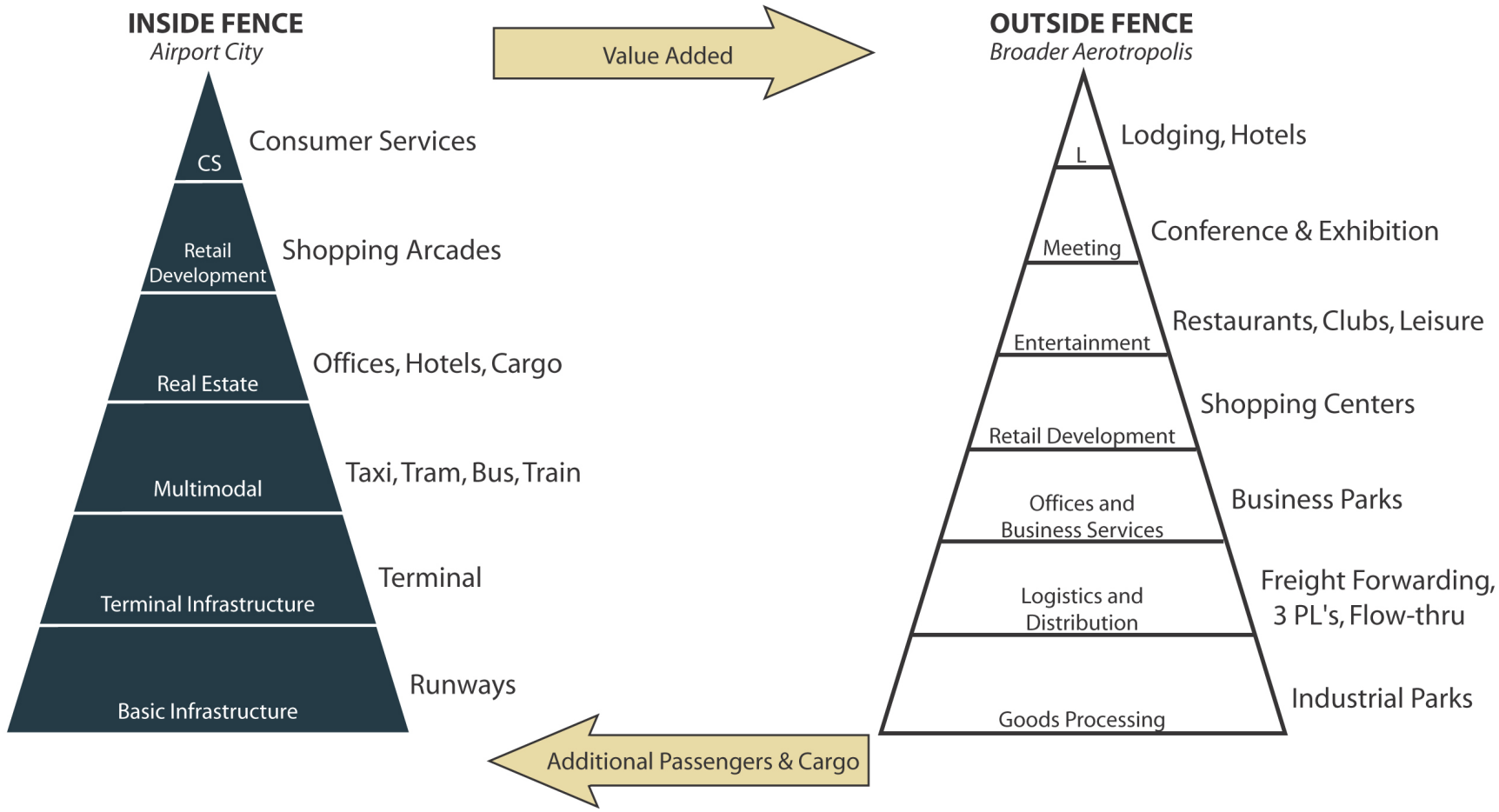
Exhibit 1.25
AMSTERDAM SCHIPOL—WOLRD TRADE CENTER

Exhibit 1.26
AMSTERDAM SCHIPOL AREA COMMERCIAL CLUSTERS



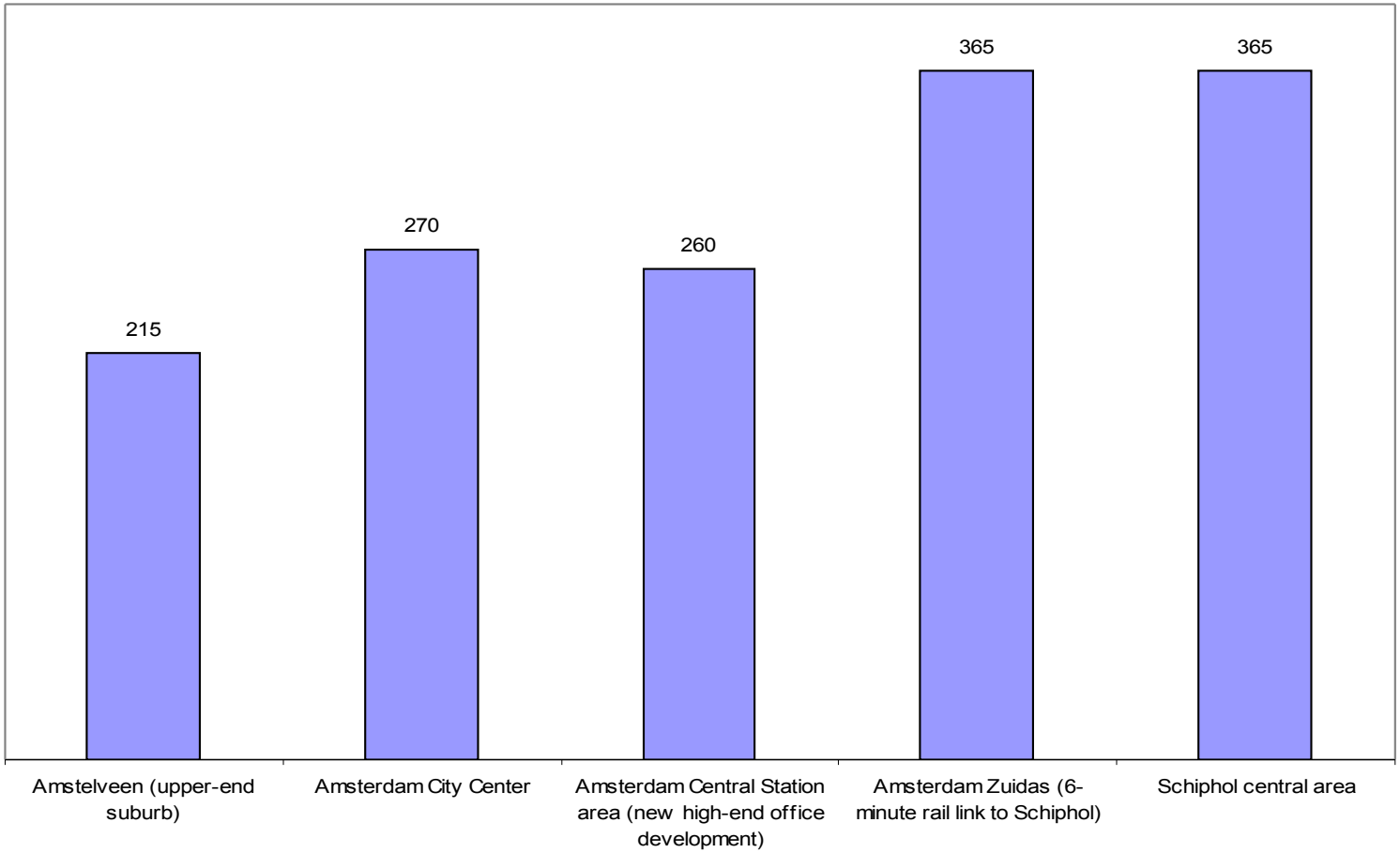
Source: NACO.

Exhibit 1.27
AMSTERDAM SCHIPOL AIRPRTY CITY – AEROTROPOLIS SYNERGIES



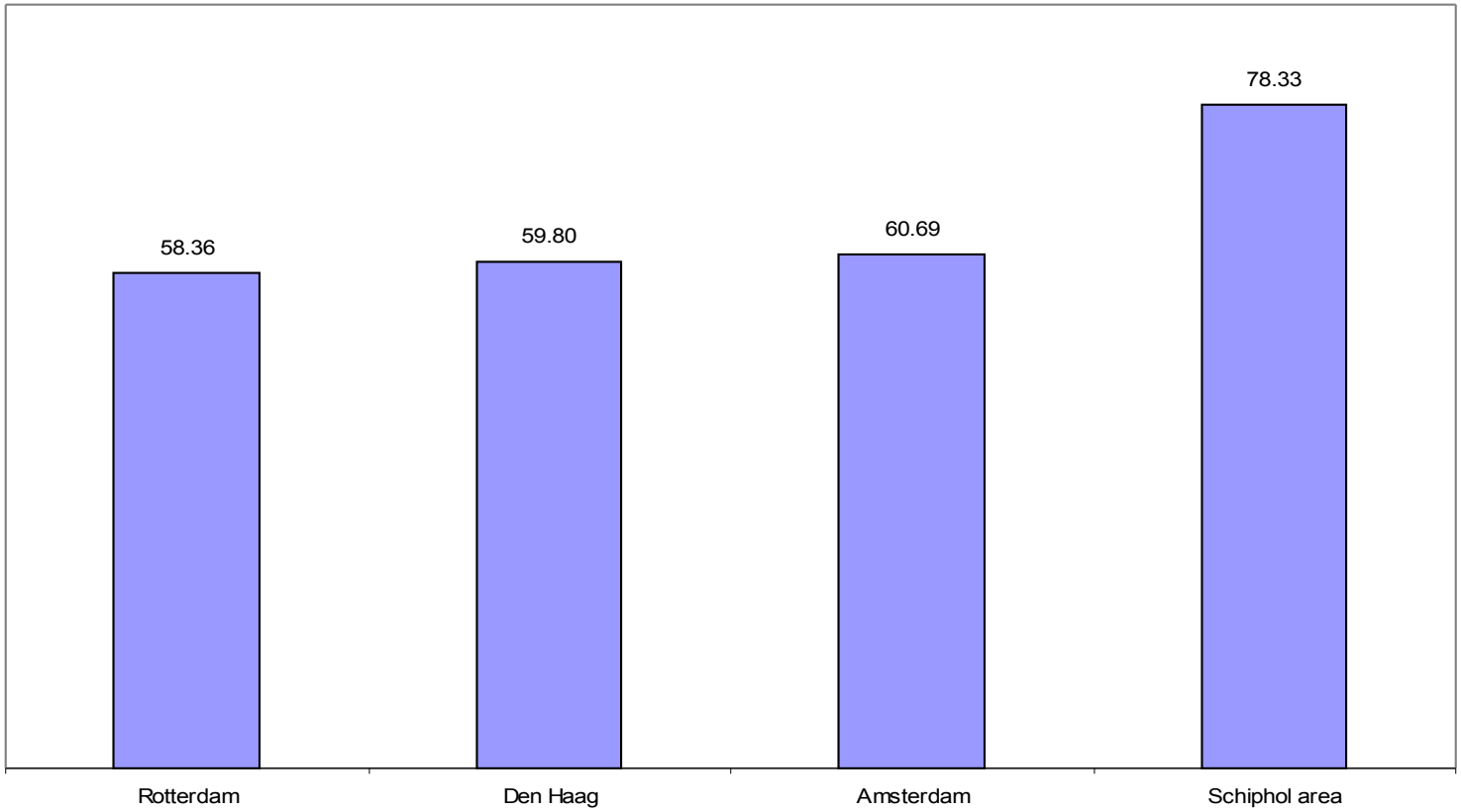
Source: Schiphol Group and Dr. John D. Kasarda

Exhibit 1.28
AMSTERDAM COMPARATIVE OFFICE RENTS (2006) EU/M^2/YR



Source: DTZ Zadelhoff

Exhibit 1.29
NETHERLANDS COMPARATIVE INDUSTRIAL PROPERTY RENTS (2006) EU/M^2/YR



Source: DTZ Zadelhoff

Chapter 2

Mississippi Air Cargo Logistics Center/Aerotropolis Infrastructure and Facilities Guidelines

I. Existing Infrastructure and Facilities

Jackson-Evers International Airport (JEIA) encompasses more than 3,300 acres in Rankin County, approximately five nautical miles east of Jackson's central business district. The airport presently has two parallel 8500×150 ft runways, 6L/34R and 16R/34L, in a roughly northwest/southeast orientation. Both runways have asphalt operating surfaces and precision markings. All taxiways are 75 ft. Parallel taxiways A and C run run the full length of runways 16R/34L and 6L/34R respectively, while taxiway B connects the parallel runways at the mid-point of both runways and immediately north of the main terminal complex. The hourly capacity of the existing runway configuration is 126 operations under VFR conditions and 65 operations under IFR conditions, with a calculated annual service volume (ASV) of 275,000 operations.

Present demand is well below peak-hour capacities, minimizing congestion in the air and on the ground. For the 12-month period from January 2007 to December 2007, Jackson-Evers International Airport recorded 74,733 operations: 11,282 (15%) air carrier; 21,789 (29%) air taxi; 14,114 (19%); general

aviation; 6,355 (9%) military; 2,023 (3%); 19,170 (26%) local military; and local civil.

In calendar year 2007, there were 1.43 million enplaned and deplaned passengers (down slightly from 1.46 million in 2006), while landed weight for all-cargo airlines registered 136.1 million pounds in 2007 (up from 135.5 million pounds the previous year). Landed weight for all-cargo airlines charted generally upwards from 80 million pounds in 1983 (the earliest year for which data are available) until 1997 when it stood at 381 million pounds. The following year saw a sizable decrease in all-cargo airline aircraft landed weight with the the discontinuation of air-cargo service by Emery AirFreight and BAX Global (service later restored). Since then (with the exception of calender year 2001), an overall downward trend characterized landed weight for all-cargo airlines until it rebounded modestly in 2007. Jackson-Evers International Airport currently offers service from integrated cargo carriers DHL/Airborne Express, BAX Global, Menlo Worldwide Forwarding, Integrated Airline Services, Inc., and United Parcel Service, as well as one on-site freight forwarder, Page and Jones.

Jackson-Evers International Airport also provides passenger service by eight carries, offering 46 non-stop flights per day to 12 cities and 14 commercial airports (see Exhibit 2.1). The inclusion of low-cost carriers, such as Southwest, help keep competition up and prices down.

The terminal building operates four gates (Gate 1–4) in East Concourse and five gates (Gates 15–19) in the West Concourse. The airport has undergone

considerable upgrading and renovation, including a $20 million expansion of the air cargo complex in 2004. Plans are to rehabilitate and extend JEIA's (and Hawkins Field) runways and taxiways in 2010, with the east runway extended from 8,500 ft. to 12,500 ft. Numerous support facilities are located adjacent to JEIA's terminals and taxiways, as is shown in Exhibit 2.2. JEIA's current tenants are listed in Exhibit 2.3.

Foreign Trade Zone. Of JEIA's 3,339 acres, 2,242 are included in Foreign Trade Zone #158. FTZ designation allows light manufacturing and value-adding logistics functions (e.g., pick and pack, assembly, kitting, sequencing, repackaging, upgrading, repair) to operate in a tax-free environment with minimum bureaucratic or customs delays for international products moving into and out of the Zone. Imported parts, components and assembled goods may enter without customs paperwork, duties, or excise taxes. The merchandise may be stored, tested, repackaged, assembled or otherwise processed. If it is re-exported, no taxes or duties are levied. If, however, the final product is imported into the United States, customs taxes and duties are due only at the time the products leave the zone.

Because the FTZ customs duty paid is the lower of either that applicable to the product itself or its component parts, the zone provides opportunities to realize considerable cost savings. It also provide one of the most flexible methods of quickly and efficiently receiving and processing time-sensitive parts and components. In addition, the airport has on-site U.S. Customs service.

As noted in Chapter 1, regional and national highway accessibility is outstanding with two major interstate highways (I-20 and I-55) intersecting near JEIA with direct connectivity to I-20 via Airport Road South. Other high-speed highways are just minutes away (see Exhibit 2.4).

Highway/air-cargo synergies are are reinforced by excellent nearby rail facilities (including an alliance of Kansas City Southern and I&M Rail Link and Canadian National Railroads forming the NAFTA Railway, extending from Canada to Mexico) as well as proximity to river ports, including a Port of Vicksburg 45 miles west of Jackson. Access to deep-water and coastal ports in the Gulf, present the opportunity for genuine quadramodal (air, highway, rail, and water transit) logistics advantage.

II. The Evolving Air Logistics Center, Airport City, and Aerotropolis

The functional core of a Jackson Air Logistics Complex (JALC) will be the Mississippi Air Cargo Logistics Center where initial phase of development and planned expansion is shown if Exhibit 2.5. Future phases will evolve over the next five to twenty years as are illustrated in the JEIA Phase II and Phase III Exhibits (2.9 and 2.10). These future phases also include the development of the East Metro Corridor on the eastern side of the airport which will complete the JEIA's future ring road. In addition to the phased development of the MACLC (to be described in some detail later in this chapter), the evolution business core

of a Jackson Airport City may be observed near the taxiway near the taxiway serving the future extended (12,500 ft.) east runway (16L-34R).

The form and function of the proposed 400-acre East Side Business Park will be determined by the market. Nonetheless, the nature of activities are likely to follow those described in Chapter 1 for DFW's Passport Park (now renamed SouthPoint Plaza), Detroit Metro's Pinnacle, and Kansas City International's Business AirPark. These include garden offices, hotels,restaurants,retail, entertainment, flextech, e-commerce fulfillment, logistics, and light JIT manufacturing. It may also be the case that one or a few large assembly firms who need runway access (such as was the case for Boeing's new 787 Dreamliner aircraft or major suppliers to Airbus) may take up a disproportional share of the future East Side Business Park.

As will be described shortly in the evolution phases of JEIA's future potential commercial land uses, other facilities may be added predicated on special market opportunities or growing demand.

With the Mississippi Air Cargo Logistics Center and its East Business District serving as dual economic drivers, strings and clusters of airport-linked commercial activities will form around the airport and span outward along JEIA's connecting highways. A good example of the former is AeroPlace, a 233-acre planned commercial development located adjacent to JEIA's western boundary in Rankin County. Proposed use includes logistics and light industrial

(complementing the MACLC), hotels, entertainment, retail, offices and possibly a college branch (see rendering in Exhibit 2.8).

Making AeroPlace a particularly choice site for these activities is the planned Airport Parkway Corridor bisecting the property. The Parkway (approved by the 2030 Jackson Urban Transportation Plan) will bypass I-20 to I-55 and create quick access between the downtown (6 miles away) and the JEIA (see Exhibit 2.7). This Parkway will be an aerolane and prime aerotropolis corridor.

A number of commercial clusters have already formed in the vicinity of the airport with more projected in the near future. Exhibit 2.8 illustrates these clusters in terms of five- and ten-mile radii concentric zones outward from JEIA. These aerotropolis clusters include retail/commercial, mixed use, medical, commercial/light industrial, office/commercial, and airports.

There are two important large certified sites in Rankin County ready for development. The first is the 43/20 Site consisting of 250 developable acres in Pelahatchie, about 20 minutes from JEIA. The site, which also has a 150-acre buffer adjacent to I-20 and both US-80 and MS Highway 43. Since 43/20 is also part of a Foreign Trade Zone and served by the Kansas City Southern rail line, it may be an appropriate future location for a Jackson Aerotropolis intermodal rail facility.

A considerably larger certified site is the 1,233-acre East Metropolitan Center, just 3 miles from JEIA. This proposed business and industrial park is

located adjacent to I-20 in Brandon and has 950 acres of site-ready tracts in various sizes up to 200 acres. The Kansas City Southern rail line is on this site which is also a Foreign Trade Zone. Thus, at least part of this tract may serve as an excellent potential intermodal rail facility as well. It is not happenstance that the four successful smaller air cargo oriented airports described in Chapter 1 all had intermodal rail facilities within three miles of the airport (Huntsville, AL; Ontario, CA; Rickenbacker, OH; and Hahn, Germany).

Air logistics and multimodal surface logistics combined to form a powerful engine for these emerging aerotropolises. In the following sections I describe how such an integrated logistics engine can be created at and around JEIA to drive a future Jackson Aerotropolis.

III. Designing the Mississippi Air Cargo Logistics Center (MACLC)

Successful development of a JEIA Airport City and greater Jackson Aerotropolis will require a powerful commercial driver. That proposed driver is the Mississippi Air Cargo Logistics Center (MACLC) evolve into in its later phases. Operating at full development as an integrated multimodal transportation and commercial complex, the MACLC will enable tenants and firms at and around JEIA and throughout the Jackson region to respond flexibly and rapidly to their domestic and global suppliers and customers. Its logistical infrastructure and business support services should be designed to enhance the

speed and agility of manufacturing, distribution and other time-sensitive industries thereby improving their competitiveness and catalyzing commercial growth at the JEIA East Side Business Park (potential future JEIA Airport City) and greater Jackson Aerotropolis.

To achieve this objective, logistics and commercial synergies as well as multimodal transportation upgrades will be proposed, including the possibility of bringing rail access to JEIA property. Establishing the airport ring road, with completion of the East Metro Corridor, and other roadway and utility improvements planned are important components of MACLC future development. I will begin with basic design guidelines for the full scale (phased) development of the Mississippi Air Cargo Logistics Center at JEIA.

IV. Basic MACLC Infrastructure Design and Configuration

At complete build-out the MACLC will include many proven elements of a modern logistics park. What will set it apart is the fusion of time-critical manufacturing and distribution facilities with multimodal transportation, advanced telecommunications, efficient materials-handling systems, and commercial support services. Bringing these elements together according to MACLC design principles to be outlined herein will substantially improve access and response time of tenants and Jackson area businesses to their domestic and international suppliers and markets.

Exhibit 2.9 describes the Phase II design of the MACLC which may also support the initial phases of the JEIA East Side Business Park. This infrastructure includes construction of the East Metro Corridor (completing the Ring Road) as well as internal roadway and utility improvements to appropriately service the East Side Business Park. In a later phase, as demand dictates, the East runway would be extended to 12,500 ft., which would handle the world's largest fully loaded air freighters. A new taxiway would be extended parallel to this runway, as well as enabling future commercial development near it.

The MACLC and East Side Business Park must be fully served by electrical power, natural gas, water and sewer facilities in ground and wide-lane internal roads designed to accommodate both large supplier trucks as well as greater volumes of employee vehicles. Fiber optics should be available throughout the sites.

It is difficult to specify the time periods for each future development since market demand combined with available JMAA resources for infrastructure improvements will set the development timetable. Phase I of the cargo center is already complete (Exhibit 2.5). For our purposes, I would estimate JEIA Phase II tentatively being in the 2010–2016 time period.

Ideally, during Phase II, JEIA would be selected as a regional air express hub facility along the lines of Alliance or Ontario, CA. A perishables center is also suggested for this phase to provide JEIA with unmatched air freight cold-chain and perishables processing in the mid-South. The Ring Road extension,

together with initial road improvements, will link the complex within minutes to I-20 (and I-55), as well as to local connectors to U.S. and state highways.

The MACLC and East Business District will be located in a Foreign Trade Zone which should be fully leveraged in industry recruiting efforts. This may not be sufficient, however, from an economic incentive standpoint, if tenants cannot own their property. My work with property development at other airports revealed that the inability of targeted tenants (especially foreign-based firms) to own their land was a deal-killer that knocked out many potential tenants. If this is the case at JEIA, it may be necessary for new legislation to be enacted allowing either private firm ownership or long-term (50 to 100 years) renewable and transferable leases) to overcome this obstacle.

A related obstacle is the inability of many public airport authorities to pay brokerage fees to commercial real estate firms who would bring potential tenants to the airport. If this limitation exists at JEIA, other types of incentives must be provided to these commercial real estate firm to have them advocate the JEIA site. Innovative financial partnerships with the JMAA might be explored here.

Another overlooked, but very important soft incentive, is speed of processing building permits. This appears to be serious problem in parts of the Jackson region where it can sometimes take up to a year or more to obtain building permits. Here I would recommend that JMAA create streamlined site development plan review and approval procedures. Under these streamlined procedures, site and building plans may be evaluated and approved within 60

days of receipt of the plans so that investor construction processes can be accelerated.

At the third phase of JEIA development (2016–2025) JIT manufacturing, distribution and logistics facilities would be located along both the western and extended eastern taxiways (see Exhibit 2.10). Wide-lane road access would be developed to both areas. Development of an on-site inland port and off-site intermodal rail facility should also be considered for completion during this third phase. A number of firms are combining air, rail, highway and water-borne movements in their assembly plans (e.g., Boeing, Airbus, BMW) and JEIA needs to be able to respond to compete for such facilities. A live animal holding facility and logistics education and training center may also be part of Phase III (see Exhibit 2.10).

In this ultimate development stage, a cargo transfer system (CTS) may be completed to carry materials, components, and finished products throughout the MACLC on an internal network of dedicated rights-of-way. This network will link off-ramp tenants to the central cargo area and to a state-of-the-art inland port providing access to air freighters, trucks, and materials-handling systems. In addition, the CTS may eventually connect tenants and the central cargo area to the off-site intermodal rail facility (IRF) containing multiple rail sidings, loading platforms, and truck cross-docking. The IRF would be linked not only to a main trunk rail line of Kansas City Southern (and possibly via a rail spur to either the MACLC or to the East Metropolitan Center), but also via the intermodal facility

to port terminals making JEIA quadramodal. The off-site intermodal facility will handle primarily bulk products and containerized cargo linked to a national network through connecting rail lines. The IRF could also serve as an additional inland port with appropriate truck cross-docking facilities and road links.

Key to the efficiency of the entire operating infrastructure is the MACLC's intermodal interfaces. These must be designed to allow seamless and flexible flow of materials among convergent transportation modes and commercial facilities, both in the core and peripheral areas of the MACLC.

The hub of the central cargo area and cargo transfer system is the central cargo facility (CCF) located along the west runway. The CCF provides off-ramp and off-site factories, warehouses, and distribution centers with automated sorting capability, customs clearance, and air freighter access. Since most MACLC and East Side Business Park tenants will not have the volume of cargo to justify direct air freighter docking, the central cargo facility offers them air access via the cargo transport system and/or direct truck cross-docking at the rear of the facility (See Exhibit 2.11 MACLC Cargo Facility).

As describe previously, the entire airport will be served by the ring road encircling it, providing efficient access to all parts of the MACLC and East Side Business Park and to local and regional highway systems, as well as to the intermodal rail facility. Internal roads will connect the central cargo area and East Side Business Park to the ring road. This will require careful planning now

to insure future internal road accessibility to all MACLC and East Side Business Park facilities and to the Ring Road.

The MACLC must be conceived as more than a multimodal logistical infrastructure, however. Its full potential and ultimate success rest on creating a total business environment that will substantially improve the sourcing, production and distribution activities of its tenants and region-wide users. This business environment will be elaborated in the next chapter. Sufficient to note here that along with its multimodal transportation and cargo-handling systems, MACLC design must support tenants and users with comprehensive advanced commerce capabilities. Electronic data interchange (EDI) and other telecommunications systems using the latest technologies, including broadband fiber optics, WiFi, WiWAN, multimedia networks, an on-site digitized satellite uplinks and downlinks, should offer JEIA tenants and users state-or-the-art electronic access to the global commercial world. EDI improves supply-chain management and a variety of other logistical practices as it tracks, coordinates, and controls materials and product flows across both domestic and international transportation modes. Open architecture, plug-in software systems (described later) will allow the MACLC's tenants and regional users real-time access to worldwide supplier, distributor, and customer databases.

It is the hope that international air cargo will be a significant component at JEIA in the future. Expedited customs procedures using automated manifest systems and express customs clearance will therefore be essential to facilitate

tenant and user import and export activities. Bonded warehouse facilities on the airport site or near the airport may also be needed.

JEIA can obtain competitive advantage by emphasizing security in its total supply chain management and logistics processes. By providing a secure shared infrastructure and operating environment to its tenants and users, substantial industrial recruitment returns may be obtained. Close coordination with TSA and security experts should therefore be emphasized in early stage design of the MACLC.

In focus group interviews conducted with potential industrial tenants for other air logistics hubs, targeted workforce skills was always mentioned as a key location factor. As was noted in Chapter 1, the Jackson area possesses a cost-effective, adaptable labor force. To ensure that future tenants have precisely the skills they need, a wide range of worker training, vocational education, and technology-transfer functions should be provided through an on-site or nearby education and training center (ETC), in association with local community colleges. A key feature of the ETC should be distance-learning capability, providing tenants and users with real-time audio, video, and tactile worker training customized to their skill needs, from virtually any location in the world. As will be discussed in the next chapter, the creation of an ETC will provide a timely opportunity for the JEIA to market and distinguish itself among other competing small to mid-sized airports in the South.

Central Cargo Area Design

The basic design element of the MACLC is the Central Cargo Area (CCA) which constitutes a zone of facilities at the operational center of the complex. The CCA includes the Central Cargo Facility (CCF), Perishables Center (PC) to support in-transit and regional agricultural shipments, and the Customs Clearance Center (CCC). Other primary components of the Central Cargo Area are the Airport Operation Area (AOA), manufacturing and distribution tenant facilities, a possible general aviation passenger terminal, nearby intermodal truck and rail terminals (linked to port facilities), special materials handling and freight forwarder and 3PL facilities, along with a Cargo Transport System (CTS) linking MACLC tenants with cargo processing facilities. Since the CCA is the primary and most important component of the MACLC, its development and design guidelines are elaborated below.

Guidelines for Central Cargo Area Design

Three key principles of agility should be followed in the design for the Central Cargo Area: 1) Flexibility; 2) Targeted Mechanization; and 3) Expandability/Phased Growth. Building agility into the processing capability and location of facilities is essential because of: 1) unpredictable longer-term cargo handling demands the MACLC; and 2) a dynamically changing and improving technological environment.

Flexibility

A critical design requirement of the CCA is that its development be demand-driven and responsive to changing needs and requirements of MACLC tenants and users. A flexible, incremental development approach is highly recommended, given the difficulties of forecasting the exact types and levels of cargo and industrial activity at and around the MACLC. Thus, for example, automation of material handling systems or full-scale development of intermodal connectors and interfaces may not be prudent early in the implementation of the MACLC. In the design of most processing systems, cost, flexibility of operation, and operational efficiencies demand appropriate compromises at different stages of infrastructure and technology development.

Three realities caution against initial automation of CCA materials handling and processing systems: 1) Jackson-Evers International Airport's Airport Operation Area (AOA) will likely have to accommodate all manner of aircraft and cargo equipment (i.e., standardization of aircraft gauge and related cargo handling equipment for serving an international air cargo market is currently not possible); 2) non-automated materials handling and accumulation (short-term storage) systems are often more cost-effective and flexible in terms of meeting peak requirements and other unanticipated immediate problems by simply providing more forklifts and manpower to meet unexpected or peak requirements; and 3) longer-term air cargo demand and other transportation

mode cargo demand are difficult to forecast in early stages for a newly evolving complex such as the MACLC.

Only as actual demands are experienced over time for such a multimodal logistics complex would it be possible to incrementally predict materials handling, equipment, infrastructure, and facility needs, and to gain verification of the estimated industry mix of cargo demands placed on the MACLC (e.g., parts and components, manufactured products, fresh cut flowers, seafood and other perishables, retail distribution products, etc.). For these reasons, it is recommended that the MACLC commence operations with relatively inexpensive, low-tech systems, to be upgraded over time as the demand and future tenant requirements become better known and the benefits to be acquired through automation become better understood, measured and demonstrated.

One means of attaining processing flexibility, and commonly employed in modern just-in-time (JIT) operations, is to create subsystems that have multiple processing equipment rather than one large processing system. Designing one large system often appears to offer economies of scale (i.e., less cost per unit produced as process equipment size increases). Such "all the eggs in one basket" type of operation, however, typically leads to inflexibility and an inability to shut down part of the total process capability for maintenance, equipment testing, equipment enhancing and even off-line employee training.

To save initial expenses and promote flexibility, mobile equipment is generally preferred to fixed position equipment (e.g., a mobile nose

loader/unloader as compared to a fixed-bridge nose loader/unloader). Ideally, all equipment should be readily reconfigurable and rearrangeable as operations layout requirements change over time. Fixed position equipment (e.g., automated conveyors attached to the floor or hung from the structural system) hinders the "fluid" design concept recommended for the MACLC.

Targeted Mechanization

Experiences of air cargo operations and associated materials handling needs at Jackson-Evers International Airport and airports elsewhere do permit initial determination of some targeted modest mechanization in MACLC operations essential to efficient cargo handling. Mechanization of standard processing operations such as container consolidation, container breakdown, and conveyors to accommodate x-ray equipment should be included in initial operations. Yet, such targeted mechanization should be provided only when and where it is clearly demand driven and economically justified.

As stressed above, because of the difficulty of predicting material handling demands and a desire to provide flexibility of arrangement which is consistent with 21st century business practices, the MACLC facility design should assume that initial material handling operations would be performed with low-tech material handling equipment (e.g., forklifts, motorized tugs, pallet jacks, etc.). This technology is not only far less costly but also "tried and true"

time-tested and reliable. At likely relatively low initial levels of manufacturing and supply-chain management demand at the MACLC, fully automated materials handling systems, though flashy, simply do not make economic sense.

When demands over time become better known and experienced, one-at-a-time evaluation of potential productivity benefits of automated equipment and facilities can be assessed and enhancements implemented to take advantage of operational improvements. For example, as available Central Cargo Facility (CCF) space fills up over time with increased activity, pallet racks should be provided to gain better use of the facility cube. Later when sufficient put-away and picking requirements develop, fork-lift use would be discontinued for automated put-away and picking of cargo from racks and replaced by computerized rail-guided picking and put away equipment.

Expandability/Phased Growth

I have been emphasizing that future demands placed on MACLC facilities and their resulting space needs are difficult to predict with any confidence. This is why it was proposed that facility development at the MACLC encompass flexible, evolutionary and phased growth. Facility requirements should be estimated as accurately as initially possible based on air cargo data currently available, but the MACLC must also be allowed to become what it needs to be as requirements reveal themselves over time. Thus, proposed design guidelines are

not so much a fixed plan as they are a flexible framework to accommodate a wide variety of tenant industries, regional users, and physical layouts.

The above framework allows for MACLC development to be modified as demand, resources, new technologies, and infrastructure advances occur. For example, the central cargo area including commercial facilities should employ a modular layout for maximum flexibility and phased development. Ground transportation designs should incorporate redundant routings and flexible road systems to minimize the impact of congestion or accidents, both within the MACLC and in connecting highway systems. Rights-of-way should be sized to allow future expansion without negatively affecting ongoing highway operations. Jackson-Evers International Airport's runways must always be equipped with state-of-the-art navigational aids to allow for growing air capacity demands and eliminate weather delays. Extensive zoning controls in flight paths should be implemented to minimize potentially conflicting land uses and noise problems that could preclude the optimal 7-day, 24-hour airport operation.

Public sector agencies responsible for JEIA and the greater Jackson region also must be prepared to respond rapidly and creatively to evolving tenant and user needs and an ever-changing business environment; hence, JEIA management itself must be agile as it creates or coordinates "one-stop shop" support for tenants and regional users from each logistical or industrial sector. In this sense, local public sector agencies such as the EDC's may not only wish to market the MACLC, but also operate as a strategic partner with tenants and area

industrial recruits in dealing with other government agencies and in seeking access to a full range of technical, financial, and political resources.

Consistent with ISO 14000 standards (international standards that enable companies to systematize and improve their environmental management efforts), maintaining environmental quality and safety are a fundamental objective of MACLC planning and development. The MACLC system must provide facilities and procedures for the handling, storage, transportation, and disposal of environmentally sensitive materials as a continuous process. Likewise, modern MACLC utility systems must offer high-quality and reliable power, water, natural gas, wastewater treatment, and solid-waste disposal to meet growing tenant needs.

Each potential tenant at the MACLC and East Side Business Park should be evaluated for its compatibility with environmental regulations and standards. A JEIA management/tenant partnership will address the requirements for operating within acceptable environmental parameters jointly. Innovative site planning and design should ensure visually attractive development with ample landscaping and aesthetic touches. Aging buildings at the airport should be restored or replaced, making the MACLC more aesthetically appealing. Ideally, the MACLC and East Side Business Park should appear more university campuses than traditional industrial/logistics parks.

Although cost savings remain important in today's industrial location decisions, the MACLC system should be designed and developed on the

assumption that tenants will pay more for its integrated, high-quality, reliable services and sound environmental planning. Because a delicate tradeoff exists between costs and on-site services, however, the MACLC's cost effectiveness will be achieved by the phasing of development to minimize initial investment and location costs for tenants. Development of the overall site infrastructure and facilities should be incremental, demand-driven, modularized, and reconfigurable. Further flexibility will be achieved by oversizing and reserving spacious rights-of-way for future infrastructure and facility expansion. The internal transportation corridors linking the transportation modes and production/logistics facilities also should be oversized to meet increasing traffic levels overtime and to accommodate future developments in vehicles and transport systems. The same corridors should have all the underground utility channels needed for powering and servicing production and distribution facilities. This includes designing corridors with rapid and flexible plug-in telecommunications capability for tenants, as needed.

I've recommended that the Central Cargo Area be designed for low-tech, cost-effective, flexible or expandable facilities with modular and reconfigurable attributes. Such design would allow facilities to grow over time to accommodate ultimate space needs. One way to reserve space initially is to provide excess separation between contiguous facilities, allowing them to grow closer together as increasing space requirements are met over time. Another way is to site selected easy-to-relocate facilities between other facilities with the intention of

moving them at a later date to permit the surrounding facilities to grow together in the space vacated by the relocated facility. All of this is key to agile infrastructure development that should guide the planning both the MACLC and East Side Business Park at JEIA.

Intermodal Interfaces

A major process element of the MACLC is the interconnection and integration of multiple modes of transport (air, truck, rail and river). Ideally, each mode must be able to seamlessly and efficiently connect to any other mode without significant loss of time or high cost. The primary operational MACLC connector (the "glue" that connects the various transportation modes) is a cargo transfer system. The transfer system will emanate from the Central Cargo Facility (CCF). The cargo transfer system may be composed of a combination of trucking modes operating on internal roads, or in later phases of development by dedicated automated cargo movement systems (for example, rail or tram) depending on the relative configuration of the elements of the MACLC and the level of activity.

Guidelines for On-Site Transportation Connectivity

The CCF would need to interface with the following modes of transportation: 1) air, via JEIA's taxiways; 2) truck, with adequate cross-docking

at the CCF and other CCA facilities, as required to meet trucking demand forecasts; 3) rail, by first providing good truck access to an off-site intermodal terminal, and eventually providing an interface between the CTS and a possible rail spur to the CCF; and 4) river, with truck and rail connections to appropriate riverport terminals. The CTS would also be the primary connector between the CCF and off-ramp MACLC production and distribution facilities. These intermodal interfaces are illustrated in Exhibit 2.12.

Because the predominant mode of transportation of products moving to and from JEIA locally and regionally would be via highways, truck terminal facilities and facility cross-docks at and near the MACLC along with Ring Road links to I-20 and I-55 would be critical design elements for successful operation of the MACLC.

Guidelines for MACLC Connectivity

A JEIA multimodal logistics system must be able to accommodate a broad variety of transportation origins and destinations to and from the MACLC. Flow paths of domestic and international air, water, truck and rail modes are represented in Exhibit 2.13 as they might occur between the MACLC and domestic or international origins and destinations at ultimate development. Flow paths of intra-MACLC cargo are shown within the boundaries of the MACLC in the Exhibit. Truck, rail and lair cargo terminal links are included as nodes of the

cargo transfer system. Truck and rail terminals, separate from the Central Cargo Facility, may locate near manufacturing or distribution tenants as the MACLC develops in later phases.

Regional truck transportation should be available between all major Jackson commercial nodes and the MACLC. Truck shipments consigned to MACLC tenants will most likely be delivered directly to those tenants. Deliveries to consignees located further from the MACLC will be delivered to the Central Cargo Facility, or to appropriate truck terminals for processing and subsequent delivery to the consignee.

Direct rail transportation lines between the MACLC and the Jackson river terminal will eventually be required if the MACLC is to achieve full quadramodality. Also to be considered is the eventual provision of spur rail lines to larger Jackson area industrial or distribution facilities that may have a high dependence on rail transportation.

Transportation to and from international origins and destinations both through a future MACLC-type network linking Jackson area businesses to the Americas, Asia, and Europe will be provided by air transport. Some of this will be trucked north and south via the NAFTA corridor, but hopefully more eventually will be air freighted directly from JEIA in future decades.

Guidelines for EDI Design

To support 21st century business practices of electronic commerce, just-in-time delivery, and supply chain management electronic data interchange (EDI) must be provided as a tool for MACLC operators, tenants, logistics service providers, and U.S. Customs. The MACLC EDI system will be a network of computers and databases that provide an interface between all parties involved in arranging a shipment. This EDI system must be capable of interfacing with multimodal carrier systems to provide on-line tracking and tracing capability for both the shipper and consignee. A key function of this system should be to interface with U.S. Customs. The MACLC EDI network should also have access to global telecommunications networks via satellite transmission. Similarly, the EDI system should be tied to a bar-coding or more advanced RFID systems for shipment identification within the system and in-transit. The general objectives of the MACLC EDI system, consistent with the communication vision of 21st century business practices are to:

- Build a cost-effective, resilient, and manageable EDI network, throughout the greater Jackson region.
- Allow all Jackson area businesses to connect to the MACLC via a network backbone at lowest charges possible.
- Ensure connectivity by providing enough fiber optics bandwidth and connection channels.

- Ensure capacity so that the Jackson regional business community and MACLC tenants can connect and not be denied access due to insufficient ports.

- Provide support for all protocols required by the users of the system.

- Allow tenants, users, and logistics service providers with a range of hosts (e.g., workstations with high-speed network access, mobile computing and data exchange via secure WiFi or WiWAN wireless networking) to connect to the MACLC's network.

- Allow MACLC tenants and the Jackson user community to access applications (e.g., database inquiries/updates) on a range of different information management systems operated by third-party entities.

Conceptually, the MACLC Communications System can be viewed in Exhibit 2.14. This Exhibit presents a vision of a possible future global communications system for the MACLC.

MACLC Planning Integration Strategy

As described in the previous sections, the MACLC at full build-out will represent a new kind of logistical center in which information technology, transportation and supply chain activities are operationally integrated to create a seamless business environment. Traditional planning activities do not capture the intersections and linkages that are necessary to create this new environment.

The proposed integrated planning process at and around JEIA must differ from traditional planning processes in three respects:

1. *Shift from Element Focus to Process Focus*. Traditional master planning exercises target individual elements of infrastructure in separate plans. For example, independently produced a master plan for rail, ports, highways, and the airport. Each of these master plans is based on traditional concepts of the role and function of these infrastructures. In a process-oriented plan, the exercise begins with an understanding of the integrated business processes and needs of the tenants and customers. In this new approach, for example, the design concept for an intermodal rail facility or airport should be guided by the desire to create value for the commercial user of the facility rather than to maximize the utilization of designed capacity. This will involve a close coordination and integration of all elements of infrastructure planning for the MACLC and Jackson region.

2. *Identify New Elements of the MACLC*. The MACLC will require new elements of infrastructure. In the 21st century, businesses will compete based on how efficiently and creatively they manage information to create competitive advantage. Even Fred Smith, Chairman of FedEx, has described his company as an IT firm that happens to fly airplanes. The provision of information technology therefore is not an afterthought, addressed once the size and function of a building or infrastructure have been designed, but

rather an organizing principle around which the identity and function of a building or infrastructure have been designed. In this process planning environment, information technology capabilities must complement and reinforce the development of multimodal transportation and industrial capabilities at the MACLC and throughout the Jackson region.

3. *Establish New Linkages Between Infrastructure Elements*. The creation of a 21st century business environment at JEIA requires new linkages among key infrastructure elements. Uninterrupted flow of products and materials through the MACLC require the integration of various modes of transportation. It is therefore necessary to plan the material handling and management systems that will integrate the movement of goods and materials from across these modes regionally and to and from the MACLC.

Designing for Future Tenant Business Needs

The ultimate success of the MACLC will depend on how well it meets the business needs of future tenants. The real customer for the planning process is not the Jackson Municipal Airport Authority, Rankin First or any government body, but firms that JMAA, Rankin First and other regional development organizations wish to recruit. Therefore, concepts and capabilities targeted to 21st century business practices described below should guide and inform the

planning process and the required functionality of the MACLC and and broader Jackson Aerotropolis. These businesses need the following:

- Paperless Environment. Companies are moving to a paperless environment in which orders for materials as well as finished goods are transmitted electronically from customers worldwide to their suppliers. Global manufacturers are increasingly requiring that their suppliers communicate electronically, and the availability of access to global communications and information networks will qualify future MACLC tenants, large and small, for new commercial opportunities.

- End-to-End Supply Chain Visibility. The ever growing imperative for speed and lower costs has caused companies to more closely manage their supply chains. The basis of competition has changed from head-to-head competition between companies to a competition that pits supply chain against supply chain. A weak link anywhere along the supply chain can have a devastating impact on a company's ability to perform. Increasingly companies are requiring end-to-end asset visibility along the entire chain requiring state-of-the-art tracing and tracking information technology.

- Just-in-Time Delivery. As companies manufacture in increasingly smaller lots and provide more customization of their products, the need for just-in-time delivery has grown. Not only must small batches of materials be shipped as economically as large batches, but they must be delivered within 24 to 48 hours anywhere in the nation and, indeed, across the globe. Traditionally, manufacturers seek suppliers that are located near the manufacturing site. The availability of an integrated information and transportation infrastructure provides the capability

for suppliers, manufacturers, and customers to work across great distances as if they were located nearby.

- Real-Time Asset Control. To assure flexible and fast response to changing customer needs, companies must not only to able to trace and track their assets quickly, but also to change their destination, routing or carrier mode as customer requirements change. Only the complete integration of information, transportation and manufacturing can provide this capability. Only a handful of companies are able to do this now, but this will be a required standard of doing business in the near future.

In sum, successful development of the MACLC intermodal and information technology systems will require a broad understanding of the basic business processes of tenants, users, and logistics service providers, their current information system capabilities, and future technology/business needs. These include better understanding of the emerging needs of information-rich industries such as 1) software packaging, financial services, transport-related services, 2) intermodal logistics and trading and transshipment, strategic and high-growth industries, 3) aerospace parts, micro-electronics, pharmaceuticals, and telecommunications, and 4) even hospitality industries, such as hotels, tourism, and recreation that will form the service backbone of airport-driven commercial development.

Attracting manufacturers, assemblers, and distribution industries will also require a thorough understanding of modern supply chain management

principles and the order-to-delivery process. To offer a truly marketable competitive advantage, the Jackson Municipal Airport Authority with the assistance of regional economic development councils, such as Rankin First, should bring together experts in logistics and supply chain management, multimodal infrastructure development, and information technology to work to create the design specifications that properly integrate all system elements. Few locations in the U.S. are doing this, so JEIA and its surrounding counties can have a first-mover advantage in attracting high value-adding industries if it takes the lead in seizing this opportunity.

Exhibit 2.1
AIRLINE SERVICE AT JACKSON-EVERS INTERNATIONAL AIRPORT

DELTA Delta/ASA/Comair	9	Atlanta
	2	Cincinnati
	1	Washington D.C.
SOUTHWEST A SYMBOL OF FREEDOM	4	Houston Hobby
	2	Chicago Midway
	2	Baltimore/Washington
	1	Orlando
nwa NORTHWEST AIRLINES	3	Memphis
	2	Detroit
American Eagle	9	Dallas/Ft. Worth
	1	Chicago O'Hare
Continental Airlines	6	Houston Intercont'l
	1	Newark Liberty Int'l
U·S AIRWAYS EXPRESS	3	Charlotte

Exhibit 2.2
JEIA PROPERTY WITH CURRENT FACILITIES

Exhibit 2.3
JEIA TENANTS

1 American Eagle Airlines
2 Atlantic Aviation
3 Avis Rent-A-Car
4 BD Aviation/JJSA
5 Budget Car Rental
6 Continental Express
7 Delta Air Cargo
8 Delta Airlines
9 DHL/Airborne Express
10 Entergy - Corporate Aviation
11 Enterprise Car Rental
12 FAA - Air Traffic Control Tower
13 FAA - Airports District Office
14 FAA - Airways Facilities System Support Center
15 FAA - Flight Standards District Office
16 GAT Aviation Services
17 Hertz Rent-A-Car
18 HMS Host, Inc.
19 Hudson News
20 Integrated Airline Services Inc.
21 International RAM Associates
22 Jackson Air Charter
23 Jackson Parking Associates
24 Mississippi Air National Guard
25 Mississippi DOT Aeronautics Division
26 National Car Rental
27 Northwest Airlines
28 Page & Jones
29 Southwest Airlines
30 Transportation Security Administration
31 Tri-Jet LLC
32 U.S. Airways Express
33 United Parcel Service
34 United States Customs
35 United States Postal Service
36 United States Weather Service
37 UPS Supply Chain Solutions (Menlo)
38 Zilco, Inc.

Exhibit 2.4
HIGHWAY LINKAGES IN THE GREATER JACKSON AREA

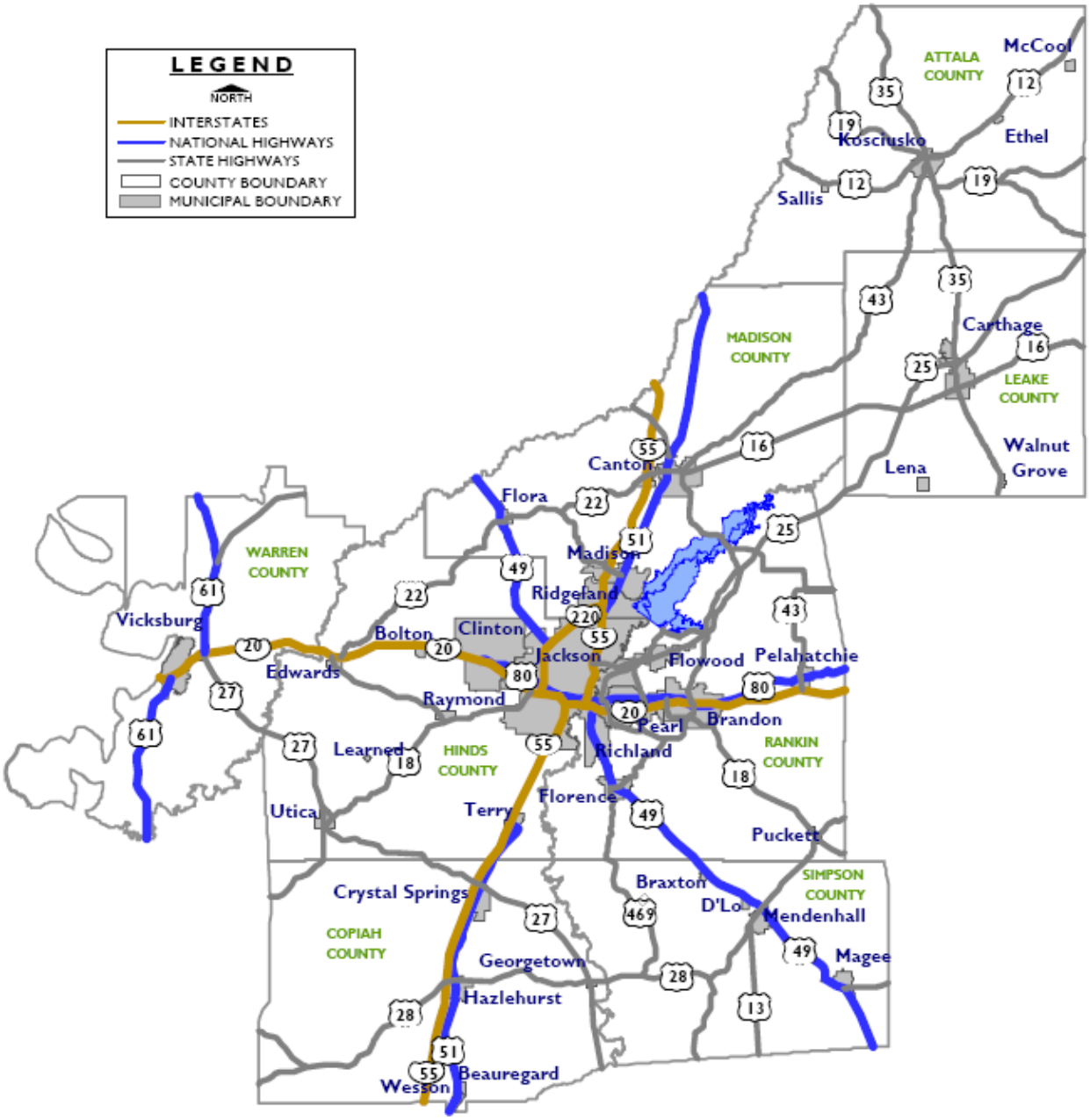


Exhibit 2.5
MISSISSIPPI AIR CARGO LOGISTICS CENTER (PHASE I)

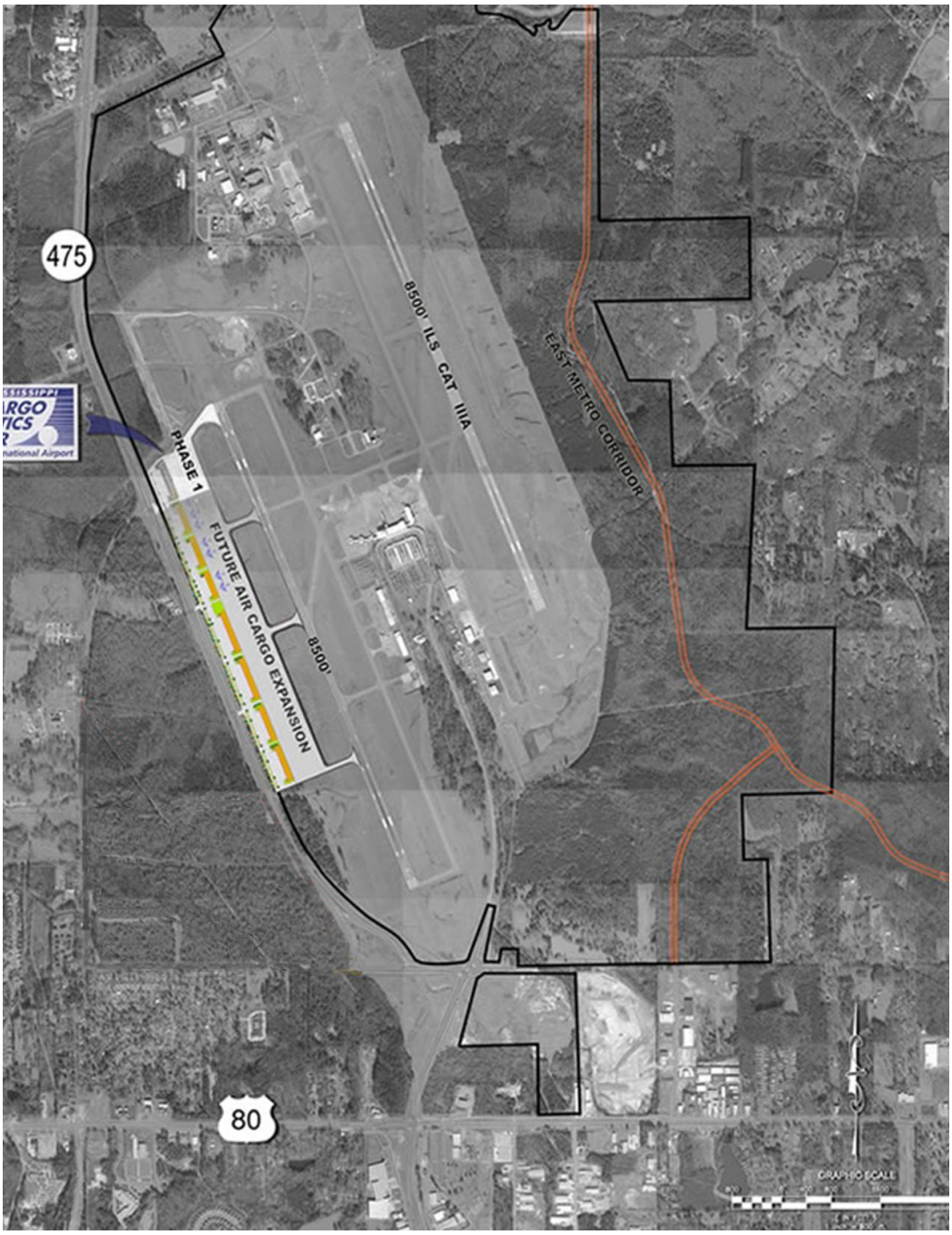


Exhibit 2.6
SCHEMATIC DESIGN STUDY OF AEROPLACE

Exhibit 2.7
PLANNED AIRPORT PARKWAY

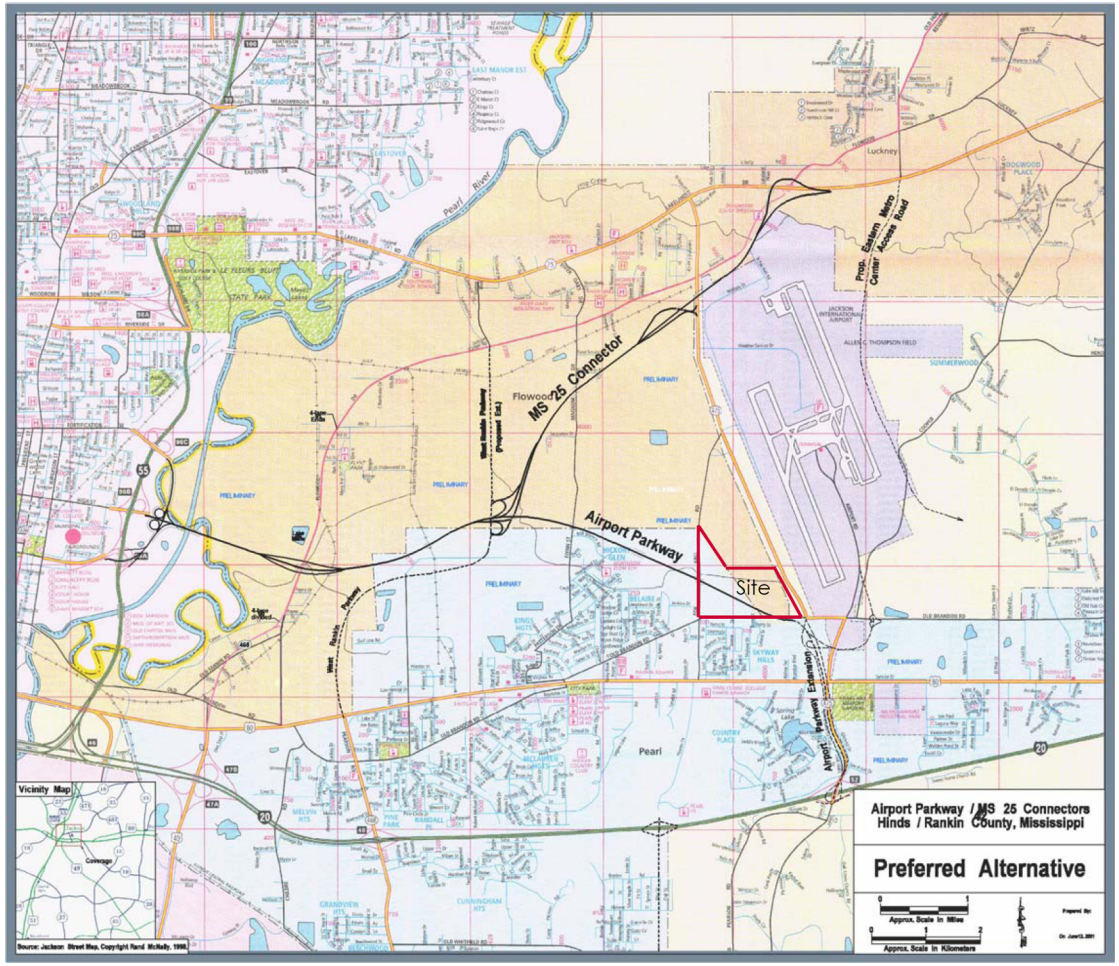


Exhibit 2.8
AEROTROPOLIS CLUSTER NEAR AND AROUND JEIA

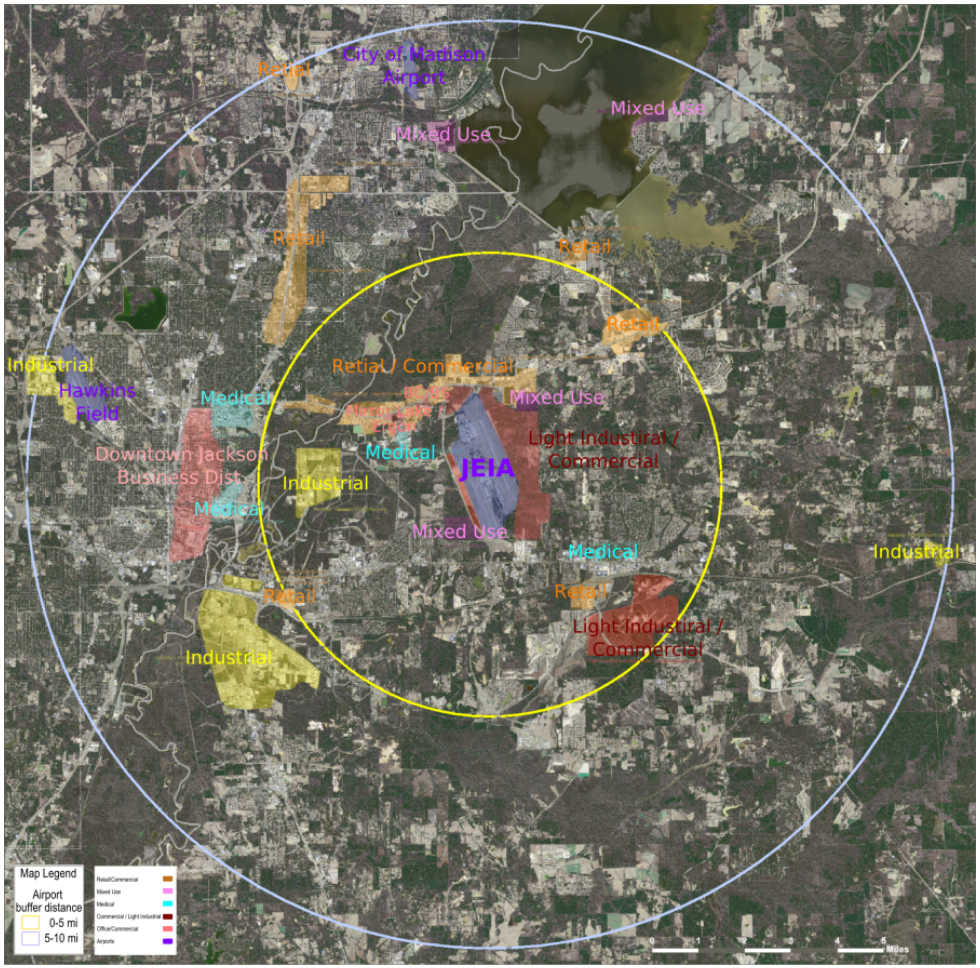


Exhibit 2.9
MACLC PHASE II

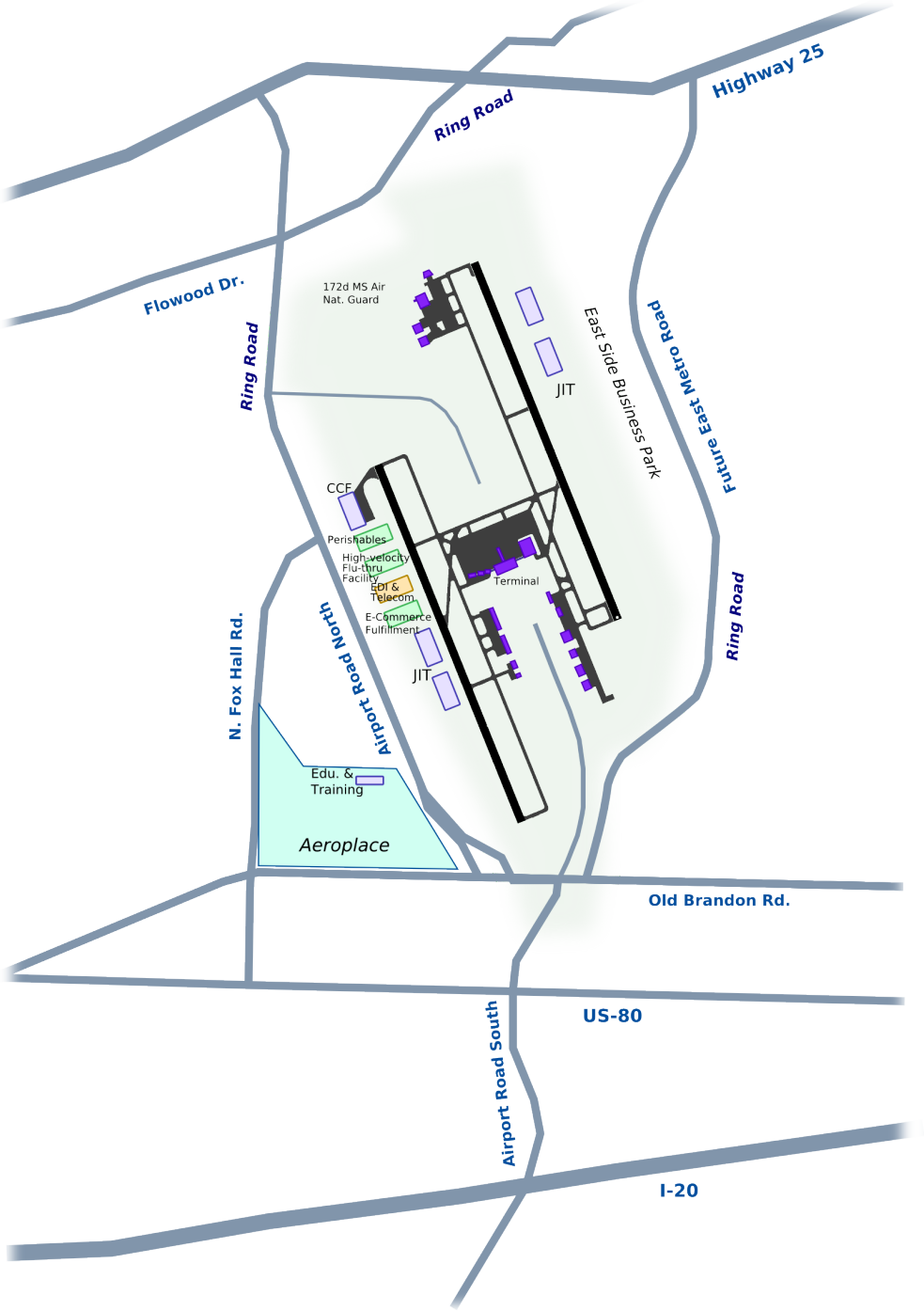


Exhibit 2.10
MACLC PHASE III

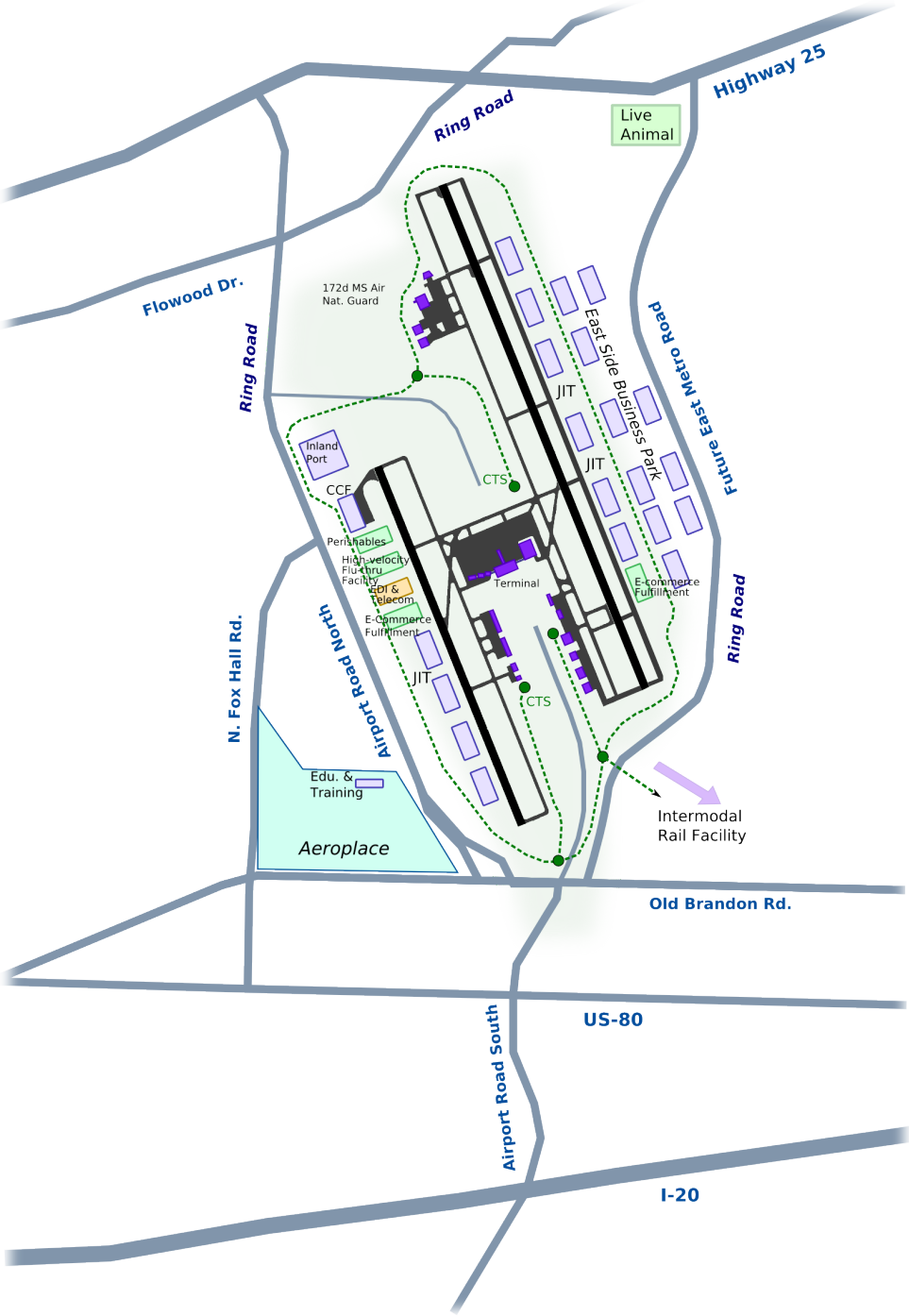


Exhibit 2.11
MACLC CENTRAL CARGO FACILITY

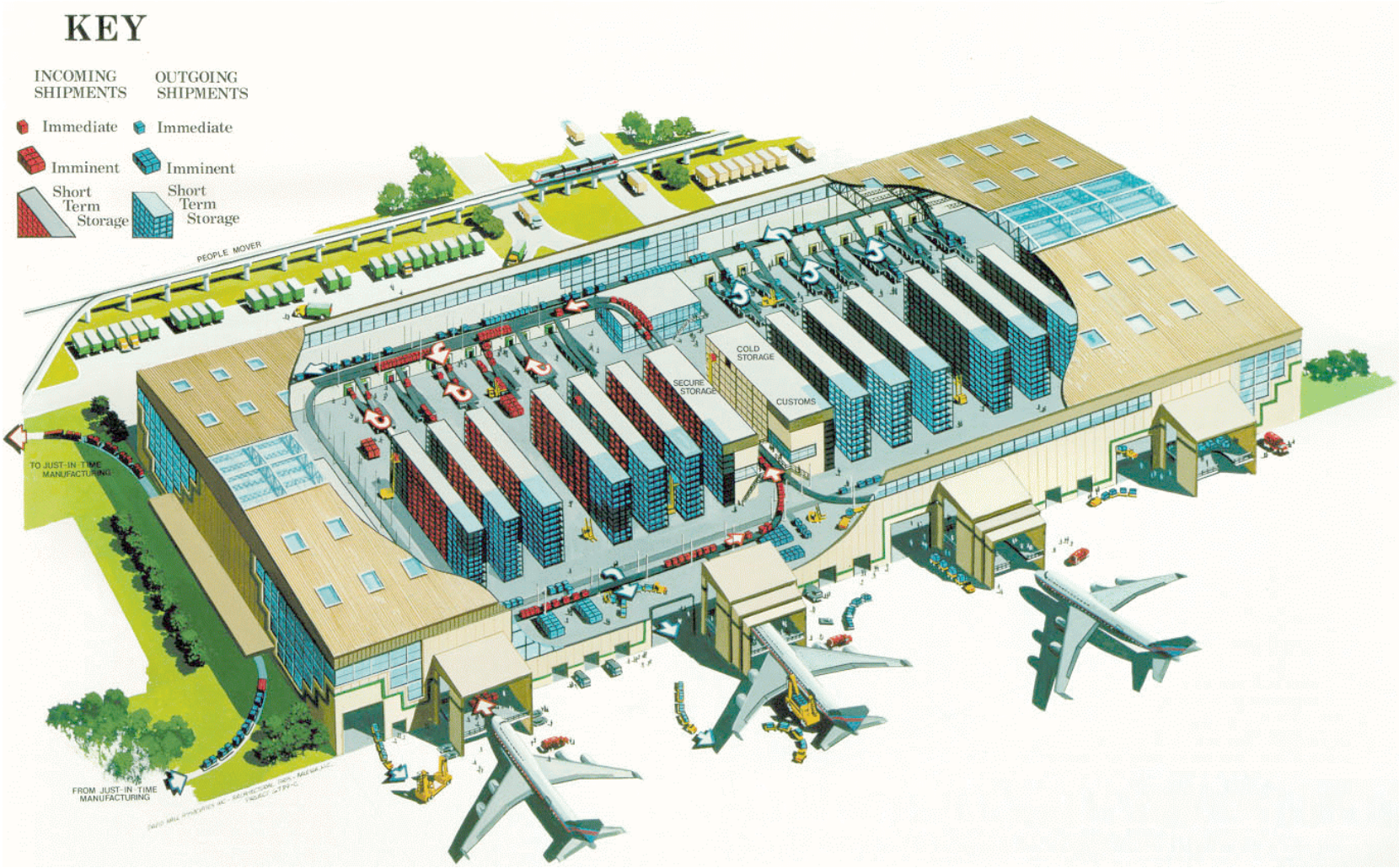


Exhibit 2.12
INTERMODAL INTERFACES AT THE MISSISSIPPI AIR CARGO LOGISTIC CENTER (MACLC)

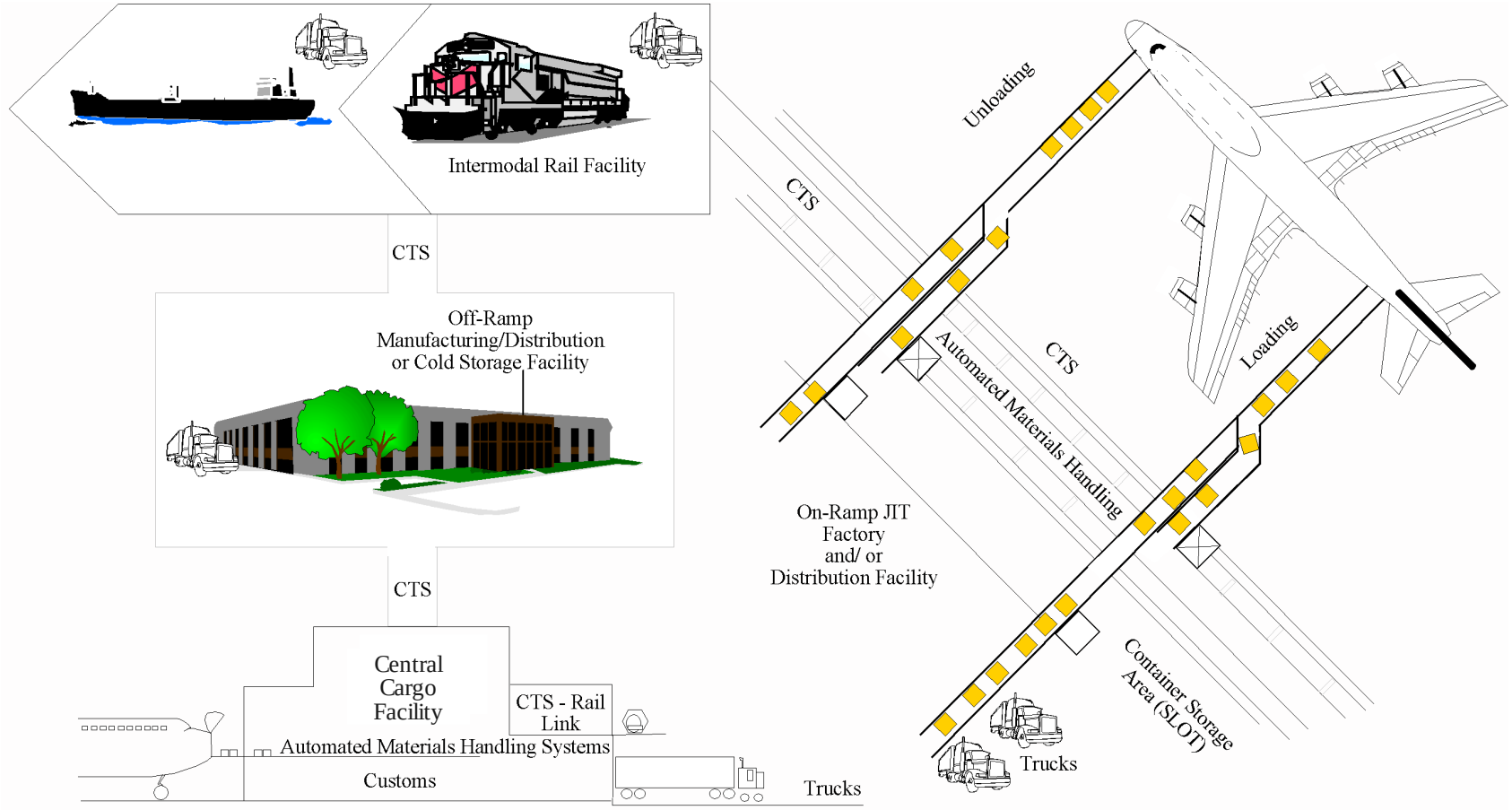


Exhibit 2.13
TRANSPORTATION LINKAGES BETWEEN
MACLC AND DOMESTIC AND INTERNATIONAL CARGO NETWORK

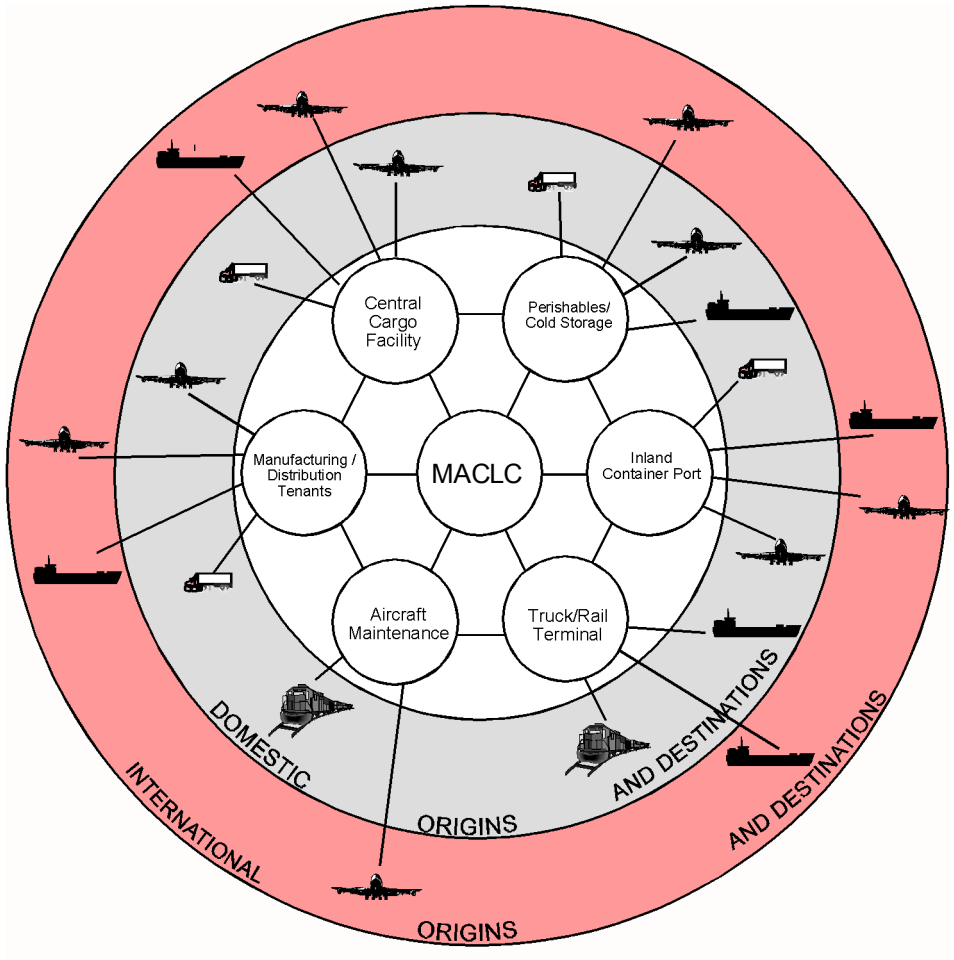
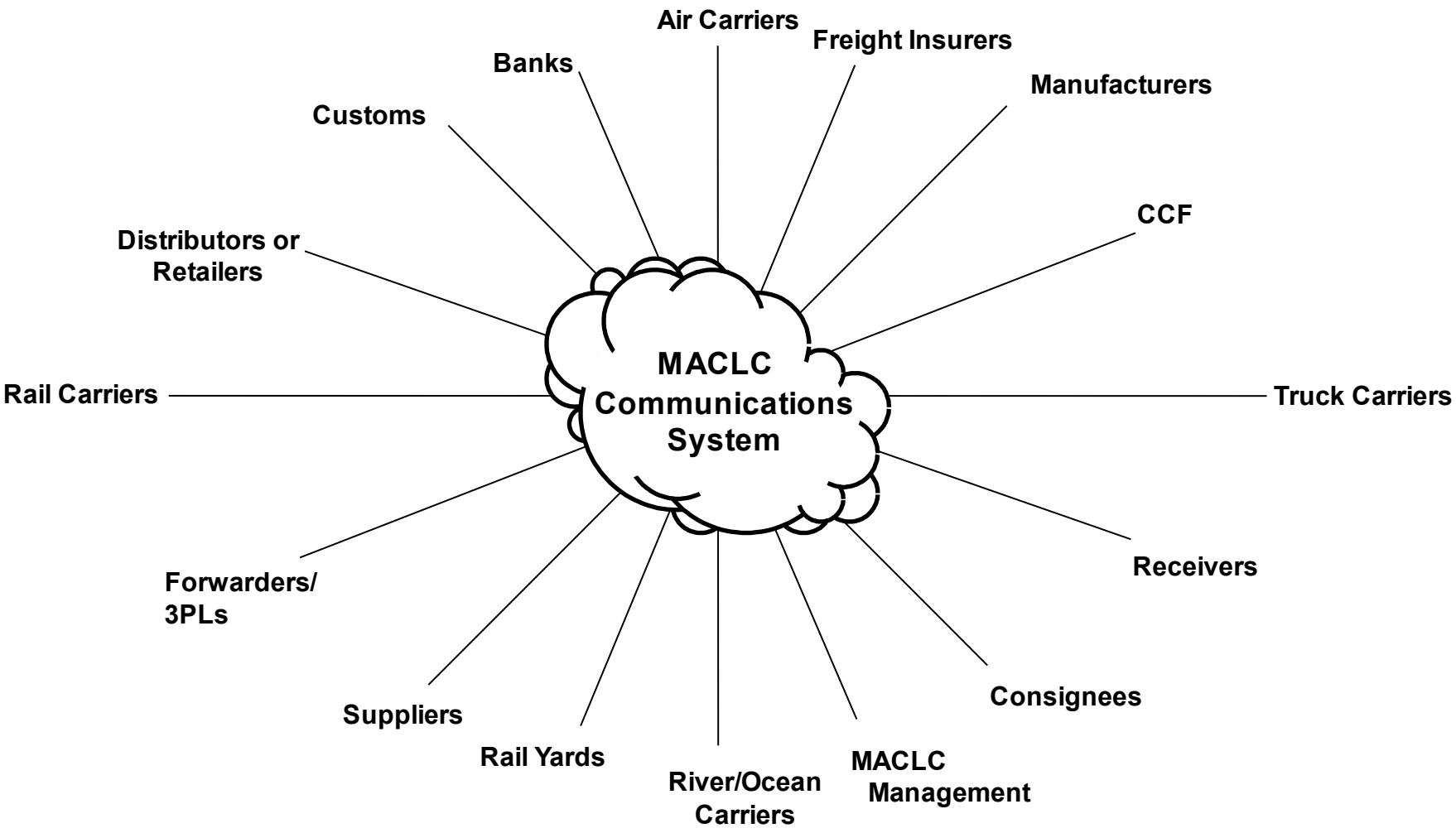


Exhibit 2.14
VIEW OF JACKSON-EVERS ALH COMMUNICATION SYSTEM AT FULL BUILDOUT



Chapter 3

Jackson Aerotropolis Business Plan Guidelines

I. Introduction

In Chapter 1, I described how connectivity, speed, and agility have become the 21st century mantra for commercial success. The Jackson region, through its multimodal infrastructure development can benefit immensely by leveraging these factors. By renewing and expanding its infrastructure and rationalizing its land use patterns so as to become more economically efficient, aesthetically pleasing, and socially and environmentally sustainable, new competitive advantages can be obtained.

From the standpoint of economic efficiency and the corresponding competitiveness, the ability of Jackson area companies to respond rapidly and flexibly to market opportunities will depend not only on internal management and operational changes but also on improving the external business environment that makes time-critical commercial practices effective. Emphasis herein will be on the business resources and infrastructure needed to improve fast-cycle logistics. Other competitive attributes of Mississippi Air Cargo Logistics Center (MACLC) and Jackson Aerotropolis success will be addressed as well. Exhibit 3.1 identifies the key resource needs for a successful time-critical business environment in the broader Jackson Aerotropolis region.

II. Business Resource Needs

First, commercial success in an aerotropolis depends on multi-modal transportation systems for fast and flexible supply chain management. Seamlessly connected multi-modal transportation systems have become pivotal to efficient business logistics. Raw materials, perishables, manufacturing components, and finished products must flow among geographically dispersed firms in a continuous and synchronized fashion. Air cargo facilities that are integrated closely with excellent highways and railways are needed to support the development of logistics providers, industrial facilities, distribution centers, and to more efficiently link them to their sourcing, production and customer networks. For example, the ability of agribusiness firms, restaurants, and supermarkets to get fresh fish, fresh produce, and meat products to and from distant markets quickly and reliably requires cross-docking facilities that often link regional surface transport with aircraft serving national and international markets. Similarly, microelectronics manufacturers require truck cross-docking facilities that bring parts, components, and semifinished goods efficiently to production sites, and facilitate the rapid shipment of assembled products to customers, nationally and globally.

Second, the Jackson Aerotropolis and its regional logistics system require an integrated telecommunications network (as specified in the previous chapter) to obtain information on markets and orders, trace, track and manage materials

and inventory, and control movements of goods to customers. Such a network is also essential to assisting, supporting, and attracting additional sophisticated third-party logistics (3PL) companies and 4PLs (advanced logistics integrators) to the Jackson region that can provide state-of-the-art logistics services to Jackson Aerotropolis businesses. The Jackson Aerotropolis telecommunications system should feature information technologies served by fiber optics loops, RFID, WiFi, WiWAN, and GPS satellite linkages that connect companies in the airport area and throughout the region to their suppliers and customers and to their own branches, offices, and partners around the country and the world. A teleport supporting advanced information and telecommunications systems can serve customer premises equipment, including rapid worldwide communication, electronic data interchange (EDI), B2B exchanges, and advanced video conferencing equipment through broadcasting and communications satellite networks. Operations research is showing that telecommunications infrastructure external to a firm now heavily influences the effectiveness and efficiency of internal firm processes.

As logistics activities continue to evolve at and near JEIA, this telecommunications system must also support express customs clearance and efficient trade data processing. As discussed in Chapter 2, automated, paperless customs clearance is a key attribute of the air logistics hub concept and will be as important to the success of JEIA's MACLC. JEIA can be positioned to serve as a future laboratory for new expedited customs clearance procedures and electronic

data interchange to achieve high-speed, barrier-free international flows of parts and components, and manufactured goods. In the future, to speed customs clearance, the Aerotropolis should build upon JEIA's automated customs environment to accelerate inspections. Through joint determination with U.S. Customs and Border Protection (US CBP) of appropriate technology, procedures, and staffing levels, JEIA can take the lead in creating the nation's most efficient and effective express customs clearance, 24 hours a day, 7 days a week for all air cargo shipments. The sales proposition of the Jackson Aerotropolis will be speed and agility in moving high value-to-weight components and products to and from the region, replicating Memphis' advantage in fast-cycle logistics which has been a huge business draw, especially to DeSoto County across the Mississippi border.

Third, the new business environment requires modern commercial services support. Globally-linked manufacturers, assemblers, and distributors must have access to foreign trade zones operators (which already exist throughout Jackson and at JEIA) and in-transit bonded warehouses at and near the airport, financial institutions, marketing, sales and employment agencies, and legal services. As noted above, expedited customs procedures are required to streamline and accelerate the import of materials, parts and components and the export of finished goods. One-stop government service centers (combining federal, state, and local agency requirements) are also necessary to expeditiously

provide foreign investors with all required licenses, permits, and investment promotion privileges.

In addition, investors' ability to attract professional managers and highly-skilled younger workers requires a full array of community amenities including modern housing, quality public schools, good shopping and restaurants, nightlife, recreational, and cultural facilities. Much of this is available in Rankin County and the Greater Jackson area, but the absence of liquor by the drink in Rankin County is a powerful deterrent to attracting business and young professionals.

Housing is also affordable. Yet the city of Jackson continues to grapple with racial divisions and public school quality issues that have pushed many residents out of the city into surrounding counties such as Rankin. Addressing these issues is essential to attracting and holding the new "creative class" professionals critical to attracting newer high-tech sectors to the airport region.

Fourth, and clearly related to the above, many high-tech and other new economy industries need access to knowledge resources that can generate or stimulate innovation and provide a reliable source of trained workers and managers. Among the most important knowledge-based organizations on which innovative businesses depend are top-notch colleges and universities providing well-educated professionals and research capacities, and consultancy organizations that help commercialize technology, develop new products, and service local, national, and foreign firms more effectively.

Such knowledge resources have proven to be a strong asset in meeting these objectives as well as fermenting technology clusters geared toward the development of growing export industries, such as medical devices. Exhibit 3.2 shows the educative institutions in the immediate Jackson region.

Likewise, a JEIA distance education and training facility drawing on the Aerotropolis' telecommunications network could provide real-time audio, video and tactile worker training on-site (or distributed education and training to facilities throughout the greater Jackson region) from training centers in distant headquarter firm locations around the world. This distance education and training facility should tie into the entire community college network in the region.

These features benefit logistics activities and all air cargo-dependent industries. Speed, connectivity, and agility are also important to passenger travel. Maintaining adequate terminal facilities and improving ground access between the airport, Jackson area office concentrations, and tourism attractions is important in growing the air passenger-driven aspects of the Jackson Aerotropolis. The planned Airport Parkway should provide a major boost. Liquor by the drink would be another economic incentive.

III. Functional Requirements to Leverage and Build upon the MACLC

The continuing pace of globalization represents a unique opportunity for the Jackson Aerotropolis to attract new investment to the region while boosting the competitiveness of existing firms. Full leveraging of the aerotropolis requires incorporating six broad functional capabilities targeted to these outcomes. For each functional (business) requirement, examples of key infrastructure elements are noted. Refer back to Chapter 2 for more detailed discussion and design/location of these elements.

1. Multi-modal Transportation System with Access to Local, National and Global Transportation Networks

On-site terminals and inland ports with efficient intermodal capability must link to Jackson's interstate highways, rail systems, and Vicksburg river port, in addition to the airport. To achieve its full potential, the Jackson Aerotropolis must provide a seamless interface between transportation modes and between local firms and air cargo and (via truck and rail) to river shipping routes so that goods and materials can flow uninterrupted through, to, and from the region quickly, at low cost, and with a minimum of human handling. Efficiently bringing together all the various modes of transportation is important to maintaining a competitive logistics infrastructure in the Jackson region and to attracting substantial additional commercial investment.

Examples of logistics infrastructure needs include:

- New and improved highways (such as Airport Parkway) and the new intermodal rail facility (perhaps at the 43/20 or East Metropolitan Center certified sites) with truck cross-dock facilities connecting efficiently to interstate highways

- Intermodal integrators for seamless connections and efficient movements among air, road, rail, and waterborne modes

- Open source software architecture to harmonize electronic tracking from mode to mode for total asset visibility and real-time product control.

2. *On-site Central Cargo Processing Capability*

Already in progress, it is recommended that the MACLC continue planning for supplementary air cargo facilities (such as the Central Cargo Facility described previously) to further boost future cargo capacity. In this and the following sections, I further specify the guidelines for planning future air cargo infrastructure and facilities at JEIA that will contribute to the unique business environment attracting firms. Whereas this infrastructure and associated support facilities may not be immediately needed, it is recommended that land, such as that already being planned surrounding the airport, continue to be reserved for such infrastructure and facilities and preliminary planning commenced.

The pivotal component of the supplemental cargo infrastructure is the proposed consolidated Central Cargo Facility that will serve a variety of airlines and that can accommodate the needs of a variety of aircraft and materials

handling activities. Flexibility in both the processing capability and location of material handling activities is essential because of nonstandard aircraft and ground cargo-related equipment, and because of a dynamically changing cargo processing environment. Targeted mechanization at the MACLC for cargo operating processes can be provided when it is productivity-driven and demand-justified.

Examples of future facility needs include:

- JEIA's new Central Cargo Facility with advanced material-handling systems (MHS)
- High-velocity flow-through facilities at MACLC with airside cargo access and truck cross-docking
- Automated express customs clearance procedures and facilities
- In-bound breakdown and delivery staging areas
- Cargo inspection, security, and holding areas
- Additional facilities for value-added service provision, such as temperature-controlled storage.

3. *On-site Cargo Transport System*

A third need is a cargo transport system that connects JEIA with all transportation modes and terminals (air, road, rail and river), with each mode to the other, and with the regional manufacturing and distribution facilities, as well

as logistics support facilities. These systems can be fully automated, semi-automated or manual depending on eventual traffic flow profiles (cargo demand) and the specifics of the site.

Examples of such infrastructure elements include:

- Both low-tech and advanced materials handling capability
- Internal road and cargo tram network
- Automated storage/retrieval systems
- RFID tagging and tracking technologies and sortation systems.

4. Shared Communications System with Transparent User Interface

Computer-to-computer information transfer between companies (Electronic Data Interchange and B2B e-commerce) have largely replaced paper and fax transmissions and even most traditional face to face supply chain transactions. This electronic interchange of information and data requires message standards, translation software and transmission capability. Recent technology developments have created new opportunities to enhance inter-company and inter-industry communications with more powerful work stations, improved data transportation mediums, WiFi, global communications networks and faster routers for electronic data transmissions. These capabilities (many of which are already in place) and new technologies will greatly facilitate seamless relationships among JEIA air logistics users/tenants and their suppliers and

customers, regionally, nationally and worldwide. The net effect will be to accelerate materials handling and product transfers among commercial facilities, aircraft, trucks, rail cars, as well as to port facilities. A key planning challenge, as described in some detail in Chapter 2, is to design a communications system that is flexible enough to support the majority of JEIA and Jackson Aerotropolis users, that offers rapid connection to regional, national and global networks, that maximizes functionality, and that allows for continuous improvement and innovation.

Examples of key electronic commerce elements include:

- Electronic data interchange (EDI) interoperability across transportation modes
- WiFi, fiber optic and satellite networks
- Wide-area broadband
- Web-based open architectures and message standards.

5. *Access to On-site and Remote Services for Commercial Support, Vocational Education and Worker Training*

In the new speed-driven economy, businesses are demanding access to a variety of support services that reduce the time and cost of logistical transactions. Desirable commercial support services noted earlier include a variety of legal, financial, and government services such as the securing of permits, customs clearances, and export licenses. Some of these services can be provided

electronically. Co-location of these services at or near JEIA or at a another strategic point in the Jackson Aerotropolis can provide a "one-stop-shop" support for recruited companies (both foreign and domestic) as well as tenants at the MACLC and future East Business Park.

Similarly, electronic access to education and training facilities throughout the country and the world can provide substantial value to Jackson Aerotropolis businesses. The proposed distance education facility on or near JEIA would provide agile support for the custom training of local labor by offering Jackson-area companies real-time audio, video, and tactile access to knowledge and training resources from around the world. For example, if another automobile manufacturer wanted to locate a production facility in the Jackson region or a bio-science firm wanted to establish a logistics facility near JEIA, worker training could be conducted on site, via simultaneous audio, video, and tactile instruction from its production headquarters in any established business center globally.

Examples of such key infrastructure elements:

- Interactive two-way video capability
- Wide area broadband information exchange
- On-line interactive and/or automated support of negotiations and contracting
- Education and training center with state-of-the-art distance-learning capabilities.

6. *Arterial Movements Unencumbered by Congestion*

I have repeatedly stressed that the battle for air cargo is won on the ground. Logistics success of JEIA and its broader aerotropolis requires speed and agility of movement on local highway systems. Through the efforts of the Jackson-area MPO's, planning is occurring to minimize choke points. Streamlining of traffic flow along local feeder routes is also needed to insure that people and product movements remain fast, flexible, and as environmentally-friendly as possible throughout the greater Jackson region.

Examples of key infrastructure elements include:

- The new Airport Parkway, the new East Metro Corridor, and improvement to I-20, I-55, and I-220 Freeways, along with new interchanges and the widening of local roads to reduce congested points in the JEIA area
- Intelligent highway system technologies
- Truck-only lanes on certain expressways
- Cluster as opposed to strip commercial development
- Seamless movement between logistics facilities and limited access highways
- Easy access to tourism and business locations from the JEIA

IV. Critical Success Factors for the Jackson Aerotropolis

Effective leveraging of JEIA, the MACLC and other regional logistics assets requires not only vision but also coordinated cross-jurisdictional actions. Guiding the development of a business plan for the Jackson Aerotropolis region should be a set of overarching themes that, if followed, will greatly facilitate their commercial success. Realizing these critical success factors will provide the region with a major competitive edge in attracting business and industry over many other sites in the Southern U.S.

Critical Factor #1
The Jackson Aerotropolis Must Be Designed Around Emerging 21st Century Business Practices

Beginning with our frequently repeated fundamental point, planning of the Jackson Aerotropolis must reflect the business practices and processes of 21st century global companies. I noted that dramatic changes are occurring in how companies transact their business, and especially in how today's most successful mega-retailers, manufacturers and logistics providers move goods and materials around the country and the world. Infrastructures can no longer be designed and built as isolated civil engineering investments or that reflect more traditional business practices. New business practices require new infrastructures. These must be geared to modern supply-chain management that fuse multi-modal transportation, advanced telecommunications, sophisticated materials handling

systems, and state-of-the-art business support services to offer businesses throughout the Jackson region with unmatched speed and agility.

Critical Factor #2
Development Plans for the Jackson Aerotropolis Must Give High Priority to Quality of Life Considerations, Economic Efficiency, and Sustainability

The Jackson Aerotropolis should be developed as a broad multi-functional area that will support not only manufacturing and distribution activities, but also tourism and the professional, scientific and white-collar service functions associated with such new economy industries of growing importance to the Jackson region. This again raises the importance of liquor by the drink considerations with respect to quality of life for young professionals. Coordinated cross-jurisdictional planning is necessary to ensure development around JEIA and outward along its transportation corridors—whether those used for logistics, local ground access, or for tourists heading to Vicksburg and other historic sites—is economically efficient, aesthetically pleasing, and socially and environmentally sustainable. Without such coordinated planning (and actions), development around the airport and throughout much of the greater Jackson region will likely be spontaneous, haphazard, unsightly, economically inefficient, and ultimately unsustainable.

Critical Factor #3
Master Plans for the Jackson Aerotropolis Must Be Flexible and Reconfigurable.

I stressed in Chapter 2 that planning for a Jackson Aerotropolis should not be viewed solely as detailed site and civil engineering plans to guide construction and development. Rather, the master plans for both the airport area and greater Aerotropolis should be developed as a flexible framework that can accommodate a wide variety of commercial facilities, tenants, and physical layouts. Master planning must look to the long-term, with a design that can adapt to new business needs and incorporate new technologies and infrastructure advances. A basic planning principle is that the Jackson Aerotropolis itself be designed as a flexible system that can respond to current and future business requirements. While the features of the competitive landscape for the near term are clearly in focus, competitive strategies will undoubtedly change over time and the Jackson Aerotropolis must be able to respond in a reasonable amount of time to new business needs and infrastructure requirements. A 15- to 30-year development planning horizon on which to build milestones is not unreasonable for this purpose.

Critical Factor #4
The Jackson Aerotropolis Must Establish Synchrony with other Infrastructure Projects Around the Country and the World.

We are moving into an era in which networks of firms compete rather than individual companies. In this extended enterprise environment, all Jackson

area companies must be able to access their suppliers, partners and customers quickly and effectively. From a logistics standpoint, this requires synchrony with air cargo networks around the country and the world and with harmonized communications (trace and track) systems. By aligning and integrating more closely into their network, Jackson area businesses will be able to participate more quickly and efficiently in the rapidly growing global economy. Whereas it will be logical for many of these firms to truck up to FedEx in Memphis, the consolidated central cargo facility may be used by other air cargo firms and logistics providers to compete with the FedEx hub as an air cargo gateway.

Critical Factor #5
The Jackson Aerotropolis Must Emphasize the Importance of Logistics-Based Capabilities in Assisting, Supporting, and Attracting Globally-Oriented Businesses.

As companies search around the world for quality parts and components at competitive prices, and as customers demand quick response and fast delivery, access to multi-modal air logistics hubs will be a major criterion for industrial location. Companies will certainly continue to require traditional economic incentives, such as local investment offsets for land or facilities, tax-based concessions and workforce training (to be addressed in the next section). However, as the competitive priorities of speed and efficient consumer response predominate, the relative importance of these traditional factors may weaken. Increasingly, investment decisions will likely be made as much on the basis of

the logistical capabilities of the site and access to national and global networks, as on government incentives.

Critical Factor #6
Improve the Social Climate in the Jackson Region.

Perhaps the most basic success factor for further economic development in Jackson is an improved social climate. As noted above, some businesses may shy away from an airport area location because of liquor by the drink restrictions, resulting in the movement of employment to other parts of the region or by-passing the region altogether. Crime in some areas of the region is already recognized as a problem that has business impacts. Rationalized land use patterns and aesthetic upgrading throughout the area near JEIA but will also have immediate effects.

V. Expanding the Business Impact of Air Passenger Service

Jackson is reasonably served by major airlines, providing good non-stop or one-stop connectivity to all major markets throughout the United States. It is absolutely essential for Jackson' business competitiveness and future prosperity that its air service be maintained and expanded. Indeed, to the extent feasible, JEIA should boost its connectivity to hub airports with additional frequencies to these hubs, despite current aviation market forces making this extremely difficult.

Jackson does not have international service, but this should not be ruled out in the future. In fact, international passenger and cargo connectivity should be pursued vigorously since the economic payoff to the Jackson region could be immense. Here the China air cargo carrier initiative of JMAA is very important.

Apropos the above, many studies have been conducted of the annual economic impact of non-stop international service on a metropolitan region's economy. Depending upon which impacts are included in the study (direct, indirect, induced, and catalytic), the amounts vary but they are all huge. Direct effects measure the impact of persons employed directly by the airport or on airport property. Indirect effects are those of off-airport employees and expenditures linked to air service such as food and lodging, taxis and limos, and travel agencies. Induced effects are additional employment and business revenues generated by the expenditures of those directly and indirectly employed as a result of the air service. Catalytic effects are the employment and business revenues generated by firms which locate in the greater airport area (i.e., the Aerotropolis) because of the accessibility the airport provides to the firm's suppliers and customers.

In 2005, consulting firm SH&E conducted a study of the direct and indirect effects of a single daily flight from Denver International Airport to three international sites: Mexico, Europe, and Asia. The flight to Mexico would generate $25.7 million annually to the Denver region, the flight to Europe would generate $90.6 million annually, and the flight to Asia $142.4 million annually for

Denver businesses. The differences were due largely to the size of the aircraft serving Mexico, Europe, and Asia and the fact that a large percentage of those traveling to Mexico would actually be Denver area residents, rather than visitors from abroad, making business or leisure trips, and thus would not have the same impact on Denver food, lodging, etc.

When all induced and catalytic effects of international flights are included (as they should be), the regional economic impact of international flights jumps considerably. A 2007 study by consulting firm LAED of the impact of LAX overseas flights on Southern California's economy revealed that each Asian and European flight in 2006 created, on average, 3,126 jobs in the region, $156 million in annual wages, and $623 million in annual revenues to the region's businesses.

Studies of other hub airports show that European flights generate between $90 million and $190 million annually in regional business revenues and Asian flights between $150 million and $290 million annually in regional business revenues. Virtually all of these studies exclude the catalytic effects which cornerstone the aerotropolis model. Were these catalytic effects to be included, the total regional economic impact would be much greater.

Interestingly, the 2007 LAX study (which did include catalytic effects) pointed out that major hubs like LAX may lose out on non-stop international Asian flights as future long-range, mid-size aircraft such as the B787 and A350 go point-to-point to mid-size U.S. airports, by-passing the contested major hubs. Jackson may have a special future opportunity to capitalize on these new mid-

size, long-range aircraft to acquire non-stop European, and in particular, Asian flights not commercially viable with jumbo jets. To repeat, plans and actions to recruit this international service to JEIA should not stop.

VI. Marketing Strategy for the Jackson Aerotropolis

Let me now offer some guidelines for a marketing strategy to attract additional commercial investors and service providers to the Jackson Aerotropolis. I assume that for at least the near future, organizations such as Rankin First and other local economic development councils will continue to have the lead role and responsibility for promoting their cities, counties, and the Jackson region and for identifying and attracting new businesses or otherwise bolstering the local economy. In the next chapter, I will make recommendations regarding potential future organization and management of some specific aerotropolis functions.

Here, I will raise the prospect that within the next ten years or so, JMAA should consider (i) partnering with a private sector firm to operate the multi-modal logistics infrastructure and facilities, and (ii) partnering with major commercial real estate developers to attract further firms to JEIA and nearby properties, especially to the East Business Park and west of the airport. This may well require new enacting legislation, an innovative financial partnership with private sector investors, or even a separate organization such as a potential

Jackson Aerotropolis Development Corporation, again in partnership with JMAA. Among the core functions of the partnership would be addressing aesthetics in the airport area, promoting new forms of commercial development, creating a marketing program for the airport area. This should be complete with public relations, advertising and publicity brochures and materials, and facilitating the identification, contact and "sales" effort with potential new businesses. If a JEIA East Business Park master developer is feasible and selected, it would be expected to have its own approach and techniques to marketing and developing key components of this area.

In view of these assumptions, in the present section I first concentrate on the immediate marketing strategy tasks that fall to JMAA and Rankin First for the period prior to the possible future involvement of a private-sector master planner and developer. It is understood that the JMAA and JEIA management will likely retain responsibility indefinitely for all airport property projects. Recognizing this possibility, I also address longer-term marketing goals and issues for the air logistics center that would be relevant either to a private-sector developer/master planner or to JEIA management assuming the latter will continue to be the entity to promote and to develop airport property for the foreseeable future.

1. PHASED MARKETING THEMES

The ultimate objective of the Jackson Aerotropolis is to serve as a major multi-modal air logistics center and airport-driven commercial complex offering tenants and users state-of-the-art logistics, knowledge resources, and commercial support. The goal is to transform the MACLC which now serves as a primarily regional logistics center into a full-fledged national logistics center with a complete complement of manufacturing facilities leveraging the logistics capabilities and a national marketplace for high-value, low-weight goods.

Based on experience with the few other regional and national multi-modal logistics complexes elsewhere and on historical trajectories of urban development, achievement of this goal will mean the MACLC will evolve through a series of phases. In each phase, the marketing effort should be designed to add to the existing nucleus of facility users, which in turn serves as a catalyst to pull additional complementary companies to the complex and the airport environs. The kinds of tenants likely to be attracted to JEIA and its surrounding area will vary with each phase of the complex's development. Marketing activities should be planned to match these anticipated development stages and tailored to the kinds of businesses and users that are most suitable to each stage, and not outrun actual or realistic development headlights.

a. Near Term

The near term represents a period from the present through the next 1 to 5 years. Strong efforts must continue to insure that all road and utility improvements and other infrastructure improvements, especially airport inter-modal interchanges, such as those proposed by DMJM-Harris, are completed to allow JEIA to expand as needed and smooth passenger flows. Rankin County should proceed with land use rationalization in the airport vicinity, creating additional commercial space near the airport.

It is important to reiterate that, during the near term period, new legislation permitting the sales of liquor by the drink will be important in order for the airport area to attract younger, new economy workers and new business.

b. Mid-Term

The mid-term for JEIA development represents roughly the years 3 through 12 including some earlier overlay with near-term activity. This period's marketing strategies should be designed to further boost the air cargo demand at JEIA, basically by going after Asian and Latin American time-definite cargo, and then to expand this demand by progressively widening and deepening the nature of activities located at and around the airport. These strategies are:

- facilitating the expansion of the MACLC while continuing to market to other air cargo service providers
- targeting industrial and commercial users of those air services

- encouraging improved logistics management,
- further fostering the integration of production and logistics,
- growing a global marketplace at Jackson.

While these strategies are broadly sequential, there would naturally be an overlap from one stage to another in implementing them. Most important, the impact of this marketing will be cumulative, with efforts in one stage preparing a network of contacts and a JEIA operating reputation to make it possible to begin moving the complex toward its next phase of evolution.

(1) Attract Charter Air Cargo Service Providers (years 3 to 12)

For JEIA to attract charter air cargo service providers, a critical mass for air cargo demand (load) is necessary on a regular basis. Previous surveys have indicated that charter air cargo operators (e.g., Atlas Air, Cargolux, Evergreen, and Polar) serve airports where they can be assured of a significant volume of airfreight. The key to building a critical mass of cargo demand will be to focus on promoting the MACLC to all industries within a 150-mile radius that are airfreight dependent. The intent here will not be to persuade the firms to relocate to the Jackson region or nearer to JEIA, but to use JEIA rather than trucking their freight to Memphis, Atlanta, or DFW. To prevent leakage of a significant portion of regional air cargo close working relationships with major freight forwarders and third-party logistics service providers (3PL) may be required.

Initial marketing targets should focus on 3PL's, freight forwarders and shippers of time-sensitive products in the 150 mile radius of JEIA. The automobile industry is an obvious sector. Additional target firms include microelectronics companies, pharmaceutical firms, medical instruments and supplies, fresh produce, and seafood, and other high value to weight products. Marketing strategies geared to shippers, freight forwarders, 3PL's and air cargo firms should emphasize the value-added that JEIA can mean in terms of lower cost and more efficient shipment services.

(2) Attracting Additional Air-Intensive Commercial Users to JEIA and the Jackson Aerotropolis (years 1 to 12)

As JEIA's air cargo service capability continues to expand, reciprocal marketing should focus on attracting shippers (i.e., manufacturers and assemblers of products) and more national forwarders and third party logistics providers (3PLs) to locate at and around JEIA and greater aerotropolis. The goal will be to begin generating on-site origin/destination cargo shipments in terms of in-bound raw materials and components and out-bound intermediate and final goods flowing to and from the time-sensitive manufacturers and distributors that operate at or near JEIA. Again, the emphasis should be on demonstrating a set of cost, speed, and service quality advantages to firms locating near or using JEIA that are compelling to shippers, forwarders, and 3PLs.

c. Mid to Longer Term

The mid to longer term (years 6 to 20 and beyond) will focus on leveraging the full-scale, advanced JEIA (air logistics complex) and its growing complement of manufacturers, logistics managers and service providers to become a global marketplace.

(1) Improved logistics management (years 6 to 15)

As development proceeds, the marketing emphasis will be on helping industrial and commercial shippers and 3PLs find opportunities at JEIA and the surrounding region to coordinate the movement of materials and finished goods so that they can rapidly and flexibly respond to customer's needs as well as to cut costs and improve supply-chain management efficiency. Ways to enhance Jackson' value-added logistics functions in sequencing, pick and pack, product labeling and assembly of knock-down product kits should be explored.

The marketing targets during this phase will be the companies already located outside the Jackson region but in a 150 mile radius of JEIA, plus the whole spectrum of major freight forwarders and third-party logistics providers that serve shippers nationally and globally. JEIA's capabilities in automated warehousing/distribution, electronic data interchange, and electronic tracing-tracking will be underlined for these logistics specialists. MACLC's value proposition during this phase will not only emphasize cost and quality of service advantages, but also the enhancements to the speed and agility of supply chain

operations that JEIA and greater aerotropolis provides shippers, forwarders, and 3PLs.

(2) Full integration of production and logistics (years 6 to 25)

By the sixth year, a new emphasis should commence whereby the marketing program will concentrate on convincing shippers and 3PLs that the Jackson Aerotropolis is the region's best location to integrate production and logistics so as to substantially reduce inventories and further improve manufacturers' supply chain management. Building on Jackson's multi-modality, expanded interstate highways, rail and port linkages and additional logistics assets, promotional materials will continuously need to differentiate the Jackson Aerotropolis from other southern industrial-commercial-logistics locations as sharply as possible in terms of the connectivity, speed and agility benefits that it can offer. Memphis will continue to be a huge competitor to the north, but JEIA could pull customers from the the south, east, and west of the Jackson region. The Jackson Aerotropolis should be marketed as a site where time-sensitive manufacturers fully coordinate their supply chains and overall production capacity with changing customer demands. The marketing message will also stress the Jackson Aerotropolis's total logistics management practices including fusion of transportation modes (air, road, rail, and river), integrated telecommunications, sophisticated materials handling systems, and state-of-the-art commercial and knowledge support services.

2. *TARGET INDUSTRIES*

At every stage of marketing, JEIA's and the Jackson Aerotropolis' promotional strategies should be grounded in solid business research and planning. This will involve market research of a generic nature on likely JEIA tenants and users, given its stage of development, as well as market research specific to the greater Jackson region. Research on commercial shippers from around the world points to five generic types of shipments where air transport is the consignees' mode of first choice. These are when:

- Flexible and customized production is the norm
- The high value of the product compared to its weight justifies the extra cost of airfreight
- The product is highly perishable—either in the organic or economic sense
- Short production cycles and/or "just-in-time" inventories require fast delivery
- Immediate delivery of spare parts, time sensitive documents or products is required

Target industry analysis for air logistics hubs conducted by UNC's Kenan Institute of Private Enterprise identified eleven industrial groups that are most likely to utilize the air express and air cargo facilities. Most of these would no

doubt also be the best target industries for the larger Jackson region, as well. They include:

- Logistics service providers
- Semi-conductor and computer chip manufacturers
- Pharmaceuticals and contract biotech and pharmaceutical lab testing facilities
- Computer and electronic sub-assembly manufacturers
- Aircraft assembly, aircraft parts suppliers and aircraft maintenance services
- Fashion, garments and accessory suppliers
- Scientific and medical instruments manufacturers, particularly those supplying small volumes of high value products, for example aromatics
- Optics and small precision equipment manufacturers
- Suppliers of perishable products—for example, fresh seafood, live animals, fresh fruit and flowers
- Digital automotive component manufacturers and related spare parts suppliers
- Jewelry and watch manufacturers.

In targeting these and other industries noted above, there are a number of services that need to be highlighted in a marketing plan for the Jackson

Aerotropolis. Many have already been discussed and already exist, but let me provide a summary list of the key support services to be improved and leveraged in marketing the Jackson Aerotropolis.

- Expedited customs clearance and pre-clearance procedures
- Full electronic data interchange capability
- Foreign Trade Zone, FTZ operators, and bonded warehouses
- Improved roadways and potential rail access to JEIA via an intermodal rail facility
- State-of-the-art materials handling services
- Reliable utility services (e.g., electricity, water, sewer)
- Industrial support services such as repair and maintenance and machine shops
- Quality of life—good housing, schools, recreation, nightlife, low crime
- Knowledge and education support, including a distance education and worker training facility at or near JEIA
- Enhanced one-stop servicing for foreign investors
- Expedited site and building permit approvals

All of the above need to be woven into both the business plan and the implementation plan for greater success of JEIA, Rankin County, and the greater Jackson region. They are not only essential to the marketing effort, but also to

developing an effective multi-modal air logistics hub and greater Jackson Aerotropolis.

Exhibit 3.1
PROPOSED BUSINESS ENVIRONMENT FOR A JACKSON REGIONAL LOGISTICS NETWORK

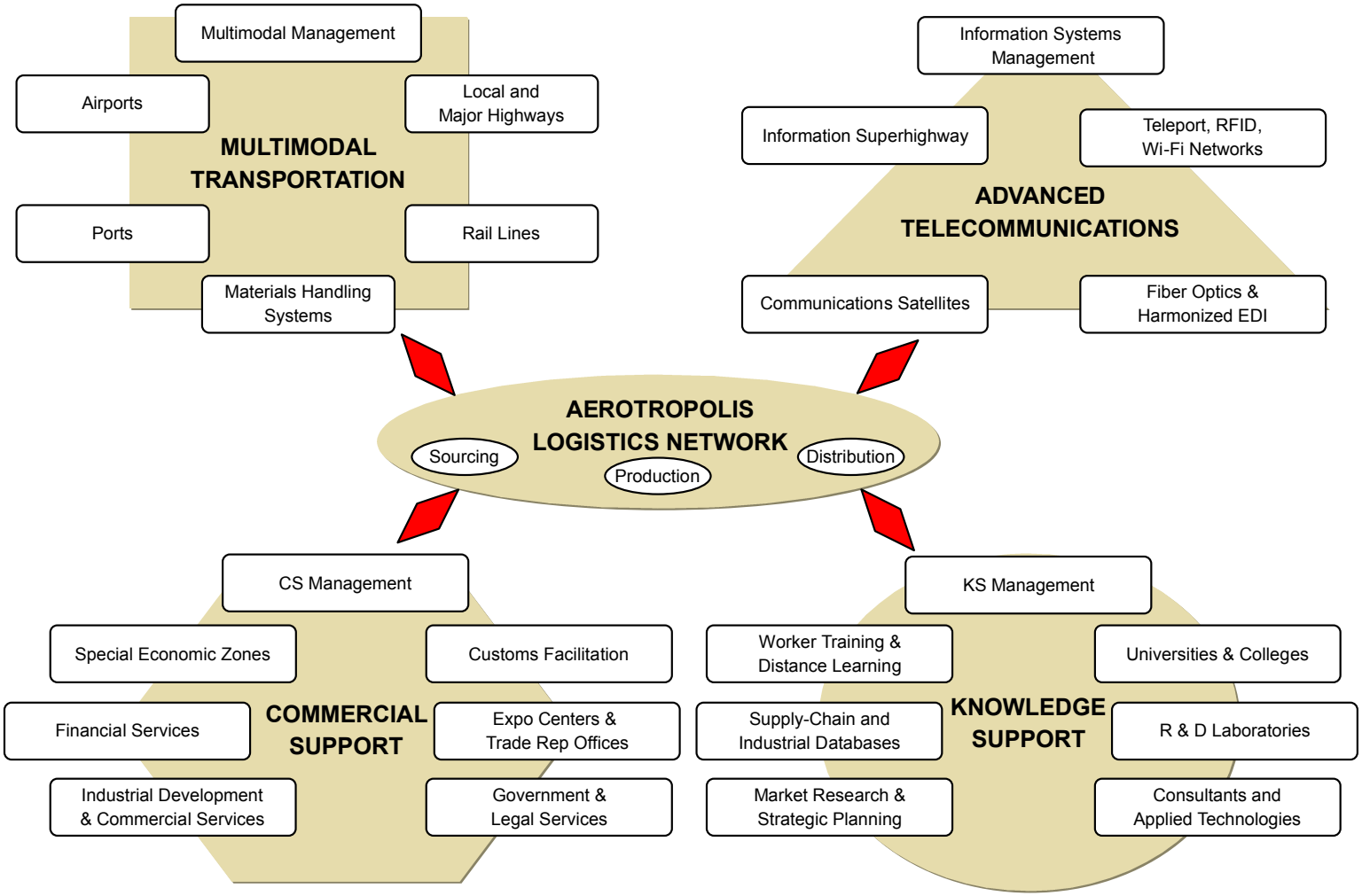


Exhibit 3.2
FOUR-YEAR COLLEGES AND UNIVERSITIES IN THE IMMEDIATE JACKSON REGION

State-Supported		
Institution	Main Campus Location, Branches	Enrollment
Jackson State University	Jackson	8,351
University of Mississippi (Branch)	Jackson	1,673
University of Mississippi Medical Center	Jackson	2,003

**Includes the Degrees Awarded for the Entire University*

Independent Nonprofit		
Institution	Main Campus Location, Branches	Enrollment
Belhaven College	Jackson	2,493
Millsaps College	Jackson	1,146
Mississippi College	Jackson	3,588
Tougaloo College	Jackson	971

Source: Mississippi Institutions of Higher Learning, 2004 & 2005; Mississippi State Board for Community & Junior Colleges, 2004

Chapter 4

Guidelines and Recommendations for a MACLC/Aerotropolis Implementation Plan

I. Introduction

In the previous two chapters, guidelines were provided for Mississippi Air Cargo Logistics Center (MACLC) infrastructure and facility design and for the development of a MACLC/Aerotropolis business plan. Building on these two chapters, this chapter will present guidelines for an implementation plan, including (1) needed JEIA site planning and approvals; (2) elaboration of infrastructure and marketing phasing; (3) incentives to attract and leverage appropriate air cargo service providers and industry; (4) coordination and harmonization with multimodal logistics hubs elsewhere; and (5) alternative governing mechanisms for financing and managing MACLC development and operation. I will also discuss public/private sector institutional approaches to developing the JEIA East Side Business Park and broader aerotropolis. The chapter concludes with 25 recommendations for the Jackson Municipal Airport Authority, Rankin First, and other regional EDCs to improve prospects for successful development of the proposed Mississippi Air Cargo Logistics Center and greater aerotropolis.

II. Infrastructure Phasing and Industrial Development Timetable

Whereas the MACLC/Aerotropolis is conceived ultimately as a fully integrated multimodal transportation, telecommunications, manufacturing, and logistics support complex, the reality is that it will likely evolve over a 5- to 25-year-period through a series of overlapping development stages. Understanding this is necessary for marketing and to making prudent investments in infrastructure and facilities timed to industry demand. Below I summarize key stages of an institutional, infrastructure and facilities implementation plan.

Stage I

Stage I will be when the appropriate government units establish the institutional and legal environment that will affect future MACLC and greater aerotropolis development. This includes approval for infrastructure and utilities, regulatory issues, land and facility ownership, leasing and concessionary rights as well as exploring a third party developer structure.

During Stage I, which can last up to six years, site improvements should be made at JEIA's East Side Business Park and at the MACLC including utilities and internal and external highway development as described in Chapter 2. Site plans should be initiated for grading and soils issues. Additional cargo service providers will be solicited for the MACLC and initial tenants will be recruited to the East Side Business Park. Basic aviation-related infrastructure upgraded,

including the extension to 12,000 feet of the east runway and associated taxiway. All approvals should also be obtained for the East Metro Corridor linking Lakeland Drive to Crossgate Boulevard via JEIA so that the JEIA Ring Road can be completed in Stage II.

Some zoning issues also need to be addressed during the next six years. Residential encroachment around JEIA has been limited to date. However, as residential development continues to grow Rankin County, effort must be made by policy makers to ensure that this residential development does not adversely impact future airport expansion and aerotropolis land-use optimization.

Stage II

Stage II (estimated to be a 3 to 12 year period following commencement of Stage I) will involve the expansion of integrated air express and commencement of international air cargo service at JEIA, a critical step to the development of a successful MACLC. Service providers would include air express carriers (e.g., FedEx, UPS, DHL) and international heavy-lift charter cargo carriers (Atlas Air, Polar Air, Cargolux, Evergreen, etc.) along with freight forwarders supporting cargo airlines and shippers. The China air cargo initiative of JMAA, commenced in Stage I, should be expanded in Stage II to other counties. At this stage, the MACLC would serve primarily as a regional air express sort facility, cargo handling and perishables transshipment center, with limited on-site pick and pack, consolidation and break-down, kit assembly, and cold storage.

The MACLC can evolve once a number of requisites are implemented during Stage II to attract new businesses and industry. These include completion of the JEIA Ring Road, expedited customs clearance and pre-clearance procedures, in-transit bonded facilities and improved interstate exchanges near the airport, a fully developed internal road system, and fully operational extended east runway and East Side Business Park activity.

One of the critical paths to attracting new manufacturing and distribution tenants to the East Side Business Park will be by offering tenants and users quicker, cheaper and more efficient site plan and building approvals, state-of-the art electronic data interchange (EDI) support, as well as high quality but rapid cargo security clearance and office, retail, hotel, and other service facilities.

As noted, new and upgraded highway connections are essential to moving both the MACLC and the East Side Business Park to the fast-cycle logistics and time-critical manufacturing-assembly stage, so local highway congestion should be addressed by this point. This will involve improvements to the I-20, I-55, and I-220 Freeways (including new interchanges) and a substantial number of new and widened state and local highways as denoted in the 2030 Jackson Urbanized Area Transportation Plan Vol. II, March 2006. Containerization should be standardized to allow quick and efficient transfer among modes and handling by automated equipment at the MACLC and other intermodal sites.

Stage III

During Stage III (commencing at least six years and possibly as much as ten years from stage II) an inland container yard, and off-site intermodal rail/truck facility should be developed. Other facilities to be implemented during Stage III include a larger and more diverse cold storage/perishables center, and a state-of-the-art distance education and worker training facility allowing specific skills transfer to firms locating at or near the MACLC from virtually any location in the world. It is during this stage that third party logistics providers (3PLs) will set up operations at the MACLC to serve growing cargo movements to and from and through the MACLC. Internal roads, visual improvements, and utility connections will be developed or extended throughout the entire MACLC (the automated cargo transfer system described in the ultimate MACLC development stage will not likely be justified at this stage based on its high cost and uncertain demand). The Ring Road and all surface transportation links should be completed, including those to the intermodal rail facility and river port terminals.

Stage IV

Stage IV (the full-scale MACLC) will be reached when sufficient manufacturing and distribution tenants and multimodal transportation and third party logistics providers reach a critical convergent mass so that production and

logistics becomes fully integrated. At this stage, estimated to be in the 15- to 25-year time frame, all the elements of the ultimate MACLC will be put in-place, include a fully functioning Central Cargo Facility, intermodal rail yard and inland container port with road and rail connections to the intermodal rail facility and improved truck connections to the Central Cargo Facility providing off-ramp and off-site manufacturers and distributors with efficient air freighter access. Stage IV will experience the siting of additional time-sensitive manufacturers, distributors, and third-party logistics providers at and around JEIA. Toward the end of this stage, the automated cargo transfer system may be justified linking all logistics, manufacturing, and distribution facilities in the MACLC.

As the MACLC evolves through its Stages, it will drive greater and greater amounts of commercial and industrial development on the airport site and throughout the greater Jackson Aerotropolis. This additional development, in turn, will generate increased volumes of cargo and passengers at JEIA in reinforcing airport-aerotropolis synergy.

III. Providing Appropriate Investor Incentives

Since the MACLC will be designed to attract and grow industry, outside as well inside airport property, incentives will play an important role. To date, Rankin County and other local counties, along with the State of Mississippi have

provided solid financial incentives for property development where investors enjoy tax advantages and other promotional privileges. Virtually, all states and local areas are in the incentives game, though, so the relative advantage in attracting major industry is declining. New incentives to attract and grow industry must be pursued. The MACLC, itself, can be one of the most powerful incentives. This is because operational incentives will be at least equally important, and in the longer term likely even more significant, than tax incentives in attracting goods-processing and distribution industries.

What the MACLC is meant to accomplish is to provide Jackson area industry with speed and agility in their supply chain management, unmatched at most other locations. Of first-order importance on the international commerce front is customs, as exporters and importers across the U.S. and around the world have consistently argued. Components of products assembled in the United States are often manufactured in several other countries and imported on a just-in-time basis. Likewise, international orders for these products are also increasingly time-definite requiring that assembled goods flow out rapidly and efficiently. At large international airports, massive amounts of freight arrive from abroad, are broken down, sorted, or consolidated, then often again shipped abroad quickly and seamlessly.

According to the US-ASEAN Business Council, "The productivity and profitability of a manufacturing plan depends in large part on cycle time – that is, its ability to process inputs into outputs as quickly as possible. Decreased cycle

time leads to lower inventories, with correspondingly lower inventory costs. In order to support world-class manufacturing, customs clearance time must be measured not in weeks, or even days, but in hours. Any customs administration that can provide reliable, timely customs clearance, or immediate release based on pre-clearance, creates an enormous competitive advantage in attracting manufacturing."

By stage II in the MACLC development cycle progresses, expedited, paperless customs procedures must be fully operational. The MACLC must not only have implemented its more advanced automated customs environment, but also, as noted previously, have in place a quick and efficient cargo security system.

At the federal level Mississippi congressional representatives should support open skies agreements for air cargo and lobby for two other government incentives to attract air cargo service providers to JEIA. These are change of gauge rights and co-terminal rights. Unlimited change of gauge rights will permit foreign-owned cargo aircraft of any size to fly into JEIA or another airport and for cargo to continue its journey on smaller aircraft of the same airline. For maximum effectiveness, there must be no limits on the number of flights, the timing between arrivals and departures, aircraft gauge, or the cargo carried. Unrestricted change of gauge rights are particularly important to smaller and mid-sized airport such as JEIA.

Unlimited co-terminal rights would permit foreign carriers to stop at any point in the U.S. to drop off shipments which originated outside the U.S. or to pick-up shipments for points outside the U.S. In order to maximize payload and in order to effectively operate an international air logistics hub, it is important that foreign carriers be given such rights without restriction. This fully liberalized environment at JEIA and other U.S. airports would be reciprocated for U.S. carriers in the countries of the foreign-based carriers.

Finally, it is important that JEIA maintain its low landing fees for air cargo carriers. Air freight is a highly cost-competitive industry and such an incentive could be a differentiating inducement for an air express or major air cargo firm to select JEIA as its Southern regional hub.

Once a critical mass of air express and air cargo service is provided at JEIA, it operates as a magnet for time-sensitive industries, as prior experiences described in Chapter 1have shown. The message is clear, increasing air cargo linkages is a powerful magnet in its own right that will draw many modern high value industries to the vicinity. JMAA's efforts to increase such service should continue.

V. Coordination and Harmonization with Similar Facilities Elsewhere

If parts, components, and finished goods are to flow rapidly and seamlessly between JEIA (and other transportation facilities within Jackson

region) and facilities around the U.S. and abroad, it is essential that their information technologies and materials handling systems be harmonized. This requires using standardized EDI messages with compatible, open architecture software systems, as described in the prior chapter.

Containerization, as noted, must also be standardized across shipping modes so, for example, that containers arriving at the proposed future intermodal rail facility can be transferred efficiently by truck to the inland container yard at the MACLC. Since at a future point, some of these containers may also be air freighted via heavy-lift aircraft from JEIA, they must also be made compatible with materials handling equipment for loading on all-cargo aircraft. Multimodal materials handling harmonization will require close coordination between the MACLC and other modal points.

When purchasing material-handling equipment, and building key infrastructure such as the Central Cargo Facility or the inland port, careful consultations should be made with major air cargo, sea cargo, and surface cargo handlers throughout the U.S. and, indeed, the world. It would be a terribly expensive mistake not coordinates design of facilities at the MACLC with the predominant technologies, materials handling equipment and space utilization standards at major ports and airports which will serve as Jackson's trading partners.

In terms of recruiting additional air cargo service providers to JEIA, it is recommended that the JMAA and local EDC's work with major freight-

forwarders, 3PLs and visit air cargo hubs at Alliance, Huntsville, Ontario and Rickenbacker to examine systems being put in operation there. Through the latter, an excellent vision can be obtained of the direction that air cargo handling is taking with a variety of automated and semi-automated cargo operations as well as other processes and procedures being implemented at these airports to speed the flow of goods through the airport.

It should also be noted that air express companies usually have their own facility design firms. Contact should be made with these companies and advice received before any such facility development contracts are signed. As a special incentive to a prospective air express or air cargo firm locating at JEIA, the JMAA may wish to offer to build a cargo facility to suit with a long-term lease-back contract. For example, Amsterdam Schiphol Airport attracted Polar Air Cargo Inc. by offering to build a permanent cargo facility to house the airfreight carrier's transshipment needs.

VI. Institutional and Management Plan for the MACLC Development and Operation

Considerable thought and work has been done to date on appropriate institutional and management plans for developing and operating a multimodal air logistics hub. One approach is to create a special public authority to develop, market, and operate the MACLC. For JEIA, such an organization might be chaired by a senior executive likely to be recruited from among the EDCs, JMAA,

or greater Jackson area public and private-sector leaders. This organization would be semi-autonomous and have authority to control and coordinate all planning, infrastructure development and facility construction to ensure timely completion of the project. The Authority could also negotiate building service contracts needed to manage the day to day facility infrastructure requirements, as are regularly used by the private sector.

The advantages of this institutional option (Option 1) include the following:

- A single organization such as an MACLC Authority should be better able to coordinate and manage all aspects of the development of the project.
- A single line of authority would perform agency coordination, contact with engineers, designers, construction contractors, construction contractors, tenants, users and suppliers to the MACLC.
- The development of the project could be constructed in a series of phases which reflect market demands with limited multiple organizational conflicts.
- The organization would closely coordinate with all public agencies on work accomplished to date.
- The creation and hiring of staff and management positions can be flexible according to need, recognizing that some political clout will be necessary to accomplish all Authority objectives.

The disadvantages of this option include the following:

- Adding another layer of government bureaucracy will likely be resisted.

- Special enabling legislation may be required to set up the new organization that could take some time.

- The new organization might be staffed by recruiting qualified personnel away from other agencies; and the stewardship role of the Jackson Municipal Airport Authority would be compromised.

- There is no element of privatization, other than some private-sector representatives, and government funds would be utilized for most shared infrastructure and facility development

Option 2: Private Enterprise Builds, Operates then Transfers the MACLC to the Jackson Municipal Airport Authority.

A private enterprise could build and temporarily operate the MACLC for a stipulated concessionary period (say 30 years) then, in accordance with an agreement with appropriate public sector agencies maintain concessions but transfer ownership of the MACLC back to JMAA. This option would eliminate the requirement for the JMAA to undertake the initial construction with its own or borrowed resources. The JMAA would provide an exclusive contract with a private enterprise to design, build and operate the MACLC complex for a given period of time.

In this option, the private sector could develop the air logistics center using private-sector financing with or without government involvement. They would operate the complex, collect income from the operation and pay a concession fee to JMAA for a determined period of time before transferring the MACLC back to the JMAA.

With Option 2, on-site construction would be performed by the private sector and off-site infrastructure (i.e., highways, electricity lines) and utilities (i.e., water lines, telecommunications services) would be provided by the appropriate government agencies. This may require a mandate from local governments to the selected firm in this build, operate and transfer (BOT) approach to provide full cooperation to the project.

The advantages of Option 2 include the following:

- The project would be implemented by private enterprise, which may be more efficient, flexible, responsive and productive than government agencies.
- The timing of the development of the project could be accelerated to meet market demand.
- No new organization would have to be established.
- There would be no requirement for local public sector or other government financial resources to the project other than to support the provision of off-site services and external infrastructure.

The disadvantages of Option 2 include the following:

- New legislation would likely be required to enable private sector BOT at JEIA.
- The private sector could have difficulty securing adequate financing for development and operating cash flow due to the size and complexity of the project.
- The private sector would expect to make an adequate return on its investment prior to the transfer back of the complex, leading to high service fees and long concessionary periods.
- Local jurisdictions might not be able to provide adequate off-site infrastructure to facilitate the operation of the complex.

Option 3: Public Sector Builds and Transfers to Private Enterprise

This option is a reversal to the previous alternative. The Jackson Municipal Airport Authority would be responsible for the construction of the project and would then transfer it to a private enterprise for operation and maintenance. Government resources finance initial development of the project but would then utilize the market-driven expertise and related financial strength of a private enterprise to market and operate the MACLC.

The advantages of Option 3 include the following:

- Public resources can be used to immediately jump-start construction of facilities, commencing with expanding the current MACLC.

- No special legislation would be needed and no new organizational structure would have to be established.

- The private sector would not be required to secure significant financing for the construction phase of the project.

- The specific expertise of local public agencies such as the Jackson Municipal Airport Authority would be employed in the design and construction phase.

- These agencies would have only limited responsibilities for marketing or operating the MACLC, which would be done mostly by the private sector whose core competency relates to commercial real estate development.

The disadvantages of Option 3 include the following:

- Extensive up-front public resources would have to be allocated to the project.

- An appropriate public agency beyond the JMAA might have to be organized and prepared to coordinate and manage the planning, design and construction of the MACLC.

- It would be difficult to construct the project as a phased development. There could eventually be conflict between the private developer and the public agency if construction continued after transfer.

- The need for close and significant coordination during the design and build phase between the private developer and public agencies could create delays and added costs, which in turn could create problems during the transfer process.

- The efficiency, flexibility, relative high productivity and responsiveness of the private enterprise are utilized only during the operating phases of the project.

Promoting and Developing the Jackson Aerotropolis

An aerotropolis will inevitably emerge around JEIA in the coming decades. The critical question is: will it form and grow intelligently, achieving the full benefits to Jackson area residents, businesses and communities discussed in prior chapters or in a spontaneous, haphazard, less than efficient manner that has characterized much airport-related development elsewhere in the U.S.

The limited development on JEIA property and areas near the airport has been lamented by some. This paucity of investment to date may, in fact, turn out to be a longer-term development advantage for JEIA and Rankin County. There are only a handful of airports in the U.S. with such a vast area of inside the fence property designated as a Foreign Trade Zone and property within a 15–20 minute radius that stands ready for development based on 21st century airport city and aerotropolis principles.

Intelligent development built on JEIA's assets and its rich surrounding multimodal transportation infrastructure needs to be planned and implemented. The stakes are high for Jackson, Rankin County and the entire region. Delay in commencing with an aerotropolis planning process such as I will outline below

could likely preclude the airport, county and greater region from realizing the full economic potential that JEIA and its nearby multimodal infrastructure offers.

Aerotropolis master planning should therefore commence as soon as feasible. A number of residential projects have begun to encroach on nearby land far better suited for commercial development, and a number of commercial projects that are highly unlikely to be leveraged by their proximity to the airport have been completed or are underway. In short, no effort is being made to assess if developments in the airport environs are consistent with or inconsistent with airport-area land-use optimization.

Apropos the above, before the opportunity to plan and develop a Jackson Aerotropolis is lost, it would seem prudent that Aerotropolis strategic planning group be formed and that the prospects of creating an Aerotropolis Development Authority be considered. This Authority could work hand-in-hand with JEIA, Rankin First, and other EDCs nearby to insure coordination and integration of inside and outside the airport fence development.

Not only is this type of integration lacking today, but also landside development beyond airport perimeters is rarely coordinated since the territory frequently crosses multiple jurisdictions (as is the case with AeroPlace). In absence of Aerotropolis-wide coordination and planning, the efficiency and true functional integrity of the Aerotropolis area is compromised, limiting businesses and communities from achieving their full competitive and positive development potential.

There are lessons to be learned by Jackson area EDC's from some innovative development approaches elsewhere. For example, recognition by local jurisdictions in the Netherlands that Amsterdam Schiphol Airport was at the center of an expanding territorial complex of airport-linked industrial and commercial development led to the establishment of a public-private partnership to oversee the development of available sites near the airport. This organization —the Schiphol Area Development Corporation (SADC)—directly manages some of these projects while coordinating all of them. It operates like a quasi-development authority for the broader Schiphol Aerotropolis. It is suggested that the Jackson area EDCs take a close look at this model.

While creating such an inter-jurisdictional authority would be favored to coordinate and optimize airport-driven development in the airport area, it is recommended that interim measures be implemented to improve chances of this outcome. One would be to institute periodic working sessions with local jurisdictional officials and planners in the Jackson Aerotropolis area to inform them better about the nature of airport-linked development and explore how their specific jurisdiction might complement and leverage this new form of development. A larger picture view of the Jackson Aerotropolis and their role in its evolution could reduce local jurisdictional competition for entering businesses, encourage more effective and mutually beneficial place marketing and branding for business recruitment, and lead to more coordinated actions to

address airport-induced problems and realize more beneficial development outcomes.

Related to this would be periodic convening of all land-use decisions-makers within the Jackson Aerotropolis area (including airport executives, planners, developers, EDC's and local community officials) for transparent discussions and information exchange on each other's real and perceived needs and goals to prevent (or at least reduce) future conflicts and improve prospects for sustainable Jackson Aerotropolis development. Highway congestion, pollution, noise, unsightly buildings, and other disamenities negatively impacting the quality of life of nearby residents and the image of the Aerotropolis must be addressed. Architecturally appealing, high-quality building construction, improved site planning, green-space, signage regulation, attractive thoroughfare lighting, and other "image" or impression-making features need to be incorporated into consistent development structures. Aerotropolis gateways, defining the project area, should be planned and designed with appropriate signage and corridors beautified through aesthetic lighting, themed electronic art, and landscaping that include screenage of large parking areas and unsightly buildings. Consistent with Aerotropolis principles, cluster rather than strip development should characterize commercial land-use planning, with maintained green-space between clusters.

One of the most promising institutional models for promoting Aerotropolis development is the DIA (Denver International Airport) Partnership.

The DIA Partnership (DIAP), now part of the Denver EDC, is a consortium of public, private, and community leaders dedicated to promoting economic opportunity and quality of life in the Denver International Airport District includes portions of Denver and Aurora as well as the communities of Brighton and Commerce City and includes portions of Adams, Arapahoe and Denver Counties.

Priority areas of the DIA Partnership are:

1. Making the DIA District a premier business location
2. Leveraging business and investment
3. Promoting quality community development

Represented by the airport district's most visible and influential business people and government officials, DIAP is exceptionally well networked, informed and can be an effective advocate for new business prospects. The Partnership offers assistance with

- Economic and demographic information
- Incentive possibilities
- Regulatory Approvals
- Master-planned location options within the District
- Design/build considerations
- Relocation services

- Metro area business practices and requirements

The Partnership works closely with DIA to develop complementary efforts locally and regionally to maintain and support DIA's strategic business plan and air service, development objectives (e.g., the completion of a new on-airport hotel, cargo development, retail, hospitality, and the development of non-passenger airline business). Along with encouraging both on-airport and off-airport development, DIAP pursues headquarters operations related to the airport.

In addition to its development objectives, the DIAP works with the airport to recruit cargo and passenger service. For example, last year, it helped develop action plan to optimize air cargo development at DIA, improved local infrastructure in support of cargo development and promoted the use of incentives directed towards attracting international cargo flights.

DIAP has an annual budget of approximately $1.2 million with $850,000 derived from membership fees (75% private, 25% public), $150,000 from events, and $200,000 in-kind. Guided by a board of directors, and an executive committee (both of which meet bi-monthly) and fulltime president, DIAP represents the region at national and international trade shows, with government and the media, with prospective investors, and with site selection consultants strongly advocating the merits of DIA and the DIA region. Exhibit 4.1 shows the basic organizational structure of the DIA Partnership.

Moving the MACLC Forward

As initial steps the Jackson Municipal Airport Authority might conduct an appropriate feasibility study which would include assessing the merits and liabilities of contracting with a third party to build and operate the full-scale MACLC. The JMAA would prepare the Terms of Reference and supervise the feasibility study. Assuming the later phase MACLC was found feasible and development recommended, the Authority would do the following:

- Prepare and issue Terms of Reference necessary for future phase MACLC design.
- Draft bid and tender documents for the design.
- Market the procurement opportunities.
- Select the MACLC design consultant for future phases.
- Negotiate and award a contract to the consultant.
- Initiate dialogue and, if appropriate legislation enacted, possibly put out to bid for potential private sector developers and operators of the MACLC.
- Create and approve the arrangements for private sector and JMAA participation predicated on the development and management options selected.
- Tender the proposals for MACLC development and operation.
- Select a successful tenderer.

- Prepare finalist contracts and concessionary arrangements.

As the primary governing organization, the JMAA must determine the best public, private or public-private venture structure to build, operate, and manage the full-scale MACLC as well as work with local governments to create effective logistical synergies throughout Rankin County and the greater Jackson region.

VII. Summary Recommendations and Action Steps

Let me conclude by presenting a set of recommendations and action steps for JMAA, Rankin First, the Greater Jackson Alliance, and other Jackson area organizations to consider for successful aerotropolis development within and around JEIA. I will begin with economic, aesthetic and airport-area development factors then move on to specific recommendations for JEIA, Rankin County, and greater Jackson to prosper. Some recommendations will be broadly strategic; others will drill down to specific needs at and around JEIA.

1. Jackson metro private sector and government leadership (as well as state agencies) must be repeatedly reminded that JEIA may well represent Jackson's (and Mississippi's) primary infrastructural asset for competitiveness and economic prosperity in the globally networked, speed-driven 21st century. Key points made in this report on the critical importance of airports for competitiveness and for local job creation and business revenues should be conveyed regularly as part of JMAA's communications campaigns.

2. To compete nationally and globally, Jackson area governments must work together as a single entity reflecting the fact that the region is a single integrated market economy. Without such cross-jurisdictional cooperation, with established protocols among local governments, firms desiring to locate in the Jackson area will play cities/counties off one another to the detriment of the local jurisdictions, their tax bases, and their residents. In particular, Jackson Aerotropolis success rests on continuous improvement in the working relationship between JMAA, Rankin County, and the city of Flowood.

3. Local county and municipal government officials must also be made aware that they have a fiduciary responsibility to guide land-uses near JEIA so that they leverage and are leveraged by the airport. Encroachment of residential and other non-compatible uses near airport peripheries will limit required future airport expansion and thereby undermine the positive economic impacts that JEIA can have on the Jackson metropolitan area, and the state.

4. The above public bodies, along with additional municipalities in Rankin County, must take on the liquor by the drink issue if quality economic growth is to occur around JEIA and the County. Without liquor by the drink it will be very difficult to attract fine dining, 4- and 5-star hotels, high-end retail, as well as attract young professionals to the area boosting the quality of the labor force. High-tech workers and other young professionals increasingly select communities with these amenities and avoid those lacking them. With knowledge workers key to Rankin County's future competitiveness, the County is as serious risk if it maintains its present policy against liquor by the drink.

5. Planning for the Jackson Aerotropolis development should also give high priority to aesthetics. Since the airport area will become a major commercial and employment district along with serving a growing number of leisure and business travelers, its appearance and spatial division of labor must be improved. As just one example, logistics, cargo processing and trucking should be physically separated as far as possible from flows of business and leisure travelers, as well as from future proposed airport hospitality, retail, and office sectors on the east side. The appearance of JEIA's cargo facilities should be improved or they should be screened with vegetation or muraled walls from Airport Road North. This will be all the more important as the MACLC expands and more trucks are drawn to it

6. Apropos the above, JEIA is the front door to Jackson for many distant travelers. It is the first thing and last thing that distant air travelers see. Since such impressions are often enduring, physical appearance of the immediate airport area is extremely important. Therefore, to the degree feasible, JEIA's surrounding areas should follow Aerotropolis principles and be upgraded and redesigned to look more like clustered commercial campuses rather than industrial or commercial strips. Where possible, landscaped greenery should separate clusters and as noted above, unsightly structures should be screened with vegetation and/or mural walls.

7. It will be increasingly difficult in the future for the Jackson Region to attract new industry and generate quality jobs on cost factors and traditional government incentives. Competitive advantage will come through strategic focus on connectivity, speed, and agility. Fast-cycle logistics should become the Jackson region's new competitive tool, based on developing a full-fledged multi-modal air logistics center as

described for later phases of the Mississippi Air Cargo Logistics Center (MACLC).

8. New local highways (such as the Airport Parkway and the East Metro Corridor) and upgraded interstates and extended rail lines are required to integrate JEIA with regional business clusters and major national and international transport modes. Similarly, state-of-the-art broadband, fiber optics, WiFi, WiWAN, and satellite uplinks and downlinks are needed for the Region's companies to trace, track, and control product movements, which in the future will increasingly be monitored and managed through RFID (radio frequency identification), GPS (Global Positioning System), and intelligent software agents (via computer chips embedded in products, parcels, and containers). The bottom line is that capital investment needs to improve; more monies need to be put forth to spur future economic growth not just fix current problems. Strategic vision and coordinated well financed action must take place with respect to all parties including, among others, Mississippi Congressional delegations, the Mississippi Development Authority, Rankin County, the City of Jackson, and municipalities adjacent to JEIA.

9. Just as today's most successful businesses are innovative, flexible, and rapidly responsive, so too must infrastructure and facility planning and design at JEIA. Master planning at JEIA and its surrounding area thus should not be so much a fixed physical plan as it is a flexible framework for accommodating a wide variety of tenants, users, facilities, and layouts that can be modified when new technologies, industries, and infrastructure emerge. For example, the future MACLC should employ a modular layout for maximum flexibility and phased development. On-site cargo processing facilities should

employ flex-tech principles and be reconfigurable to allow for expansion (or even contraction) as demand warrants. Ground transportation systems should incorporate redundant routings to minimize the impact of congestion or accidents both within JEIA and its connecting transport systems. JEIA management itself must be agile, prepared to respond rapidly and creatively to evolving tenant and user needs and to coordinate "one-stop-shop" support from a variety of government and institutional sectors.

10. JEIA's intermodal transportation infrastructure should be designed to allow seamless and flexible flows of materials among convergent transportation modes and industrial and other commercial facilities both in the core and peripheral areas of JEIA. At some point in the future, a cargo transfer system (CTS) must be planned to eventually link the future Central Cargo Facility (CCF) to cargo-related tenants throughout the JEIA campus, as well as to an off-site intermodal rail facility and via highways and perhaps a rail spur to the airport eventually. The CCF would provide off-ramp JEIA tenants and off-site production facilities, warehouses, and distribution centers with efficient sorting capability, customs clearance, and air freighter access.

11. Strong efforts must continue to attract additional passenger and air cargo service to JEIA, including JMAA's China cargo initiative. Airlines must be viewed not just as companies, but more as basic transportation infrastructure, no different from roadways and rail. Airlines, like public infrastructure, are shared by all (business, tourists, etc) providing "highways in the sky" that rapidly connect the Jackson region to the nation and the world. These highways in the skies are "public good" infrastructures that do not have to be maintained by public money as do roadways and much other public

infrastructure. To the extent possible low charges to airlines must be maintained to attract more air service, and additional incentives should be considered as well.

12. To compensate for its lower airline fees, the Airport Authority should explore further non-aeronautical revenue sources. Following airport city and aerotropolis principles, JEIA must be thought of more in terms of a multifunctional commercial entity. This would involve developing more revenue generating activities in the terminal similar to Philadelphia, Pittsburgh, Detroit, and Amsterdam Schiphol, possibly bringing in a private-sector operator to promote and manage on-site commercial real estate development, and generating other non-aeronautical revenues. Innovative revenue-generating relationships might also be developed with off-site businesses and industries that would substantially benefit from expanded passenger and air cargo airline service.

13. Marketing of the MACLC should emphasize the importance of its logistics-based capabilities in attracting time-sensitive goods-processing businesses. Such businesses will certainly continue to seek traditional investment incentives such as tax relief, investment offsets for land or facilities and workforce training. However, as noted above, as the competitive priorities of connectivity, speed and agile market response grow in importance, the relative power of traditional government incentives will lessen. Increasingly, firm siting decisions will be made at least as much on the basis of logistical capabilities of the site and access to global networks as on traditional government incentives. Such logistics-based marketing must be based in development realities of the MACLC, though, and phased, predicated on its stage of logistics capabilities. In each phase, the marketing effort

should be designed to attract a targeted segment of MACLC tenants and users based on capabilities offered at the phase which, in turn, would serve as a catalyst to attract additional complementary firms to the MACLC, the East Side Business Park, Jackson Aerotropolis, and broader region.

14. Attracting time-sensitive manufacturing and distribution industries will also require a thorough understanding of modern supply chain management principles and the fast-cycle logistics. To offer a truly marketable competitive advantage, JEIA management, with the assistance of local and regional economic development organizations, should bring together experts in logistics and supply chain management, multi-modal infrastructure development and information technology to help design specifications that would properly integrate and leverage all MACLC elements for fast-cycle logistics. I know of no locations in the U.S. that are doing this, so the MACLC can have a first-mover advantage in attracting high tech and other time-critical industries if it takes the lead in seizing this opportunity.

15. Logistics curricula concentrations at four-year and community colleges need to continue to expand and improve. Faculty possessing logistics expertise should be among the recruitment priorities of these colleges and universities. A good example here is Greensboro, NC, which is putting a logistics oriented community college branch on Piedmont Triad International Airport. Four-year and graduate universities in the Greensboro area are also building up their logistics curricula to make the region in the provision of logistics services.

16. To ensure that firms being recruited to the Jackson Aerotropolis have appropriately skilled workers and managers, a wide range of worker training, management education and technology transfer functions should be provided through a state-of-the-art education and training center (ETC). A key feature of the ETC should be distance-learning capability, providing recruited firms with real-time audio, video, and tactile worker training customized to their skill needs, from virtually anywhere in the world. Because no other area is doing this, such headquarters-direct training capability would provide remarkable flexibility in firm recruitment and could distinguish the Jackson region in rapid-response customized work-force training.

17. The JMAA, Rankin First, and other EDC's should establish a close working relationship with major corporate relocation and site selection consultants, making them aware of the MACLC's and region's assets and regularly updating them on development progress. In most cases, large companies looking to expand or relocate rely on site selection specialists to provide them with a short-list of potential locations to choose from, along with their strengths and weaknesses. Likewise, major commercial real estate firms such as Colliers International, CB Richard Ellis, Hines, and Jones, Lang, LaSalle and Real Estate Investment Trusts (REIT), such as Prologis, AMB Properties, Highwoods, and Liberty Property Trust often work closely with corporations in their site selection and eventual commercial development.

18. Because entry appearance, project architecture and other symbols also send an important message, all JEIA gateway entrances should receive special emphasis in design and image appearance. These entries must set the tone for the development within which the airport's identity

will be reinforced through distinctive building architecture, signage, landscaping, and roadway configuration. Design standards need to be incorporated into surrounding local communities' plans as well as the JEIA's site design standards. This "image-making" or branding is a pivotal aerotropolis marketing strategy.

19. There are lessons to be learned by the JMAA and Jackson's economic development organizations from commercial development approaches around Amsterdam Schiphol Airport and Denver International Airport. For example, recognition by local jurisdictions in the Netherlands that Amsterdam Schiphol Airport was at the center of an expanding territorial complex of airport-linked industrial and commercial development led to the establishment of a public-private partnership to oversee the development of available sites near the airport. This organization—the Schiphol Area Development Company (SADC)—directly manages some of these projects while coordinating all of them. It operates like a quasi-development authority for the broader Schiphol airport city. Likewise, as was described previously in this chapter, a public-private partnership has been established to foster economic development at and around Denver International Airport (the DIA Partnership). It is recommended that Airport Authority, Rankin first, and other economic development organizations in the JEIA area take a close look at these models.

20. Whereas creating an inter-jurisdictional development organization such as SADC and DIAP may not be well received in a Region already served by a number of economic development organizations, it is recommended that a non-bureaucratic alternative be implemented to improve chances of coordinated efforts. One would be to institute periodic working sessions with airport area municipal and county

officials and their planners to inform them better about the nature of airport-linked development and explore how their specific jurisdiction might complement and leverage this new form of development. A better understanding by local government leaders of a Jackson Aerotropolis along with their community's role in their evolution could (1) reduce local jurisdictional competition for entering businesses, (2) encourage more effective and mutually beneficial place marketing and branding for business recruitment, (3) lead to more coordinated actions to address airport-induced problems, and (4) realize more beneficial development outcomes.

21. Airport area city and county leaders should convene and produce an action plan with necessary resources committed to guide and assist both the near-term and longer-term development of the Jackson Aerotropolis. One of the biggest failures in the past has been a lack of a comprehensive multi-year plan that clearly defines roles and who carries them out, along with providing the necessary short and long-term organizational funding.

22. If speed and agility are going to be the selling points for the MACLC and Jackson Aerotropolis, local governments will have to move quickly and flexibly when a tenant expresses interest. Often prospective tenants cannot afford to wait a year or more (or even six months) to get their site plan and building permits approved. It is therefore recommended that Jackson cities and counties establish an accelerated site and building plan approval process that can be completed more quickly than present.

23. JEIA management should remain focused on improving the airport's aeronautical infrastructure and service. Their core competency is not

logistics services or commercial real estate development. The Airport Authority should therefore consider bringing in private-sector master developers for the later phase MACLC and for the East Side Business Park in the form of a public-private sector development partnerships.

24. The JMAA, Rankin First, and other local economic development organizations may wish to take a bold step by immediately "branding" the Jackson Aerotropolis. To some extent, the media is the message. Such branding could be instrumental in creating "buzz" in marketing to potential outside investors, developers, tenants, and users. It will also provide an excellent framework for local organizations to promote the greater Jackson Region and its competitive future.

25. Major efforts such as the planning, guiding, and implementing a Jackson Aerotropolis requires a full-time "champion" dedicated to lead the efforts. This must be an individual who has passion for the project and immense respect in the Jackson area; one who does not polarize and who can build coalitions; and one who knows how to tap into financial resources locally, at the state level, and in Washington.

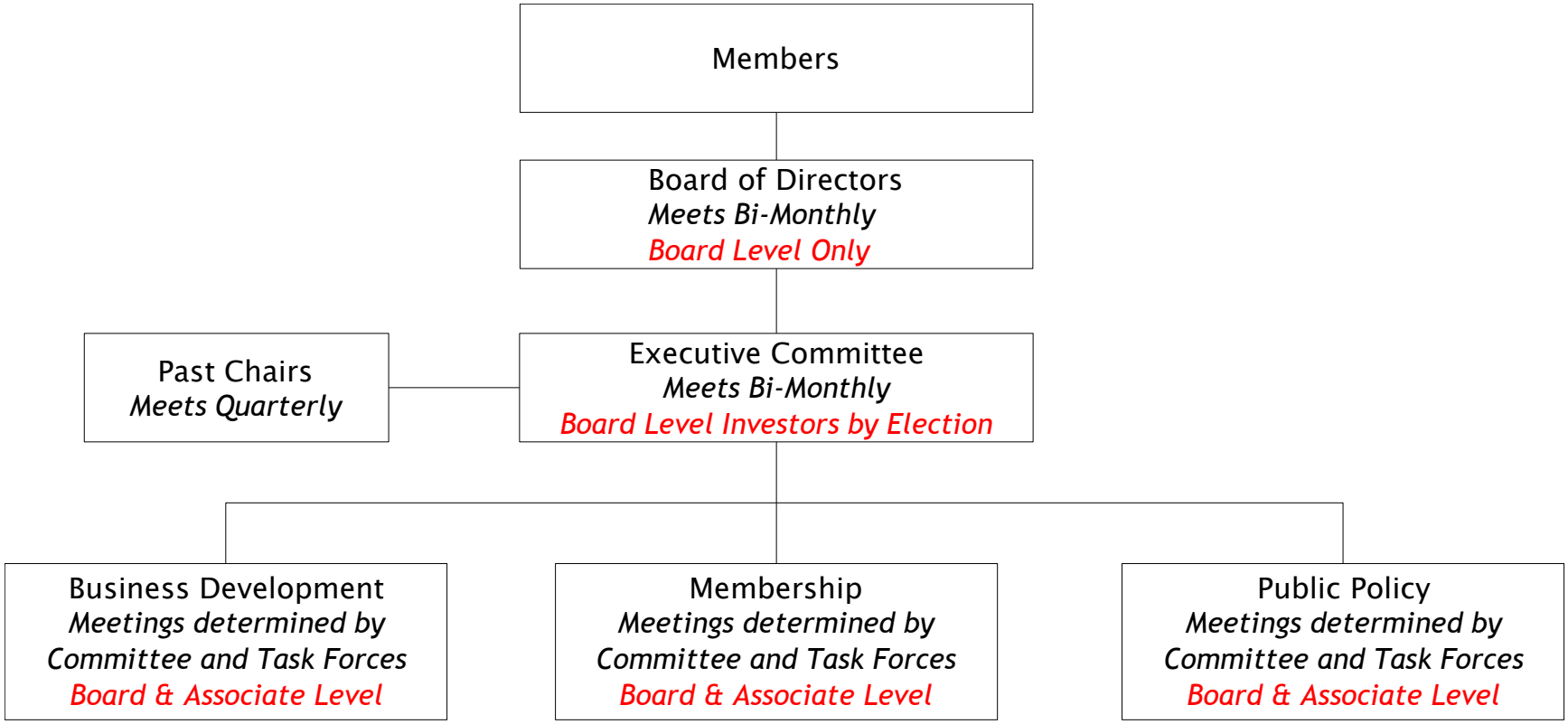



Exhibit 4.1
ORGANIZATIONAL STRUCTURE OF DIA PARTNERSHIP