RICKENBACKER
INTERNATIONAL AIRPORT

Master Plan

Final Technical Report

May 2021

COLUMBUS
REGIONAL AIRPORT AUTHORITY

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INTERNATIONAL

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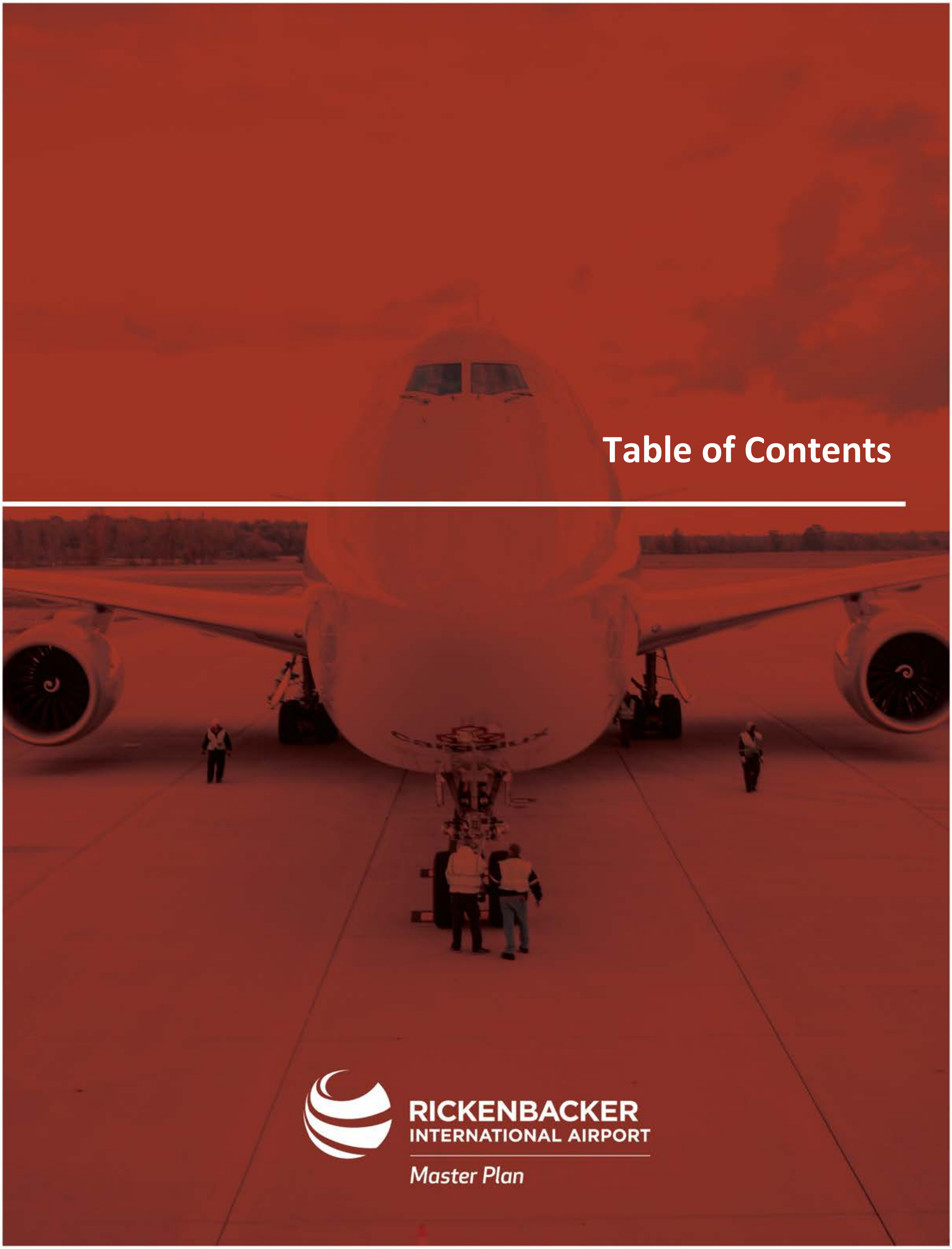

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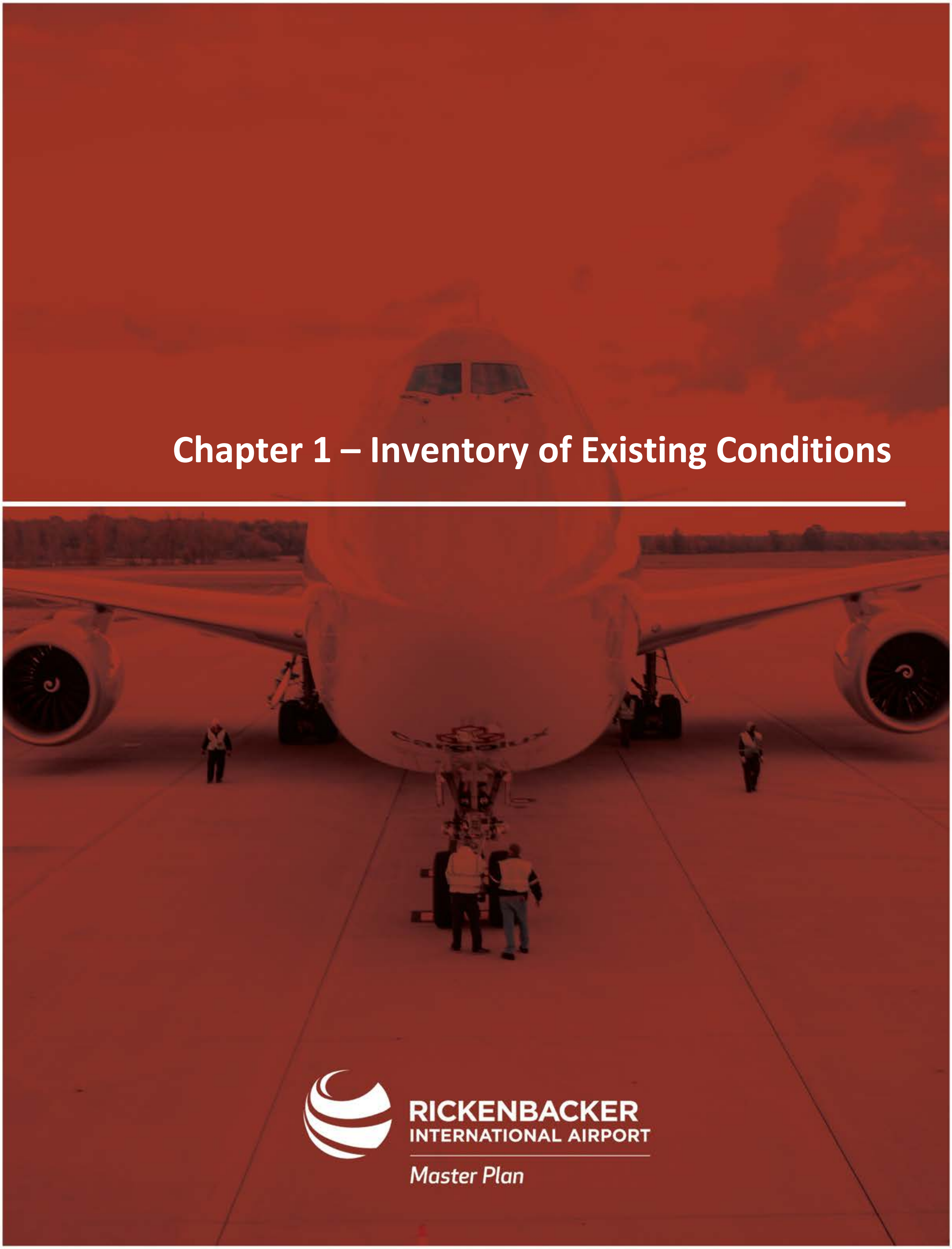

1.0 Inventory of Existing Conditions

This chapter presents a summary of the pertinent data that has been inventoried to support the following elements of the master plan study. In broad terms, this chapter presents the development history of the airport, description and condition of the existing issues and facilities, as well as the regional setting of the airport. The majority of the information presented in this chapter was collected with the assistance of airport management, airport administrative staff, and airport tenants.

1.1 Background

This project involves preparation of an Airport Master Plan and Airport Layout Plan (ALP) Update (including Airports GIS and Exhibit "A" Property Map Update) for the Rickenbacker International Airport (LCK) in accordance with the requirements of the Federal Aviation Administration (FAA), Ohio Department of Transportation (ODOT), and the needs of the Columbus Regional Airport Authority (CRAA), the airport sponsor.

The Master Plan Update (the Study) will guide CRAA's strategy for the development of Rickenbacker International Airport to satisfy demand in a cost-effective, feasible manner while minimizing environmental and socioeconomic impacts. The planning process will be tailored to the unique conditions at LCK. Therefore, it is the intent of this Study process to foster the development and adoption of a flexible approach to master planning that devotes resources and attention to critical issues at LCK. In particular, the Study addresses the impacts of the following issues and changing trends upon airport facilities:

- Provides a comprehensive activity forecast for identifying anticipated future activity levels at LCK;
- Fosters the continued growth of scheduled and non-scheduled air cargo, passenger, military, and general aviation activities;
- Preserves aviation facilities and property to accommodate forecasted growth of aeronautical activity;
- Performs a comprehensive justification analysis for AIP eligibility for Runway 5L-23R;
- Identifies and preserves the ability to grow non-aeronautical development that is compatible with aeronautical operations;
- Assesses existing infrastructure and develops a comprehensive plan for updating the infrastructure to accommodate anticipated development at LCK;
- Ensures LCK develops in a manner that supports a continued military presence and associated activities; and
- Incorporates information from and provides information for the Mid-Ohio Regional Planning Commission (MORPC) "2018 Rickenbacker Area Comprehensive Study," to allow for a comprehensive development plan for Rickenbacker and the surrounding area.

The background section describes the process, goals, and objectives of the Study. Also, the background section provides a high-level overview of the key characteristics of the airport, such as its role in the national and local aviation system, management organization, and development history.

1.1.1 Goal and Objectives of the Master Plan Update

Rickenbacker International Airport is a Joint Use former military airbase and is one of the world's only cargo-dedicated airports. Commercial development on and near the facility was anticipated in the 1995 Final Environmental Impact Statement (FEIS) for transfer of the base from the military to the Rickenbacker Port Authority (RPA). In late 2002, the City of Columbus, Franklin County, and the Columbus Municipal Airport Authority approved the merger of the Columbus Municipal Airport Authority and Rickenbacker Port Authority, and the airport was transferred to the newly formed Columbus Regional Airport Authority on January 1, 2003. In 1998, the former RPA finalized a master plan for the long-term future development at LCK. This previous effort was conducted prior to the merger with CRAA and has not been relied upon as a document to guide the growth of LCK.

This Study is intended to address the development needs over the next 20 years, with a primary focus on the short (0-5 years) and intermediate-term (6-10 years) actions, to improve air transport access, air cargo and logistics activities, passenger terminal efficiency and security, air safety, and maximize development and economic impact to generate resources to support the financial health of LCK and the Region.

At the commencement of the Study, the project team met with key CRAA staff members to provide an overview of the master planning study process and strategy, and to solicit feedback from CRAA to assist/inform the master planning effort. As part of a project kick-off meeting and visioning workshop, the project team conducted a visioning exercise with CRAA and project team members to uncover Rickenbacker's strengths, weaknesses, opportunities and threats, then to identify a vision and desired outcomes for the master planning process. A list of themes which emerged from each of the four categories is shown below.

Strengths – What are Rickenbacker's strengths?

- Room for growth (land/facilities/infrastructure)
- Positive momentum
- Multi-modal hub
- Skilled workforce
- Diversity of shipments
- Ease of use
- Physical location
- Valuable regional asset

Weaknesses – What weaknesses can we improve upon?

- Aging infrastructure
- Access to workforce

- Financial self-sufficiency
- Multi-jurisdictional cohesiveness
- Lack of national awareness
- Federal freight restrictions

Opportunities – What are other opportunities we haven't talked about yet?

- Military collaboration
- Un-tapped infrastructure resources
- Innovative regional funding
- E-commerce
- Nearby workforce
- Public-private partnerships
- Improved marketing and promotion
- Engaging diverse relationships
- Room for growth/physical location

Threats – What threats are out there that could affect Rickenbacker?

- Economic recession
- New transportation technologies
- Environmental issues
- Jurisdictional competition
- Movement of commercial hubs
- Decrease in exports
- Skilled workforce
- Nearby roadway congestion

Once these outcomes were established, CRAA participants identified key goal priorities specific to Rickenbacker International Airport and the Rickenbacker Global Logistics Park (RGLP) that needed to be addressed within this Study. These goals included, but were not limited to:

- Achieve self-sustainable operations;
- Expand growth of exports;
- Identify new transportation needs;
- Establish a regional structured governing body;
- Being recognized as a global gateway;
- Collaborate with military base operations;
- Implement all aspects of the master plan;
- Become an air hub for Amazon (On February 1, 2017, it was determined that LCK will not be an air hub for Amazon, as the company announced that they will be establishing their Amazon Prime Air Hub in Northern Kentucky.);
- Fund repair/replacement of runways;

- Address environmental issues;
- Increase industrial and logistics districts square footage to 100 million square feet;
- Coordinate compatible land uses;
- Become a national leader in freight operations;
- Experience a large increase in aviation activity;
- Create facilities and attractive places for people and workforce;
- Increase regional jobs;
- Improve access to workforce;
- Utilize new innovative technologies; and
- Improve "just in time" services

During the planning process these prioritized goals were also shared with the Stakeholder Advisory Committee (SAC), Mid-Ohio Regional Planning Commission (MORPC) and the public.

The overall purpose of this Airport Master Plan update is to provide reasonable guidelines for future airport development alternatives to satisfy aviation demand in a cost-effective manner. In support of this purpose and the goals identified, the primary objective of the Study is to create a 20-year development program that will maintain a safe, efficient, economical, and environmentally sustainable airport facility for CRAA, and the surrounding counties, cities and municipalities. The key elements of the planning process are shown in **Figure 1-1 Airport Master Planning Process**.

1.1.2 Master Plan Review and Approval Process

The development plans described in this master plan represent the vision of the future development of the airport. As explained in AC 150/5070-6B (Change 2), Airport Master Plans, the development recommendations in this Study represent the views, policies, and development plans of the airport sponsor and do not necessarily reflect the opinion of the FAA.

The FAA reviews the elements contained in the airport master plan to ensure that the appropriate planning techniques have been applied throughout the entire planning process. However, the FAA only approves the following elements:

- Forecasts of Aviation Demand
- Airport Layout Plan

During the Study, representatives from CRAA and the master plan project team coordinated regularly with representatives of FAA's Detroit Airports District Office to maintain open communication and streamline the agency review and approval process.

1.1.3 Airport Location and Study Area

Rickenbacker International Airport (LCK) is centrally located in the State of Ohio, approximately 10 miles south of the City of Columbus. The airport is comprised of 4,342 acres and is physically located within two counties, Franklin and Pickaway. The majority of the airport property is located in Franklin County, while the southern portions of the property are located in Pickaway County. Incorporated jurisdictions located near the airport include the Cities of Columbus and Groveport and the Villages of Obetz and Lockbourne. Detailed location information is provided in **Table 1-1 Airport Location** and **Figure 1-2 Airport Location/Vicinity Map**.

Table 1-1 Airport Location

Item	Data
Airport Name	Rickenbacker International Airport
Associated City	Columbus, OH
Distance from City	10 miles south
County	Franklin and Pickaway
FAA Region	Great Lakes Region
FAA Site Number	17786.*A
FAA Location ID	LCK
Airport Reference Point	
Latitude:	N 39 ° 48' 49.635" (NAD83)
Longitude:	W 082 ° 55' 40.138" (NAD83)
Elevation (MSL):	852.3 feet (NAVD88)

Source: FAA Form 5010. AVN Datasheets. eNASR, 2009 LCK ALP Update.

The overall project study area, depicted in **Figure 1-3 Project Study Area,** includes approximately 17.2 square miles that encompasses the Rickenbacker area and its various facilities. The study area is specifically designed to consider the large base of businesses that may have an impact on the future development of LCK.

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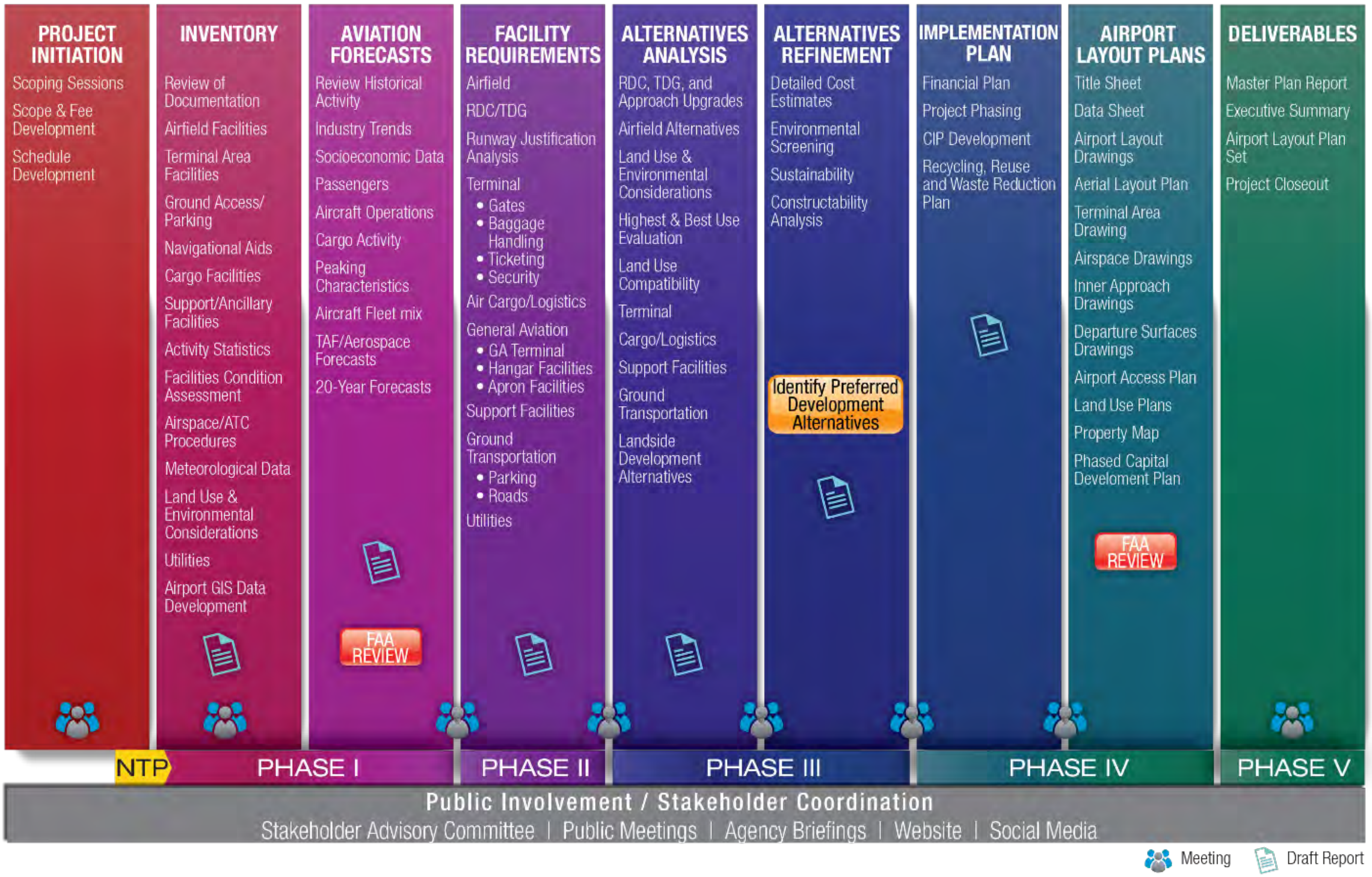
Figure 1-1 Airport Master Planning Process



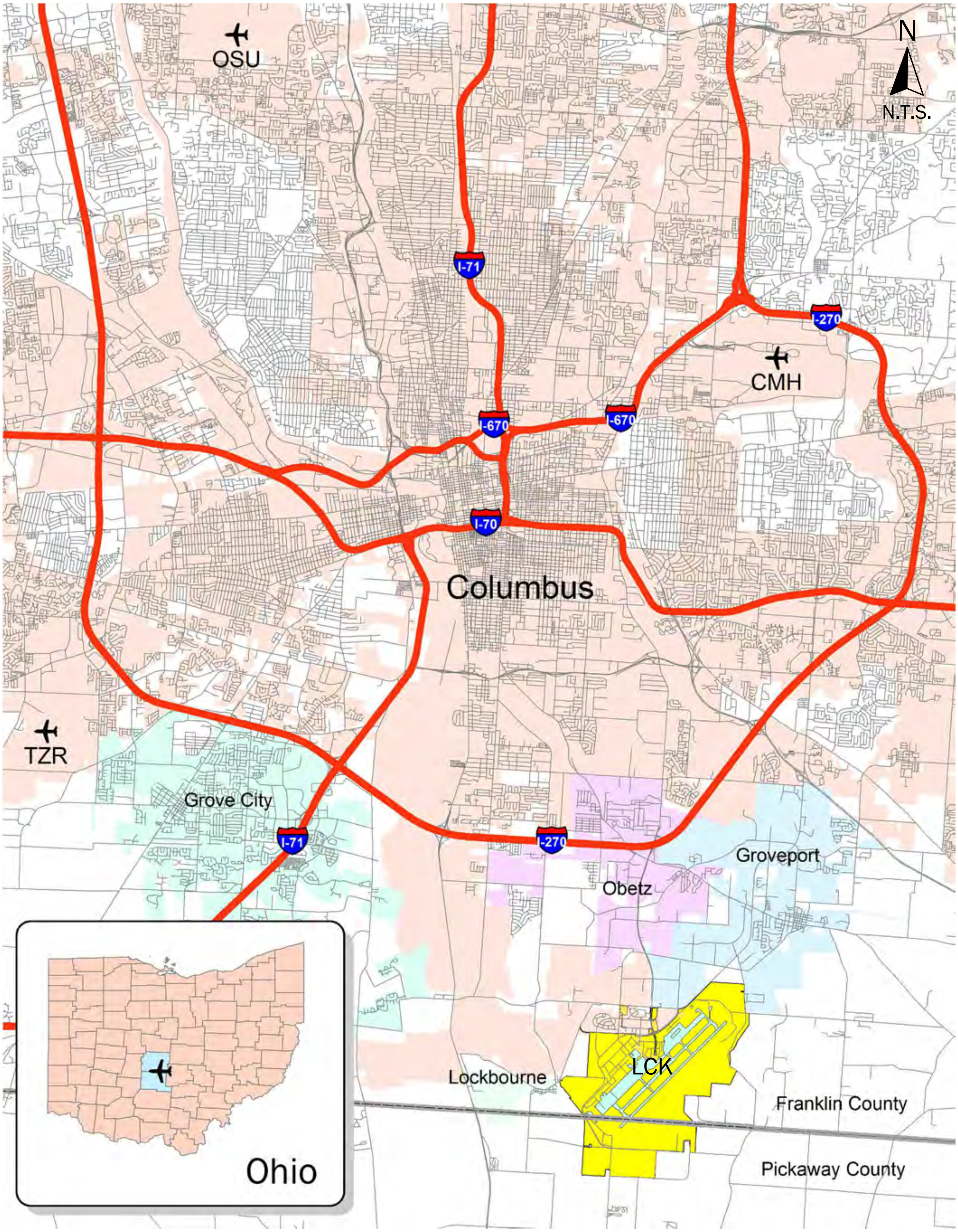


Figure 1-2 Location / Vicinity Map

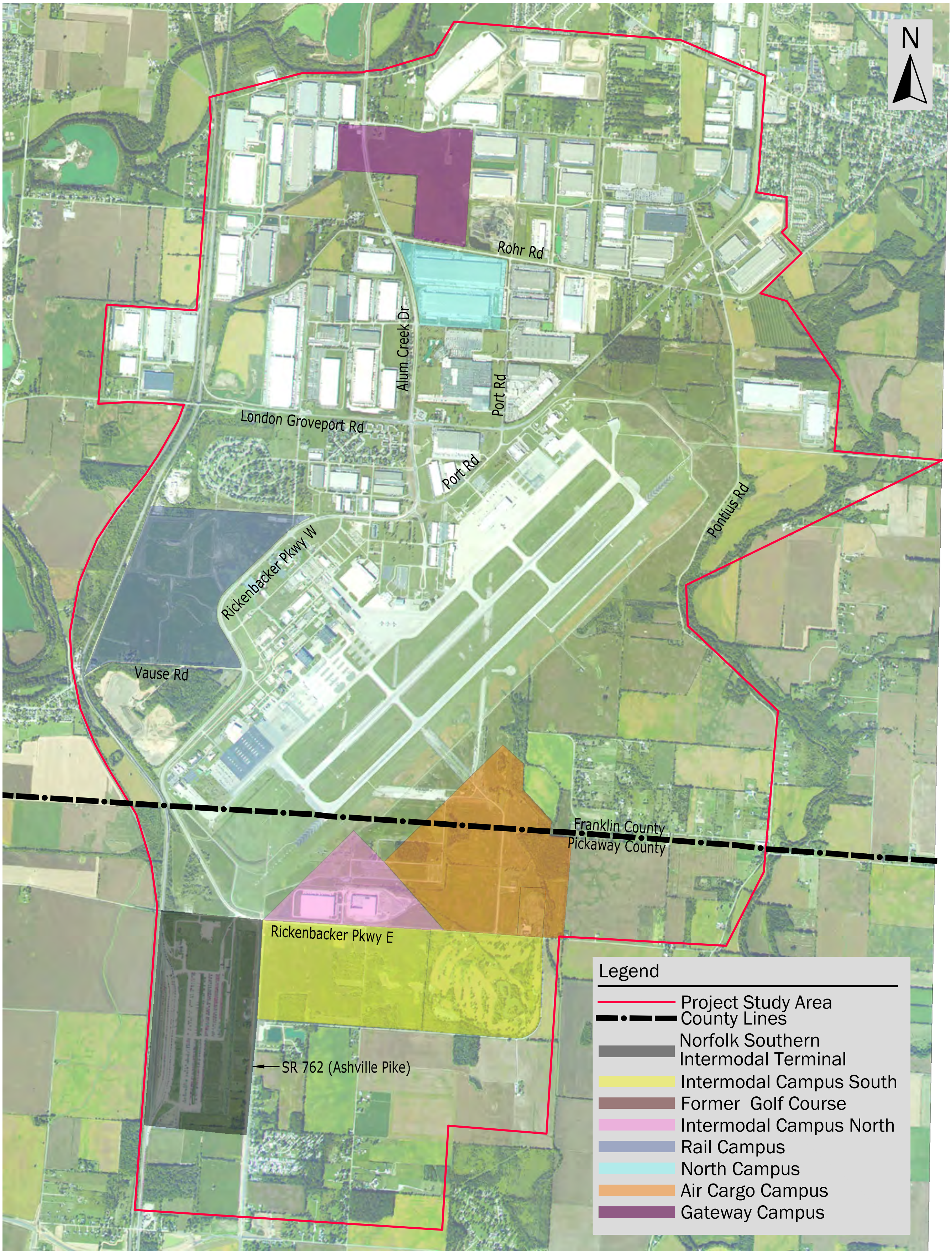


Figure 1-3 Project Study Area

North American International Freight Center

Although the focus of the Study is on the future development of Rickenbacker International Airport, it is important to recognize its role within the North American International Freight Center. The North American International Freight Center is home to a large base of air, road, and rail transport companies supported by a mix of premier freight forwarders, consolidators, Customs brokers and third-party logistics providers. The area offers several facilities and benefits that will be considered throughout the Study:

- Foreign Trade Zone #138
- Rickenbacker Global Logistics Park
- Norfolk Southern Rickenbacker Intermodal Terminal
- US Customs and Border Protection (CBP) Services

Foreign Trade Zone #138

The inland port is located within Foreign Trade Zone (FTZ) #138 which includes LCK, surrounding industrial parks and a 25-county service area in Central Ohio. The FTZ is a site within the US that is legally considered to be outside of customs territory for the purpose of duties, merchandise processing fees, and other considerations. Goods may be brought into the site duty-free and without formal Customs entry. These goods may then be manipulated or re-exported without paying duties and with substantially lower Customs fees. FTZs have been proven to be a successful trade program by consistently creating and retaining jobs and capital investment in the U.S. The FTZ also provides companies the opportunity to lower costs and increase profits.

Rickenbacker Global Logistics Park

The Rickenbacker Global Logistics Park (RGLP) is being developed through a public/private partnership comprised of CRAA, Capitol Square, Ltd., and Duke Realty Corporation. RGLP is strategically located in the heart of the North American International Freight Center and FTZ #138. As shown in **Figure 1-3 Rickenbacker Global Logistics Park**, RGLP's five campuses are strategically located to provide tenants access to three major transportation options – road, rail, and air. RGLP currently offers approximately 4.5 million square feet of distribution space with room to expand to over 20 million square feet. Proximity to major interstates provides access to 47% of the US and 33% of Canadian populations within a one-day drive. Businesses currently operating in the RGLP are responsible for the creation of thousands of jobs and a huge economic benefit for Central Ohio.

Norfolk Southern Rickenbacker Intermodal Terminal

The Rickenbacker area is serviced by two of the largest rail providers in the US, Norfolk Southern Corporation (NS) and CSX Corporation (CSX). The majority of rail freight traveling to Columbus is international and reaches the Ohio Valley via the East and West Coast ocean ports.

The Norfolk Southern Rickenbacker Intermodal Terminal, which is capable of handling more than 400,000 containers annually, is located adjacent to the airport in the southern portion of the inland port. According to the NS website, the company operates one of the most extensive intermodal networks in the East, encompassing approximately 19,500 route miles throughout 22 states and the District of Columbia. Norfolk Southern serves every major container port in the eastern United States and provides connections to multiple rail carriers.

CSX Corporation operates their intermodal terminal facility in West Columbus at Buckeye Yard, a multi-service facility owned by both CSX and NS, as a result of the Conrail purchase in 1999. NS owns the classification yard but closed the hump yard in 2008. The western portion of the yard and the classification yard are currently used for car storage. The CSX Intermodal Columbus Terminal, which occupies the eastern portion of the yard, is a facility capable of handling Containers of Flat Cars (COFC) and Trailers on Flat Cars (TOFC). CSX is considered one of the country's leading transportation companies, providing rail, intermodal and rail-to-truck transload services. According to the company's website, CSX's transportation network includes approximately 21,000 miles, with service to 23 eastern states and the District of Columbia.

US Customs and Border Protection

US Customs and Border Protection (CBP) has a complex mission at ports of entry with broad law enforcement authorities tied to screening all foreign visitors, returning American citizens and imported cargo that enters the U.S. at more than 300 land, air, and sea ports. The Columbus Port of entry is responsible for performing immigration inspections of people entering the country including visitors, Legal Permanent Residents, and U.S. citizens as well as examination and security of all cargo and agriculture products entering the U.S. Their Columbus office is located nearby at 6431 Alum Creek Drive, just north of the entrance to LCK.

An international Federal Inspection Station (FIS) is located on the airport on the ground level of the Passenger Terminal. The FIS facility is regularly used to process international cargo flight crews and infrequent international charter flights. LCK also serves as an authorized Port of Embarkation for the export of animals by air. Building 596 is used for temporary housing of animals prior to flights.

From a cargo perspective, CBP is responsible for knowing what is inside containers, whether it poses a risk to the American people, and ensuring that all proper revenues are collected. Working with the trade community, programs like the *Container Security Initiative* and the *Customs-Trade Partnership Against Terrorism* help to increase security and safeguard the world's trade industry. Also, CBP has undertaken a number of initiatives, such as the use of non-intrusive inspectional technology, to increase its ability to examine cargo effectively without slowing the flow of trade, which plays a significant part in the US economy.

1.1.4 Relevant Studies

During the course of this Study, existing plans and studies were reviewed and evaluated in order to obtain relevant background information. These included but were not limited to previous planning studies, design drawings, the previous ALP Drawing Set, and relevant FAA and state role assessments. In addition, the master plan project team will coordinate closely with MORPC to incorporate information from, and provide information for, the "2018 Rickenbacker Area Comprehensive Study," to allow for a comprehensive development plan for Rickenbacker and the surrounding area. The following section provides an overview of the various studies that were reviewed and/or coordinated with as part of this effort.

1998 Master Plan Update

The previous Master Plan Update for Rickenbacker International Airport was completed in March 1998. Recommendations from the plan include a mix of projects ranging from airfield modifications, navigational aids and lighting, cargo facilities, apron improvements, and other landside projects, many of which have been implemented at LCK. Some of the key implemented projects include:

- Runway 5R-23L rehabilitation and lighting
- Runway 5L rehabilitation and lighting
- Taxiway A (between Taxiways B and D) rehabilitation
- Taxiway B rehabilitation
- Taxiway C (north) reconstruction
- Taxiway D rehabilitation
- Cargo Apron #1 rehabilitation
- Cargo Apron #2 rehabilitation
- Cargo Apron #3 reconstruction
- Additional snow removal equipment
- Additional fuel storage supply/distribution
- Security fence and access controls

Some of the recommendations are also explored in this Study for their continued need today and in the future.

Other recently-completed projects not mentioned in the previous master plan include the new airport traffic control tower and Air Cargo Terminal 5, both completed in 2016. In addition to the projects recommended in this Study, CRAA has future plans to conduct a variety of improvements at LCK including the rehabilitation and widening projects associated with modifications of standards (MOS) for Boeing 747-8F operations, rehabilitation of Hangars 594 and 596, replacement of the fuel farm, Cargo Ramp 3 deicing pad and glycol collection system, and construction of a new aircraft maintenance, repair and overhaul (MRO) hangar and apron. This aggressive development plan over the next several years will likely require funds from the FAA, CRAA, and other private sources.

Rickenbacker Area Comprehensive Study

The Mid-Ohio Regional Planning Commission (MORPC) is working with multiple stakeholders in the Rickenbacker area on a community-driven study to provide an information-based strategy to help Central Ohio position the area as a successful international logistics hub. The MORPC study looks into the area's multifaceted existing factors and their growth potential over the next 10 to 20 years.

The study is being conducted in coordination with Columbus 2020 and the Mid-Ohio Development Exchange, an organization of local economic development organizations from throughout the 11-county Columbus Region, and in conjunction with the Rickenbacker International Airport Master Plan. Major study components include:

- Infrastructure (highways, sanitary, water, broadband)
- Economic Development (development, competitiveness, workforce)
- Energy (providers, efficiency, reliability, production)
- Housing (workforce housing analysis)
- Placemaking (amenities, supporting uses, area identity & perception)
- Continuance of Coordination and Implementation (MORPC, CRAA, Columbus 2020, Columbus Chamber, Pickaway Progress Partnership, local governments, businesses)

Throughout the planning process, these studies will share their respective findings, ideas, and concerns in the interest of developing a comprehensive plan for Rickenbacker International Airport and the surrounding area. Throughout the planning process, stakeholders from both projects will meet to review and discuss the findings and recommendations of each study in an effort to shape the future of the Rickenbacker area.

Insight 2050

Insight 2050 is a collaborative initiative between MORPC, Columbus 2020, ULI Columbus and a stakeholder committee of public and private partners. The initiative aims to help Central Ohio communities proactively plan for development and population growth over the next 30+ years. It seeks to generate objective metrics to help inform local decision making. During the initial phase of the initiative, Insight 2050 examined the effects of population growth and changing development patterns on the Central Ohio region in the coming thirty-five years. Population and land development projections recently released by Insight 2050 will be considered in the formulation of aviation activity forecasts and development of airport alternatives during subsequent phases of this Study.

2007 Rickenbacker Area Road Network Assessment

This planning effort of assessing road needs around Rickenbacker International Airport was undertaken by CRAA and MORPC to help aid in continuity and connectivity of the road network as the area develops. The Rickenbacker Area Road Network Assessment is a conceptual document showing an overall transportation network intended for use as a planning tool. It provides a functional network of roadways in the study area to accommodate the traffic projected to occur through the 2030 study horizon year[1]. A number of projects recommended in the 2007 study have been completed or are underway, including:

- Rickenbacker Parkway
- Bixby Road (US 33 to Winchester Pike) – Under Construction
- Intersection modifications at Alum Creek Drive and Groveport Road
- Rickenbacker Intermodal Connector (Duvall Road to Rickenbacker Parkway)
- Intersection modifications at London Groveport Road and US 23

Other recommendations identified in the study that have not been completed, will be further considered as the LCK Study assesses future roadway infrastructure needs.

1.1.5 Airport Ownership and Management Structure

LCK is owned and operated by the Columbus Regional Airport Authority (CRAA). CRAA, an independent governmental organization, sets the policies under which the airport is operated. In addition, CRAA owns and operates the John Glenn Columbus International Airport and Bolton Field Airport. The CRAA was the result of the merger between the Columbus Municipal Airport Authority and the Rickenbacker Port Authority on January 1, 2003.

The governing body of the CRAA is a Board of Directors comprised of nine business and community leaders. Four members of the Board are appointed by the Mayor of the City of Columbus, four by the Franklin County Board of Commissioners, and one jointly by the Mayor of the City of Columbus and the Franklin County Board of Commissioners. The Board members are appointed to serve four-year staggered terms.

Since the merger in 2003, CRAA has continued to actively market and develop LCK to its fullest potential. Over the past several years, CRAA has invested their time and effort towards making key access and infrastructure improvements in order to protect and maintain their investment and support the overall growth of this facility. In 2016 alone, CRAA welcomed increased passenger and cargo activity, the addition of a new airport traffic control tower, and a new cargo terminal to LCK. A summary of the airport's development history is included in this chapter.

1.1.6 Aeronautical Role of the Airport

Rickenbacker International Airport is a commercial service air carrier airport that supports a variety of activities including air cargo, passenger service, military operations, and general aviation. This joint-use civilian/military airport is an important component of the Rickenbacker area, which includes the Rickenbacker Global Logistics Park, a state-of-the-art intermodal facility, foreign trade zone status, and proximity to major interstates that provide access to major population concentrations in the US and Canada within a single day's drive. The following sections discuss the specific roles and classifications assigned to LCK by the FAA and ODOT.

[1] Rickenbacker Area Road Network Assessment, Executive Summary, January 2007, MORPC.

National Plan of Integrated Airport Systems

The airport is included in the 2017-2021 National Plan of Integrated Airport Systems (NPIAS) as a commercial service primary (non-hub) airport. Airports listed in the NPIAS are eligible to receive Federal funding for specific improvement projects under the FAA's Airport Improvement Program (AIP). The NPIAS includes 3,331 existing and 14 proposed airports that are considered to be essential to national air transportation, 99 of which are located in Ohio. **Table 1-2 FAA NPIAS Service Level** shows the NPIAS categories based on the service levels.

Table 1-2 FAA NPIAS Service Level

Category	Criteria
Commercial Service – Primary	A public use commercial airport that enplanes more than 10,000 passengers annually.
Commercial Service – Non-primary	A public use commercial airport that enplanes between 2,500 and 10,000 passengers annually.
General Aviation – Reliever	A general aviation airport relieving congestion at a commercial service airport and providing general aviation access to its community. Must have at least 100 based aircraft or 25,000 annual itinerant operations.
General Aviation	All other NPIAS airports.

Source: FAA Order 5090.3C, Field Formulation of the National Plan of Integrated Airport Systems, December 2000.

Ohio Airports Focus Study

The 2014 Ohio Airports Focus Study (OH Focus Study) assigns specific classifications to the airports in the state of Ohio. **Table 1-3 Ohio Airport Type Classifications** shows the airport categories in the OH Focus Study. According to the OH Focus study, LCK is classified as an Air Carrier airport. The goal of the OH Focus Study is to optimize investment in a diverse airport system. The OH Focus Study identifies specific facility requirements for each of the airport categories and also describes services that should be available at the airports. The recommendations of the OH Focus Study are evaluated later in this Master Plan Update as part of the facility requirements analysis.

Table 1-3 Ohio Airport Type Classifications

Airport Category	Criteria
Air Carrier	Support commercial airline activities.
Level 1	Meet the needs of nearly all GA corporate jet traffic.
Level 2	Meet the needs of smaller corporate aircraft.
Level 3	Serves light SEP and MEP for business, recreation, and training.
Level 4	Serves small GA pistons and requires basic support facilities and services.

Source: 2014 Ohio Airports Focus Study.

14 CFR Part 139 Certification of Airports

The FAA prescribes rules governing the certification and operation of airports for commercial operations under Federal Aviation Regulations (FAR) Part 139, *Certification of Airports*.

According to the regulation, Part 139 certification is required for any airport having activity by air carrier aircraft capable of carrying nine or more passengers and requires that all such airports prepare an Airport Certification Manual and establish appropriate safety and security procedures in compliance with FAA standards. FAR Part 139 categorizes airports into four classes shown in **Table 1-4 FAR Part 139 Airport Classes**, based on the type of air carrier operations experienced at the facility. LCK is categorized as a Class 1 airport, ARFF Index B and is required to undergo annual FAA inspections in order to retain their FAR Part 139 Airport Certification.

Table 1-4 FAR Part 139 Airport Classes

Class	Description
Class I	Airports serving all types of scheduled operations of air carrier aircraft designed for at least 31 passenger seats and any other type of air carrier operations.
Class II	Airports that serve scheduled operations of small air carrier aircraft and unscheduled operations of large air carrier aircraft.
Class III	Airports that serve only scheduled operations of small air carrier aircraft.
Class IV	Airports that serve only unscheduled operations of large air carrier aircraft.

Source: FAR Part 139, Certification of Airports.

1.1.7 Development History

The majority of the Project Area was historically a military air base. The Rickenbacker Air National Guard Base (RANGB) was originally named the Northeastern Training Center of the Army Air Corps but was later renamed Lockbourne Air Force Base. The base was constructed in 1942 and consisted of 1,574 acres with two runways (north-south and east-west) and a taxiway system connecting the runways.[2] The current runway configuration was constructed in 1951, and the base grew to approximately 4,000 acres.

According to the CRAA website, the base was renamed Rickenbacker Air Force Base in 1974 in honor of World War I flying ace and Congressional Medal of Honor recipient Eddie Rickenbacker, a Columbus native. With the cessation of hostilities in Vietnam and the ending of the military draft, the number of Armed Forces personnel declined sharply, resulting in downsizing and closures of military bases around the country. In April 1978, the Air Force announced plans to transfer Strategic Air Command functions elsewhere, leading to the eventual loss of 12,000 jobs locally.

In 1980, the base closed and the property was transferred to the Ohio Air National Guard (OHANG). Shortly after the base closure, Franklin County Commissioners activated the Rickenbacker Port Authority (RPA), which entered into a joint-use agreement with the US Air Force to share responsibility for operating the airport. The Authority's mission also included receiving and redeveloping airport land released for civilian use, with the idea that the property would be a good location for an industrial site.[3] During the period from 1982 to

[2] Air Force Civil Engineer Center. Second Five-Year Review Report for BRAC Portion of Rickenbacker Air National Guard Base. Page 3-1. February 2014.
[3] http://columbusairports.com/about-us/our-history/, February 2017, Columbus Regional Airport Authority.

1985, the government began the process of divesting portions of the property, including the transfer of 1,642 acres to the RPA.

Throughout the 1990s Rickenbacker developed into an international logistics hub starting with Spiegel/Eddie Bauer and Siemens locating to the area in 1992. A few years later US Customs relocated their offices to LCK. The facility was realigned in 1994, with two parcels remaining in government control: 170 acres for use by the OHANG and 148 acres for use by the Ohio Army Guard / US Reserves[4]. The airfield was transferred to the RPA in 1999.

In late 2002, the City of Columbus, Franklin County, and the Columbus Municipal Airport Authority approved the merger of the Columbus Airport Authority and Rickenbacker Port Authority, and the airport was transferred to the newly formed Columbus Regional Airport Authority on January 1, 2003. For the remainder of the decade, a number of important projects were completed. In July 2003, the Rickenbacker Charter Terminal opened with Southeast Airlines providing the first passenger charter service at Rickenbacker International Airport. During that same year, the first two lanes of Rickenbacker Parkway were completed on the west side of the airport, opening up the southwest side of the airport for development. As a result, CRAA collaborated with Norfolk Southern Corporation in 2008 to build and open the Rickenbacker Intermodal Terminal adjacent to the airport. Later that year, CRAA built and opened Air Cargo Terminal 4 with the assistance of FAA Military Airport Program funding. By the end of the decade, the Heartland Corridor capacity expansion project opened, thereby significantly increasing the speed of containerized freight moving in double-stack trains between the East Coast and the Midwest. The Heartland Corridor extends across Virginia, through southern West Virginia and north through the Rickenbacker Intermodal Terminal to Chicago.

Since 2010, a sampling of important milestones occurred at LCK:

- In 2012, a three-mile stretch of Rickenbacker Parkway opened to accommodate four lanes of traffic and provide a more efficient route for moving freight to and from nearby Norfolk Southern Rickenbacker Intermodal Terminal, improving the flow of truck traffic surrounding Rickenbacker International Airport. This project was a joint effort of the CRAA, MORPC, ODOT and the city of Columbus.
- Allegiant Air, a low-cost air carrier, entered the Columbus passenger service market in November 2012 providing direct flights from the Rickenbacker Charter Terminal to Orlando-Sanford International Airport. Allegiant is the first scheduled carrier to operate from the airport.
- In 2013, Cargolux Airlines International, S.A. initiated scheduled twice-weekly air cargo flights between LCK and Hong Kong using Boeing 747-8 freighter aircraft.
- CRAA formed Rickenbacker Aviation in 2013 to operate as the airport's primary Fixed Base Operator (FBO). Bringing the FBO operations completely in-house increased Rickenbacker's revenue stream for these airport services.

[4] Amec Foster Wheeler Environment & Infrastructure, Inc. Draft – Perfluorinated Compounds Preliminary Assessment: BRAC Portion of Rickenbacker Air National Guard Base. Page 2-1. December 2015.

- In November 2013 Allegiant Air added year-round, non-service flights between LCK and St. Pete-Clearwater International Airport (PIE). The airline later added service to Punta Gorda, Florida in 2014.
- The East-West Connector between the southwest corner of the airport and US Route 23 was completed in October 2014.
- In April 2016, CRAA opened a new $8M Airport Traffic Control Tower. The new tower was designed to be more conducive to current and future business at Rickenbacker and, most importantly, strengthen the safety and security of the airport.
- Most recently, Air Cargo Terminal 5 opened in May 2016 as a result of public-private partnerships between CRAA and Distribution Land Corp/Mast Global. The development of this facility has led to increased air cargo activity at LCK.

It is important to note that many of the planning, design and construction projects conducted at LCK over the years could not have been accomplished without Federal assistance through the FAA's Airport Improvement Program and Military Airport Program. **Table 1-5 FAA Grant Activity** depicts the FAA grant activity at LCK over the past 10 years.

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Table 1-5 FAA Grant Activity

Fiscal Year	Project Description	Grant Sequence Number	Original Grant Amount	Passenger Entitlement Funds	Cargo Entitlement Funds	Non-Primary Entitlement Funds	Military Airport Program (MAP) Funds	Discretionary Funds
2006	Rehabilitate Runway 5R/23L (design only); Update Pavement Management Program; Rehabilitate Ramp # 2	33	$1,060,039	$580,874	$479,165	–	–	–
2006	Install fuel hydrant loop system; Construct air cargo terminal # 4 (Phase 1) (2005 MAP Disbursement)	34	$4,685,832	–	–	–	$4,685,832	–
2007	Construct Air Cargo Terminal # 4; Update Exhibit "A" Property Map; Update Airport Layout Plan (Phase 2) (2007 MAP Disbursement)	35	$4,607,344	$107,344	–	–	$4,500,000	–
2008	Rehabilitate Runway 5R-23L (Phase 1 – Approximately 8,790' x 50'; Phase 2	36	$1,979,437	$913,363	$954,834	$111,240	–	–
2008	Rehabilitate Runway 5R-23L (Phase 1 – Approximately 8,790' x 50'; Phase 2	37	$2,228,842	$530,582	$301,118	$38,760	–	$1,358,382
2009	Rehabilitate Runway 5R-23L (Phase 2, approximately 2,052' x 150'; Phase 3	38	$5,478,976	–	$475,800	$101,307	–	$4,901,869
2011	Rehabilitate Runway 5R-23L pavement and lighting (Phase 3 – final construction) including update pavement management program	39	$4,525,474	1,000,000	1,056,326	150,000	–	$2,319,148
2013	Purchase two replacement snow blowers	40	$1,143,414	–	$1,143,414	–	–	–
2015	Acquire snow removal equipment (two replacement snow brooms)	41	$839,683	$150	$839,683	–	–	–
2016	Update Airport Master Plan Study (Including AGIS Survey and Exhibit "A" Map)	42	$1,518,886	$1,518,886	–	–	–	–
2016	Rehabilitate Parallel Taxiway A (Ph. I – 3,780' x 75' including shoulders, geometry improvements; and lighting and signage improvements). Rehabilitate Connector Taxiway B (1,700' x 75', including shoulders, geometry improvements; and lighting and signage improvements). Rehabilitate Connector Taxiway C (700' x 100', including shoulders, geometry improvements; and lighting and signage improvements). Update Pavement Management Program	43	$7,186,681	$631,114	$1,188,477	–	–	$5,367,090

Source: CRAA. FAA Airport Improvement Program (AIP) Grant Histories

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1.2 Inventory and Description of Existing Facilities

The initial element in the Airport Master Plan process is a thorough inventory of existing facilities currently available at the airport. This inventory chapter summarizes information collected in late 2016 and early 2017 regarding the current airfield configuration, existing facilities, surrounding airspace, and environmental overview. This section summarizes the airport conditions, that going forward in the master plan process, establish the baseline conditions for further analysis and recommendations presented in later chapters. Identification of airside, landside, and surrounding airport facilities, including their respective conditions is critical to the evaluation of facility requirements and opportunities based on existing and forecasted demand. Existing facilities are depicted in **Figure 1-4 Existing Airport Facilities** and **Table 1-6 Existing Buildings**.

1.2.1 Runway Configuration

There are two active parallel runways at LCK, Runway 5R-23L (primary) and Runway 5L-23R (parallel). Both runways are oriented in a northeast/southwest direction and are numbered based on their magnetic direction rounded off to the nearest 10 degrees. The centerline-to-centerline separation between the two runways is 1,000 feet. Runway 5L-23R is 11,902 feet long and 150 feet wide. The surface of the runway is bituminous asphalt, and it is currently in fair condition. Runway 5R-23L is 12,102 feet long and 200 feet wide. The surface is bituminous asphalt in good condition. A decommissioned runway (6-24) is located approximately 649 feet to the southeast from the Runway 5R-23L centerline. A crosswind runway is not available at LCK. **Table 1-7 Existing Runway Design** summarizes the characteristics of the existing runways.

Table 1-7 Existing Runway Design shows the weight bearing capacity of each runway. Both runways can accommodate typical operations of the current design/critical aircraft (747-400). Also, Boeing 747-8 aircraft can operate on both runways according to FAA conditional approval of the modification to standards. Future runway developments funded through AIP or PFC are subject to the applicable FAA standards for the designated critical aircraft.

Runway Shoulders

Runway shoulders are an area adjacent to the defined edge of paved runways that provide a transition between the pavement and the adjacent surface. Runway 5L-23R has variable width paved runway shoulders in fair condition. There are sections where the runway shoulders are wider due to pavement remnants of a wider runway. However, these pavement sections are in fair to poor condition.

Runway 5R-23L does not have paved shoulders. Modification of Standards (MOS) Component # 1 allows for Boeing 747-8F operations without the required 40 feet paved shoulders. Paved shoulders may be substituted with maintained turf shoulders. According to Engineering Brief No. 74A, the 747-8 "… has demonstrated that it can be safely operated on runways as narrow as 150 feet wide …". However, further analysis to safely accommodate Boeing 747-8F operations is provided in the requirements chapter.

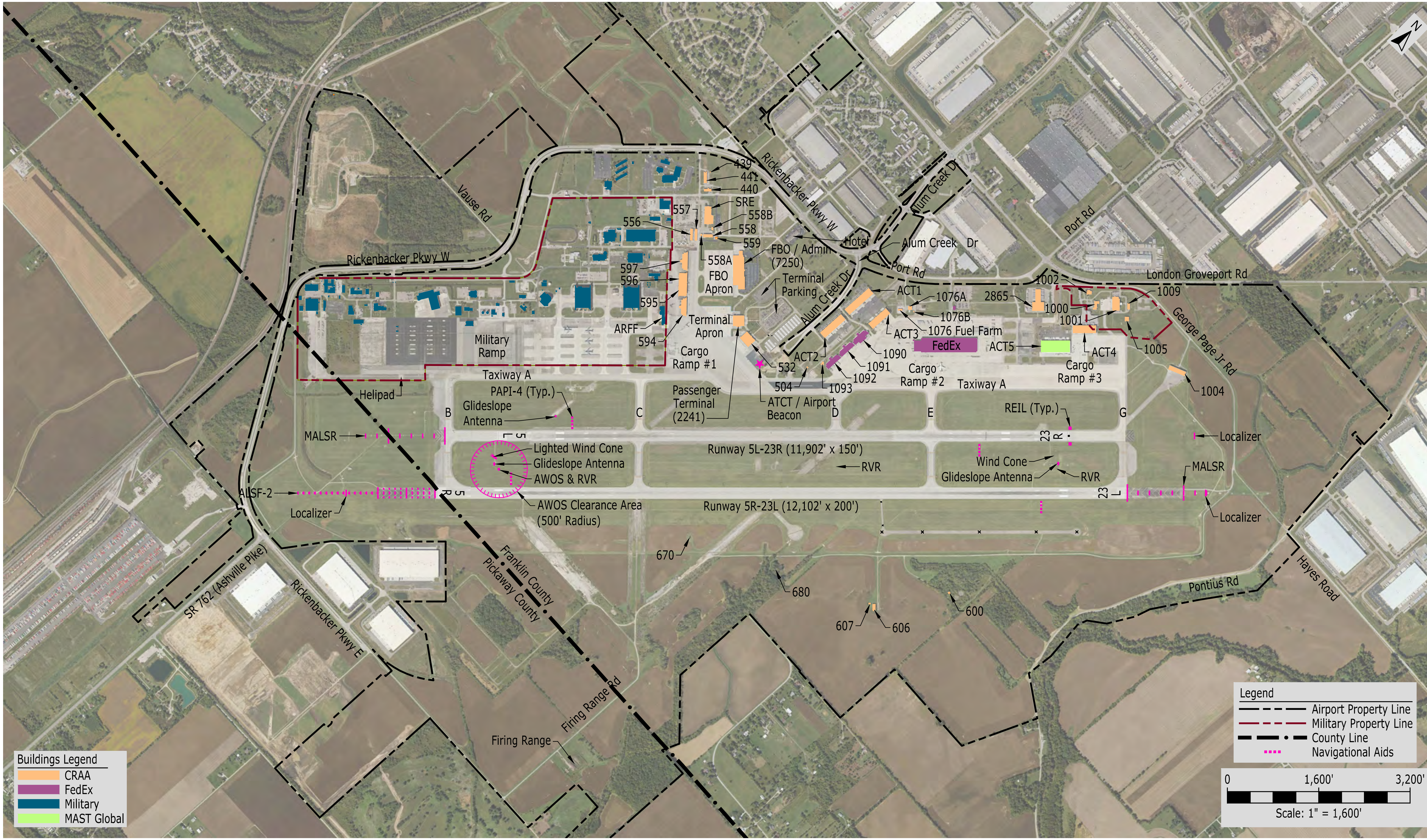

Figure 1-4 Existing Airport Facilities

Table 1-6 Existing Buildings

Building Number	Tenant Use	Owner	Building Area (SF)	Built	Address
439	Storage Shed	CRAA	240	Unknown	Club Rd
440	CRAA Administration	CRAA	5,490	1970	7161 2nd St.
441	Maintenance Shop (Old)	CRAA	9,610	1959	2042 Club Rd
504	Sanitary Lift Station	CRAA	560	1983	Access Rd.
532	Hangar	CRAA	34,930	1942	2295 John Circle Dr.
556	Maintenance Storage	CRAA	8,220	1958	2083 Club Rd.
557	Maintenance Storage	CRAA	8,260	1958	2081 Club Rd.
558	SRE Vehicle Maintenance	CRAA	7,560	2001	2058-D Club Rd
559	Triturator	CRAA	420	2001	2058-E Club Rd.
594	Hangar (Vacant)	CRAA	28,880	1954	2202 Reserve Rd.
595	Hangar (UPS)	CRAA	28,270	1953	2162 Reserve Rd.
596	Hangar (Vacant)	CRAA	28,270	1953	2134 Reserve Rd.
597	Hangar (Vacant)	CRAA	26,310	1954	2096 Reserve Rd.
600	Wastewater Plant (Abandoned)	CRAA	1,120	1942	Perimeter Rd.
606	Communications (Abandoned)	CRAA	484	1951	Perimeter Rd
607	Power Station (Abandoned)	CRAA	4,500	1951	Perimeter Rd
670	Former TACAN Station	CRAA	360	1959	Perimeter Rd.
680	Former Ordinance Disposal	CRAA	2,750	1953	Perimeter Rd.
1000	Office Building (Vacant)	CRAA	8,190	1957	3005 Geo. Page Jr. Rd.
1001	Hangar (Airnet II)	CRAA	30,115	1956	3041 Geo. Page Jr. Rd.
1002	Office Building (Vacant)	CRAA	4,970	1957	2987 Geo. Page Jr. Rd.
1004	Hangar (Vacant)	CRAA	21,270	1956	3251 Geo. Page Jr. Rd.
1005	Storage	CRAA	4,331	1990	3077 Geo. Page Jr. Rd.
1009	Storage (Vacant)	CRAA	4,180	1962	3077 Geo. Page Jr. Rd.
1076	Fuel Farm	CRAA	2,030	1952	Cargo Rd.
1090	Hangar (FedEx Equipment Storage/ Maintenance)	AeroTerm	32,830	Unknown	7240 N. Access Rd.
1091	Hangar	AeroTerm	26,880	Unknown	7240 N. Access Rd.
1092	Hangar	AeroTerm	26,880	Unknown	N. Access Rd.
1093	Airfield Lighting Vault	CRAA	1,760	1952	N. Access Rd.
2241	Passenger Terminal	CRAA	42,600	2001	2241 John Circle Dr
2865	Forward Air	CRAA	50,000	1994	2865 Geo. Page Jr. Rd.
7250	FBO/CRAA Administration	CRAA	148,170	2004	7250 Star Check Dr.
ACT1	Air Cargo Terminal I	CRAA	67,870	1999	7200 Alum Creek Dr.
ACT2	Air Cargo Terminal II	CRAA	58,350	2000	7280 Alum Creek Dr.
ACT3	Air Cargo Terminal III	CRAA	46,060	2001	2566 Jerrie Mock Ave.
ACT4	Air Cargo Terminal IV	CRAA	53,240	2007	2961 Geo. Page Jr. Rd.
ACT5	Air Cargo Terminal V	MAST Global	100,000	2016	2893 Geo. Page Jr. Rd.
SRE	Snow Removal Equipment Storage	CRAA	40,540	1999	2058 Club Rd.
FEDX	FED EX Terminal	AeroTerm	290,000		7066 Cargo Rd.
2323	Hotel				2323 Rickenbacker Pkwy. W
ARFF	ARFF	Military		2005	

Source: CRAA, Michael Baker International

Runway Blast Pads

Runway blast pads are paved areas that provide protection from blast erosion beyond the runway ends. Runway 5R-23L has 1,000 feet long and 200 feet wide blast pads (paved overrun) located at each runway end. The length of 1,000 feet is also a military design requirement that provides protection in the event that a departing aircraft overruns beyond the end of the runway, or an aircraft arriving touches down before the beginning of the runway. Runway 5L has a blast pad that is 200 feet wide and 200 feet long. The blast pad for Runway 23R is 150 feet long and 200 feet wide. The pavement of the Runway 5R-23L blast pads is in very poor condition, and the Runway 5L-23R blast pads are in fair condition.

Current dimensional standards (ADG V) require a blast pad width of 220 feet and a length of 400 feet. The dimensions of the existing blast pads do not meet the requirements for the existing dimensional standards ADG V and the critical aircraft (747-400). In addition, the current blast pads do not meet the requirements for operating Boeing 747-8 aircraft (ADG VI). However, MOS # 2 allows for ADG V and VI operations on Runway 5R-23L without the required blast pad dimensions. MOS # 8 allows for ADG V and VI operations on Runway 5L-23R without the required blast pad dimensions.

According to FAA Engineering Brief 74A, to accommodate Boeing 747-8 operations, the 220-foot standard blast pad width does not need to be increased to the ADG VI standard of 280 feet. However, the width of the current blast pads (200 feet) falls 20 feet short of the width required by ADG V standards. According to an FAA letter dated June 11, 2013, the FAA conditionally approved Boeing 747-8 operations requiring a runway inspection following a Boeing 747-8 operation and prior to any air carrier operation. According to the FAA letter dated July 22, 2013, the FAA conditionally approved Boeing 747-8 operations on Runway 5L-23R, requiring a runway and blast pad inspection immediately following a Boeing 747-8 operation and prior to any air carrier operation. Also, future runway and blast pad construction funded under the FAA's Airport Improvement Program is subject to the design standards corresponding to the critical aircraft (ADG V or ADG VI) as determined in this Study.

Runway Overruns

Runway overruns reduce the probability of serious damage to an aircraft in case an aircraft runs off the runway during takeoff or landing, or an aircraft lands short during landing. Runway overrun requirements are a military standard similar to the runway safety area (RSA) requirements. However, military runway overruns are generally a paved area beyond the end of a runway, of the same width as the runway plus the shoulders, centered on the extended runway centerline. In order to meet this requirement, the thresholds of Runway 5L-23R have been displaced. The requirements for overruns and the validity of the existing displaced thresholds will be further analyzed in the requirements chapter.

Table 1-7 Existing Runway Design

Item	Runway 5L-23R		Runway 5R-23L	
	5L	23R	5R	23L
Runway Length (feet)	11,902		12,102	
Displaced Threshold	898	989	–	–
Runway Width (feet)	150		200	
True Bearing	45.31°	225.32°	45.31°	225.32°
Magnetic Declination	7.09° W (changing by 0.04° W per year)			
Effective Gradient	0.1% up to NE		0.4% up to NE	
Shoulder width (feet)	Varies		0	
Blast Pad				
Width (feet):	200	200	200	200
Length (feet):	200	150	1,000	1,000
Surface Type and Condition	Asphalt Fair		Asphalt Good	
Surface Treatment	Grooved		Grooved	
PCN				
Class:	69		92	
Type:	Flexible		Flexible	
Subgrade Strength:	Medium		Low	
Pressure Limit:	High		High	
Rating Method:	Technical		Technical	
Weight Bearing Capacity				
Single Wheel:	75,000		75,000	
Dual Wheel:	190,000		210,000	
Dual Tandem Wheel:	320,000		380,000	
Double Dual Tandem Wheel:	825,000		850,000	
Runway Markings	Precision Instrument			
Runway Design Code (RDC)	D-V-2400	D-V-4000	D-V-1200	D-V-2400
Critical Aircraft	747-8*		747-8*	

Source: Form 5010, AVN Datasheets, eNASR, 2009 LCK ALP. (*) With FAA-approved modification to standards

Runway Declared Distances

As described in AC 150/5300-13A, declared distances represent the maximum distances available and suitable for meeting takeoff, rejected takeoff, and landing requirements. Declared distances are generally used by turbine powered aircraft operators to determine if the runway length meets the operating performance requirements of the aircraft. For 14 CFR Part 139 certificated airports, declared distances must be published even when all the distances are equal and equal to the runway length in both directions.

Because of the Runway 5L-23R displaced threshold, the available runway distance has been reduced. **Table 1-8 Existing Declared Distances** summarizes the existing declared distances. In order to maximize the use of available runway pavement, the requirement of a displaced threshold and the need for declared distances will be further analyzed in the requirements chapter.

The minimum distances required for takeoff and landing obtained by the pilot during flight planning must fall within the applicable declared distances before the pilot can accept the runway for takeoff or landing.

The Takeoff Run Available (TORA) is the distance available and suitable for takeoff run requirements. The Takeoff Distance Available (TODA) is the length of TORA plus any additional runway or clearway beyond the departure end of the TORA that may be used to satisfy takeoff requirements. TORA and TODA may be adjusted to reduce incompatible land uses in the departure RPZ, mitigate environmental effects, or mitigate penetrations to the departure Obstacle Clearance Surface (OCS).

The Accelerate-Stop Distance Available (ASDA) is the distance available to accelerate from brake release to the limit of the rejected takeoff point (V_1). This distance provides sufficient and suitable pavement to stop the aircraft without overrunning the runway end. The Runway Safety Area (RSA) provides additional protection in the case of an overrun. However, the RSA beyond the departing end is not part of the ASDA. The ASDA may be adjusted when standard RSA length beyond the end of the runway is not available.

Landing Distance Available (LDA) is the distance available from the landing threshold to complete approach, touchdown, and decelerate to a stop. As the ASDA, the LDA provides a sufficient and suitable runway to complete the landing without overrunning the runway end. The RSA beyond the runway end provides additional protection in case of a runway end overrun during landing. The LDA is affected by penetrations to the approach obstacle clearance surface, Runway Protection Zone (RPZ) requirements, RSA requirements (prior and beyond runway end), and Runway Object Free Area (ROFA) (prior and beyond runway end). The LDA may be adjusted to satisfy RSA, ROFA, RPZ, and OCS requirements.

Aircraft operations are not prohibited from operating beyond the declared distance limit during takeoff, landing, or taxi operation provided the runway surface is appropriately marked as a usable runway.

Table 1-8 Existing Declared Distances

Runway	Declared Distances (Feet)			
	TORA	TODA	ASDA	LDA
5L	11,902	11,902	11,902	11,004
23R	11,902	11,902	11,902	10,913
5R	12,102	12,102	12,102	12,102
23L	12,102	12,102	12,102	12,102

Source: FAA Form 5010, Chart Supplement.

1.2.2 Runway Protection

Safe and efficient operations at the airport require certain areas of the airfield to be clear of objects or restricted to objects with a certain function, composition, or height. A number of areas and volumes of airspace have been defined to protect aircraft while operating on the runways. The following sections describe these areas, their current associated standards, and any issues.

Runway Safety Area and Runway Object Free Area

The runway safety area (RSA) is a surface surrounding the runway, prepared, or suitable, for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway. The RSA also provides greater accessibility for firefighting and rescue equipment in emergency situations. The dimensions of the RSA are defined by the Runway Design Code (RDC) and the criteria described in AC 150/5300-13A. The RSA is centered on the runway centerline. The dimensions of the existing RSA are shown in **Table 1-9 Existing Runway Protection Geometry**.

According to AC 150/5300-13A, the RSA must meet the following standards:

- The RSA must be cleared and graded and not have potentially hazardous ruts, humps, depressions, or other surface variation.
- The RSA must be drained by grading or storm sewers to prevent water accumulation.
- The RSA must be capable, under dry conditions, of supporting snow removal equipment, Aircraft Rescue and Fire Fighting (ARFF) equipment, and the occasional passage of aircraft without causing damage to the aircraft.
- The RSA must be free of objects, except for objects that need to be located in the RSA because of their function.

Table 1-9 Existing Runway Protection Geometry shows the dimensions of the RSA. The RSA of Runway 5L-23R and Runway 5R-23L meets the required RSA standards. Also, the RSA dimensions required for RDC V are the same as the RSA dimensions required for RDC VI. Therefore, the current RSA is capable of accommodating Boeing 747-8 (RDC VI) operations. **Table 1-9 Existing Runway Protection Geometry** also shows the dimensions of the existing Runway Object Free Area (ROFA) for Runway 5L-23R and Runway 5R-23L. The current dimensions of the ROFA accommodate Boeing 747-8 operations and meet RDC V and VI requirements.

Runway Protection Zone

The runway protection zone (RPZ) is a surface trapezoidal in shape and centered about the extended runway centerline. The purpose of the RPZ is to enhance the protection of people and property on the ground. Generally, the RPZ begins at 200 feet beyond the end of the runway. However, the RPZ may begin at a location other than the runway end in order to meet other standards. When the RPZ begins at a location other than 200 feet beyond the end of the runway, two RPZs are required, a departure RPZ, and an approach RPZ. Because Runway 5L-23R has displaced thresholds, the approach RPZs begin at 200 feet from the threshold, and the departure RPZs begin at 200 feet beyond the runway end. For Runway 5R-23L, the RPZs begin at 200 feet beyond the end of the runway.

Currently, the RPZs are located on existing airport property. Airport service roads are located within the RPZs. Small sections of Hayes Rd., and Pontius Rd. are located within the Runway 5R departure RPZ and Runway 23L approach RPZ.

Runway Obstacle Free Zone

The Runway Obstacle Free Zone (ROFZ) is a three-dimensional volume of airspace which protects aircraft during the transition period to and from the runway. The OFZ clearing standards preclude taxiing and parked airplanes and object penetrations, except for frangible NAVAID locations that are fixed by function. Under certain circumstances, vehicles, equipment, and personnel may be authorized by air traffic control to enter the area. The OFZ is comprised of the inner-approach OFZ and the inner-transitional OFZ. However, the inner-approach OFZ applies only to runways equipped with an Approach Lighting System (ALS), and the inner-transitional OFZ only applies to runways with lower than ¾ stature mile approach visibility minimums. Therefore, the inner-approach OFZ and inner-transitional OFZ standards are not applicable to the Runway 23R approach end. The existing dimensions of the RPZs are shown in **Table 1-9 Existing Runway Protection Geometry**.

Precision Obstacle Free Zone

The Precision Obstacle Free Zone (POFZ) is the volume of airspace above an area beginning at the threshold, at the threshold elevation, and centered on the extended runway centerline 200 feet long and 800 feet wide. However, the POFZ is in effect only when all the operational conditions are met: the approach includes vertical guidance, reported ceiling below 250 feet, visibility is less than a ¾ statute mile, or the Runway Visual Range (RVR) is below 4,000 feet.

There are no taxiways inside the POFZ. The POFZ is considered clear even if the wing of an aircraft holding on a taxiway waiting for runway clearance penetrates the POFZ. However, neither the fuselage nor the tail of the aircraft may penetrate the POFZ. This situation may occur when an aircraft is holding on Taxiways “B” and “G” between the two runways. However, there are no additional hold markings required to indicate the location of the POFZ.

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Table 1-9 Existing Runway Protection Geometry

Dimensions	Runway 5L-23R		Runway 5R-23L	
	5L	23R	5R	23L
Runway Safety Area (RSA)				
Length beyond departure end (feet):	1,000	1,000	1,000	1,000
Length prior to threshold (feet):	600	600	600	600
Width (feet):	500	500	500	500
Runway Object Free Area (ROFA)				
Length beyond runway end (feet):	1,000	1,000	1,000	1,000
Length prior to threshold (feet):	600	600	600	600
Width (feet):	800	800	800	800
Runway Obstacle Free Zone (ROFZ)				
Length beyond runway end (feet):	200	200	200	200
Width (feet):	400	400	400	400
Inner-approach OFZ		–		
Length (feet):		–		
Width (feet):	400	–	400	400
Slope:	50:1	–	50:1	50:1
Inner-transitional OFZ				
	Yes	N/A	Yes	Yes
Precision Obstacle Free Zone (POFZ)				
Length (feet):	200	–	200	200
Width (feet):	800	–	800	800
Approach Runway Protection Zone (RPZ)				
Length (feet):	2,500	1,700	2,500	2,500
Inner Width (feet):	1,000	1,000	1,000	1,000
Outer Width (feet):	1,750	1,510	1,750	1,750
Acres:	78.914	48.978	78.914	78.914
Departure Runway Protection Zone (RPZ)				
Length (feet):	1,700	1,700	1,700	1,700
Inner Width (feet):	500	500	500	500
Outer Width (feet):	1,010	1,010	1,010	1,010
Acres:	29.465	29.465	29.465	29.465

Source: 2009 ALP Update, FAA AC 150/5300-13A.

Runway Separation

The current runway separation dimensions are shown in **Table 1-10 Existing Runway Separation Standards**. The current runway centerline to parallel centerline is 1,000 feet and accommodates simultaneous aircraft operations under VFR. The distance between Runway 5L-23R and the parallel Taxiway “A” varies between 790 to 1,000 feet. This taxiway separation distance accommodates the current ADG and critical aircraft. The aircraft parking areas are located adjacent to Taxiway “A”. The approximate separation between the runway centerline and the aircraft parking areas is as follows: Ramp # 1: 980 feet, Ramp # 2 and Ramp # 3: 1,030 feet, and Military Ramp: 1,200 feet.

Table 1-10 Existing Runway Separation Standards

Dimensions	Runway 5L-23R		Runway 5R-23L	
	5L	23R	5R	23L
Runway Centerline to:				
Parallel runway centerline (feet):	1,000		1,000	
Holding position (feet):	Varies > 280		Varies > 280	
Parallel taxiway centerline (feet):	Varies 790 to 1,000		–	–
Aircraft Parking Area (feet):	> 500		> 500	
Helicopter touchdown pad (feet):	1,000		2,000	

Source: 2009 ALP Update

Runway Orientation and Wind Coverage

Runway orientation is a key factor for airport safety and efficiency. Wind speed and direction is a key factor influencing runway orientation and the number of runways. Wind conditions affect the aircraft in varying degrees. Small aircraft are more sensitive to crosswind conditions.

The wind data analysis considers the wind speed and direction as it relates to the existing runway layout during all weather conditions, VFR conditions, IFR conditions, and IFR CAT I and II conditions. The FAA recommends that sufficient runways be provided to achieve 95% wind coverage. As shown in **Table 1-11 Existing Wind Coverage,** the existing runway configuration provides adequate wind coverage for the critical aircraft without the need for a crosswind runway.

Table 1-11 Existing Wind Coverage

Flight Rules	Runway Direction	Wind Coverage Percentage (%) Allowable Crosswind Component (Knots)			
		10.5	13	16	20
All Weather	5	45.52	46.41	47.15	47.31
	23	65.41	67.74	69.32	69.80
	5-23	93.68	96.90	99.23	99.87
VFR	5	45.20	46.07	46.81	46.97
	23	65.44	67.80	69.41	69.90
	5-23	93.63	96.87	99.22	99.87
IFR	5	51.96	53.25	54.17	54.34
	23	62.03	63.85	65.18	65.60
	5-23	93.90	97.01	99.27	99.85
IFR CAT I	5	53.64	53.94	54.22	54.32
	23	69.86	70.69	71.37	71.61
	5-23	97.51	98.63	99.59	99.93
IFR CAT II	5	70.10	70.16	70.29	70.31
	23	88.73	89.02	89.31	89.68
	5-23	98.72	99.08	99.49	99.88

Source: National Climatic Data Center (NCDC) Integrated Surface Data (ISD).
FAA AGIS Windrose Generator

1.2.3 Taxiways and Taxilanes Configuration

Taxiways are paved areas defining an established path for taxiing of aircraft from one part of an airport to another. A taxilane is a taxiway designated for low speed and precise taxiing, providing access from taxiways to aircraft parking positions and other areas. In general, the efficiency of a runway system is directly related to the capability of the taxiway system to facilitate the movement of aircraft traffic to and from the runway system. **Table 1-12 Existing Taxiways** summarizes the characteristics of the existing taxiways.

Previous taxiway design and protection guidance was based solely on the Airplane Design Group (ADG). The ADG takes into account the aircraft wingspan and tail height, but not the dimensions of the aircraft undercarriage. The new design guidelines presented in AC 150/5300-13A establish the Taxiway Design Group (TDG), which is based on the Main Gear Width (MGW) and the Cockpit to Main Gear Distance (CMG). The current critical aircraft is the Boeing 747-400 and is classified as TDG 5. The FAA has conditionally approved a Modification of Standards (MOS) to accommodate operations of the Boeing 747-8, which is classified as TDG 5. However, as part of the conditions of the MOS, aircraft with wingspan greater than 171 feet are restricted to operate at 15 miles per hour on all taxiways.

Table 1-12 Existing Taxiways

Taxiway	Type	Width (Feet)	Shoulder Width[1]	PCI
A	Full Parallel Taxiway	75	35	41-91
B	Entrance Taxiway	75-100	35	40-68
C	Right Angle Exit Taxiway	75-100	35	53-94
D	Right Angle Exit Taxiway	100	35	53
E	Right Angle Exit Taxiway	75	35	59-83
G	Entrance Taxiway	75	35	36-77

Source: CRAA 2015/2016 Airport Pavement Management Program Data (PCI Final)
Note: [1]Current TDG 5 standard requires 30-foot shoulders, and CRAA is continuing with MOS Phase 1 Improvements Project.

1.2.4 Aircraft Aprons

Aprons provide a paved area to accommodate aircraft during loading and unloading of passengers or cargo. Aprons are usually associated with a terminal facility, for example, a passenger terminal or an air cargo processing facility. The existing aprons are designated as Ramp #1, Ramp #2, Ramp #3, and Military Ramp. Currently, each ramp serves multiple functions and users. Ramp #1 provides apron space for cargo operations, commercial passenger operations, and general aviation operations. Ramp #2 provides apron space for cargo operations. Ramp #3 provides apron space for cargo operations and a small portion of general aviation operations. Aprons are provided with ground vehicle roadway markings and signage, which facilitate the circulation of vehicles and ground support equipment. Aircraft apron locations and pavement conditions are indicated in **Table 1-13 Aircraft Apron Areas** and **Figure 1-5 Existing Pavement Conditions**.

Table 1-13 Aircraft Apron Areas

Ramp	Approx. Size (Square Feet)	Functions	General Condition
Ramp # 1	2,440,356	Cargo apron, passenger terminal apron, general aviation	Good to fair condition PCI 56-100
Ramp # 2	1,926,994	Cargo apron	Fair condition PCI 56-70
Ramp # 3	1,131,315	Cargo apron, general aviation apron	Good condition PCI 86-100
Military Ramp	–	Military apron	Good

Source: CRAA Pavement Management System. Ramp size are approximate values to be updated when FAA AGIS data becomes available

Air Cargo Aprons

On Cargo Ramp # 1, there are five marked cargo aircraft parking positions within a delineated area of approximately 286,000 square feet. However, the actual number of aircraft that can be parked on the apron depends on the size of the aircraft. As a result, the Boeing 747-200 is the largest aircraft that can be parked. Aircraft parking in this area is limited to a maximum fuselage length of 231 feet. The current markings delineating the parking position areas allow for airplane design group (ADG) IV taxilanes. The taxilanes provide access from Taxiway “A” to the parking positions, the passenger terminal apron, and the FBO Ramp. The pavement condition of the cargo aprons in the Ramp # 1 area varies from fair to satisfactory with a PCI range from 64 to 73.

Cargo Ramp # 2 provides approximately 1,700,000 square feet of apron space. Cargo Ramp # 2 is primarily used by FedEx. Adjacent to the FedEx building there are six aircraft parking positions. All FedEx parking positions are provided with an underground fuel line. Aircraft parking position #25 is located adjacent to Building #1091 and #1092. This parking position is currently utilized to serve very large aircraft such as the Boeing 747-8 and the Antonov 124. A fuel line and hydrant are available at parking position #25. In front of building #1090 and ACT3, there are markings for two additional parking positions designed to accommodate Boeing 767 aircraft. These parking positions were used by a former tenant. However, they are currently not being used. Northeast of the FedEx building there is an additional parking position capable of accommodating very large aircraft such as the Boeing 747-8. A fuel line is also provided to this parking position. The pavement is currently in fair condition with a PCI of 60.

Cargo Ramp # 3 provides approximately 1,086,290 square feet of apron space. This apron is part of a phased development of the air cargo terminal buildings ACT 4 and ACT 5. The pavement is in good condition with a PCI ranging between 94 and 100. There are four parking positions that can accommodate aircraft as large as the Boeing 747-8. Each parking position is provided with a fuel line and hydrant. The parking position in front of the ACT 4 building is also provided with a nose tether which prevents the aircraft from tipping during certain loading operations.

Table 1-14 Existing Cargo Aprons

Ramp #	Approx. Size (square feet)	Aircraft Parking Positions	Condition / PCI	Tenants
1	286,000	5	Fair to satisfactory / 64-73	UPS
2	1,700,000	11	Fair / 60	FedEx
3	1,086,290	4	Good / 94-100	Multiple

Source: CRAA Pavement Management System. Ramp size are approximate values to be updated when FAA AGIS data becomes available

Passenger Terminal Apron

The commercial passenger apron is located adjacent to the passenger terminal. The approximate area of the apron is 161,000 square feet. The pavement is in good condition with a PCI of approximately 87. The apron provides space for simultaneous parking of two aircraft, with two passenger bridges providing access between the aircraft and the terminal. The passenger bridges can be rearranged to provide access to several types of aircraft and sizes up to ADG IV.

General Aviation Apron

As show in **Table 1-15 Existing General Aviation Aprons**, there are three general aviation aprons. The largest apron is adjacent to the FBO building previously occupied by Airnet Systems, Inc. In mid-2017, Rickenbacker Aviation and the CRAA administrative offices will be relocated to the building previously occupied by Airnet. The apron will be designated as the FBO Ramp. The FBO Ramp provides approximately 418,000 square feet of apron space. The pavement of the FBO Ramp is in good condition with a PCI of approximately 95. A valve-controlled de-ice pad is located on the FBO Ramp adjacent to the connector taxilane at the mid-section of the apron. The existing FBO apron is adjacent to Building # 532 which is currently occupied by Rickenbacker Aviation. The apron provides approximately 96,000 square feet of aircraft parking space. The pavement is in serious to fair condition with a PCI between 24 and 68. Adjacent to Building #1001, currently occupied by Airnet II, there is an apron primarily used by Airnet II customers. The apron is approximately 45,000 square feet, and the pavement is in good condition with a PCI of 96.

Table 1-15 Existing General Aviation Aprons

Apron	Approx. Size (square feet)	Aircraft Parking Positions	Condition / PCI	Tenants
FBO Ramp	418,000	Multiple tie-downs	Good / 95	Rickenbacker Aviation
Existing FBO	96,000	About 10	Serious to Fair / 24-68	Rickenbacker Aviation
Airnet II	45,000	Multiple tie-downs	Good / 96	Airnet II

Source: CRAA Pavement Management System. Ramp size are approximate values to be updated when FAA AGIS data becomes available.

Military Apron

The portion of the apron currently restricted to military use covers approximately 171 acres. The apron is owned, operated and maintained by the military. The northern portion of the ramp is used by the Ohio Air National Guard's 121st Air Refueling Wing in support of their KC-135 Stratotanker mission. The southwestern portion of the military ramp is dedicated to supporting UH-60 Black Hawk helicopter activities associated with the Ohio Army National Guard's 137th Aviation Regiment.

1.2.5 Helipad

A helipad is located on Taxiway "A", in front of the Military Ramp, approximately 750 feet from Runway 5L end to the southwest along the extended centerline of Taxiway "A". The helipad is approximately 95 x 95 feet. The distance between the final approach and takeoff area (FATO) is greater than 700 feet. The helipad is used primarily for military operations.

1.2.6 Airfield Pavement Condition

Airfield pavements, particularly runway pavements are constructed to provide adequate support for the loads imposed by aircraft, as well as resisting the abrasive action of traffic and deterioration from adverse weather conditions and other influences. Airfield pavements are designed not only to withstand the load of the heaviest aircraft expected to use the airport, but they must also be able to withstand repetitive loadings of the entire range of aircraft expected to use the pavement over many years. Airport Improvement Program (AIP) Grant Assurance 11 requires the sponsor to implement and maintain a pavement maintenance and management program. A pavement management program (PMP) is a set of procedures for collecting, analyzing, maintaining, and reporting pavement data. **Figure 1-5 Existing Pavement Conditions** shows the pavement condition based on the 2015/2016 inspection and the existing pavement management system. The pavement condition is represented by the Pavement Condition Index (PCI). The method to determine the PCI is described in AC 150/5380-7B, Airport Pavement Management Program (PMP). The PCI is a numerical indicator representing the structural integrity and surface operational condition of the pavement. The PCI is based on an objective measurement of the type, severity, and quantity of distress. The PCI values range from 0 to 100, where 0 indicates a failed pavement and 100 is a new pavement. Deterioration curves can be applied to the PCI values to estimate future PCI values and perform a life-cycle cost analysis to plan for pavement maintenance and rehabilitation projects.

As shown in **Figure 1-5 Existing Pavement Conditions**, Runway 5R-23L is in satisfactory to good condition. Runway 5L-23R is in fair condition, with some sections in satisfactory and poor condition. The section of Taxiway "A" between Taxiway "B" and Taxiway "D" is in poor condition. The remaining section of Taxiway "A" is in good condition. Taxiways segments between Taxiway "A" and Runway 5R-23L, Taxiways "C", "E", and "G" are in good to fair condition. Taxiway "B" and Taxiway "G" south are in very poor condition and Taxiway "D" is in poor condition. Taxiway segments between Runway 5L-23R and Runway 5R-23L are in fair to very poor condition.

The aircraft aprons are in good to fair condition. In Ramp # 1, the passenger terminal apron and the general aviation apron are in good condition. The cargo apron is in satisfactory condition. The majority of the pavement in Ramp # 2 is in fair condition. The apron in Ramp # 3 is in good condition.

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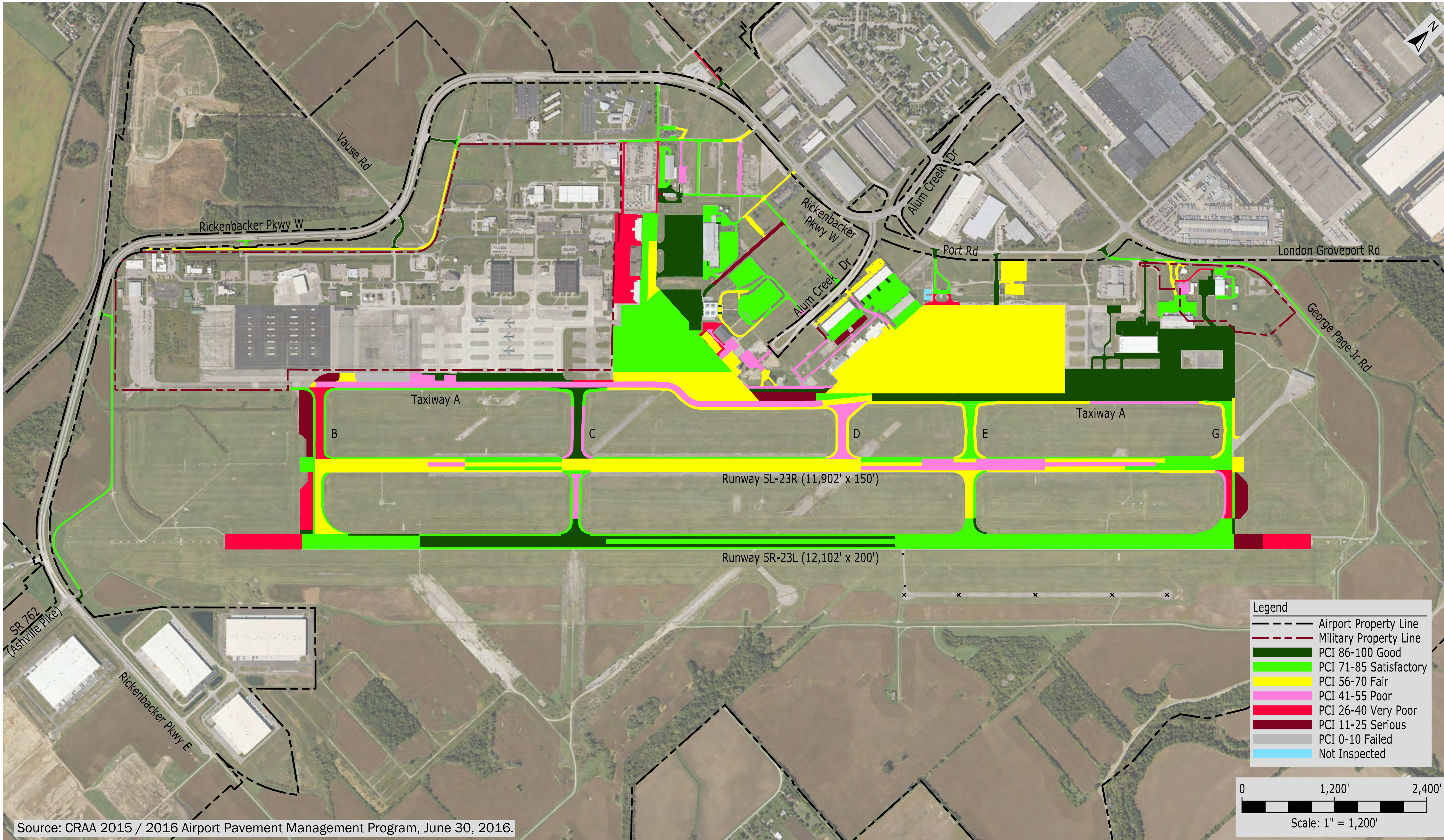

Source: CRAA 2015 / 2016 Airport Pavement Management Program, June 30, 2016.

1.2.7 Airfield Lighting, Markings, and Signage

Airfield lighting, markings, and signage increase the utility of the airport by increasing visibility and enhancing operational safety. Pavement markings are classified into four areas: runway markings, taxiway markings, hold position markings, and other markings. In addition to pavement markings, the airfield is also provided with lighted signs. Airport signs are classified into six groups: mandatory instruction signs, location signs, direction signs, destination signs, information signs, and runway distance remaining signs. The type and configuration of the airport signs are described in the current signage plan. Runway distance remaining signs are located on the northwest side of Runways 5L-23R and 5R-23L. Lighted windcones are also provided adjacent to the glideslope antenna between Runway ends 5L and 5R, and adjacent to the glideslope antenna between Runway ends 23L and 23R. Windcones visually provide pilots with wind direction and intensity.

Runway and Taxiway Lighting

Edge lighting systems outline usable operational areas of the airport during periods of darkness and low visibility weather conditions. Lighting systems are classified according to the intensity or brightness produced by the lighting system. Runway 5L-23R and Runway 5R-23L are equipped with High Intensity Runway Lights (HIRLS). Runway 5R is provided with in-runway lighting including runway centerline lights and touchdown zone lights (TDZL). Runway centerline lights and touchdown zone lights are installed on certain precision approach runways to facilitate landing under adverse visibility conditions. Taxiway edge lighting systems are configured to define the lateral limits of the taxiways. Medium intensity taxiway lights (MITL) are provided along the edges of the taxiways. **Table 1-16 Existing Runway Lighting** summarizes the existing runway lighting.

Table 1-16 Existing Runway Lighting

Runway End	Edge Lights	Centerline Lights	Touchdown Zone Lights	Approach Lights	REILS
5L	HIRL	No	No	MALSR	No
23R			No	None	Yes
5R	HIRL	Yes	Yes	ALSF-2	No
23L			No	MALSR	No

Source: FAA AVN datasheets

Runway and Taxiway Markings

Pavement markings are classified into four areas: runway markings, taxiways markings, hold position markings, and other markings. In general, runway markings are white. Markings for taxiways, areas not intended for use by aircraft, and holding positions are yellow.

Runway marking elements are defined according to the type of approach provided for the runway. There are three types of markings for runways: visual, non-precision instrument, and precision instrument. A summary of the current runway markings is shown in **Table 1-17 Existing Runway Markings**. The existing runway markings are in good condition and meet the requirements of a precision instrument runway.

Table 1-17 Existing Runway Markings

Marking Element	Runway 5L-23R		Runway 5R-23L	
	5L	23R	5R	23L
Designation	Yes	Yes	Yes	Yes
Centerline	Yes		Yes	
Threshold	Yes (12 stripes)		Yes (16 stripes)	
Displaced Threshold	Yes	Yes	No	No
Aiming Point	Yes	Yes	Yes	Yes
Touchdown Zone	Yes	Yes	Yes	Yes
Side Stripes	Yes	Yes	Yes	Yes
Threshold Bar	Yes	Yes	Yes	Yes

Source: 2009 ALP Update ALP, FAA Form 5010, 2016 aerial photo

Continuous taxiway centerline and edge markings are provided along Taxiways “A”, “B”, “C”, “D”, “E”, and “G”. Taxiway “A” is provided with continuous and dashed markings along Cargo Ramp # 1, Cargo Ramp # 2, and Cargo Ramp #3. The dashed markings along Taxiway “A” indicate that the adjoining pavement (apron) is intended for use by aircraft. Taxiway shoulder markings are provided along the section of Taxiway “A” between Cargo Ramp #1 and Ramp #2. Centerline markings are provided on the taxilanes that provide aircraft circulation on the cargo ramps.

Runway Holding Position Markings

Runway holding position markings indicate where an aircraft must stop when approaching a runway. The runway holding markings consist of four yellow lines, two solid and two dashed. The lines are spaced six to twelve inches apart, and they extend across the width of the taxiway. Surface painted holding position signs have a red background with white letters/numbers and are intended to supplement the signs located at the holding position. Runway holding position markings and surface painted holding position signs are provided on Taxiways “B”, “C”, “D”, “E”, and “G”.

1.2.8 Electronic, Visual, and Satellite Aids to Navigation

Electronic, visual, and satellite aids to navigation (NAVAIDS) increase the safety and utility of the airport. In addition, the availability of NAVAIDS is critical because it has a direct impact on the overall capacity of the airport. The availability of instrument approach and departure procedures, particularly the availability of specific approach and departure minimums is directly related to the availability of certain NAVAIDS. The NAVAIDS located on airport property are owned and maintained by the CRAA. A summary of existing navigational aids at LCK is included in **Table 1-18 Navigational Aids Summary** below.

Table 1-18 Navigational Aids (NAVAIDS) Summary

Location	NAVAID	ID	Equipment Type	In Service Year	Condition	Last Maintenance	Maintenance Event	Estimated Useful Life	Replace	Notes
Runway 5R	ALSF-2	DDV	AirFlo-ADB	2017	Good			15-20 YRS	2037	Shelter - 1992; Partial Retrofit (2016/2017)
Runway 5R	Localizer	DDV	Thales Mark 20A	2001	Good	8/7/2018	Annual	15-20 YRS	2021	
Runway 5R	Glide Slope	DDV	Thales Mark 20A	2001	Good	8/7/2018	Annual	15-20 YRS	2021	
Runway 5R	DME	DDV	Thales 415SE	2011	Good	8/15/2018	Annual	15-20 YRS	2031	DME is collocated with the localizer
Runway 5R	Inner Marker	DDV	Thales Mark 10	2001	Fair	8/7/2018	Annual	15-20 YRS	2021	
Runway 5R	Outer Marker	DDV	Thales Mark 10	2001	Fair	8/6/2018	Annual	15-20 YRS	2021	
Runway 5R	LOM (NDB)	DDV	Nautel ND200	2001	Good	8/6/2018	Annual	15-20 YRS	2021	
Runway 5R	PC - RVR	DDV	Vaisala	2012	Good	8/28/2018	Bi-Weekly	15-20 YRS	2032	
Runway 5R	PAPI		MULTI ELECTRIC CORP	1999	POOR	9/30/2018	Monthly	10-15 YRS	2020	Replacement Planned (2020)
Runway 5L	MALSR	FQS	DME Corporation	2004	Good	9/30/2018	Weekly	15-20 YRS	2024	
Runway 5L	Localizer	FQS	Thales Mark 20A	2004	Good	8/7/2018	Annual	15-20 YRS	2024	
Runway 5L	Glide Slope	FQS	Thales Mark 20A	2004	Good	8/7/2018	Annual	15-20 YRS	2024	
Runway 5L	DME	FQS	Thales 415SE	2004	Good	8/15/2018	Annual	15-20 YRS	2024	DME is collocated with the localizer
Runway 5L	PAPI		ADB L880	2004	Fair	9/30/2018	Monthly	10-15 YRS	2020	

Table 1-18 Navigational Aids (NAVAIDS) Summary

Location	NAVAID	ID	Equipment Type	In Service Year	Condition	Last Maintenance	Maintenance Event	Estimated Useful Life	Replace	Notes
Runway 23L	MALSR	LCK	MULTI ELECTRIC CORP	1999	POOR	10/2/2018	Weekly	15-20 YRS	2020	Partial Retrofit Planned (2020)
Runway 23L	Localizer	LCK	Thales Mark 20A	2016	Good	8/13/2018	Annual	15-20 YRS	2036	
Runway 23L	Glide Slope	LCK	Thales Mark 20A	2016	Good	8/14/2018	Annual	15-20 YRS	2036	
Runway 23L	Outer Marker	LCK	Thales Mark 10	2001	Fair	8/6/2018	Annual	15-20 YRS	2021	
Runway 23L	LOM (NDB)	LCK	Nautel ND200	2001	Good	8/6/2018	Annual	15-20 YRS	2021	
Runway 23L	PAPI		ADB L880 LED	2018	Good	9/30/2018	Monthly	10-15 YRS	2033	
	AWOS		Vaisala VD IIIPT	2008	Good	7/4/2018	Repair	10-15 YRS	2023	
Runway 23R	PAPI		ADB L880	2004	Fair	9/30/2018	Monthly	10-15 YRS	2019	
Runway 23R	REIL		ADB L-849C Voltage	2007	Good	10/2/2018	Bi-Monthly	10-15 YRS	2022	

Condition Definitions:
Good - Equipment is newer model with few concerns regarding future operation.
Fair - Older model equipment, however functioning properly.
Poor - Equipment should be budgeted for replacement due to future operational concerns.

Sources: DBT Transportation Services, September 2018; CRAA Operations, 2018; CRAA Maintenance, 2018.
Compiled by Michael Baker International, October 2018.

Approach Lighting System

Approach light systems (ALS) facilitate the transition from instrument flight to visual flight for landing. There are two ALS configurations provided at the airport. The approach to Runway 5R is provided with an Approach Lighting System with Sequenced Flashers II (ALSF-2). The high-intensity ALS is 2,400 feet long with light stations positioned every 100 feet. The system also includes sequenced flashing lights. The ALSF-2 configuration is required for the ILS CAT-II precision approach to Runway 5R.

The approaches to Runway 5L and Runway 23L are equipped with a Medium Intensity ALS with Runway Alignment (MALSR). This medium intensity ALS is 2,400 feet long with light station positions every 200 feet. The system also includes sequenced flashing runway alignment indicator lights (RAILS). This system is used for the ILS CAT-I precision approach.

Runway End Identifier Lighting

Runway End Identifier Lights (REIL) are installed to provide rapid and positive identification of the approach end of a particular runway. The system consists of a pair of synchronized flashing lights located laterally on each side of the runway threshold. Only Runway 23R is equipped with REIL.

Airport Rotating Beacon

The Airport Rotating Beacon (ABN) helps pilots identify the airport at night. The beacon is normally operated from sunset to sunrise. In some cases, the beacon may be turned on when the ceiling is less than 1,000 feet, and/or the ground visibility is less than three statute miles. The colors of the beacon are clear (white) and green indicating a civil airport. The ABN is located on the top of the ATCT.

Precision Approach Path Indicator / Visual Glideslope Indicator

A Precision Approach Path Indicator (PAPI) is a light array positioned beside the runway. The PAPI consists of four equally spaced light units color-coded to provide a visual indication of an aircraft's position relative to the designated glide slope for the runway. At LCK a four light PAPI is provided on the left side of each runway approach end. The PAPI for Runway 5R-23L is located to serve aircraft in height group 4. Because of the location of the PAPIs, only the PAPI for Runway 5R aligns with the electronic glideslope. Also, for Runway 5R-23L the PAPI and ILS runway point of intercept (RPI) are not coincidental. The RPI is the point where the extended glideslope intercepts the runway centerline on the runway surface. **Table 1-19 Existing Precision Approach Path Indicators (PAPI)** summarizes the characteristics of the existing PAPIs.

Table 1-19 Existing Precision Approach Path Indicators (PAPI)

Item	Runway 5L-23R		Runway 5R-23L	
	5L	23R	5R	23L
Type	PAPI Four Light	PAPI Four Light	PAPI Four Light	PAPI Four Light
Location	Left	Left	Left	Left
Latitude:	N 39° 48’27.46”	N 39° 49’17.07”	N 39° 48’12.96”	N 39° 49’17.57”
Longitude:	W 082° 56’18.39”	W 082° 55’13.35”	W 082° 56’19.17”	W 082° 54’54.48”
Distance form threshold (feet)	1,315	1,562	1,312	1,493
Elevation (feet)	743.2	738.1	735.3	739.1
Angle	3.00	3.00	3.00	3.00
Threshold Crossing Height (THC) (feet)	70.1	74.8	65.4	73.4
Aligned with Glideslope (GS)	No	No	Yes	No

Source: FAA AVN Datasheets

Instrument Landing System

The Instrument Landing System (ILS) provides pilots with electronic guidance for aircraft alignment, descent gradient, and position until the pilot can establish visual contact and confirm the runway alignment and location.

The ILS has three elements:

- Guidance information: the localizer and glide slope
- Range information: marker beacons, Distance Measuring Equipment (DME), and compass locator.
- Visual information: approach lighting system (ALS), touchdown lights, centerline lights, and runway lights.

Localizer Runway 5L is located approximately 1,200 feet from the 23R end. Localizer Runway 5R is located approximately 1,300 feet from the 23L end. Localizer Runway 23L is located approximately 1,500 feet from the 5R end.

The Distance Measuring Equipment (DME) provides pilots with a slant range measurement of the distance to the runway in nautical miles. The DME is collocated with the ILS. The DME establishes the outer marker for the ILS approach to Runway 5R.

Very High-Frequency Omnidirectional Range

The Very High-Frequency Omnidirectional Range (VOR) is a ground-based radio navigation system. The VOR provides magnetic bearing information to and from the VOR station. A VOR is not located at the airport. However, two off-airport VOR stations support the existing standard instrument procedures. Yellow Bud (XUB) VOR is located approximately 18 nautical miles south-southwest of LCK. XUB is a terminal VOR (TVOR) used to define several fixes in the instrument approaches, as well as the missed approach procedure. Appleton (APE) VOR is located approximately 26 nautical miles north-northeast of LCK. APE VOR is a high-level VOR (HVOR), and it is used to define the standard departure procedure during northeast flow operations. APE VOR is also part of the definition of Victor airway thirty-eight (V38) and Victor airway five (V5).

Non-Directional Beacon

A non-directional beacon (NDB) is a radio beacon that transmits nondirectional signals whereby the pilot of an aircraft properly equipped can determine bearings and navigate based on the station. At LCK, there are two NDB stations. The COBBS NDB is located about eight miles to the southwest of the airport, and the PICKL NDB is located about five miles northeast.

The COBBS NDB is used as the initial approach fix (IAF) and as a compass locator for the outer marker (OM) for the Runway 5R ILS approach. In addition, the COBBS NDB is the primary NAVAID for the Runway 5R NDB approach. In addition to the middle marker (MM), and inner marker (IM), the COBBS NDB provides range information in case the DME is not available.

The COBBS NDB also serves as the primary NAVAID for an alternate missed approach procedure. The PICKL NDB is used as a compass locator for the outer marker (OM) for the Runway 23L ILS or Localizer approach. The PICKL NDB also serves as the primary NAVAID for an alternate missed approach procedure.

Weather Reporting Systems

As described in AC 150/5220-16D, Automated Weather Observing System (AWOS), for Non-Federal Application, an AWOS is a computerized system that automatically measures one or more weather parameters, analyzes the data, and prepares a weather observation that consists of the parameters measured. The weather data is then prepared and disseminated to the pilot in the vicinity of the airport, using an integral very high frequency (VHF) radio or an existing navigational aid (NAVAID), or an Automatic Terminal Information Service (ATIS). Observations may also be available by dial-up telephone service. There are five standard types of AWOS. An AWOS-III is available at LCK. The data recorded by the AWOS-III is transmitted over VHF frequency and telephone.

The AWOS-III is important equipment because it provides information regarding the meteorological conditions and altimeter setting necessary to use the instrument approach procedures. Weather reports from the AWOS-III are usable by 14 CFR Part 121 and 135 operators. However, ceiling and visibility reports provided by the control tower are always considered official weather, and RVR reports are typically the controlling visibility reference.

When certain weather information is not available at LCK, the instrument approach procedures are impacted, potentially reducing the capacity of the airport. When altimeter information is not available, and the John Glenn Columbus International Airport altimeter setting is used, the ILS Runway 5R to Category II minimums is not authorized, and all other instrument procedures have increased approach minimums. In addition, LCK cannot be used as an alternate airport when local weather information is not available.

Runway Visual Range

Runway visual range (RVR) is the primary visibility measurement used by 14 CFR Part 121 and Part 135 operators with specific visibility reports and controlling values outlined in their respective operations specifications. CAT-II runways (longer than 8,000 feet) with authorized minimums below 1,600 feet RVR require touchdown, rollout, and mid-point RVR. There are three RVR sensors located between the two runways. The touchdown and rollout RVR sensors are located at 1,108 feet from Runway 5R end and 1,222 feet from the Runway 23L end. The mid-point RVR sensor is located at 5,081 feet from the end of Runway 23L.

1.2.9 Airport Traffic Control Tower

The Airport Traffic Control Tower (ATCT) is established to provide for a safe, orderly, and expeditious flow of aircraft on and in the vicinity of the airport. The new ATCT building opened in April 2016. The ATCT is a staffed facility that uses air/ground communications and other Air Traffic Control (ATC) systems to provide air traffic services on, and in the vicinity of the airport. The ATCT is owned by CRAA and operated by Dynamic Science, Inc. (a subdivision of Exodyne Inc.), under a Department of Defense contract with the US Air Force. ATC services are provided for civil and military aircraft operations 24 hours a day. **Table 1-20 Airport Traffic Control Tower (ATCT)** summarizes relevant information regarding the existing ATCT.

Table 1-20 Airport Traffic Control Tower (ATCT)

Item	Data
Facility ID	LCK
Facility Name	Rickenbacker International
Operator	Dynamic Science, Inc. / US Air Force
Staffing	Two controllers; one controller during non-peak hours
Tower Call	Rick Tower
Hours of Operation	24
Frequencies	
Tower:	120.05
Ground:	125.275
Location	
Latitude:	39° 48’59.17”
Longitude:	82° 55’59.67”
Elevations (feet MSL)	
Top:	861.23
CAB Floor:	833.66
CAB Eye:	838.66
Top Beacon.:	855.35

Source: eNASR. Existing ALP.

1.2.10 Commercial Passenger Terminal Facilities

The Passenger Terminal (Building 2241), sometimes referred to as the “Charter Terminal,” is a two-story structure constructed in 2001 and encompasses approximately 42,600 square feet. The building is fully operational with major building systems in-place and is in good condition. Passenger boarding is provided at two gates equipped with passenger boarding bridges

The terminal building includes airline ticketing space (Allegiant Airlines), a public lobby, administration, baggage claim and make-up, secure passenger waiting areas, security screening checkpoint station, Federal Inspection Services (FIS), vending machines, a restaurant (Bob Evans), and support facilities (MEP and Rest Rooms). The various functions and approximate square footages of the existing facility are indicated in **Table 1-21 Passenger Terminal Functional Areas** below.

Table 1-21 Passenger Terminal Functional Areas

Functional Area	Size (square feet)
Ticketing	788
Airline Offices	338
Administration	900
Inbound Baggage Make-up (outside of building area)	900
Outbound Baggage Make-up	1,800
Bag Claim Lobby	3,769
Federal Inspection Services (FIS)	10,181
Security Screening	1,350
Concession/Restaurant	338
Public Waiting	1,013
Passenger Waiting	4,331
Circulation	14,544
Support (Mechanical/Electrical/Plumbing/Rest Rooms)	3,248

Source: International Passenger Terminal As-Built Drawings, 2004; Michael Baker International

1.2.11 Air Cargo Facilities

There are nine facilities used in varying degrees to support cargo loading, unloading or support services for either scheduled, ad-hoc or “surge” aircraft operations at LCK.

FedEx and UPS operate aircraft in their network to support their hub-spoke overnight and express shipment and package volumes. The LCK facilities used by these two carriers are dedicated to the sortation of packages that are transferred between their pick-up and delivery vehicles and their hubs. The aircraft are deployed from LCK to ferry package volumes to and from their sortation hubs.

- FedEx operates two large sortation hubs; their global sort is located in Memphis. TN while their domestic hub is located in Indianapolis, IN.
- UPS operates their global hub operation in Louisville, KY.

For international import and export cargo, there were currently four global air carriers who provided service to Columbus in 2017: Cargolux, Cathay Pacific, Etihad, and Emirates. These airlines provide scheduled service between global origins/destinations and LCK. In addition, numerous charter operators support the demand for ad-hoc, unscheduled cargo volume lift at LCK.

These charter operators include:

- Kalitta Air
- Atlas Air
- Amerijet
- National Air Cargo
- Antonov Airlines
- Centurion Cargo
- Volga-Dnepr Airlines
- Singapore Airlines Cargo
- Ethiopian Cargo Services

In 2017, there were three separate facilities that support the operations of these air carriers. These facilities include:

- Air Cargo Terminal 4
- Air Cargo Terminal 5, and
- Forward Air Forwarding (Building 2865).

Air Cargo Terminal 1 (ACT 1) and Air Cargo Terminal 2 (ACT 2) are located outside the security fence line; however, these facilities have tenants who contribute by moving freight to the facilities above for loading of exports, or they receive imported cargo. Air Cargo Terminal 3 (ACT 3) has direct airside access to Cargo Ramp 2 and could support a direct facility to aircraft program if/when demand for new capacity emerges at LCK.

Air Cargo Terminal 4 (ACT4), Air Cargo Terminal 5 (ACT 5) and Forward Air Forwarding LCK (FAF) are designated as Container Freight Stations (CFS), which are authorized to handle, store and process international cargo. CFS shipments are moved from the aircraft ramp into the facility to await US Customs and Border Protection (CBP) clearance and release. Freight from the arriving aircraft is deconsolidated; individual shipments are cleared through customs (or moved in-bond) by a bonded carrier/trucker. In-bond shipments can be moved between bonded/CFS/Zone sites or facilities to other bonded/CFS/Zone sites or facilities by bonded carriers. Truckers or carriers post a bond assuring CBP that they will fulfill their obligation to move the goods in-tact and complete. At the destination facility, bonded or FTZ regulations apply to goods with respect to payment/timing for the payment of applicable duties and taxes. CFS facilities require increased facility security, alarm systems, and require secure holding cells for high-value cargo shipments. CFS key employees must submit background checks to CBP as part of the security process.

It appears that not all tenants currently occupying space at ACT 1 and ACT 2 are contributing to the movement of goods to/from LCK. As demand for space at/near the cargo aprons continues to increase, it may be an objective of the CRAA to consider implementing a minimum annual guarantee (MAG) lease clause that requires future users in CRAA facilities to contribute to arrival/departure cargo volumes. This is a future policy consideration that would provide the CRAA with knowledge that tenants on the airport will be contributors to the overall future cargo operation and growth.

Cargo facilities at LCK are summarized in the following sections.

Air Cargo Terminal 1

ACT 1 is a 67,200 SF subdivided, multi-tenant facility located at 7200 Alum Creek Drive. The facility was constructed in 1999 and is currently in good condition. The facility is provisioned to support the operations of up to 14 users in individual bays. Adequate parking is provided on the street-side (front) of the facility for employees and walk-in traffic. This area provides parking for 136 automobiles.

Each entrance faces the street and is marked with a letter from A-N. Some of the bays in the facility are occupied by a single tenant, and other users occupy multiple bays for their operation. However, the design of each bay appears to have been configured to support current tenant requirements. Each leasehold has offices, meeting rooms and warehouse space. According to the signage, there are six tenants who are active in the space at ACT 1. There are several bays that have signs indicating an occupant; however, some bays appear to be vacant.

ACT 1 does not have direct cargo ramp access from the back (non-street) side of the facility; however, there are 7 drive-up ramps and 28 cargo doors to support the loading or unloading of trucks. Vehicles seeking ramp access must pass through a nearby security gate or must transit public roads to discharge freight at one of the CFS facilities for loading. Arriving freight to ACT 1 must be delivered to the back of the building, or an escort for an airport conveyance must be available for the short transit from the airside gate to the docks at the rear of ACT 1.

Air Cargo Terminal 2

ACT 2 is a 57,600 SF sub-divided multi-tenant facility located at 7280 Alum Creek Drive. The facility was constructed in 2000 and is in good condition. ACT 2 is provisioned to support the operations of up to 12 users in individual bays. Adequate parking for employees and walk-in traffic is provided for 90 automobiles on the street-side (front) of the facility. Each operation's bay facing the street is marked with a letter from A-L. Some of the bays in the facility are occupied by a single tenant, and other tenants occupy multiple bays for their operation.

The facility does not have direct airside access to Cargo Ramp 2 from the back (non-street) side of the facility; however, there are 4 drive-up ramps and 24 cargo doors to support the loading or unloading of trucks. Vehicles seeking airside access must pass through a nearby security gate or must transit public roads to discharge freight at one of the CFS facilities for loading. An additional 43,775 SF of unmarked pavement is available on the east side of the facility for truck parking.

Similar to ACT1, there are tenants in the facility who do not contribute to the overall volumes of goods moved to/from LCK. However, during the tenant interviews, Landmark Global was identified as a tenant with an e-commerce aggregation operation in Bays E-H. This operation has significant volumes of e-commerce cargo that are currently shipped to Chicago O'Hare International Airport (ORD) for export.

Air Cargo Terminal 3

ACT 3 is a 40,000 SF subdivided, multi-tenant facility located at 2566 Jerrie Mock Avenue. The facility was constructed in 2001 and is in good condition. ACT 3 is provisioned to support the operations of 10 users in individual bays. Adequate parking is provided on the public side (west side) of the facility for employees and walk-in traffic. This area has the capacity to accommodate parking for 57 automobiles and 28 trucks. The truck parking area is situated between ACT 1 and ACT 3. Each bay of the facility facing the street is marked with a letter from A-H; some bays in the facility are occupied by a single user, and other users occupy several bays for their operations.

ACT 3 has 10 cargo access doors offering direct airside access to Cargo Ramp 2 on the east side of the facility. Approximately 48,000 SF of the apron area immediately adjacent to ACT 3 is used to support the arrival of tugs/dollies or other airside support equipment facilitating the movement of air cargo to/from aircraft.

In 2017, tenants included CAS, Worldwide Freight Systems and notice of a CFS station in the bay off space H. In 2018, Trinity Logistics became the fourth CFS on the airport by leasing 100% of ACT 3. As a CFS facility with airside access to Cargo Apron 2, there are specific security and access requirements relating to the entry of people to the building seeking ramp access. Currently, there are no visible airside activities being conducted by the occupants of ACT 3.

Air Cargo Terminal 4

ACT 4 is a 48,000 SF facility, single-tenant occupied facility located at 2961 George Page Jr. Road. Constructed in 2008, this clear span warehouse facility is in good condition. ACT 4 is currently occupied by RCS Logistics who operates this facility as a Container Freight Station and "cross-dock" for arriving/departing enplaned or deplaned materials. Truck (10) and private vehicle (53) parking is provided on the public assess side with 14 truck doors and walkup access to a controlled entrance. ACT 4 includes office, meeting, and logistics support space and an elevated airside of the facility to support tug/dolly freight movement. The facility is configured with 48,000 SF of warehouse space, and 12 drive-in airside doors are provided.

As a CFS facility, security and access control are heightened, and personnel must be badged or escorted when on the premises. RCS Logistics indicates that this operation has the capacity to manage the loading or unloading of up to three wide-body all-cargo aircraft each day. When more aircraft arrivals occur, there is significant congestion, and it is a challenge to efficiently move freight, load trucks, and manage airside cargo activities, even if more staff is assigned to the operations. There are two wide-body aircraft parking positions (one marked and tethered position) capable of accommodating Boeing 747-8F aircraft located adjacent to ACT 4. Hydrant fueling is provided.

Air Cargo Terminal 5

LCK's newest cargo facility, ACT 5, was completed in mid-2016 as a result of public-private partnerships between CRAA and Distribution Land Corp/Mast Global. The facility is located at 2893 George Page Jr. Road is in excellent condition and is one of four facilities used to support CFS services and consolidation/deconsolidation of arriving or departing cargo at LCK. The facility is a CFS, and cargo and logistics services conducted between the landside and the airside are provided by Total Airport Services (TAS). This 100,000 SF cargo facility includes offices that are leased to an array of freight stakeholders, freight forwarders, and logistics service providers. It is constructed with direct ramp access for tug/dolly operations on the airside. On the public side, there are 24 truck-dock doors and two drive-up ramps. Truck parking (12) and private vehicle (108) parking is provided on the public access side of the facility. Direct access to Cargo Ramp 3 is controlled. Access to the offices, public meeting rooms, and employee areas require badges or escort. A total of three wide-body aircraft parking positions (two marked positions) capable of accommodating Boeing 747-8F aircraft are provided directly in front of the facility. Hydrant fueling is provided.

FedEx Hub/Sort Facility

The FedEx Hub/Sort Facility is located adjacent to Cargo Ramp 2 and direct access is provided via Cargo Road. Owned by AeroTerm and operated by FedEx, this 290,000 SF automated sortation facility supports FedEx's overnight freight that arrives or departs the Columbus region. Multiple trucks and aircraft arrive and depart this facility to support FedEx's daytime, second day and overnight sorts in either Memphis or Indianapolis. During normal activities, some 40,000 pieces of cargo/parcels are processed through this facility each day. However, during peak season, when demand is higher for holiday and e-commerce trade, the facility processes up to 200,000 pieces/day.

The FedEx facility has existed for some time and was a hub for the Flying Tigers operation when Federal Express bought Flying Tigers. FedEx indicates that this is one of their top five operations in the nation, largely driven by the presence of 11 of FedEx's top 20 retail customers who occupy manufacturing, distribution or e-commerce activities in/near Columbus.

The north side of the facility has capacity for 120 truck trailer loading bays, significant truck parking, and vehicle parking for 200 staff members during normal operations. Located adjacent to Air Cargo Ramp 2, dedicated aircraft parking facilities capable of supporting 6 wide-body aircraft and 2-3 commuter aircraft are provided. The airport's underground fuel hydrant loop serves the FedEx aircraft parking positions.

FedEx also operates out of a legacy military maintenance and storage facility (Building 1090) on Cargo Ramp 2. This facility is used to support maintenance of cargo handling equipment, loaders and other items in support of limited maintenance, repair or overhaul that could be completed during the time aircraft are on the ramp at LCK. Building 1090 also doubles as an inside storage facility for loading equipment during periods of inclement weather, snow or ice conditions.

UPS Hub/Sort Facility

The UPS Hub/Sort Facility (Building 595) is located at 2162 Reserve Road with direct access to Cargo Ramp 1. This 28,270 SF facility was a legacy military hangar/maintenance shop (pre-1958 construction) converted into a sortation facility to support UPS air and overnight volumes. The inside of the facility is equipped with material handling equipment that can be scaled to accommodate higher volumes of packages during surge/holiday or peak season. The equipment is made up of slides, conveyors, and positions to support loading and unloading of various aircraft pallets and loading devices. The building is functional but is in overall poor condition. Hangar doors are not functioning, and overhead doors have been installed in the hangar doors. Recommended improvements for this facility are included in Appendix C of this Study.

UPS operates an evening and morning sort at this facility, and during peak season, operates a “daylight/second-day sort” to accommodate the increased volumes. Trucks support the movement of goods that can transit from Columbus to Louisville and make the cut-off for the night-time national sort. A last-out aircraft leaves Columbus to move late arrivals or late orders to Louisville for inclusion in the national sort.

In the morning, an early aircraft arrives to drop off “first delivery, AM volumes” and this is supported by truck(s) that arrive from Louisville to support daytime, PM deliveries in the Columbus region. It is important to note that this facility only manages air volumes. However, when drivers pick-up longer delivery items on their routes, UPS re-routes this longer delivery volume to the ground terminal in Columbus and the packages are serviced by the ground network. Drivers and sorters are on hand in the evenings to pre-sort packages before they transit to the Louisville hub, and drivers and sorters also support the arrival of morning volumes to be sorted and put out for delivery on the local/regional route trucks that support the air volumes.

The UPS facility at LCK processes about 10,000 packages per day supporting as many as 12 truck destinations. There are 65 staff members supporting the operation during normal non-seasonal schedules.

Forward Air LCK Terminal

The Forward Air LCK Terminal (Building 2865) is located outside the security fence at 2865 George Page Jr Road and offers ramp and public access. This CFS facility consisting of 50,470 SF of warehouse and office space was constructed in 1994 and is in average condition. Recommended improvements for this facility are included in Appendix C of this Study.

The Forward Air LCK Terminal processes 5 to 6 million pounds per week and is both a cross-dock and consolidation/deconsolidation facility. This cargo amounts to about 85,000 packages per week. FAF receives cargo at the dock from the aircraft loaders or ground handlers. The cargo is then deconsolidated, cleared and loaded for delivery to a freight forwarder or cargo owner. FAF also receives freight from cargo owners or freight forwarders and builds consolidations that are delivered to the ground handler at TAS or RCS for loading at ACT 4 or ACT 5.

This facility is one of two facilities operated by FAF at Rickenbacker. The Forward Air LCK Terminal moves a higher volume air cargo and possesses 36 truck/cargo doors to support the cross-dock program. During normal operations, the facility supports a staff of 60 dock, handling, and office personnel. Automobile parking is provided for employees inside the fence and customers on the public side. A gate house is located at the entrance to the facility.

1.2.12 General Aviation Facilities

General aviation requires a wide array of services and facilities. The type of aircraft, climate, frequency and type of operations define the type of facilities and level of service. Some of these facilities and services are provided by the airport owner/operator, and some are provided by private entities.

The current FBO is in the hangar (Building 532) next to the passenger terminal. In mid-2017, the FBO will be relocated to a new location north of the terminal (Building 7250). CRAA administration offices will be collocated in the same facility.

Itinerant aircraft parking is provided adjacent to Building 532. The FBO ramp (adjacent to Building 7250) is used primarily for itinerant aircraft parking. An area located on the west side of the apron is designated as a valve-controlled de-ice pad. A glycol recovery vehicle (GRV) is used to recover the glycol during aircraft de-ice operations.

Building 1001 is currently occupied by Airnet II. Airnet II provides scheduled and on-demand cargo charter services. In addition, this tenant provides general maintenance services, engine and airframe maintenance, as well as avionics installation and maintenance services.

1.2.13 Military Facilities

As a former military base, the military has a rich history at LCK and continues to be very active at this joint-use airport. Today the military continues to be a key partner with CRAA as they together develop and maintain LCK's world class facilities. The Rickenbacker Air National Guard Base (Base) is host to the Ohio Air National Guard (OANG), Ohio Army National Guard (ONG), and the Army, Navy and Marine Corps Reserves. Facilities within this 312-acre military cantonment area include taxiways, aprons, hangars, buildings, and other specialized support facilities.

The Ohio Air National Guard is home to the 121st Air Refueling Wing, an organization dedicated to the mission of the KC-135, disaster response and combat support. In addition to aircraft parking, maintenance, and fueling facilities, there are several mission essential support functions associated with Ohio Air National Guard. In addition, the Base serves as a divert location for other military aviation units during storm evacuations.

On the southwest corner of the Base, the Ohio Army National Guard, 1st Battalion, 137th Aviation Regiment supports readiness and training activities associated with the UH-60 Black Hawk helicopter mission. In addition to facilities for helicopter/aircraft parking, maintenance and fueling, the Ohio Army National Guard operates a series of administration, billeting/transient barracks and mission support facilities.

The Army, Navy and Marine Corps Reserve units located on the Base operate and maintain administration and training facilities in support of their individual missions.

1.2.14 Support Facilities

Several additional facilities are important to keeping the airport operational and for the provision of key capabilities at LCK. In general, support facilities ensure the smooth and efficient airport operation. Facilities not documented in other sections of this chapter include the Aircraft Rescue and Firefighting, airport maintenance and snow removal equipment facilities. The existing characteristics of these facilities are documented in this section for further use in subsequent phases of this Study.

Aircraft Rescue and Firefighting Services

Aircraft rescue and firefighting (ARFF) equipment and services are determined by the combination of the length of the air carrier aircraft expressed in groups, and the average daily departures of air carrier aircraft. All ARFF indexes require, at a minimum, at least one lightweight vehicle providing either 500 pounds of sodium-based dry chemical extinguishing agent or halon 1211 or 450 pounds of potassium-based dry chemical and sufficient water to produce 100 gallons of aqueous film forming foam (AFFF).

The airport is currently a 14 CFR Part 139, Class I certificated airport, with an ARFF Index B. However, ARFF Index E equipment is available 24-hours. Prior permission is required for unscheduled air carrier operations with more than 30 passenger seats. There are no specific access roads established for the ARFF vehicles. However, ARFF vehicles may access an accident site via the taxiways, runway, or the perimeter road. The available ARFF equipment is shown in **Table 1-22 Existing ARFF Equipment** below.

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Table 1-22 Existing ARFF Equipment

Model Year	Make/Model	Water Capacity (Gallons)	AFFF Capacity/Concentration (Gallons)	Dry Chemical Type	Dry Chemical Capacity (Pounds)	Max. Turret Discharge Rate (Gallons per Minute)
2006	Oshkosh/P-19R	1,500	210 / 3%	Potassium -Based	450	1,950
1994	Oshkosh/P-23	3,300	300 / 3%	Potassium -Based	500	2,000
2006	Oshkosh/P-23R	3,000	420 / 3%	Potassium -Based	450	1,950
2014	KME/RIV	400	40 / 3%		0	
2014	KME/RIV	400	40 / 3%		0	

Source: CRAA

Airport/Airfield Maintenance, Equipment, and Facilities

Staff from CRAA's facilities (airfield maintenance) department are responsible for the day to day maintenance functions on the airfield, including record keeping, and repairs. Pavement maintenance includes crack sealing, seal coating, and striping. Other general maintenance responsibilities include safety area repairs, mowing, general electrical repairs, and snow removal. Equipment and materials to perform these general maintenance functions are available and stored in the corresponding maintenance equipment storage buildings. Airport Maintenance facilities are located within the maintenance complex off Club Road, southeast of the existing CRAA administrative offices (Building 440). The complex includes facilities for the storage of maintenance equipment, a maintenance garage, fueling station and a triturator for disposing of airline waste. The maintenance equipment storage/boiler facility (Building 556) was constructed in 1957 and is in poor condition. The adjacent maintenance storage facility (Building 557) was constructed in 1958 and is also in poor condition. The maintenance garage (Building 558), fueling canopy (Building 558A), adjacent storage (Building 558B) and triturator (Building 559) were all constructed in 2001 and are fully functional. Recommendations for future maintenance facility improvements are included in the Facility Condition Assessment Report located in Appendix C of this report.

Snow Removal Equipment

The airport currently has and maintains snow removal equipment (SRE) in accordance with 14 CFR 139.313 Snow and Ice Control Plan. Snow removal equipment is stored in the SRE building which is located at 2058 Club Road, within the airport maintenance complex. In addition to equipment storage, the facility includes CRAA staff support space. The SRE facility was constructed in 2001 and is currently in good condition.

Aircraft Deicing Facilities

A valve-controlled de-ice pad is located on the FBO Ramp. A glycol recovery vehicle (GRV) will be used to recover the glycol used during deice operations. All other aircraft deicing operations are performed directly at the aircraft parking position (the gate or on the cargo apron) utilizing mobile de-ice equipment.

1.2.15 Access, Circulation, and Parking

As mentioned earlier in this chapter, MORPC's Rickenbacker Area Comprehensive Plan will be evaluating the transportation infrastructure in the Rickenbacker area concurrently with this project. The MORPC study will analyze the area transportation system, to include transit services, ridesharing services, and bicycle/pedestrian facilities. Based on the results of travel demand modeling, the study will identify areas of current and projected congestion. Crash data will be evaluated, and recommendations for improvement projects will be included. This information will be used by the LCK master plan team during alternative development to address future facility and infrastructure needs.

Airport Access Roads

Figure 1-6 Airport Access shows the existing airport access roads. Rickenbacker International Airport is located four miles south of Interstate 270. This interstate is a major four to six-lane limited access highway that forms a loop around the City of Columbus, connecting to eastbound and westbound Interstate 70 and northbound and southbound Interstate 71. Primary north/south access to the Rickenbacker International Airport is provided from Interstate 270 via Alum Creek Drive, a four-lane divided highway. SR 317/London Groveport Road provides an east-west connection between US 23 to US 33, with follow-on connectivity to Interstate 270. Rickenbacker Parkway is a four-lane divided highway that leads south from Alum Creek Drive along the airport's western perimeter to Ashville Pike near the Norfolk Southern Rickenbacker Intermodal Terminal. SR 762/Duvall Road runs east/west through Pickaway County. The Pickaway East-West Connector, also known as Rickenbacker Intermodal Connector, provides three lanes of improved access along Duvall Road and Ashville Pike between US 23 and the Norfolk Southern Rickenbacker Intermodal Terminal.

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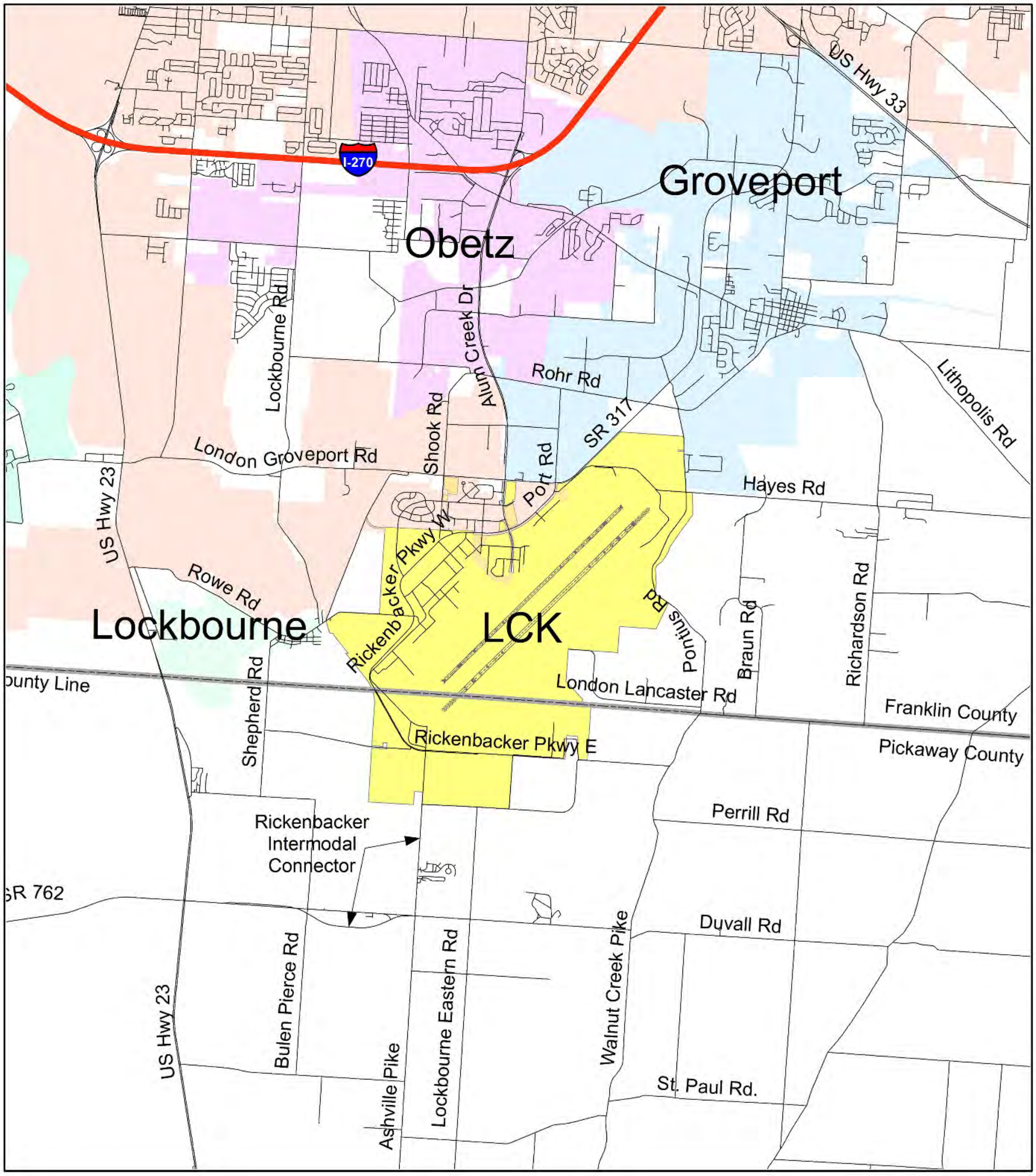
Figure 1-6 Airport Access



Source: Michael Baker International, Inc.

Perimeter Road

An Airport Perimeter Road is located just outside the security fence line of the airport. The Airport Perimeter Road is used by airport support vehicles to access areas of the airport to perform work functions without having to cross active taxiways and runways or travel on public roadways. According to the airport's pavement management program, portions of the two-lane paved roadway on the northern and southern ends of the airport are in satisfactory condition. However, portions of the road along the south/southeastern side of the airport were observed to be in poor condition during the master plan site visit. This will be further evaluated as part of the facility requirements phase of the Study.

Terminal Access Road

Access to the Passenger Terminal is provided via John Circle Drive from Alum Creek Drive. This terminal loop road begins as a two-lane road which turns into a two-lane one-way loop road providing access to the Passenger Terminal and the two associated parking lots. A third lane is provided for passenger loading/off-loading for approximately 235 feet directly in front of the Passenger Terminal. During peak periods, the three-lane section along the terminal curb front experiences high levels of congestion following flight arrivals and preceding flight departures.

Vehicle Parking

Businesses located at Rickenbacker International Airport have designated parking areas for their employees and patrons. For the purpose of this Study, vehicular parking associated with the passenger terminal, air cargo terminals, FBO, hangars, and airport support facilities were identified as part of the inventory of existing facilities. The information depicted in **Table 1-23 LCK Parking Facilities** is used later in this study to identify future parking needs.

Passenger Terminal Parking

In 2017, two parking lots served the Passenger Terminal. The main parking lot, Parking Lot 1, is located directly in front of the terminal and has a capacity of 349 spaces (336 standard and 13 handicapped). There are two entrances available from both the east and west sides of John Circle Drive. Each entrance is equipped with an automated ticket control station. Vehicles exit at the southeast corner of the lot onto the east side of John Circle Drive. A sidewalk provides direct pedestrian access between Parking Lot 1 and the Passenger Terminal. An additional sidewalk leading to the FBO facility is also provided.

Parking Lot 2 is located on the west side of John Circle Drive directly across the street from Parking Lot 1. The entrance to the lot is equipped with an automatic ticket control station. Parking Lot 2 has a capacity of 237 standard parking spaces. Sidewalk access between Parking Lot 2, and the Passenger Terminal is provided. Vehicles exit at the south end of the lot on to John Circle Drive.

In response to constrained parking conditions, CRAA completed Lot #3 in early 2018 which provides an additional 338 parking spaces in a new surface parking lot located east of Lot #1.

Entrances are located on the east side of John Circle Drive. Sidewalk access to the Terminal is provided.

The cost of parking is $2 for the first hour and $1 each additional hour with a maximum of $7 per day (24-hour period). Users of the parking facilities pay as they leave at automated exit toll stations. **Table 1-23 LCK Parking Facilities** summarizes the available passenger terminal parking space.

Table 1-23 LCK Parking Facilities

Description	Size
Passenger Terminal Lot 1	349 automobiles
Passenger Terminal Lot 2	207 automobiles + 30 rental car spaces
Passenger Terminal Lot 3	338 automobiles
Building 532 (Former FBO)	20 automobiles (unmarked)
FBO (Building 7250)	328 automobiles
Airport Traffic Control Tower	47 automobiles
Air Cargo Terminal 1	136 automobiles
Air Cargo Terminal 2	90 automobiles
Air Cargo Terminal 3	57 automobiles/28 trucks
Air Cargo Terminal 4	53 automobiles/10 trucks
Air Cargo Terminal 5	108 automobiles/12 trucks
Forward Air Facility (Building 2865)	64 automobiles/10 trucks
Building 1000	33 automobiles
Building 1001	34 automobiles
Building 1002	4,010 SF (Unmarked)
Building 1009	None
FedEx Hub/Sorting Facility	200 automobiles
Building 594	Unmarked
Building 595 (UPS Hub/Sorting Facility)	Unmarked
Building 596	Unmarked
Building 597	Unmarked
SRE	27 automobiles
Former CRAA Administration (Building 440)	25 automobiles

Source: Michael Baker International, Inc.

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1.2.16 Utilities

This section provides a brief summary of the inventory conducted for the utility facilities in and around the Study area. Additional information regarding the following utilities is depicted in figures located in **Appendix B**, **Utilities Figures**, of this report.

- Water Utilities
- Storm Utilities
- Sanitary Utilities
- Natural Gas Utilities
- Electric Utilities
- Telecom Utilities
- Fuel Utilities

The purpose of this utility inventory effort is to support the master plan process, but not to perform a detailed “as-built” inventory with field inspection. The Study will identify constraints with existing utilities to inform and guide the process of evaluating future development alternatives. It should be noted that the figures included in Appendix B are for planning purposes only and provide general information on the location, size, and direction of flow (where applicable) of the existing utilities based on the sources identified below. Some of the figures are more complete than others, depending on the readily available information.

The following sources were used in the preparation of the figures located in Appendix B:

- CRAA-provided planning studies, base maps, construction plans, and as-built plans
- CRAA staff interviews
- Facility drawings provided by utility companies
- Facility drawings provided by municipalities (Columbus, Groveport, etc.)

Water Utilities

The airport is served by an existing 24” water main, owned by the City of Columbus, running along Alum Creek Drive from the north to John Glenn Avenue. This 24” water main extends west along John Glenn Avenue, then extends both north and south along the Shook Road alignment. The southern extension runs along Rickenbacker Parkway and ends at the master meter at the Franklin/Pickaway County line. The north extension runs to London-Groveport Road, then heads west along London-Groveport Road.

Figure B.1 Water Utilities depicts this 24” water main in addition to smaller City of Columbus water main lines within the Study area. All water main lines depicted outside of the airport property and private properties are owned and operated by either the Earnhart Hill Regional Water and Sewer District, the City of Columbus, or the City of Groveport.

Figure B.1 Water Utilities also depicts the existing water main lines within the City of Groveport. The City of Groveport within the Study area is served by a series of smaller water mains (12-

16") which are fed by a 20" water main along Groveport Road in the northeast corner of the Study area.

Figure B.1 Water Utilities also depicts proposed future extensions of the water main system around the airport. These proposed future extensions were extracted from the 2006 LCK Water and Sanitary Sewer System Development Master Plan, by MS Consultants, Inc., dated November 6, 2006 (referred to as "MS Report" in the figures), with the location and status revised to reflect the proposed alignment of Rickenbacker Parkway in 2018 by CRAA staff. A water and sewer contract is currently being drafted with the City of Columbus, under which Columbus is anticipated to maintain all water facilities.

Storm Utilities

The drainage system within the Study area consists of a series of underground storm sewers, culverts, basins, and ditches/creeks. All storm facilities depicted outside of the airport property and other private properties are owned and operated by the City of Columbus, the City of Groveport, the City of Obetz, or the City of Lockbourne.

Figure B.2 Storm Utilities depicts six drainage areas (003, 004, 005, 006, 007, and 010) and five outfalls (003, 004, 005, 007, 010), which were extracted from the airport's Stormwater Pollution Prevention Plan (2015 SWPPP).

Figure B.2 Storm Utilities also depicts structures consisting of reinforced concrete pipe (RCP) and box culverts where known.

Drainage Areas 003 thru 007 drain into Walnut Creek to the east, while Drainage Area 010 drains into an unnamed creek to the west (referred herein as West Creek), which ultimately outlets into Big Walnut Creek. Both Walnut Creek and West Creek flow from north to south.

Sanitary Utilities

The sanitary sewer system, as shown in **Figure B.3 Sanitary Utilities**, is made up of a series of gravity lines, force mains, and pump stations in and around the airport. All sewer facilities depicted outside of the airport property and other private properties are owned and operated by either the City of Columbus or the City of Groveport.

Within the Columbus city limits, off-airport sewage flows from the north through a 12-foot-diameter pipe along Alum Creek Drive, then turns west along London-Groveport Road through a 14-foot-diameter pipe to the Southerly Wastewater Treatment Plant (WWTP). Sewage from the area south of the airport is pumped north into the airport's gravity sewers, which collects and flows north through a 42" main and outlets into the 14-foot-diameter sewer main at the intersection of Alum Creek Drive and London-Groveport Road that flows to the Southerly WWTP.

Figure B.3 Sanitary Utilities also depicts the existing sewer system within the City of Groveport, which consists of primarily gravity sewers. In general, Groveport sewage is collected from the area east of Alum Creek Drive and flows northeast to a 42” trunk line that flows to the north along London-Groveport Road.

Figure B.3 Sanitary Utilities also depicts the proposed future extensions of the sewer system south of the airport. These proposed extensions were extracted from the 2006 LCK Water and Sanitary Sewer System Development Master Plan, by MS Consultants, Inc. (Referred to as “MS Report” in the figures), with the location and status revised to reflect the proposed alignment of Rickenbacker Parkway in 2018 by CRAA staff. These proposed future extensions include gravity sewers that will flow west to the Southerly WWTP, as depicted in the City of Columbus “Tributary Area Map for Existing and Proposed Interceptor Sewers.” This information is included in **Figure B.3 Sanitary Utilities**.

Natural Gas Utilities

The natural gas system within the Study area consists of a series of underground pipes. Gas facilities outside of the airport property and other private properties are owned and operated by Columbia Gas.

Figure B.4 Gas Utilities depicts the high- and medium-pressure underground natural gas lines that serve the area around the airport. A high-pressure line extends from the northeast corner of the Study area to London-Groveport Road in the central-western portion of the Study area.

This high-pressure line feeds a medium-pressure line at Shook Road, which extends south through the airport property, along a portion of Rickenbacker Parkway.

Electric Utilities

The electric system depicted within the Study area consists of a series of underground and overhead electric lines and substations. Electric facilities outside of the airport property and other private properties are owned and operated by South Central Power (SCP), Dominion, and American Electric Power (AEP).

Figure B.5 Electric Utilities depicts the overhead and underground SCP transmission and distribution lines that serve most of the Study area. It is also depicts the Dominion and AEP transmission lines that traverse the area surrounding the airport.

Also depicted in **Figure B.5 Electric Utilities** are the underground electric lines that serve the airfield area.

Telecom Utilities

The telecommunication system depicted within the Study area consists of Sprint and AT&T facilities.

Figure B.6 Telecom Utilities depicts the underground AT&T telecommunications cables that extend from Alum Creek Road to the area south of the airport. Also depicted are spare telecommunications conduits along Rickenbacker Parkway for future use and private underground telecommunication cables and manhole locations.

Also depicted in **Figure B.6 Telecom Utilities** are the Sprint telecommunications facilities that run along the railroad to the west of the airport.

Fuel Utilities

As depicted in **Figure B.7 Fuel Utilities**, the fuel facilities at the airport include a fuel farm located in the northeast area of the airport near the FedEx facility. This fuel farm includes one 20,000-gallon above-ground Avgas tank, and eight 50,000-gallon underground Jet A tanks, which are connected to an underground hydrant loop with fuel hydrant locations shown. It also includes a 12,000-gallon above-ground diesel fuel tank. All of these tanks are loaded and unloaded via truck. Fuel facility information was provided by CRAA.

Figure B.7 Fuel Utilities also depicts an abandoned 6” Ashland fuel line to the west of the airport, and an active east-west Marathon Petroleum transmission line south of the airport.

1.3 Existing Airspace and Obstruction to Air Navigation

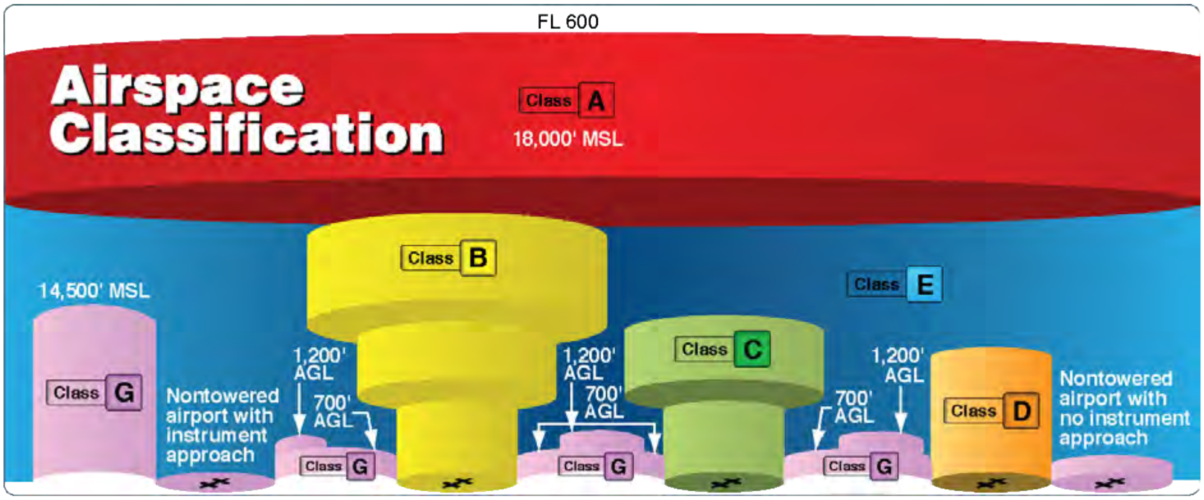
The National Airspace System (NAS) is an integrated set of control, procedures, and policies established and regulated by the FAA to maintain safe and efficient aircraft operations. However, it is the responsibility of the airport sponsor to take the appropriate actions to assure that the terminal airspace required to protect instrument and visual operations to the airport has been adequately cleared and protected by removing, lowering, relocating, marking, lighting, or other acceptable mitigation methods. In addition, establishment or creation of future hazards should be prevented. **Figure 1-7 Airspace Classification** shows the airspace in the NAS.

This section describes the current airspace surrounding LCK, as well as the existing airspace standards regarding airspace protection. In addition, this section also describes the current standard instrument procedures currently available to facilitate aircraft operations during low ceiling and low visibility, as well as facilitate air traffic flow management and air traffic communications.

1.3.1 Airspace Classification

LCK is located within Class D airspace. Generally, Class D airspace extends upward from the surface to 2,500 feet above the airport elevation. However, at LCK, the Class D airspace is divided into two sections. One section is located below the John Glenn Columbus International Airport Class C airspace, and it extends from the surface to 2,500 feet Mean Sea Level (MSL). The remaining section extends from the surface to 3,000 feet MSL. Surrounding the LCK Class D airspace is the Columbus Class E airspace which extends from 18,000 feet MSL downwards to 700 feet Above Ground Level (AGL). Surrounding the Columbus Class E airspace is the Ohio Class E airspace which extends from 18,000 feet MSL downwards to 1,200 feet AGL. The class of airspace shown on the Sectional Chart in **Figure 1-8 Sectional Aeronautical Chart**, provides aircraft operators with information regarding the required operating rules, as well as pilot and equipment certification requirements.

Figure 1-7 Airspace Classification



Source: Adapted from Pilot's Handbook of Aeronautical Knowledge (FAA-H-8083-25B)

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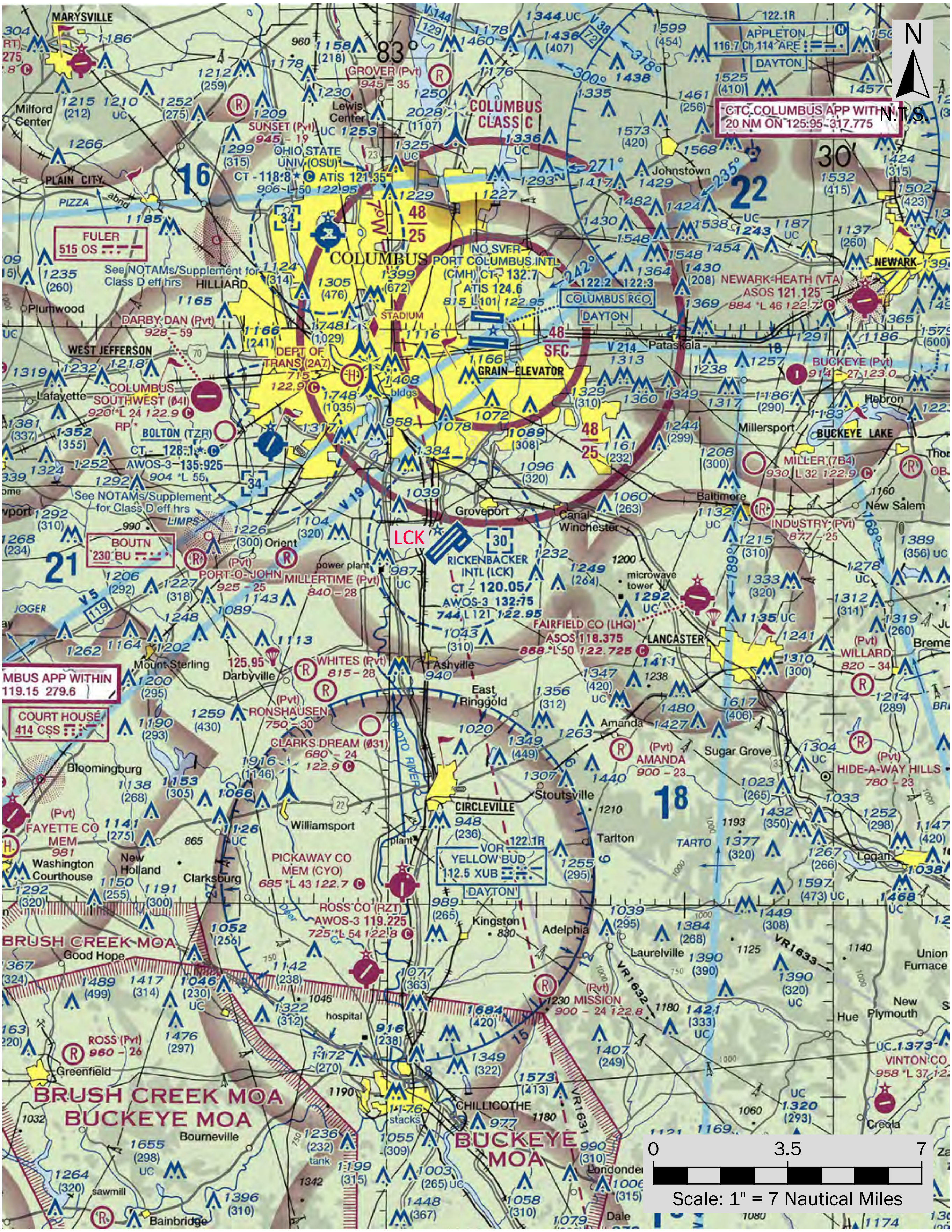

Figure 1-8 Sectional Aeronautical Chart

A Military Operation Area (MOA) is airspace with defined vertical and lateral limits established for the purpose of separating certain military training operations from civilian IFR traffic. As shown in **Table 1-24 Military Operation Areas (MOAs)**, there are two MOAs southwest of LCK.

Table 1-24 Military Operation Areas (MOAs)

Name	Altitude	Time of Use	Controlling Agency	Frequencies
Brush Creek	100 feet AGL to but not including 5,000 feet MSL	0800-2200 Mon-Sat	Indianapolis Center	134.0 135.57
Buckeye	5,000 feet MSL to but not including FL180	0800-2000 Mon-Fri 0800-1600 Sat-Sun	Indianapolis Center	134.0 135.57

Source: Cincinnati Sectional Chart 97th Edition

1.3.2 Civil Airport Imaginary Surfaces

Existing Part 77 surfaces (14 CFR Part 77 – Safe, Efficient Use, and Preservation of the Navigable Airspace) are summarized in **Table 1-25 Dimensions of the Existing Imaginary Surfaces**. Objects that penetrate the Part 77 imaginary surfaces may be considered obstructions to air navigation and require analysis by the FAA. Once the analysis is completed, the FAA makes a determination and provides details of the findings. Good planning practices suggest that future airport facility developments should be planned to avoid penetrations to Part 77 surfaces. Unmitigated penetrations to the Part 77 imaginary surfaces may have an impact on the instrument procedures which may affect the overall capacity of the airport. Further analysis regarding Part 77 will be discussed in the following chapters as the master planning process moves forward.

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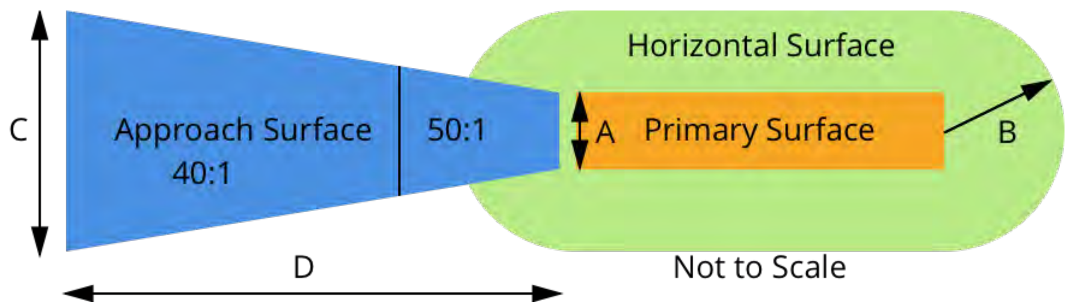
Table 1-25 Dimensions of the Existing Imaginary Surfaces

Dim	Item	Runway 5L-23R		Runway 5R-23L	
		5L	23R	5R	23L
A	Width of the primary surface and approach surface width at inner end (feet)	1,000	1,000	1,000	1,000
B	Radius of the horizontal surface (feet)	10,000	10,000	10,000	10,000
C	Approach surface width at end (feet)	16,000	4,000	16,000	16,000
D	Approach surface length (feet)	50,000	10,000	50,000	50,000
–	Approach slope	50:1 inner 10,0000 40:1 outer 40,000	34:1	50:1 inner 10,0000 40:1 outer 40,000	50:1 inner 10,0000 40:1 outer 40,000
–	Conical surface	20:1	20:1	20:1	20:1
–	Transitional surface	7:1	7:1	7:1	7:1



Source: 14 CFR Part 77. Michael Baker International, Inc.

1.3.3 Obstacle Clearance Surfaces

LCK, as a federally obligated airport, is subject to Grant Assurances 20 and 21 which require the protection of the approach and departure surfaces. The airport operator has an ongoing obligation to review the surface(s) for obstacles and obstructions. The FAA reviews all Instrument Approach Procedures (IAP) approximately every two years. Obstacles found within the associated approach/departure surfaces at that time may result in higher minima, loss of approaches and/or loss of nighttime operations, potentially reducing airport capacity. The dimensions of the current obstacle clearance surfaces (OCS) are shown in **Table 1-26 Existing Dimensions of the Obstacle Clearance Surfaces.**

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Table 1-26 Existing Dimensions of the Obstacle Clearance Surfaces

Procedure Type	Dimensional Standard (Feet)	Dimensions			
		5L	23R	5R	23L
Approach	Runway Type	7	6	7	7
	A	200	200	200	200
	B	800	800	800	800
	C	3,800	3,800	3,800	3,800
	D	10,000	10,000	10,000	10,000
	E	0	0	0	0
	Slope	34:1	20:1	34:1	34:1
Departure	A	0	0	0	0
	B	1,000	1,000	1,000	1,000
	C	6,466	6,466	6,466	6,466
	D	10,200	10,200	10,200	10,200
	E	0	0	0	0
	Slope	40:1	40:1	40:1	40:1

Source: AC 150/5300-13A define by the runway type.

1.3.4 Standard Instrument Procedures

The FAA develops standard instrument procedures to facilitate safe navigation around obstructions and obstacles identified through the analysis of the airspace surfaces discussed in the previous sections. Standard instrument procedures are developed in accordance with 14 CFR Part 97, Standard Instrument Procedures, and FAA Order 8260.3C, United States Standard for Terminal Instrument Procedures (TERPS).

Instrument Departure Procedures

Instrument departure procedures are preplanned IFR procedures providing obstruction clearance from the terminal area to the appropriate route structure. There are two types of departure procedures: obstacle departure procedures and standard instrument departures (SID). SIDs are generally published to facilitate air traffic control purposes, primarily to reduce the communications workload between the pilots and air traffic control. There is one SID, LOCKBOURNE FOUR departure published for LCK. This SID is used for departures from Runway 5L or Runway 5R. An update to Lockbourne Four is scheduled for publication on 12/7/2017. LCK does not have any published takeoff minimums or obstacle departure procedures.

Standard Terminal Arrival

Standard terminal arrival (STAR) procedures facilitate the transition between en-route and the instrument approach procedure. As shown in **Table 1-27 Standard Terminal Arrivals (STARs)**, there are three STARs, each one having multiple transitions. STARs are not directly associated with a particular airport. However, STARs provide navigation information to a fix or NAVAID designated by ATC from which radar vectors commonly take over. In the case of LCK, radar vectors to the final approach course are provided from the GAILL, GUNNE, and BREMN fixes.

Table 1-27 Standard Terminal Arrivals (STARs)

Procedure Name	Transitions
BREMN FOUR	Bellaire Transition (AIR.BREMN4) Henderson Transition (HNN.BREMN4 Morgantown Transition (MGV.BREMN4)
GAILL TWO ARRIVAL (RNAV)	Cincinnati Transition (CVG.GAILL2) Louisville Transition (IUU.GAIL2) Pocket City Transition (PXV.GAIL2) St. Louis Transition (STL.GAIL2)
GUNNE TWO	Brickyard Transition (VHP.GUNNE2) Flag City Transition (FBC.GUNNE2) Fort Wayne Transition (FWA.GUNNE2)

Source: FAA Instrument Flight Procedures Gateway

Instrument Approach Procedure

Instrument approach procedures (IAPs) facilitate the transition from the airspace to the airport. IAPs are critical to the airport because they may directly affect the overall capacity of the airport to handle aircraft operations during low ceilings and low visibility. IAPs may be affected due to penetrations of Part 77 imaginary surfaces or the obstacle clearance surfaces. **Table 1-28 Existing Standard Instrument Approach Procedures** shows the IAPs available at LCK. For example, with the appropriate aircrew and aircraft certification, the existing ILS IAP for Runway 5R allows operations with ceilings as low as 100 feet AGL and 1,200 feet RVR.

Table 1-28 Existing Standard Instrument Approach Procedures

Description	Navaid Type	Navaid Ident	Amendment	Date
ILS or LOC RWY 5L	ILS	FQS	1B	11/12/2015
ILS or LOC RWY 5R	ILS	DDV	3B	04/02/2015
ILS or LOC RWY 23L	ILS	LCK	1A	04/02/2015
RNAV (GPS) RWY 5L	GPS/WAAS	–	Original A	04/02/2015
RNAV (GPS) RWY 5R	GPS/WAAS	–	1A	04/02/2015
RNAV (GPS) RWY 23L	GPS/WAAS	–	Original	01/15/2009
RNAV (GPS) RWY 23R	GPS/WAAS	–	Original B	04/28/2016
NDB RWY 5R	NDB	DD	2A	04/02/2015
NDB RWY 23L	NDB	LC	2A	04/02/2015

Source: AVN Datasheets. Instrument Approach Procedures

1.4 Historical Weather Conditions

The key parameters that affect operations, as well as the airfield layout, are temperature, meteorological conditions, and wind directions. Temperature directly affects runway length requirements. Meteorological conditions affect the overall capacity of the airfield. The wind direction affects the runway alignment which in turn affects the overall layout of the airfield. The parameters presented in this section will be used to evaluate the existing airport configuration and to design future development alternatives.

1.4.1 Average Temperatures

The National Climatic Data Center (NCDC) station nearest to LCK reporting climate normals is Columbus VLY Crossing (USC00331783). The station is about 10 miles north of the airport (latitude: 39.9047; Longitude: -82.9200) at an elevation of approximately 760 feet. According to the National Oceanic and Atmospheric Administration (NOAA), climate normals are three-decade averages of climatological variables such as temperature and precipitation. **Table 1-29 Monthly Climate Normals** summarizes relevant climate normals. Climatological data such as temperature and precipitation are key factors for airport planning because of the relationship to aircraft operating requirements. For example, aircraft takeoff and landing distances increase as temperature increases. Also, required runway length calculations require the mean daily maximum temperature of the hottest month. Instrument approaches which depend upon in-flight barometric pressure, such as LNAV/VNAV and RNP are temperature sensitive. The average annual snowfall is a parameter used to determine the minimum snow removal equipment requirements.

The hottest month is July, and the mean daily maximum temperature of the hottest month is 86.8 degrees Fahrenheit. The coldest month is January. The mean daily minimum temperature is 18.2 degrees Fahrenheit. The annual average precipitation is 40.11 inches, and the annual average snowfall is 21.0 inches.

Table 1-29 Monthly Climate Normals

Normal Temperature	Degrees Fahrenheit (°F)			Average Precipitation (Inches)	
	Low	Average	High	Precipitation	Snowfall
January	18.6	27.8	37.0	2.86	10.3
February	21.4	31.7	42.0	2.32	5.0
March	28.9	40.5	52.1	3.13	1.8
April	39.9	52.5	65.1	3.76	0.6
May	50.3	62.5	74.8	4.56	0.0
June	59.8	71.6	83.4	3.71	0.0
July	63.6	75.0	86.3	4.42	0.0
August	61.3	73.2	85.0	3.15	0.0
September	53.5	66.3	79.1	3.03	0.0
October	41.3	54.1	67.0	2.71	0.0
November	32.4	43.4	54.3	3.32	0.33
December	23.4	32.5	41.5	3.14	0.31

Source: 1981-2010 U.S. Climate Normals. Station USC00331783

1.4.2 Meteorological Conditions

Visual Meteorological Conditions (VMC) occurs when the ceiling is greater than 3,000 feet, and visibility is greater than 5 miles. Marginal Visual Meteorological Conditions (MVMC) occurs when the ceiling is greater than or equal to 1,000 feet and less than or equal to 3,000 feet and/or visibility greater than or equal to 3 to less than or equal to 5 miles. Instrument Meteorological Conditions (IMC) occurs when the ceiling is greater than or equal to 500 feet to less than 1,000 feet and/or visibility greater than or equal to 1 to less than 3 miles.

Low Instrument Meteorological Conditions (LIMC) is a sub-category of IMC, and it is used to define the sub-categories of ILS approaches. Thus, IMC conditions are ceiling less than 1,000 feet and/or visibility less than 3 miles. Low Instrument Meteorological Conditions (LIMC) occurs when the ceiling is less than 500 feet and/or visibility less than 1 statute mile (SM). LIMC is a sub-category of Instrument Meteorological Conditions.

Table 1-30 Year 2016 Meteorological Conditions summarizes the percentages of prevailing meteorological conditions for the calendar year 2016. These percentages provide an indicator representing the amount of time aircraft will be able to operate under certain regulations.

It is the responsibility of the pilot in command to determine if aircraft can be operated within the limits of the applicable regulations.

Table 1-30 Year 2016 Meteorological Conditions

Meteorological Condition	Ceiling (Feet)	Visibility (Statute Miles)	% of Observations
VMC	> 3,000	> 5	76.38%
MVMC	≥ 1,000 and ≤ 3,000	≥ 3 and ≤ 5	12.97%
IMC	≥ 500 and < 1,000	≥ 1 and < 3	3.03%
LIMC CAT I	≥ 150 and < 500	≥ ½ and < 1 (2,400' RVR)	0.97%
LIMC CAT II	≥ 100 < 150	≥ ¼ and < ½ (1,600' RVR)	0.14%
Below Minimums	< 100	< ¼ (1,200' RVR)	8.52%

Source: National Climatic Data Center (NCDC) Rickenbacker International Airport (USAF 724285, WBAN 13812) Years: 2006-2016.
Percentages may not add up due to rounding.

1.5 Regional Setting and Land Use

The purpose of this section is to provide an overall regional setting of the airport and the land uses surrounding it. LCK is located approximately 10 miles south of downtown Columbus. A portion of the LCK property is located within the City limits. The City of Groveport is located 4½ miles to the northeast of LCK and a small portion of the airport property is located within the City of Groveport limits. Located 3 miles to the west of LCK is the Village of Lockbourne. **Figure 1-9 Existing Land Uses** shows the existing land uses surrounding LCK.

LCK is physically located within the jurisdiction of two counties, Franklin and Pickaway. The majority of the airport property is located in Franklin County, while the southern portions of the property are located in Pickaway County.

The City of Columbus, Groveport, and Franklin County have established an Airport Environs Overlay (AEO). The general purpose of the AEO is to protect public health, safety, and welfare by regulating development and land use within the areas surrounding the airport.

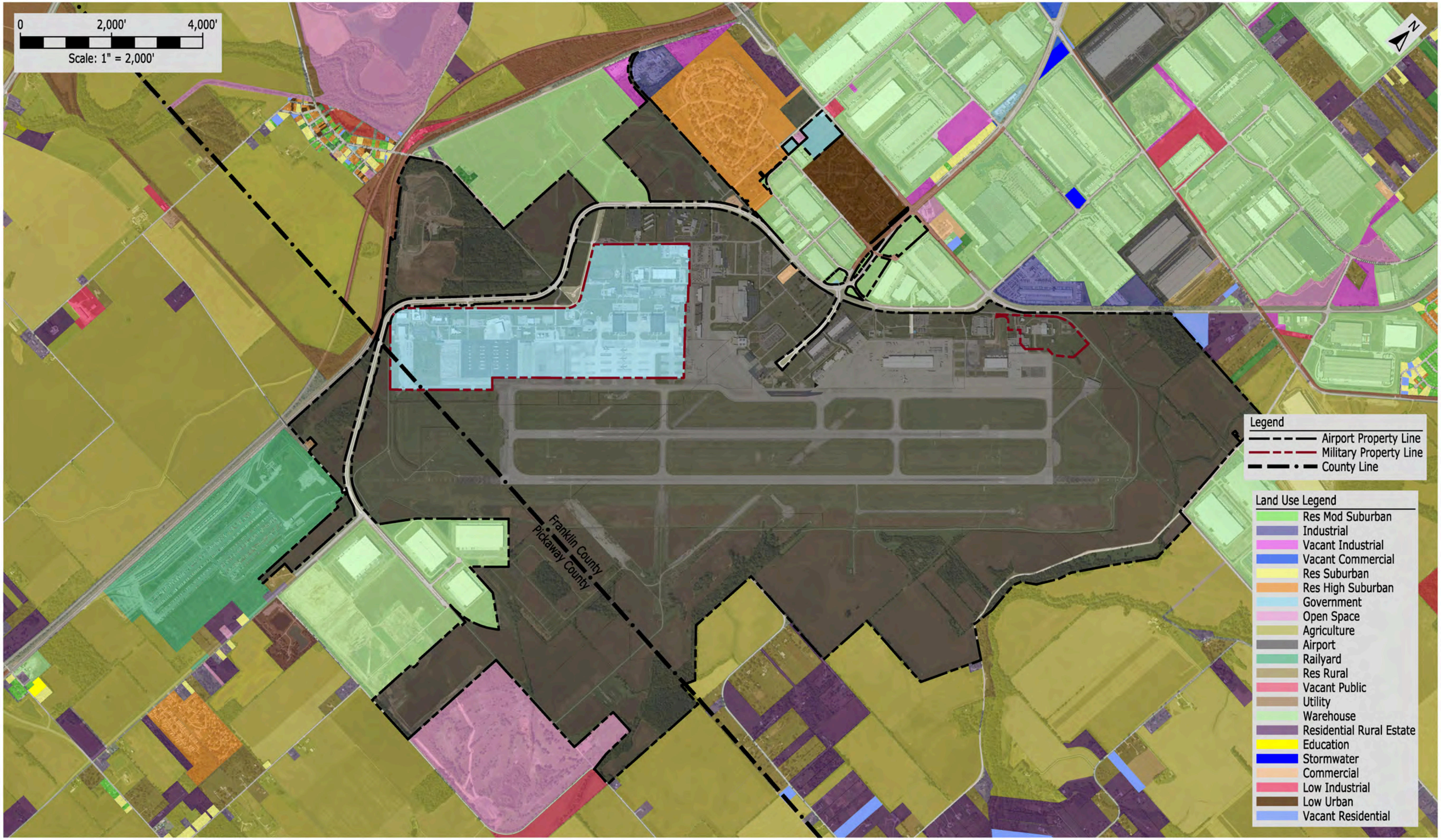

Figure 1-9 Existing Land Uses

The City of Columbus and Franklin County established an AEO district with three sub-districts based on specific average day-night noise levels. The City of Groveport has established an Airport Noise Boundary (ANB) overlay. The limits of this area are established by the noise contours included in the most recent 14 CFR Part 150 aircraft noise study. The ANB overlay is sub-divided into four districts defined by specific average day-night noise levels.

Part 150 Noise Compatibility

The 2006 Part 150 Noise Compatibility Program (NCP) study incorporated five additional land use measures in addition to the 17 land use measures approved in the 1998 Part 150. In addition to land use measures, the Part 150 study recommended a preferential runway use system in effect from 2300 to 0700. Runway 23L and Runway 23R should be used for departures and Runway 5L and Runway 5R should be used for arrivals, if the wind speed is 10 knots or less, and the pilot of the aircraft determines that the operation is safe.

1.6 Environmental Review

An environmental review was prepared as part of this Study to address existing natural and man-made environmental conditions at LCK. The information contained in Appendix A of this report is intended to help identify relevant environmental issues that should be considered during preparation of the Study.

Some of the proposed improvement projects at the airport will require environmental permitting through a number of different agencies, each with its own criteria and focus. Future development of the airport and the integration of environmental permitting will be critical to the success of each project as well as to the success of the airport.

Coordination with the appropriate agencies for permitting requirements will be made on an individual basis as each project is funded. Additional details of the possible environmental impacts are included as part of the alternatives analysis in this Study.

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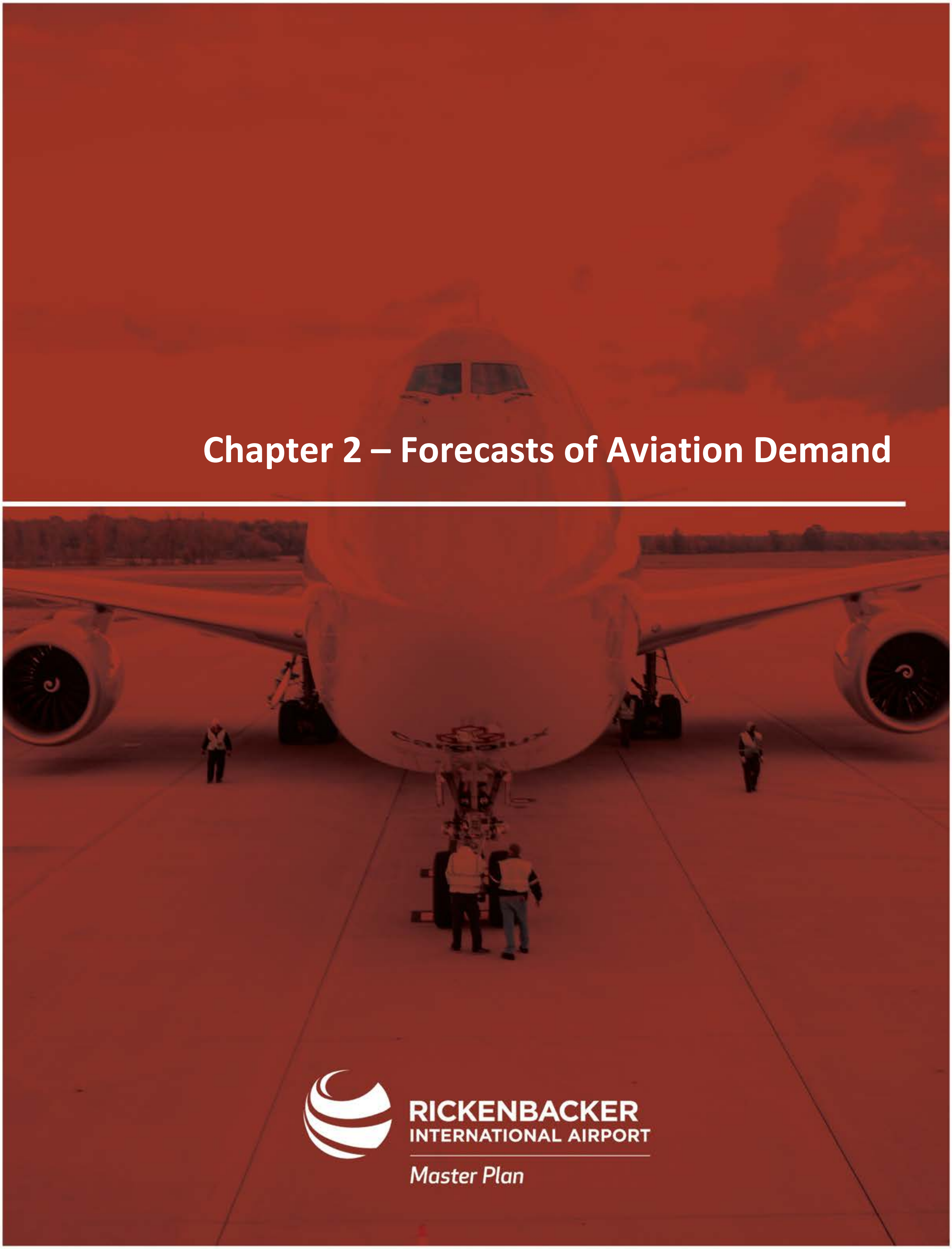
Chapter 2 – Forecasts of Aviation Demand



2.0 Forecasts of Aviation Demand

This aviation forecasting effort was conducted as part of the Master Plan Update (the Study) for the Rickenbacker International Airport (LCK). The forecasts were developed using the most recently available information and are referenced in later sections of this Study to determine short- and long-term facility requirements and to provide the preliminary justifications for recommended improvements. The forecasts are presented over a 20-year planning period and have a base year of 2016, which represented the most recent 12 months of available activity data, and extend through 2036. Although various forecasting efforts have been conducted over the course of LCK's history, this is the first comprehensive forecast since Allegiant initiated passenger airline service in late 2012. Also, the Columbus Regional Airport Authority (CRAA) and their partners have positioned LCK to be a key facility for handling international air cargo activity in a limited congestion environment unlike busier cargo gateways in Chicago, New York, Miami, and elsewhere. Organizations such as CRAA, the Federal government, Federal Aviation Administration (FAA), State of Ohio, Franklin County, City of Columbus, Mid-Ohio Regional Planning Commission (MORPC), and private entities have invested time and resources into creating a multi-modal transportation campus around LCK where cargo can quickly be connected by air, rail, and road. The investments have resulted in international cargo imports and exports continuing to grow year-to-year and new routes and air cargo handlers continuing to show an interest in LCK. As discussed in this chapter, the growth of worldwide e-commerce also has the potential to capture tremendous opportunities at LCK. Consequently, it was critical to develop updated forecasts of aviation demand that illustrate realistic expectations for future growth for all categories of activity (commercial airlines, domestic and international cargo, general aviation, and military).

The airport is one part of making the vision for the Rickenbacker area thrive as an inland port in Central Ohio. Key to that is being able to provide necessary facilities in a timely manner. This forecasting effort and subsequent analyses in this Study provide a proactive guide for CRAA to determine when, how, and where to develop facilities to continue to support the inland port. Since LCK serves all categories of aviation activity in very unique capacities, forecasts were first conducted for each category and then collectively evaluated. Emphasis was placed on air cargo because that is what drives much of the airport's long-term facility requirements (airfield facilities, building construction, roads, circulation, etc.). However, Allegiant's passenger service has also grown significantly since its inception at LCK. The demands of the passenger terminal building and apron, terminal loop road (John Circle Drive) and parking lots, and overall circulation are also important considerations—this is especially true when there is a high priority to focus on customer service and convenience. While the forecasts of aviation demand do not identify what development will be needed, they consider what could LCK realistically attract based on initiatives of the CRAA, industry trends, and local trends. As a part of Foreign-Trade Zone (FTZ) #138 that is administered by CRAA, the airport can capitalize on the continued growth of international imports and exports. All of this information was considered as part of the forecasts of aviation demand, as well as various opportunities mentioned throughout this chapter and Study.

For example, some interesting facts regarding activity at LCK in 2016 are listed below. Note that this list does not include Cincinnati/Northern Kentucky International Airport (CVG), which is located in Covington, Kentucky.

- Based on a review of the FAA's Traffic Flow Management System Counts (TFMSC) database, LCK was the only Ohio airport to receive Boeing 747-8 Freighter jet (747-8F) operations in 2016.
- LCK experienced more Boeing 747 jet (747-8F and other models) operations than all other airports in Ohio combined in 2016 (per the FAA's TFMSC database).
- According to the FAA's All-Cargo Landed Weight records, LCK landed more air cargo than any other Ohio airport in 2015. And based on preliminary information from the U.S. Department of Transportation's (USDOT's) Bureau of Transportation Statistics (BTS), LCK also landed more cargo than any other Ohio airport in 2016.
- Based on preliminary information from the USDOT's BTS, LCK handled more Allegiant passengers and operations than any other Ohio airport in 2016.

The FAA's National Plan of Integrated Airport Systems (NPIAS) identifies LCK as a Primary Commercial Service Airport. As part of the NPIAS, the airport is eligible to receive annual Airport Improvement Program (AIP) entitlement funding for necessary facility improvements. CRAA receives annual AIP entitlement funding for both the airline passenger activities and landed cargo weights at LCK. According to FAA Order 5100.38D, Airport Improvement Program Handbook, passenger entitlements are calculated based on the number of enplaned or departing passengers each year, while cargo entitlements are "divided on a pro-rata basis according to an airport's share of total U.S. landed cargo weight." Therefore, the forecasts in this Study may be used to estimate the funding that will be available for CRAA to conduct improvements to LCK during the planning period.

The following elements are addressed as part of this forecasting effort:

- Forecasting Limitations
- Historical and Baseline Activity Analysis
- Factors and Opportunities Affecting Activity Levels (General)
- Airline Forecasts
- Cargo Activity
- Military Forecasts
- General Aviation Operations and Based Aircraft Forecasts
- Instrument Operations Forecast
- Peaking Forecasts
- Forecast Summary

2.1 Forecasting Limitations

Forecasting aviation activity is a complex process that considers a multitude of factors, both controllable and beyond an airport's control. Forecasts are not to be construed with predictions of the future, but rather an educated guess of future activity based on a variety of predictors, calculations, assumptions, and subjective judgment. The accuracy of the estimates decline as the planning term is extended, potentially as a result of unforeseen local or geopolitical events, natural disasters, and/or climatological events.

The FAA's forecast approval process typically constitutes an approval for planning purposes only, which allows the airport sponsor to depict projects that are consistent with the long-term growth expectations on the Airport Layout Plan (ALP) Drawing Set. In most cases, prior to issuing a grant, the FAA will require updated information demonstrating that a proposed project is justified by activity at the time, or by activity that would directly result from the implementation of the proposed project. This policy helps to ensure that funding is directed towards critical projects throughout the U.S.

2.2 Historical and Baseline Activity Analysis

Because LCK serves all sectors of aviation activity, there are several historical activity trends that must be analyzed to determine what the likelihood may be for growth during the planning period. It is also necessary to identify the baseline values from where all forecasts begin, which are the actual 2016 values for LCK as determined primarily from the following resources referenced throughout this chapter:

- Historical Activity Counts from the Airport Traffic Control Tower (ATCT)
- Historical Activity Records from CRAA
- FAA TFMSC Database
- FAA Terminal Area Forecast (TAF)
- USDOT Bureau of Transportation Statistics (BTS) Databases

A summary of the historical operations for LCK is presented in **Table 2-1 Historical ATCT Activity Counts (2001-2016)** and was obtained from historical activity counts from the ATCT for the period between 2001 and 2016. There are several different activity characteristics listed in the table that are broken down in further detail within this chapter, but this is the traditional way that activity is categorized by FAA and ATCT personnel. Below are definitions of the activity characteristics from the FAA's TAF Summary for Fiscal Years 2015-2040.

- **Local Operations** are conducted by aircraft operating in the traffic pattern or within sight of the tower, or aircraft known to be departing or arriving from flight in local practice areas, or aircraft executing practice instrument approaches at the airport.
- **Itinerant Operations** are all aircraft operations other than local operations. Essentially, these represent takeoffs and landings of aircraft going from one airport to another.
- **Air Carrier Operations** represent either takeoffs or landings of commercial aircraft with seating capacity of more than 60 seats.

- **Commuter/Air Taxi** operations are one category. Commuter operations include takeoffs and landings by aircraft with 60 or fewer seats that transport regional passengers on scheduled commercial flights. Air taxi operations include takeoffs and landings by aircraft with 60 or fewer seats conducted on unscheduled or for-hire flights. This category can be difficult to differentiate from air carrier and general aviation operations and was therefore broken up later in this chapter.
- **Itinerant General Aviation and Local Civil Operations** represent all civil aviation aircraft takeoffs and landings not classified as commercial.
- **Military Operations** represent takeoffs and landings by military aircraft. Operations are either itinerant or local flights.

The historical activity data in **Table 2-1 Historical ATCT Activity Counts (2001-2016)** and the summary of historical itinerant and local operations in **Figure 2-1 Historical ATCT Activity Counts (2001-2016)** are not as illustrative of the recent growth that has occurred in the air cargo and airline sectors at LCK. For example, **Table 2-2 Historical Activity by User Group (2001-2016)** and **Figure 2-2 Historical Activity by User Group (2001-2016)** illustrate historical activity by user group and **Table 2-3 Historical Air Cargo Activity (2001-2016)** and **Figure 2-3 Average Pounds Per Cargo Operation (2001-2016)** summarize historical cargo statistics (air cargo landings were assumed to equal departures). Shortly after CRAA merged with the Rickenbacker Port Authority (RPA) in 2003, the passenger terminal opened, and Southeast Airlines began service to several markets from LCK. The airline ceased operations shortly after starting and other airlines such as Pan Am, Hooters Air, and Direct Air also attempted service at LCK, but airline passenger activity did not start to pick up again until Allegiant began service at LCK in late 2012. Regarding air cargo, in the early 2000's companies like Express One International and Evergreen International used to conduct regular operations at LCK, but both companies eventually ceased operations due to financial difficulties. AirNet Express conducted thousands of annual air cargo operations out of LCK using smaller aircraft, but relocated to another airport in 2008. And similar to general aviation activity at airports throughout the country, LCK experienced a decline after the terrorist attacks on September 11, 2001 and due to sharp fuel price increases after Hurricane Katrina damaged Gulf Coast refineries in August 2005. These events and other factors are identified throughout this chapter to help better understand the historical activity trends at LCK and what the opportunities for future growth may be.

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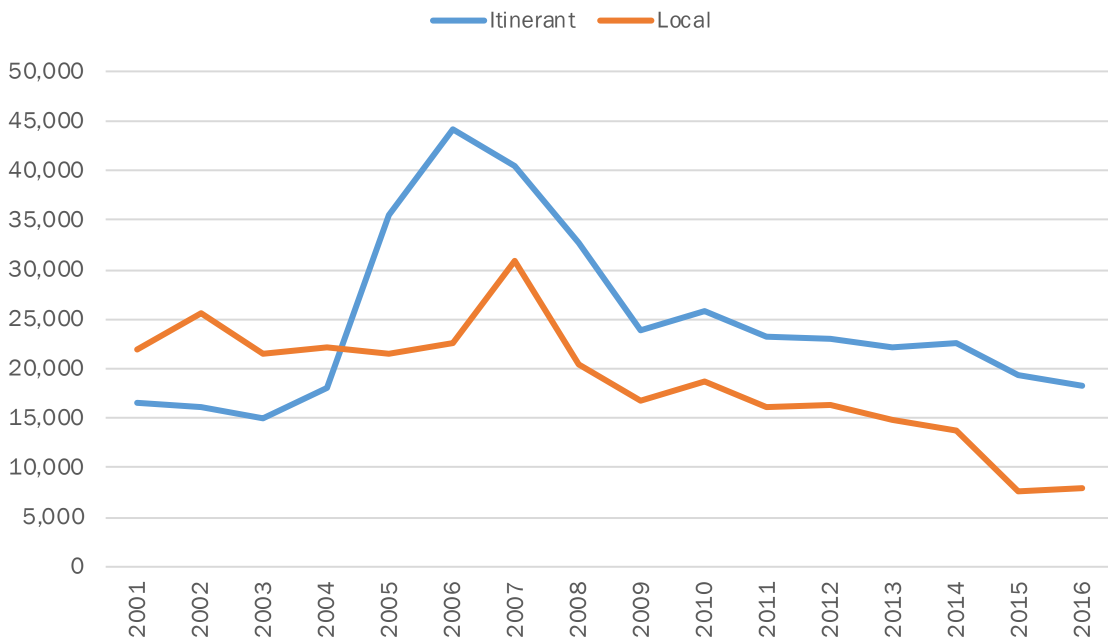
Figure 2-1 Historical ATCT Activity Counts (2001-2016)



Sources: Historical activity records from CRAA and Michael Baker International, Inc., 2017.

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Table 2-1 Historical ATCT Activity Counts (2001-2016)

Year	Itinerant (IT Operations)					Local Operations (LOC)				Total
	Air Carrier/ Air Taxi	General Aviation	Military	Total IT	% Total	General Aviation	Military	Total LOC	% Total	
2001	5,834	7,556	3,159	16,549	43.09%	8,633	13,226	21,859	56.91%	38,408
2002	5,653	7,551	2,981	16,185	38.65%	12,379	13,308	25,687	61.35%	41,872
2003	5,455	7,006	2,523	14,984	41.04%	8,861	12,668	21,529	58.96%	36,513
2004	8,844	6,570	2,568	17,982	44.70%	7,382	14,867	22,249	55.30%	40,231
2005	28,102	5,010	2,381	35,493	62.27%	7,840	13,665	21,505	37.73%	56,998
2006	37,282	4,440	2,430	44,152	66.19%	7,596	14,954	22,550	33.81%	66,702
2007	32,762	5,403	2,300	40,465	56.72%	17,413	13,462	30,875	43.28%	71,340
2008	26,641	3,619	2,387	32,647	61.42%	5,405	15,098	20,503	38.58%	53,150
2009	17,429	4,138	2,239	23,806	58.66%	5,366	11,414	16,780	41.34%	40,586
2010	19,020	4,561	2,246	25,827	58.02%	5,403	13,286	18,689	41.98%	44,516
2011	17,293	3,850	2,124	23,267	59.02%	4,274	11,883	16,157	40.98%	39,424
2012	17,207	3,691	2,190	23,088	58.55%	4,550	11,798	16,348	41.45%	39,436
2013	18,385	2,244	1,515	22,144	59.79%	5,160	9,731	14,891	40.21%	37,035
2014	18,341	2,753	1,556	22,650	62.11%	4,901	8,917	13,818	37.89%	36,468
2015	14,663	3,020	1,707	19,390	71.80%	2,701	4,913	7,614	28.20%	27,004
2016	14,273	2,602	1,470	18,345	69.73%	2,824	5,138	7,962	30.27%	26,307
AAGR 2001-2010	14.03%	-5.45%	-3.72%	5.07%	3.36%	-5.07%	0.05%	-1.73%	-3.32%	1.65%
AAGR 2010-2016	-4.67%	-8.93%	-6.82%	-5.54%	3.11%	-10.25%	-14.64%	-13.26%	-5.31%	-8.39%

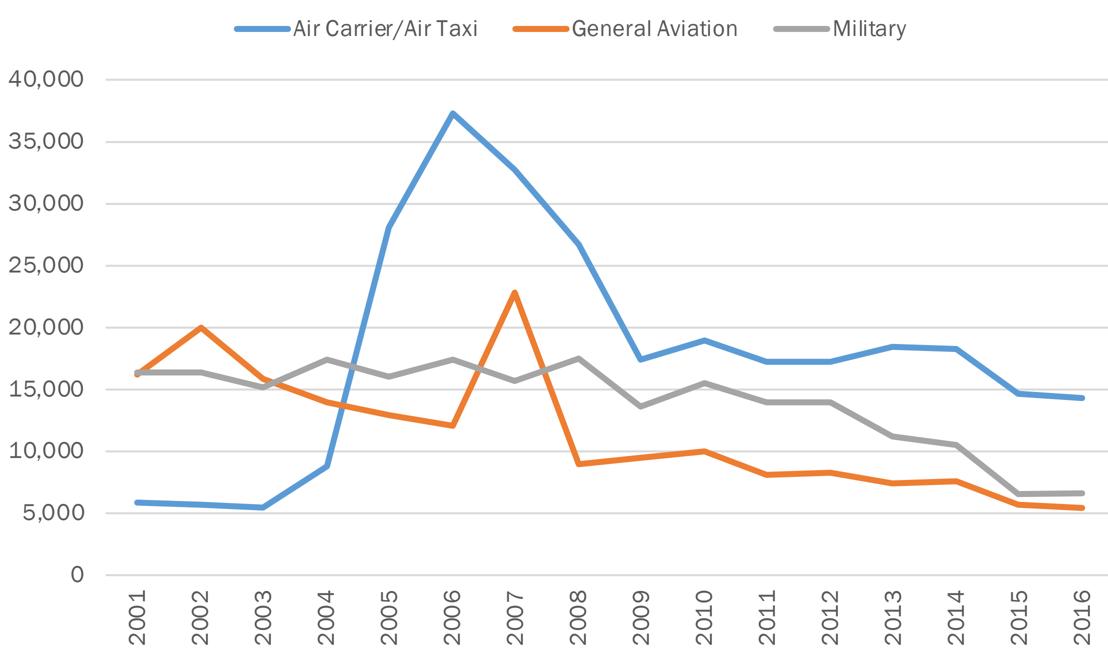
Sources: Historical activity records from CRAA and Michael Baker International, Inc., 2017.
Note: It was necessary to combine certain ATCT activity counts in 2015 and 2016 to illustrate the same format as previous years. The ATCT at LCK previously counted all activity by the categories in this table, but began counting activity differently in 2015. Therefore, it was necessary to estimate the split between itinerant and local operations for general aviation and military activity.
AAGR – Average Annual Growth Rate

Table 2-2 Historical Activity by User Group (2001-2016)

Year	Air Carrier/Air Taxi	General Aviation	Military	Total
2001	5,834	16,189	16,385	38,408
2002	5,653	19,930	16,289	41,872
2003	5,455	15,867	15,191	36,513
2004	8,844	13,952	17,435	40,231
2005	28,102	12,850	16,046	56,998
2006	37,282	12,036	17,384	66,702
2007	32,762	22,816	15,762	71,340
2008	26,641	9,024	17,485	53,150
2009	17,429	9,504	13,653	40,586
2010	19,020	9,964	15,532	44,516
2011	17,293	8,124	14,007	39,424
2012	17,207	8,241	13,988	39,436
2013	18,385	7,404	11,246	37,035
2014	18,341	7,654	10,473	36,468
2015	14,663	5,721	6,620	27,004
2016	14,273	5,426	6,608	26,307
AAGR 2001-2010	14.03%	-5.25%	-0.59%	1.65%
AAGR 2010-2016	-4.67%	-9.63%	-13.27%	-8.39%

Sources: Historical activity records from CRAA and Michael Baker International, Inc., 2017.
AAGR – Average Annual Growth Rate

Figure 2-2 Historical Activity by User Group (2001-2016)



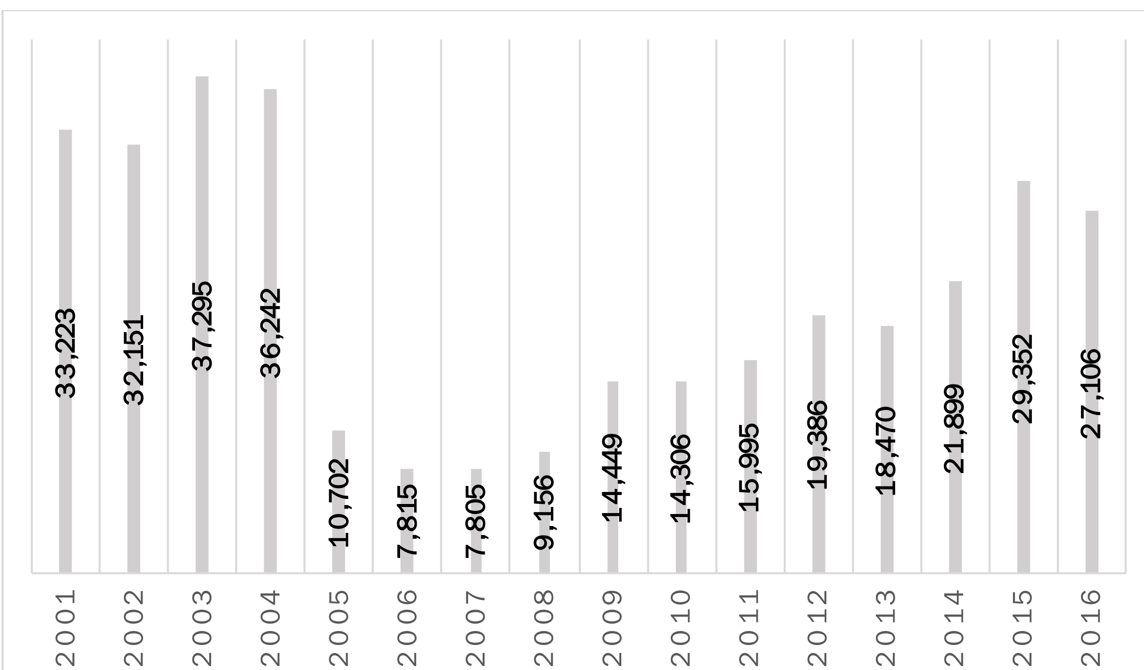
Sources: Historical activity records from CRAA and Michael Baker International, Inc., 2017.

Table 2-3 Historical Air Cargo Activity (2001-2016)

Year	Pounds	Metric Tons	Landings	Total Cargo Ops	Pounds Per Op
2001	213,360,995	96,779	3,211	6,422	33,223
2002	218,945,356	99,312	3,405	6,810	32,151
2003	204,675,711	92,839	2,744	5,488	37,295
2004	215,926,925	97,943	2,979	5,958	36,242
2005	248,917,975	112,907	11,629	23,258	10,702
2006	250,748,061	113,737	16,043	32,086	7,815
2007	220,529,131	100,030	14,128	28,256	7,805
2008	199,814,163	90,634	10,912	21,824	9,156
2009	158,450,106	71,872	5,483	10,966	14,449
2010	153,793,913	69,760	5,375	10,750	14,306
2011	146,164,909	66,299	4,569	9,138	15,995
2012	157,373,170	71,383	4,059	8,118	19,386
2013	153,670,161	69,704	4,160	8,320	18,470
2014	171,422,618	77,756	3,914	7,828	21,899
2015	198,596,025	90,082	3,383	6,766	29,352
2016	202,159,519	91,698	3,729	7,458	27,106
AAGR 2001-2010	-3.57%	-3.57%	5.89%	5.89%	-8.94%
AAGR 2010-2016	4.66%	4.66%	-5.91%	-5.91%	11.24%

Sources: Historical activity records from CRAA and Michael Baker International, Inc., 2017.
AAGR – Average Annual Growth Rate

Figure 2-3 Average Pounds Per Cargo Operation (2001-2016)

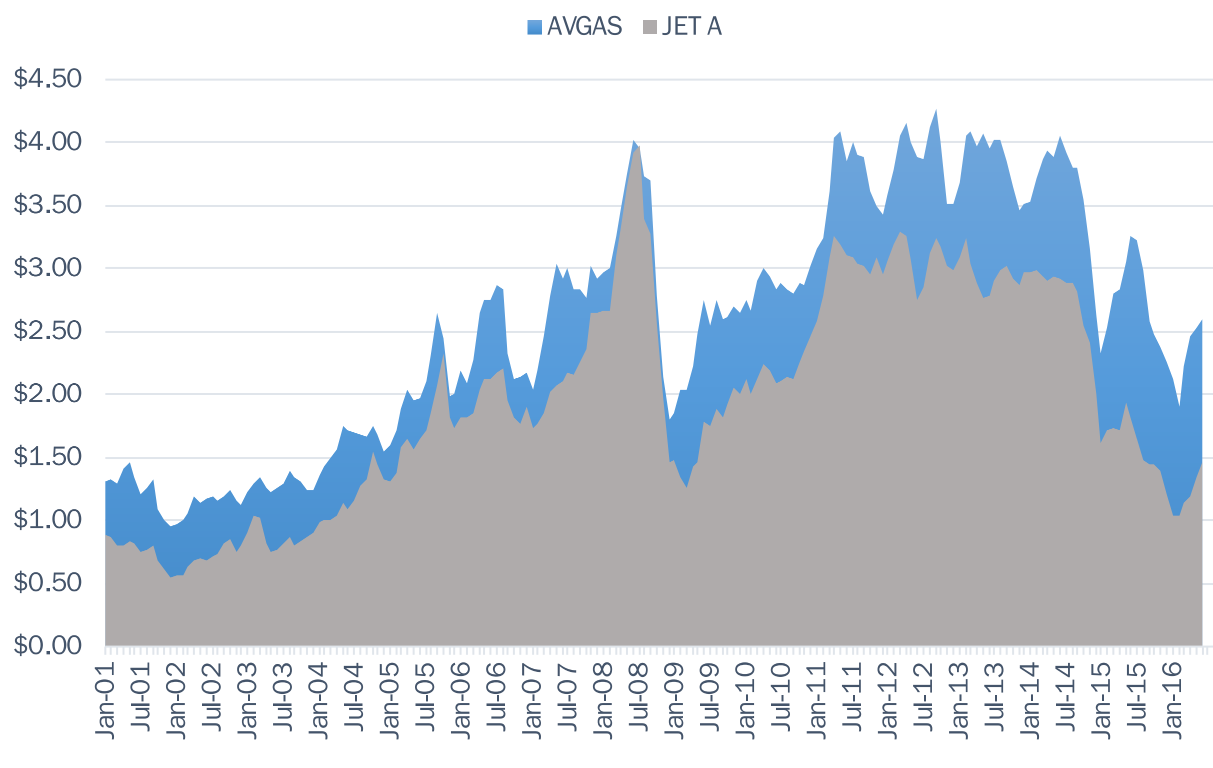


Sources: Historical activity records from CRAA and Michael Baker International, Inc., 2017.

2.3 Factors and Opportunities Affecting Activity Levels (General)

This section describes past and present trends that may influence activity levels at LCK. As part of any forecasting effort, the FAA recommends the identification of historical factors that represented turning points for the U.S. aviation industry such as the terrorist attacks on September 11, 2001, sharp fuel price increases after Hurricane Katrina damaged Gulf Coast refineries in August 2005 (refer to **Figure 2-4 U.S. Aviation Gasoline Wholesale/Resale by Refiners (2001-2016)**, and the economic recession of the late 2000s. In October 2016, Hurricane Matthew also produced airline cancellations at LCK and temporary relocations of military jets from their home bases to LCK to avoid poor weather. Although many of those events were impossible to predict, their resulting consequences had considerable impacts on aviation activity throughout the U.S. Local trends are also important because they provide airport-specific information that can be used to support the selection of preferred forecasts. General trends evaluated in this section include economic conditions and the FAA's Next Generation Air Transportation System (NextGen) initiatives. Other trends are presented as part of the individual forecast elements in this chapter.

Figure 2-4 U.S. Aviation Gasoline Wholesale/Resale by Refiners (2001-2016)

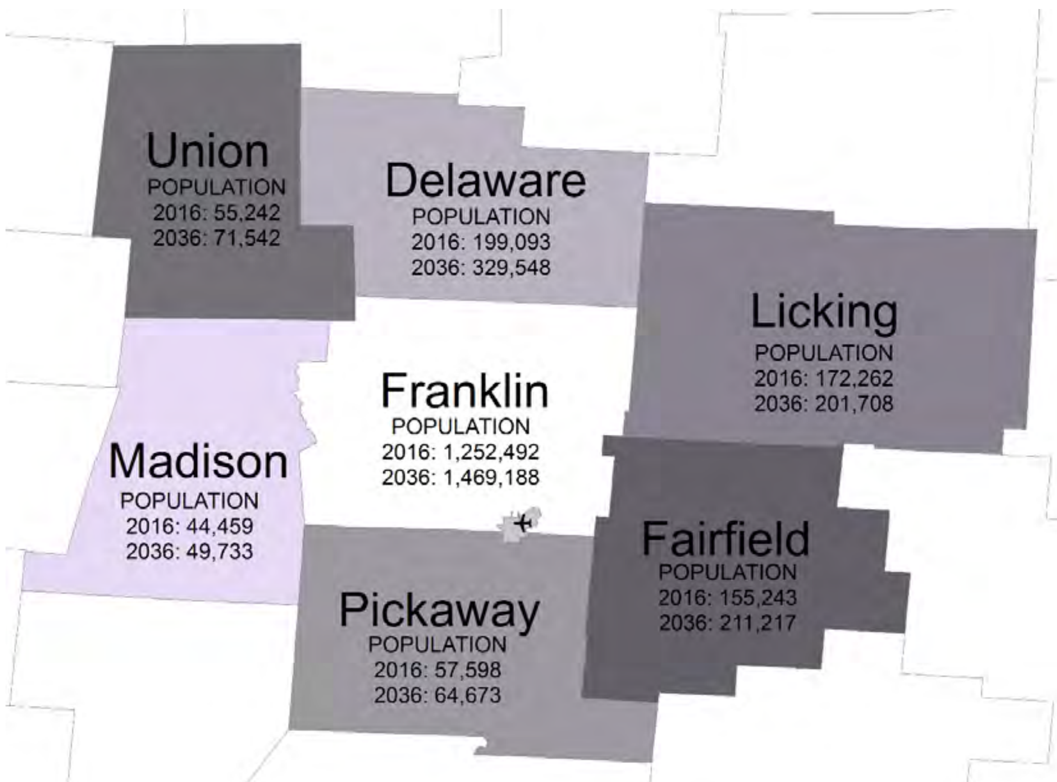


Sources: U.S. Energy Information Administration and Michael Baker International, Inc., 2017.

2.3.2 Economic Conditions

The economic conditions of an area can affect the demand for aviation-related travel and business services. Three key factors were selected to evaluate the economic profile of the area surrounding LCK: 1) Population, 2) Total Employment, and 3) Per Capita Personal Income (PCPI). The historical and forecast data shown in **Table 2-4 Historical and Forecast Economic Conditions (2000-2036)** was obtained from Woods & Poole Economics, Inc. and was extracted from a 2016 dataset for all counties and metro areas in Ohio. The dataset is useful because it provides a single-source of annually updated economic variables. A comparison of geographies was conducted for the U.S., State of Ohio, and the seven counties that comprise the MORPC planning area (refer to **Figure 2-5 Seven-County Region**).

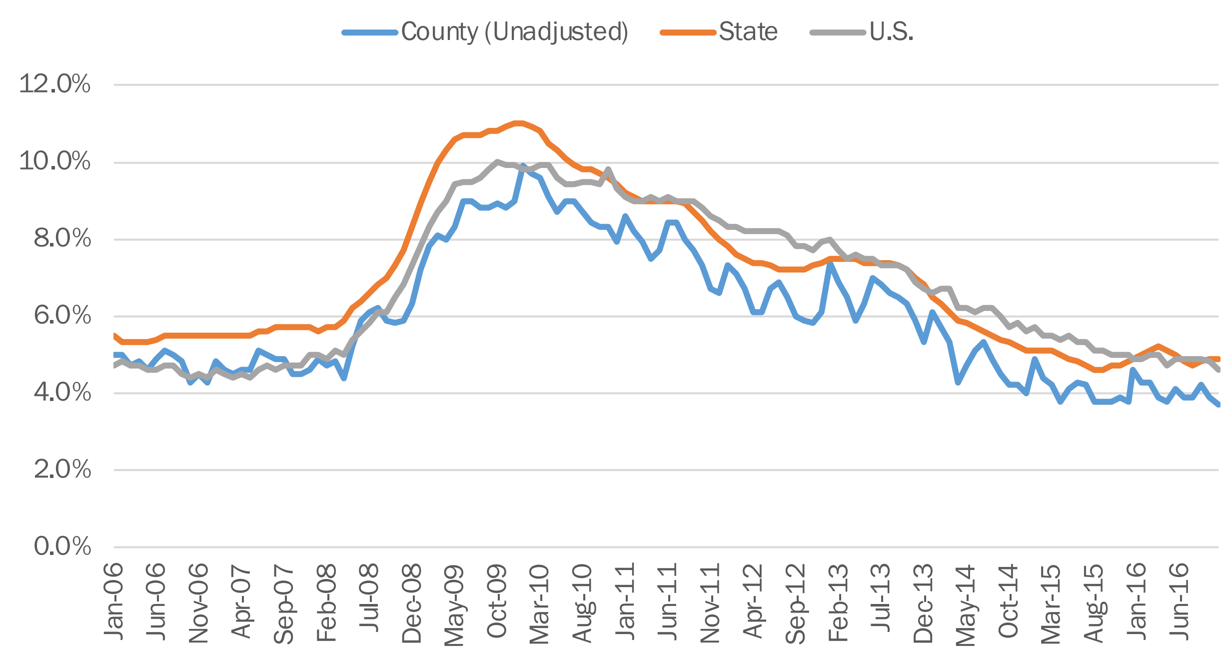
Figure 2-5 Seven-County Region



Sources: Woods & Poole Economics, Inc. and Michael Baker International, Inc., 2017.
Note: Woods & Poole does not guarantee the accuracy of the data.

According to the economic data from Woods & Poole, modest growth is forecast for population and employment in the State of Ohio. The state population is expected to grow at an Average Annual Growth Rate (AAGR) of 0.31% and employment is expected to grow at an AAGR of 0.88% over the 20-year planning period. LCK is physically located in both Franklin and Pickaway Counties, with the majority of the airport property located in Franklin County. Of the seven counties in the area, Franklin County has the largest population and employment base. Being the state capital of Ohio, Columbus and Franklin County have benefitted from historically lower unemployment rates than the state and U.S. (refer to **Figure 2-6 Historical Unemployment Rates (2006-2016)**. This can be attributed to the high number of state employee positions within Franklin County and the surrounding suburban areas, as well as the presence of The Ohio State University (OSU). The historical and forecast growth in Central Ohio suggests that a demand for aviation services will likely continue to grow as population, employment, and PCPI levels are projected to increase. This information was compared to MORPC's 2040 Land Use Projections forecasts that have a base year of 2015. As an example, MORPC's population forecast from 2015 to 2040 shows an AAGR of 0.64% for the seven counties and the Woods & Poole data shows an AAGR of 1.07% from 2016 to 2036 for the same region. Because MORPC was in the process of updating the Land Use Projections forecast at the time of this writing, the more current Woods & Poole data was incorporated into this Study.

Figure 2-6 Historical Unemployment Rates (2006-2016)



Sources: U.S. Bureau of Labor Statistics and Michael Baker International, Inc., 2017.

Table 2-4 Historical and Forecast Economic Conditions (2000-2036)

Year	U.S.	Ohio	Seven-County Region							
			Delaware	Fairfield	Franklin	Licking	Madison	Pickaway	Union	Combined/Average
Population										
2000	282,162,000	11,364,000	111,759	123,485	1,072,018	146,268	40,218	52,808	41,338	1,587,894
2010	309,347,000	11,540,000	175,108	146,391	1,166,107	166,707	43,412	55,725	52,391	1,805,841
2016	324,507,000	11,664,000	199,093	155,243	1,252,492	172,262	44,459	57,598	55,242	1,936,389
2021	339,812,000	11,866,000	226,681	168,300	1,308,410	179,873	45,896	59,516	59,154	2,047,830
2026	355,802,000	12,068,000	257,699	182,178	1,364,744	187,535	47,307	61,403	63,247	2,164,113
2031	372,071,000	12,255,000	292,162	196,661	1,419,617	194,989	48,629	63,178	67,439	2,282,675
2036	387,690,000	12,399,000	329,549	211,217	1,469,188	201,708	49,733	64,673	71,542	2,397,610
AAGR 2000-2010	0.92%	0.15%	4.59%	1.72%	0.84%	1.32%	0.77%	0.54%	2.40%	1.29%
AAGR 2010-2016	0.80%	0.18%	2.16%	0.98%	1.20%	0.55%	0.40%	0.55%	0.89%	1.17%
AAGR 2016-2036	0.89%	0.31%	2.55%	1.55%	0.80%	0.79%	0.56%	0.58%	1.30%	1.07%
Employment										
2000	165,371,000	6,780,000	54,728	51,567	851,573	72,635	18,283	22,134	29,018	1,099,938
2010	173,035,000	6,400,000	116,290	61,296	822,241	71,101	19,124	19,429	32,344	1,141,825
2016	191,871,000	6,922,000	138,963	67,749	934,293	75,933	21,955	19,779	38,450	1,297,122
2021	206,284,000	7,299,000	159,538	74,602	1,006,557	80,253	23,516	20,729	41,697	1,406,892
2026	220,486,000	7,646,000	182,123	81,702	1,077,833	84,104	24,989	21,526	44,898	1,517,175
2031	234,283,000	7,962,000	206,685	88,999	1,146,633	87,439	26,353	22,171	48,072	1,626,352
2036	247,548,000	8,243,000	233,198	96,454	1,211,655	90,261	27,605	22,678	51,212	1,733,063
AAGR 2000-2010	0.45%	-0.57%	7.83%	1.74%	-0.35%	-0.21%	0.45%	-1.30%	1.09%	0.37%
AAGR 2010-2016	1.74%	1.32%	3.01%	1.68%	2.15%	1.10%	2.33%	0.30%	2.92%	2.15%
AAGR 2016-2036	1.28%	0.88%	2.62%	1.78%	1.31%	0.87%	1.15%	0.69%	1.44%	1.46%
Per Capita Personal Income (PCPI)										
2000	$30,602	$28,631	$42,698	$28,527	$38,768	$27,445	$24,233	$22,113	$26,641	$30,061
2010	$40,277	$36,377	$53,358	$35,126	$38,662	$34,390	$31,475	$30,130	$34,517	$36,808
2016	$48,134	$44,310	$68,481	$41,745	$42,775	$41,454	$38,208	$36,326	$44,646	$44,805
2021	$56,667	$52,604	$80,007	$48,819	$46,148	$48,218	$45,138	$42,272	$51,816	$51,774
2026	$69,840	$65,344	$97,888	$59,746	$49,656	$58,581	$55,687	$51,326	$62,961	$62,264
2031	$88,466	$83,343	$123,685	$75,215	$52,901	$73,014	$70,499	$63,842	$78,880	$76,862
2036	$112,547	$106,686	$157,682	$95,182	$55,946	$91,239	$89,557	$79,522	$99,633	$95,537
AAGR 2000-2010	2.79%	2.42%	2.25%	2.10%	-0.03%	2.28%	2.65%	3.14%	2.62%	2.05%
AAGR 2010-2016	3.01%	3.34%	4.25%	2.92%	1.70%	3.16%	3.28%	3.17%	4.38%	3.33%
AAGR 2016-2036	4.34%	4.49%	4.26%	4.21%	1.35%	4.02%	4.35%	4.00%	4.10%	3.86%

Sources: Woods & Poole Economics, Inc. and Michael Baker International, Inc., 2017.
Note: Woods & Poole does not guarantee the accuracy of the data.
AAGR – Average Annual Growth Rate

2.3.3 FAA Next Generation Air Transportation System (NextGen)

NextGen includes a series of improvements to the national aviation system that are intended to make air travel more safe, convenient, and dependable. By investing in new technologies and replacing aging systems, NextGen initiatives are focused on improving schedule predictability, reducing environmental impacts, flying more direct routes, limiting ground holding, better circumventing poor weather, providing better approaches and access to airports, and improving safety for accident avoidance. The FAA's investment in NextGen initiatives should help to improve access and approach capability for airports around the U.S., as has been the case at LCK with the rollout of Localizer Performance with Vertical Guidance (LPV) approaches that provide horizontal and vertical course guidance to aircraft via Global Positioning System (GPS). Through the recommendations of this Study and the FAA's ongoing NextGen initiatives, it is anticipated that LCK will continue to become more accessible and that airlines will be able to continue to save time and money through more efficient route planning.

2.4 Airline Forecasts

The airline forecasts were divided into the following elements:

- Scheduled Airlines
- Allegiant Trends
- Scheduled Airlines Forecast
- Unscheduled Airlines Forecast
- Airline Fleet Mix Forecast
- Airline Belly Cargo and Remain-Overnight (RON) Considerations

2.4.2 Scheduled Airlines

As mentioned in this Study, the scheduled airline service at LCK is conducted exclusively by Allegiant. Allegiant began service at LCK in late 2012 and has experienced high levels of year-to-year growth ever since. In the first full year of service at LCK in 2013, Allegiant conducted a total of 214 operations flying to two airports in Florida: St. Pete-Clearwater International Airport (PIE) and Orlando Sanford International Airport (SFB). During 2013, Allegiant flew 29,864 passengers between LCK and those two airports using 166-passenger McDonnell Douglas MD-80 jets (MD-80s). In 2014, Allegiant passenger service at LCK grew by 189.07% over the previous year and service was added to Punta Gorda Airport (PGD) in Florida and Myrtle Beach International Airport (MYR) in South Carolina. As shown in **Table 2-5 Allegiant Activity at LCK (2013-2016)**, Allegiant continued to fly more passengers and add destinations in 2015 and 2016, with total passengers reaching 196,115 in 2016 on 1,338 operations using a mix of MD-80s and Airbus A320 jets (A320s) flying between LCK and eight destinations. **Figure 2-7 Total Allegiant Passengers at LCK (2001-2016)** illustrates the growth in total Allegiant passengers between 2013 and 2016—a historical trend line is shown to evaluate what the future passenger growth might look like at LCK if the growth were to continue in a similar manner. Using the trend line equation below, total 2036 Allegiant passengers would reach 1,345,682 at LCK, however that value was not deemed appropriate for this forecasting effort because of recent and announced business plans by Allegiant that are described later in this section. With the addition of seasonal service to Destin-Fort Walton Beach Airport (VPS) in Florida and increased frequency on existing routes, the Allegiant service is expected to continue to experience passenger and operational growth in 2017. **Table 2-6 Allegiant Non-Stop Destinations from LCK (as of January 10, 2017)** summarizes the Allegiant schedule for LCK as of January 10, 2017 and **Figure 2-8 Allegiant Non-Stop Destinations from LCK (as of January 10, 2017)** illustrates the map of year-round and seasonal destinations from LCK.

Trend Line Equation: $y = 57113x - 25030$

Where y equals annual passengers…

And X is the evaluation year minus the base year (2013) plus 1.

2036 Example: $y = (57113 \times (2036-2013+1)) - 25030 = 1{,}345{,}682$ passengers

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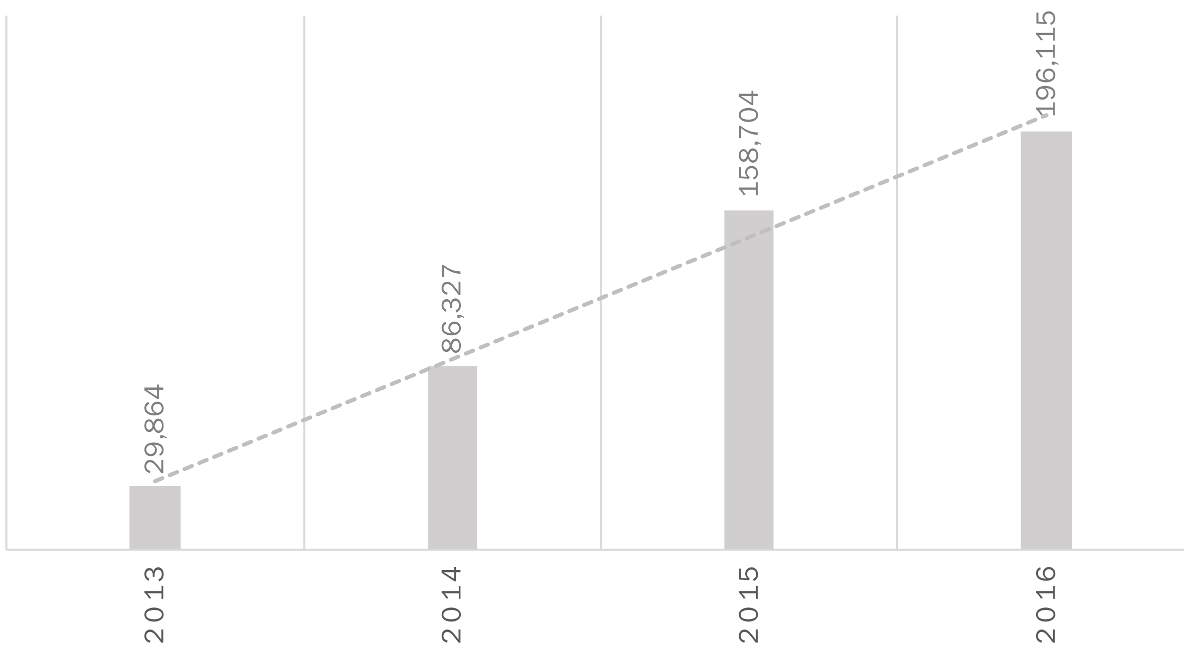
Table 2-5 Allegiant Activity at LCK (2013-2016)

Year	Passengers				Operations			
	Enplanements	Deplanements	Total	Yearly Growth	Departures	Arrivals	Total	Yearly Growth
2013	15,063	14,801	29,864		107	107	214	
2014	43,425	42,902	86,327	189.07%	296	296	592	176.64%
2015	79,730	78,974	158,704	83.84%	569	569	1,138	92.23%
2016	99,311	96,804	196,115	23.57%	669	669	1,338	17.57%
AAGR 2013-2016	87.51%	87.01%	87.26%		84.22%	84.22%	84.22%	

Sources: Historical activity records from CRAA and Michael Baker International, Inc., 2017.
AAGR – Average Annual Growth Rate

Figure 2-7 Total Allegiant Passengers at LCK (2001-2016)



Sources: Historical activity records from CRAA and Michael Baker International, Inc., 2017.

Table 2-6 Allegiant Non-Stop Destinations from LCK (as of January 10, 2017)

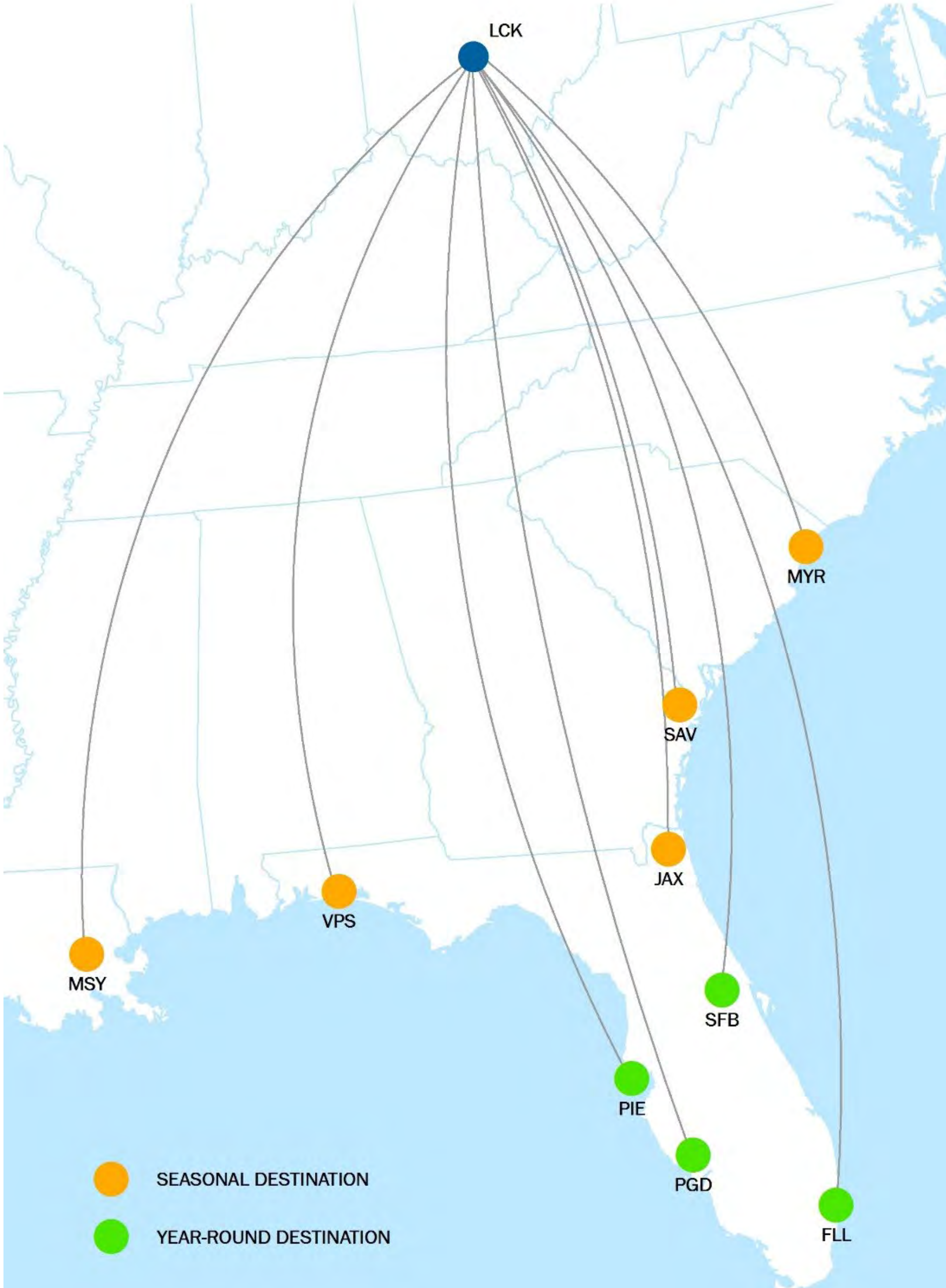
Airport	Airport Location	Service Duration	Service Frequency
Destin-Fort Walton Beach (VPS)	Destin, FL	Seasonal Begins 5/25/2017	2 x Week
Fort Lauderdale/Hollywood International (FLL)	Fort Lauderdale, FL	Year-Round	2-3 x Week
Jacksonville International (JAX)	Jacksonville, FL	Seasonal Returns 4/4/2017	2 x Week
Myrtle Beach International (MYR)	Myrtle Beach, SC	Seasonal Returns 4/13/2017	2-7 x Week
New Orleans International (MSY)	New Orleans, LA	Seasonal Returns 2/17/2017	2 x Week
Orlando Sanford International (SFB)	Orlando, FL	Year-Round	2-4 x Week
Punta Gorda Airport (PGD)	Punta Gorda, FL	Year-Round	2-5 x Week
Savannah/Hilton Head International (SAV)	Savannah, GA	Seasonal Returns 3/10/2017	2-3 x Week
St. Pete-Clearwater International (PIE)	St. Petersburg, FL	Year-Round	2-6 x Week

Sources: CRAA records.

2.4.3 Allegiant Trends

Based on preliminary information from the USDOT's BTS, LCK was the busiest airport in the State of Ohio for Allegiant service in 2016 (not including CVG which is located in Kentucky). The airport's location in Central Ohio, proximity to a large population center, and connections to leisure destinations in the Southeastern U.S. have allowed Allegiant to continuously expand its low-cost service at LCK while maintaining high load factor ratios, which are calculated by dividing occupied passenger seats by available passenger seats. Airlines strive to have high load factors in order to maximize the number of passengers on each flight, thereby maximizing the profitability of each flight. According to the FAA Aerospace Forecast Fiscal Years 2016-2036, domestic scheduled passenger load factor ratios are forecast to increase from 80.5% in 2016 to 81.0% by 2036. In every year since 2013 at LCK (refer to **Table 2-7 Allegiant Load Factors at LCK (2013-2016)**), Allegiant has exceeded the FAA's 2036 forecast load factor ratio for domestic scheduled passengers (for both enplaned and deplaned passengers). This is a common trend for Allegiant in many markets where routes continue to experience high load factor ratios even as service is expanded. Consequently, the desire for low-cost leisure travel services is seen as the primary driving force for the Allegiant service growth at LCK.

Figure 2-8 Allegiant Non-Stop Destinations from LCK (as of January 10, 2017)



Sources: CRAA records and Michael Baker International, Inc., 2017.

Table 2-7 Allegiant Load Factors at LCK (2013-2016)

Year	Load Factors			Average Passengers	Aircraft		Destinations
	Enplaned	Deplaned	Average		Type	Seats	
2013	87.03%	84.70%	85.87%	139.55	MD80	166	PIE, SFB
2014	89.14%	86.43%	87.79%	145.82	MD80, A320	166 or 177	PIE, PGD, SFB, MYR
2015	83.51%	80.83%	82.17%	139.46	MD80, A320	166 or 177	FLL, SAV, PIE, PGD, SFB, MYR
2016	87.66%	84.59%	86.13%	146.57	MD80, A320	166 or 177	FLL, SAV, PIE, PGD, SFB, MYR, MSY, JAX

Sources: Bureau of Transportation Statistics (BTS) Air Carrier Statistics (Form 41 Traffic, T-100 Domestic Segment, U.S. Carriers) and Michael Baker International, Inc., 2017.
Note: Only a partial year of data was available for 2016.

According to Allegiant's website, "From America's favorite small cities to world-class destinations, Allegiant makes leisure travel affordable and convenient. With low-low fares, nonstop, all-jet service and premier travel partners, Allegiant provides a complete travel experience with great value and without the hassle." Based in Las Vegas, Nevada, Allegiant has experienced rapid growth at LCK and in revenues, profits, and net income in recent years. However, the company has faced numerous maintenance issues associated with an aging fleet and is undergoing fleet replacements and maintenance. According to Allegiant's 2016 Investor Day presentation (dated November 28, 2016), the company plans to phase out all MD80s by 2019, to purchase 12 new 186 seat A320s by 2020, and also focus on utilizing additional used Airbus jets (A319s and A320s). The new A320s will be the first new aircraft that Allegiant has received during the airline's history as it transitions to an all Airbus fleet. Due to this investment, rising fuel prices, and a new contract deal with pilots, Allegiant anticipates slower growth. While Allegiant does not outline specific proprietary growth plans, the forecasts for this Study anticipate slower growth for Allegiant service in the long-term. Other airlines are also employing strategies to become more competitive with Allegiant (e.g., Basic Economy Fares on American Airlines that do not come with a seat assignment or allow for a full-sized carry-on and similar fare structures/policies on Delta Air Lines and United Airlines).

In Ohio, Allegiant pulled its service from Akron-Canton Regional Airport (CAK) and shifted operations to Cleveland-Hopkins International Airport (CLE). This was done in an effort to be closer to their customer base in Cleveland and to increase the airline's presence in Northeast Ohio. At CLE, Allegiant will fly to two additional destinations beyond those scheduled at LCK in 2017: Austin-Bergstrom International Airport (AUS) in Texas and Phoenix-Mesa Gateway Airport (IWA) in Arizona, both of which are key destinations for Allegiant (*note that there are not currently any direct flights between CRAA's airports and AUS*). CVG also has Allegiant service to AUS, IWA, and other destinations not currently served from LCK. Situations like this and airline mergers, acquisitions, and/or losses of an airline hub such as what occurred at CLE can create unknown, undesired, or unwelcome circumstances for an airport.

2.4.4 Scheduled Airlines Forecast

While the population around the Columbus area appears to sustain the increasing service to leisure markets served by Allegiant, the market may become oversaturated, particularly considering the proximity to and airline service at John Glenn Columbus International Airport (CMH). Furthermore, the ability to withstand continued airline service growth at LCK may decline due to a lack of appropriate facilities to accommodate demands (short-term and long-term) and it is not CRAA's intention to grow passenger service at LCK to any substantial degree given the focus is on passenger growth at CMH. While previous forecasting efforts were reviewed to develop the scheduled airline forecast for LCK, such as the 2006 Federal Aviation Regulation (FAR) Part 150 Noise Study and the 2012 environmental documentation for Air Cargo Terminal (ACT) 5, the rise in Allegiant's service at LCK since those studies were conducted suggests that recent trends are more appropriate to analyze for this Study.

Two scheduled airline forecast scenarios were identified for LCK due to the uncertainty associated with Allegiant's future growth expectations in Columbus and throughout the U.S. The first scenario assumes lower growth based on Allegiant's known plans at LCK and also accounts for the natural growth that is associated with growing population and employment in the region. The second scenario assumes higher growth based on operations Allegiant is currently conducting at comparable markets around Ohio.

Scenario 1 assumes that what is known for 2017 will occur. Allegiant intends to add bi-weekly roundtrip service to VPS beginning on May 25, 2017. Assuming that the VPS service will last four months per year, it would result in 16 additional operations per month or 64 additional operations per year. Allegiant also intends to add additional frequencies to some destinations served in 2016, which vary throughout the year based on demand and seasonal activities. Through a review of Allegiant's flight schedule through July 2017, it appears that the additional frequencies could result in five additional departures and arrivals per week on average in 2017, which would generate 520 more operations per year. Therefore, 584 additional scheduled Allegiant operations may occur in 2017 to accommodate the new VPS service and added frequencies. In 2016, Allegiant service at LCK averaged 146.57 (rounded) Persons Per Operation (PPO), which if applied to 2017 suggests that 85,599 more passengers could be accommodated. After 2017, Scenario 1 assumes that natural growth will occur in accordance with the forecast population AAGR of 1.07% for the seven-county MORPC region between 2016 and 2036. That value was applied to enplanements and deplanements (with the same 146.57 PPO) to determine the number of scheduled airline departures through 2036 (and arrivals were assumed to equal departures). The resulting forecast for Scenario 1 is presented in **Table 2-8 Scheduled Airline Forecast Scenario 1 (2016-2036)** and illustrates enplanements increasing from 99,311 in 2016 to 173,960, total passengers increasing from 196,115 to 344,851, and total operations increasing from 1,338 to 2,374.

Scenario 2 assumes all of the same factors as Scenario 1, but adds two additional bi-weekly round trip destinations to 2018, one to 2019, and one to 2020. This would provide a comparable number of destinations that are now provided by Allegiant at CLE as of 2017, potentially with the addition of year-round service to AUS and IWA (or other key Allegiant destinations), and also considers the potential for continued growth and new routes in the short-term. In 2018, Scenario 2 adds a total of eight weekly operations or 416 annual operations and approximately 1,173 weekly passengers or 60,974 annual passengers (rounded). Half of those values were applied in both 2019 and 2020 to account for the addition of new destinations. Then starting in 2021, Scenario 2 applies the same natural growth assumptions as Scenario 1. The resulting forecast for Scenario 1 is presented in **Table 2-9 Scheduled Airline Forecast Scenario 2 (2016-2036)** and illustrates enplanements increasing from 99,311 in 2016 to 240,787, total passengers increasing from 196,115 to 478,602, and total operations increasing from 1,338 to 3,286.

Figure 2-9 Scheduled Passenger Scenarios (2013-2036) illustrates a comparison between the scheduled passenger forecasts and **Figure 2-10 Scheduled Operations Scenarios (2013-2036)** illustrates a comparison between the scheduled operations forecasts (including historical activity back to 2013). Both tables indicate what the average number of operations would be each day if spread evenly across a year. Because Allegiant does not conduct routine and daily service between many of its routes, those numbers do not represent true peaking that would occur under each scenario. Actual peak days may be higher due to seasonal activity, delays, and other factors, but it provides a preliminary expectation of what the average daily requirement would look like for the passenger terminal facility under each scenario. <u>Because CRAA has indicated that passenger growth should be focused on CMH, the added facility demands under Scenario 2 may make such a growth forecast challenging without significant improvements to the passenger terminal area at LCK. Consequently, no further analysis of Scenario 2 was conducted as part of this forecasting effort; however, the ability to meet such a level of demand at LCK should be discussed with CRAA staff and considered as part of the facility requirements within this Study.</u>

2.4.5 Unscheduled Airlines Forecast

Unscheduled airlines at LCK also provide charter service primarily for athletic charters by OSU and Ohio University (OU), whereas visiting teams generally use CMH. Occasional charters are also conducted for university marching bands, university boosters, visiting athletic teams, and the military. The historical and forecast unscheduled airline information is presented in **Table 2-10 Combined Scenario 1 and Unscheduled Airline Forecasts (2013-2036)** and combined with Scenario 1 of the scheduled airline forecast to show the overall airline passenger and airline forecasts during the planning period. The unscheduled airline forecasts were conducted by increasing all variables (enplanements, deplanements, departures, and arrivals) by the forecast population AAGR of 1.07% for the seven-county region between 2016 and 2036. Unscheduled activity at LCK can change from year-to-year depending upon the travel schedules of OSU and OU, and is therefore hard to predict until the teams establish their schedules and coordinate with CRAA staff to make proper arrangements. Because it only represents a small percentage of the total airline activity at LCK, the 1.07% AAGR should be sufficient to estimate long-term demands. Total scheduled and unscheduled airline passengers are forecast to increase from 203,269 in 2016 to 353,702 by 2036 and operations are forecast to increase from 1,438 to 2,497 during the same period.

Table 2-8 Scheduled Airline Forecast Scenario 1 (2016-2036)

Year	Passengers				Operations				
	Enplanements	Deplanements	Total	Yearly Growth	Departures	Arrivals	Total	Yearly Growth	Operations ÷ 365
2016	99,311	96,804	196,115	23.57%	669	669	1,338	17.57%	3.67
2017	142,110	139,603	281,714	43.65%	961	961	1,922	43.65%	5.27
2018	143,631	141,097	284,728	1.07%	980	980	1,960	1.97%	5.37
2019	145,168	142,607	287,775	1.07%	990	990	1,981	1.07%	5.43
2020	146,721	144,133	290,854	1.07%	1,001	1,001	2,002	1.07%	5.48
2021	148,291	145,675	293,966	1.07%	1,012	1,012	2,023	1.07%	5.54
2022	149,878	147,234	297,111	1.07%	1,023	1,023	2,045	1.07%	5.60
2023	151,481	148,809	300,291	1.07%	1,033	1,033	2,067	1.07%	5.66
2024	153,102	150,401	303,504	1.07%	1,045	1,045	2,089	1.07%	5.72
2025	154,740	152,011	306,751	1.07%	1,056	1,056	2,111	1.07%	5.78
2026	156,396	153,637	310,033	1.07%	1,067	1,067	2,134	1.07%	5.85
2027	158,070	155,281	313,351	1.07%	1,078	1,078	2,157	1.07%	5.91
2028	159,761	156,943	316,704	1.07%	1,090	1,090	2,180	1.07%	5.97
2029	161,470	158,622	320,092	1.07%	1,102	1,102	2,203	1.07%	6.04
2030	163,198	160,319	323,517	1.07%	1,113	1,113	2,227	1.07%	6.10
2031	164,944	162,035	326,979	1.07%	1,125	1,125	2,251	1.07%	6.17
2032	166,709	163,768	330,478	1.07%	1,137	1,137	2,275	1.07%	6.23
2033	168,493	165,521	334,014	1.07%	1,150	1,150	2,299	1.07%	6.30
2034	170,296	167,292	337,588	1.07%	1,162	1,162	2,324	1.07%	6.37
2035	172,118	169,082	341,200	1.07%	1,174	1,174	2,349	1.07%	6.43
2036	173,960	170,891	344,851	1.07%	1,187	1,187	2,374	1.07%	6.50
AAGR 2016-2036	2.84%	2.88%	2.86%		2.91%	2.91%	2.91%		

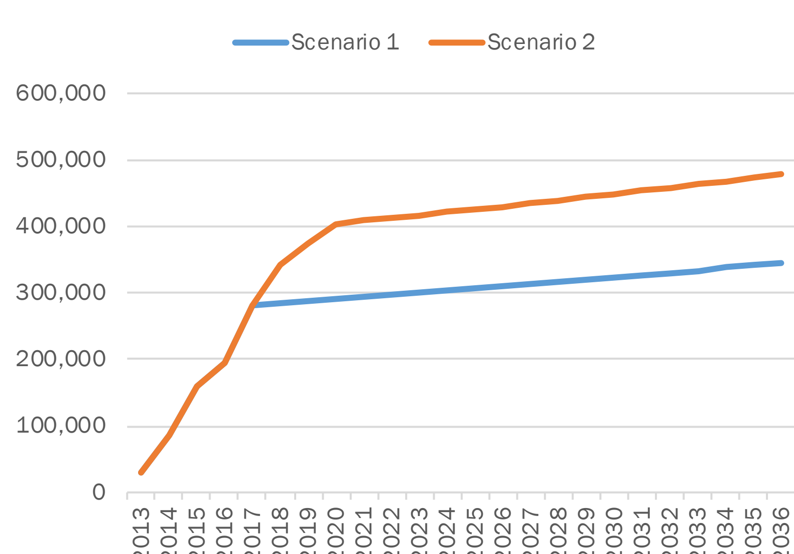
Source: Michael Baker International, Inc., 2017.
Note: Some numbers may not add correctly due to rounding.
AAGR – Average Annual Growth Rate

Table 2-9 Scheduled Airline Forecast Scenario 2 (2016-2036)

Year	Passengers				Operations				
	Enplanements	Deplanements	Total	Yearly Growth	Departures	Arrivals	Total	Yearly Growth	Operations ÷ 365
2016	99,311	96,804	196,115	23.57%	669	669	1,338	17.57%	3.67
2017	142,110	139,603	281,714	43.65%	961	961	1,922	43.65%	5.27
2018	172,598	170,091	342,688	21.64%	1,169	1,169	2,338	21.64%	6.41
2019	187,841	185,334	373,175	8.90%	1,273	1,273	2,546	8.90%	6.98
2020	203,085	200,578	403,663	8.17%	1,377	1,377	2,754	8.17%	7.55
2021	205,258	202,724	407,982	1.07%	1,400	1,400	2,801	1.70%	7.67
2022	207,454	204,893	412,347	1.07%	1,415	1,415	2,831	1.07%	7.76
2023	209,674	207,086	416,759	1.07%	1,431	1,431	2,861	1.07%	7.84
2024	211,917	209,301	421,219	1.07%	1,446	1,446	2,892	1.07%	7.92
2025	214,185	211,541	425,726	1.07%	1,461	1,461	2,923	1.07%	8.01
2026	216,477	213,804	430,281	1.07%	1,477	1,477	2,954	1.07%	8.09
2027	218,793	216,092	434,885	1.07%	1,493	1,493	2,985	1.07%	8.18
2028	221,134	218,404	439,538	1.07%	1,509	1,509	3,017	1.07%	8.27
2029	223,500	220,741	444,241	1.07%	1,525	1,525	3,050	1.07%	8.36
2030	225,892	223,103	448,995	1.07%	1,541	1,541	3,082	1.07%	8.44
2031	228,309	225,490	453,799	1.07%	1,558	1,558	3,115	1.07%	8.54
2032	230,752	227,903	458,655	1.07%	1,574	1,574	3,149	1.07%	8.63
2033	233,221	230,342	463,562	1.07%	1,591	1,591	3,182	1.07%	8.72
2034	235,716	232,806	468,522	1.07%	1,608	1,608	3,216	1.07%	8.81
2035	238,238	235,297	473,536	1.07%	1,625	1,625	3,251	1.07%	8.91
2036	240,787	237,815	478,602	1.07%	1,643	1,643	3,286	1.07%	9.00
AAGR 2016-2036	4.53%	4.60%	4.59%		4.59%	4.59%	4.59%		

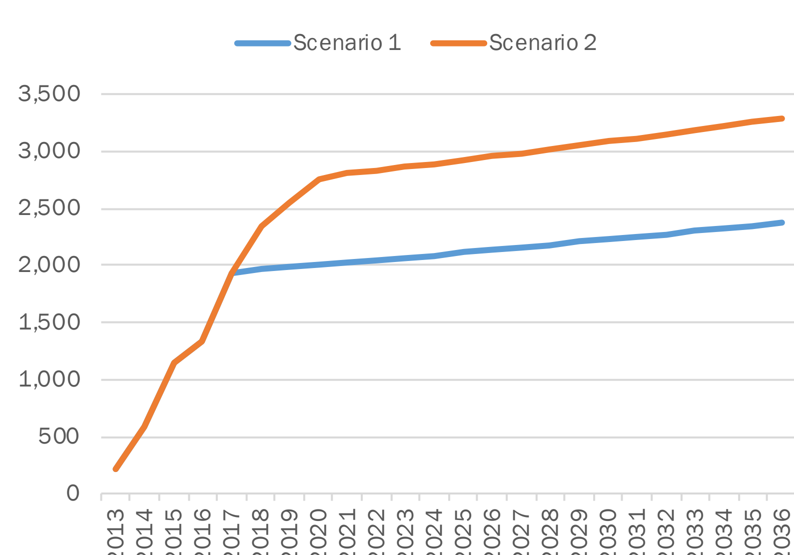
Source: Michael Baker International, Inc., 2017.
Note: Some numbers may not add correctly due to rounding.
AAGR – Average Annual Growth Rate

Figure 2-9 Scheduled Passenger Scenarios (2013-2036)



Source: Michael Baker International, Inc., 2017.

Figure 2-10 Scheduled Operations Scenarios (2013-2036)



Sources: Michael Baker International, Inc., 2017.

Table 2-10 Combined Scenario 1 and Unscheduled Airline Forecasts (2013-2036)

Year	Unscheduled Airlines						Combined Scenario 1 and Unscheduled Airlines					
	Passengers			Operations			Passengers			Operations		
	Enplanements	Deplanements	Total	Departures	Arrivals	Total	Enplanements	Deplanements	Total	Departures	Arrivals	Total
2013	1,745	1,660	3,405	102	102	204	16,808	16,461	33,269	209	209	418
2014	3,068	2,177	5,245	64	64	128	46,493	45,079	91,572	360	360	720
2015	3,355	4,192	7,547	51	51	102	83,085	83,166	166,251	620	620	1,240
2016	3,978	3,176	7,154	50	50	100	103,289	99,980	203,269	719	719	1,438
2017	4,021	3,210	7,231	51	51	101	146,131	142,813	288,944	1,012	1,012	2,023
2018	4,064	3,244	7,308	51	51	102	147,695	144,341	292,036	1,031	1,031	2,062
2019	4,107	3,279	7,386	52	52	103	149,275	145,886	295,161	1,042	1,042	2,084
2020	4,151	3,314	7,465	52	52	104	150,872	147,447	298,319	1,053	1,053	2,106
2021	4,195	3,350	7,545	53	53	105	152,486	149,025	301,511	1,064	1,064	2,129
2022	4,240	3,385	7,626	53	53	107	154,118	150,619	304,737	1,076	1,076	2,152
2023	4,286	3,422	7,707	54	54	108	155,767	152,231	307,998	1,087	1,087	2,175
2024	4,332	3,458	7,790	54	54	109	157,434	153,860	311,293	1,099	1,099	2,198
2025	4,378	3,495	7,873	55	55	110	159,118	155,506	314,624	1,111	1,111	2,221
2026	4,425	3,533	7,957	56	56	111	160,821	157,170	317,991	1,123	1,123	2,245
2027	4,472	3,570	8,043	56	56	112	162,542	158,852	321,393	1,135	1,135	2,269
2028	4,520	3,609	8,129	57	57	114	164,281	160,551	324,832	1,147	1,147	2,294
2029	4,568	3,647	8,216	57	57	115	166,039	162,269	328,308	1,159	1,159	2,318
2030	4,617	3,686	8,303	58	58	116	167,815	164,005	331,821	1,171	1,171	2,343
2031	4,667	3,726	8,392	59	59	117	169,611	165,760	335,371	1,184	1,184	2,368
2032	4,717	3,766	8,482	59	59	119	171,426	167,534	338,960	1,197	1,197	2,393
2033	4,767	3,806	8,573	60	60	120	173,260	169,327	342,587	1,209	1,209	2,419
2034	4,818	3,847	8,665	61	61	121	175,114	171,138	346,252	1,222	1,222	2,445
2035	4,870	3,888	8,757	61	61	122	176,988	172,970	349,957	1,235	1,235	2,471
2036	4,922	3,929	8,851	62	62	124	178,881	174,820	353,702	1,249	1,249	2,497
AAGR 2016-2036	1.07%	1.07%	1.07%	1.07%	1.07%	1.07%	2.78%	2.83%	2.81%	2.80%	2.80%	2.80%

Source: Michael Baker International, Inc., 2017.
Note: Some numbers may not add correctly due to rounding.
AAGR – Average Annual Growth Rate

2.4.6 Airline Fleet Mix Forecast

All airline activity at LCK is conducted using jets whether it is scheduled or unscheduled. As mentioned earlier, Allegiant is in the process of replacing its older aircraft (MD80s) with new A320s and other used Airbus jets (A320s and A319s). By 2019, Allegiant plans to be flying an entirely Airbus fleet, with the exception of some spare MD80s for peak times, whereas in 2016 they flew approximately 36% of their operations at LCK using MD80s. Unscheduled airline operations tend to be conducted in a variety of different aircraft each year, but predominantly in aircraft comparable to those that Allegiant flies (e.g., Boeing 737 aircraft). For some larger football games during the year (e.g., Bowl games), OSU may charter Boeing 747s to transport the team, marching band, and others; however, for the sake of this forecast analysis, it was determined that Allegiant's trend of increasing use of narrow-body Airbus jets and phasing out older jets was most representative of the passenger airline activity that currently operates and is forecast to operate at LCK during the planning period. The resulting forecast is presented in **Table 2-11 Airline Fleet Mix Forecast (2013-2036)**. The numbers were estimated by reviewing Allegiant's proposed fleet replacement plans.

Table 2-11 Airline Fleet Mix Forecast (2013-2036)

Year	MD80 (or Equivalent)	Airbus (or Equivalent)	Total
2016	524	914	1,438
2017	445	1,578	2,023
2018	158	1,904	2,062
2019	0	2,084	2,084
2020	0	2,106	2,106
2021	0	2,129	2,129
2022	0	2,152	2,152
2023	0	2,175	2,175
2024	0	2,198	2,198
2025	0	2,221	2,221
2026	0	2,245	2,245
2027	0	2,269	2,269
2028	0	2,294	2,294
2029	0	2,318	2,318
2030	0	2,343	2,343
2031	0	2,368	2,368
2032	0	2,393	2,393
2033	0	2,419	2,419
2034	0	2,445	2,445
2035	0	2,471	2,471
2036	0	2,497	2,497
AAGR 2016-2036	N/A	5.15%	2.80%

Source: Michael Baker International, Inc., 2017.
AAGR – Average Annual Growth Rate

2.4.7 Airline Belly Cargo and Remain Overnight (RON) Considerations

Some passenger airlines carry cargo in the belly or baggage compartment of the aircraft. This is often arranged with contract mail and courier services and the United States Postal Service (USPS). However, Allegiant does not carry cargo or mail in the belly of its aircraft. Allegiant's corporate policy is that all baggage must accompany a passenger on the flight. This is common for low-cost carriers who have quick turnaround times and limited staff at each location to make such a practice profitable. Therefore, no forecasts of airline belly cargo were conducted for this Study.

According to Change 2 of FAA AC 150/6070-6B, "The availability and need for Remain-Overnight (RON) aircraft parking should be evaluated. RON aircraft parking may be provided at gates or in proximity to the passenger terminal building or in remote locations (remote hardstands)." Based on discussions with the Fixed Base Operator (FBO) at LCK, Allegiant rarely has a need for RON aircraft parking unless there is an issue with an aircraft where a flight has to be canceled and maintenance needs to occur. Therefore, no forecast of RON aircraft parking was conducted for this Study.

2.5 Cargo Activity

The following summary identifies the existing state of the cargo activity at LCK and identifies the activity levels that have occurred since 2013. **Table 2-12 Cargo Activity, Scheduled, and Unscheduled Operations** below summarizes each year of activity and the contribution of each of the carriers/groups. As will be noted later in this section, 2016 was the year in which scheduled operations added loaded exports out of LCK. The table demonstrates the contribution to the overall volumes; stated here in pounds by the carriers. There has been an evolution in carrier activity at LCK and a noticeable shift in contribution by the four current air carriers who manage operations and the arrival/departure of international air cargo.

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Table 2-12 Cargo Activity, Scheduled, and Unscheduled Operations

Carrier		2013	2014	2015	2016
AirNet		619,780	553,351		
Amerijet			312,560		
Atlas Air		51,205	1,161,331		
Cargolux		5,456,089	14,150,181	21,915,516	27,380,616
Cathay Pacific			9,985,973	19,081,839	23,053,238
Emirates				6,263,209	21,911,017
Ethiopian					2,792,514
FedEx		106,737,571	111,502,955	96,195,242	86,909,693
Kalitta Air		13,338,637	4,099,276		
UPS		26,760,239	28,495,325	31,056,527	30,827,855
Charter					9,294,586
Charter (Domestic)				1,833,474	
Charter (International)				22,250,218	
Other		706,640	1,161,666		
Total Carrier Volume	Pounds	5,456,089	24,136,154	47,260,564	75,137,385
Total, All Activities	Pounds	153,670,161	171,422,618	198,596,025	202,159,519

Source: IMS Worldwide, 2017

The above charts can be summarized in the following data points:

- Growth from 2013-2014: 342.4 % pure international freighter traffic, not including charters, FedEx, or UPS, representing growth from 5,456,089 to 24,136,154 pounds. All-inclusive, total growth was 11.6% from 153,670,161 pounds to 171,422,618 pounds.
- Growth from 2014-2015: 95.8 % pure international freighter traffic, not including charters, FedEx, or UPS, representing growth from 24,136,154 pounds to 47,260,564 pounds. All-inclusive, total growth was 15.9 % from 171,422,618 pounds to 198,596,025 pounds.
- Growth from 2015-2016: 59 % pure international freighter traffic, not including charters, FedEx, or UPS, representing growth from 47,260,564 pounds to 75,137,385 pounds. All-inclusive total growth is only 1.8 %, due to lower FedEx numbers.

The average annual growth in pure international freighter traffic for the four carriers who manage scheduled operations at LCK was 167.5% between 2013 and 2016. The total average combined annual cargo growth of all carrier and charter operations was 9.8%.

This finding is a critical component of the air cargo forecast for LCK. The total growth in the past years, in terms of total operations (all carriers and charters), is almost twice the global cargo growth forecast (Boeing @ 4.2%, see details in Section 2.5.3 below). This growth is not only spectacular for a small activity airport, but historic, as Columbus and Rickenbacker have now evolved into a viable alternative for global operations for the largest and most significant air carriers. The efforts undertaken to date provide a foundation for continued growth in the international freight sector, with more and more forwarders, logistics providers, air carriers and cargo owners leveraging their utilization of the Rickenbacker option to produce a more competitive global supply chain.

The LCK airport has a long history of charter activity driven by the changing demands of the retail and other manufacturers in the region. While most of the charter activity is inbound, import driven, there are also domestic charters that support movement of goods between key manufacturing origins and consumer destinations in the US and North America. Given the volumes of charter activity over the past years, and the expectation that charter volumes will be sustained, this provides a strong context to support shifts from unscheduled freighter charter operations to scheduled freighter activity. Converting unscheduled operations to scheduled operations is a top priority for the CRAA, cargo owners and the global freight forwarders who operate in the region.

2.5.1 Variables Affecting the Forecast

The carriers, the cargo owners and their logistics service providers all have recognized and embraced the value proposition provided by using the Rickenbacker gateway as an option for cargo. However, observing the growth of the scheduled carriers creates numerous immediate challenges and opportunities that must be addressed if new business growth is to be captured and sustained at LCK. These challenges are outlined below in summary and presented in detail within later sections of this document.

- In the past three years, many freight forwarders who operate in or near Columbus have only moved a percentage of their cargo in favor of a Rickenbacker solution for freight they manage for cargo owners.
- Many cargo owners have moved some, but not all cargo to this gateway option.
- Freight stakeholders, the airlines, and Forward Air Freight (FAF) have not completed an operations, pricing or logistics solution that would "terminate" the FAF way-bill from one of the many remote cities that send cargo into the FAF sort operation in Columbus. This sort facility processes over 16 million pounds of cargo each week. Diverting freight from this current routing to the LCK aircraft, instead of having FAF trucking this freight to other gateway markets is being considered. Terminating 5% of the cargo that moves via truck to these other cities each night would result in a growth of 9.9 million additional pounds to the current 75,137,385 pounds contributed by the four carriers. This would represent a potential impact of 13.2% growth to the annual volume total.
- FAF performs a weekend sort for Pilot Air Freight at another location in Columbus. Pilot's new management seeks a more aggressive presence in the global cargo markets. If it is possible to capture 5% of the Pilot cargo processed in Columbus, this would add 1.95 million pounds to the 75,137,385 pounds currently contributed by the four carriers. This represents a potential impact of 2.6 % growth to the annual volume total.
- One prospective e-commerce vendor who has a strong presence in JFK and LAX has indicated the need for a mid-country processing and sortation center. Initial forecasts for e-commerce volumes are much higher, but if 50,000 packages per day were to be processed by this vendor (10% of what they indicate is possible when permits, facilities

and procedures are in place) this would add 44 million new pounds of cargo to the current air carriers' contribution of 75,137,385 pounds annually. This single vendor would increase the total cargo volumes by up to 58.6% over existing 2016 volumes.

The effect of these initiatives would almost double the total volume of international freighter cargo at Rickenbacker within the next two years or sooner. It means that the cargo contributions by the current four (or new carriers or increased frequencies) has the potential to add 55,850,000 pounds to the forecast. This is cargo that would be enplaned or deplaned using incumbent or new air carriers operating at LCK and does not include any "organic" growth contributions from the Global Freight Forwarders (GFF), who will continue to route and re-route cargo to the LCK gateway.

This statement is made without consideration of any of the freight forwarders who are currently considering and evaluating relocation of their entire global hub operations to Columbus from ORD or JFK. This does not consider the volumes of growth that could be captured by this group or other freight stakeholders, if they are successful in their e-commerce strategies. Finally, it does not consider the impact on downstream transportation or logistics infrastructure that would be necessary to accommodate this growth. In future sections of this forecast, this impact will be discussed.

The above historical cargo activity and annual summaries point to significant growth at LCK. This growth is driven by a wide-array of factors, each is catalogued and the potential impact on future growth is provided within future sections of this report/forecast.

2.5.2 Factors and Opportunities Affecting Cargo Activity Levels

In 2012, the leading economic development and business recruitment entity in Columbus, the Columbus 2020 organization, conducted a study to determine if Columbus was retaining its leadership "edge" as a desired location for global logistics activities. During this study, a market review and analysis was conducted which demonstrated that Columbus was an excellent location for supporting retailers, manufacturers and their freight forwarding, third-party logistics service providers. With significant transportation assets and the ability to reach large populations of consumers due to its strong logistics infrastructure, this makes Columbus a location that will continue to attract warehouse, distribution and emerging fulfillment activities for the new e-commerce industry.

In 2013-2014, the CRAA aligned with an array of economic development stakeholders, and private business partners to determine the feasibility of expanding international cargo operations at LCK to include new scheduled operations in support of the growth in both imports and exports. This move was supported by a local retailer and key strategic staff from the air carriers operating at LCK. The CRAA conducted an initiative to determine, given the volumes identified in the study, an effort to attract other global cargo carriers to expand the frequency and depth of operations at LCK. A local firm, Regionomics, and IMS Worldwide, Inc., a national logistics consulting firm, were hired to conduct an economic impact study to determine the overall direct, indirect and induced impact which would result from new and expanded air cargo operations at LCK. As a result of this effort, the CRAA launched an expanded, successful marketing effort and constructed the new private-publicly funded air cargo terminal, which has positioned LCK (as demonstrated above) as a new alternative global gateway. As such, LCK has seen significant growth in operations, both scheduled, unscheduled or ad-hoc charters, increases in LCK cargo routings, as well as an expansion in the array of global freight forwarders that occupy space in/near LCK.

Columbus Value Proposition

The LCK value proposition has been simply to provide the freight stakeholders, shippers and third-party service providers with an alternative to other traditional gateways such as ORD, JFK, ATL and EWR, while at the same time providing the freight stakeholders with a congestion-free and more efficient supply chain model. The result has been extraordinary growth that has significantly exceeded the projections for global air cargo growth. Using the LCK alternative to the traditional gateway provides the freight forwarder, their client, and the cargo owner with loading from warehouse to airplane on the ramp in minutes and hours, not days. The same compression of time occurs during the un-load, sort and dispatch cycle. None of the other traditional gateways can provide this level of "speed to market."

For the years 2013-2016, the total growth of cargo at LCK has been 9.8% growth year-over-year. This is a significant contrast to the overall projections and historic performance of global cargo. What is remarkable about the growth of cargo imports and exports at LCK is that in 2015, during the prolonged labor issues impacting ocean freight on the west coast at the Ports of Los Angeles and Long Beach, cargo owners and their logistics providers re-routed cargo impacted by ocean supply chains to both scheduled and ad-hoc charter operations. Despite having over 90 charters in 2015, during the peak of the supply chain disruption, in 2016 the overall cargo volumes will still surpass the historic high volumes achieved in 2015. This is an important consideration as the baseline for the Cargo Forecast must be grounded on data that supports continued growth and expansion of air operations at LCK. Given the impact of the charters and the ability of the carriers and cargo owners to route cargo to LCK over other gateways, it demonstrates the strength of the LCK value proposition and logistics advantages of using this gateway.

The Columbus freight community relies on a wide diversity of conveyances to move cargo between global origins and destinations, to and from Columbus and the region. Columbus is connected to the world by air cargo operations and package/express couriers, and is connected to North America by rail and truck. Columbus is served by two of the Class 1 Railways in North America that operate intermodal operations in Columbus. Norfolk Southern (NS) operates their intermodal facility at Rickenbacker; CSX Transportation (CSX) operates their facility in West Columbus. These two rail carriers connect Columbus with ocean carriers that deliver inbound cargo from global suppliers that primarily utilize containerized cargo to move high volumes of goods from origins to destinations in Columbus. By connecting to the western rail carriers (Burlington Northern Santa Fe (BNSF) and Union Pacific (UP) Railways), CSX and NS provide access to the global freight that is discharged from ocean container ships at both western and eastern US ports. This ocean shipment method of conveyance is preferred, as it provides a cost-effective method to move high volumes of goods in a secure supply chain to a warehouse, distribution or fulfillment center in Columbus.

FedEx and UPS operate both ground and air cargo operations at Rickenbacker and in Columbus. These, as will be demonstrated in the e-commerce and intermodal portion of this section, provide a broad reach and a wide-array of delivery choices for cargo owners or their third-party logistics service providers to "match up" the demand for delivery to or from Columbus.

Given the strength of the LCK operations and the supporting cast of logistics services, (ocean, rail, truck, courier, cargo aircraft), LCK is well positioned to sustain its growth and exceed the forecasts for global air cargo. Columbus is one of the key inland ports used by the rail carriers, ocean carriers, freight forwarders and cargo owners, where industrial buildings are arrayed in a cluster that allows the freight community to aggregate high volumes of cargo to specific destinations. Inland ports are places where organized economic activity occurs and where these activities produce efficiencies of scale for the collective users.

Inland Ports also exist in Dallas-Fort Worth, Kansas City and Chicago. These inland ports are supported by the rail carriers who discharge intermodal ocean volumes at these locations from west coast ports. Atlanta, Columbus, Lehigh Valley and Chicago are inland ports supported by the eastern rail carriers who operate in support of the key ocean ports on the eastern coast. Columbus, Atlanta and Chicago are unique as these inland ports are supported by rail carriers who discharge containerized freight from both western and eastern ports. As an inland port, Columbus is viewed by the freight community as a critical location for distribution and now for fulfillment platforms in support of store and e-commerce requirements in a local, regional, national and international platform for high-volume trade.

CRAA Staff Contribution

In 2015, the CRAA hired a dedicated outside sales person focused on business development to increase cargo activity within the catchment area. This new position held the following specific objectives:

- Identify global freight forwarders (GFF) who do not operate or occupy space at/near LCK.
- Determine a strategy to add their volumes, customers, and influence to the Columbus, OH area and occupy space at/near LCK.
- Identify a "pathway" to re-direct freight from traditional freight gateways to LCK as it provides a more predictable global solution, and in many cases, a shorter cycle between origin/destination than the traditional gateways.

To assist in the strategic marketing process, a catchment zone was defined as a region that would benefit by using freight routed through LCK. This catchment zone has been the focus of the sales and business development efforts by the CRAA. Cities such as Detroit, Cleveland, Pittsburgh, Louisville, Cincinnati and Indianapolis were identified as markets where the line haul and "speed to market" advantages provided at LCK would benefit shippers and freight logistics providers.

As these initiatives continue and new GFF/third-party logistics providers (3PL) embrace the value proposition of LCK as a strong global gateway, this will continue to drive new import and export volumes at LCK. Some of the GFF/3PL firms have indicated that because of the favorable advantages that are gained by using the LCK gateway, they will re-route significant volumes of cargo from existing gateways to LCK. Currently, many of the GFF/3PL firms only route a minor portion of their import/export traffic through the LCK gateway and have significant volumes routing through the traditional gateways of JFK and ORD.

2.5.3 Cargo Industry Growth Projections

The forecasts below demonstrate the views of some of the world's top industry leaders and summarizes their projections for air cargo growth:

- The International Air Transport Association projects 4.1% CAG (2015-2020)
- International market forecast specialist Sandler Research projects 5.97% growth each year (2014-2019)
- The Boeing Company projects 4.2% CAG (2015-2035)
- Leading international market research firm Technavio projects 4.57% (2016-2020)

Boeing states in its Current Market Outlook 2015-2035, "Replacement of aging airplanes, plus the industry's growth requirements, will create a demand for 2,370 freighter deliveries over the next 20 years. Of these, 1,440 will be passenger airplane conversions. The remaining 930 airplanes, valued at $270 billion, will be new. The overall freighter fleet will increase by more than half—from 1,770 airplanes in 2015 to 3,010 by 2035. According to Andrew Herdman, General Director of the Association of Asia Pacific Airlines, "air cargo is an essential part of the global supply chain accounting for the transportation of over $6 trillion worth of goods a year and 40% of this volume moves on Asian Airlines." According to the Journal of Commerce (January 2017), the share of cargo carried by freighters remains high in markets worldwide, specifically in the two largest trade routes: Asia-North America and Asia-Europe, where more than 70% of total air cargo traffic is carried by freighters.

LCK has exceeded the growth projections for global air cargo and this report provides the context for multiple impacts that will drive a higher rate of growth over current levels at least for the next 4-5 years and into future years. There are several initiatives in place that will contribute to even higher growth and increasing volumes of cargo, operations and frequencies. These initiatives and their impact are presented in separate sections within the report below.

2.5.4 Logistics Providers

LCK is well positioned for continuing and expanding its influence on global logistics and trade. This statement is supported by the following initiatives and efforts in place that will drive increases in cargo volumes to this new global gateway.

There are many companies involved in managing global trade for cargo owners. These companies are called freight forwarders, or third-party logistics service providers, that provide a wide-array of services to cargo owners in support of their global manufacturing, distribution and e-commerce fulfillment programs. These global freight forwarders, or third-party logistics providers, occupy space in the Columbus region and utilize the intermodal rail, truck, courier and air networks to support their client's movement of goods. These providers utilize their ability to reach a large portion of the population of the US from their warehouses, distribution or fulfillment centers located in Columbus. As new demands emerge for global e-commerce or cross-border trade, Columbus and LCK are well positioned due to the high density of retailers that produce, distribute and support their retail stores from locations at/near Columbus. These cargo owners rely on one, or in some cases, multiple freight logistics partners to move, manage, store, control and ship or receive goods on their behalf, not only in Columbus but in other domestic and international markets. The relationships between cargo owners and their selected GFF or 3PL is significant and often includes aspects of technology platforms used to support order management, inventory control and supply chain visibility which are shared between the cargo owner and the freight logistics partner.

Of the top 25 GFF firms shown in **Table 2-13 Top 25 Global Freight Forwarders**, 17 (as of 2016) have operations, occupy facilities and manage ground, ocean and air cargo for multiple clients, or cargo owners from their facilities located in Ohio or in the Columbus area.

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Table 2-13 Top 25 Global Freight Forwarders

A & A Rank	Provider
1	DHL Supply Chain & Global Forwarding
2	Kuehne + Nagel
3	DB Schenker Logistics
4	Panalpina
5	Sinotrans
6	Nippon Express
7	Expeditors International of Washington
8	SDV (Bolloré Group)
9	CEVA Logistics
10	DSV A/S – Cleveland
11	Hellmann Worldwide Logistics
12	UPS Supply Chain Solutions
13	Kintetsu World Express – Cleveland
14	UTi Worldwide – Cleveland
15	Damco
16	Pantos Logistics
17	Yusen Logistics – Cincinnati
18	C.H. Robinson
19	Kerry Logistics
20	Agility
21	Geodis
22	Toll Holdings
23	Logwin
24	NNR Global Logistics
25	Dimerco Express

Note: Columbus-Based FF (in RED) – Ohio Markets (GOLD)
Source: Armstrong & Associates, Inc., 2015

In addition, many "niche" freight forwarders, who do not have the global "spend" of the top forwarders, are also located in Columbus and these providers still retain a high level of volume in relationships to the top retailers. While these forwarders are not identified as the top tier in terms of revenue dollars, they uniquely contribute to a significant component of retailers' global operations, while occupying industrial space at/near Columbus.

There are a number of the top tier of freight forwarders who do not have a significant presence at/near Columbus. Some of these firms were identified and contacts established during project interviews. This information was provided to CRAA and local economic development stakeholders in order to determine a process to communicate the advantages of the Columbus market.

In later portions of this section, there is a description of the CSX and NS operations and their historical statistics for intermodal activities in Columbus. Intermodal business connects the ocean ports to inland ports. Intermodal shipments arrive at ocean ports and are transferred to rail carriers for delivery to an intermodal facility for final drayage (truck delivery) to a warehouse, manufacturing, distribution or fulfillment center.

The growth of the intermodal sector at an inland port drives the growth of new industrial buildings occupied by 3PLs or GFF firms. As more companies recognize the value of a facility in/near Columbus, they will bring their 3PL or GFF to that market in order to assure a seamless transition or expansion of their logistics network.

In many cases, cargo owners utilize one or several 3PLs, and these expansions are a partnership between the cargo owner and their GFF. This new business, driven by strong growth in intermodal activity results in some demand for air cargo as part of the business-driven by plant, logistics, labor or other disruptions. As more GFF move into facilities in Columbus, they will contribute to the expedited cargo moves required when disruptions occur or when market demand exceeds what can be moved on an all-water/intermodal supply chain. This relationship becomes more critical as the couriers, both FedEx and UPS, and now Amazon, utilize more intermodal moves to supplement their ground distribution networks.

2.5.5 Movement of Goods

The GFF/3PL community of logistics service providers have for many decades supported their traditional air freight gateways, such as ORD, JFK, ATL, DFW, LAX and MIA. These gateway hubs provide the GFF with locations where they can aggregate export volumes from their national network of operations and access global lift. LCK now offers an alternative to this traditional freight routing regime. However, many of the GFF firms have strict policies related to supporting specific gateway locations in terms of volumes, and in many cases, the GFF pay a fee to support the gateway facility and staff.

Numerous cities in the near-Columbus area have been identified as markets where the air cargo solution offered at LCK provides a lower cost (by virtue of a shorter line haul to LCK rather than other gateways) and compressed supply chain from origin to destination by as much as one to two days. Both of these reasons and significant congestion at the traditional gateways are resulting in some forwarders and cargo owners re-assessing the traditional gateway model and embracing the LCK model.

In 2013-2014, when the demand study was completed, it was recommended that a new cargo facility be immediately constructed to support the expected volumes. Air Cargo Terminal 5 is the result, and consideration should already be underway to determine the funding strategy for the expansion of Air Cargo Terminal 5.

During the course of this forecast, many GFFs indicated the desire, and, in fact, the need to be in a facility on the cargo ramp in order to have more control over the airside process. Today, many of the forwarders rely on a ground-handler, Container Freight Station (CFS) operator to unload, sort and deliver cargo. This adds another layer of time and cost to their supply chain.

2.5.6 Foreign Trade Zone Overview

Columbus is served by Foreign Trade Zone (FTZ) No. 138, managed by the Grantee, Columbus Regional Airport Authority. FTZ No. 138 currently serves 1 industrial park, along with 11 usage-driven and 1 subzone, which operate for a specific user. This Zone project is an Alternate Site Framework (ASF) Zone project and serves the counties of Champaign, Clark, Coshocton, Crawford, Delaware, Fairfield, Franklin, Hocking, Knox, Licking, Logan, Madison, Marion, Morrow, Muskingum, Perry, Pickaway, Pike, Ross, Union, Vinton and Wyandot, along with portions of Guernsey, Athens and Highland counties in Ohio. The ASF structure offers an expedited approval process for single user sites. The federal approval process takes from 30-60 days once the application has completed the local and grantee process.

By definition, an FTZ is a government-designated site where foreign and domestic materials remain in a kind of international commerce limbo. While the goods remain in the Zone, the materials may be stored, manipulated, mixed with domestic and/or foreign materials, used in assembly or manufacturing processes, or exhibited for sale without triggering the payment of US Customs and Border Protection (CBP) duties and excise taxes.

Imports may flow directly into the Zone and be held there indefinitely duty free. Duty is assessed only when those goods are shipped out of the Zone and into the US marketplace. However, the most important new benefits are those that result in supply-chain efficiencies and velocity improvement, while cutting costs from the Supply Chain. These new benefits are known as Weekly Entry and Direct Delivery.

- *Weekly Entry* was added to the FTZ benefits stream in the year 2000 by the Trade and Development Act. This benefit allows the importer to file a consolidated entry to CBP instead of the regular “entry per Bill of Lading” that normally occurs in shipping. By reducing the number of CBP entries, huge economies of scale can lower an importer’s internal paperwork processing costs and reduce the fees paid to CBP for each entry. This fee reduction can be $200,000, $300,000, or up to $1 million of savings annually for a large Distribution Center (DC) operator. The cost savings are so significant that the FTZ program is now being used by 45 of the top 100 importers in the U.S.
- *Direct Delivery* is a CBP procedure, only allowed in an FTZ. This benefit gives the users/tenant the ability to “Sign for” CBP upon receipt of goods that normally have to go to another location for signature, BEFORE the goods can be delivered to the DC. With Direct Delivery, the importers can cut 1 – 2 days of inbound time on their receipt of goods. This is being proven daily by Huffy Bikes, Black and Decker, Skechers, and other importers who have announced publicly that they are receiving improved supply-chain velocity within their FTZ.

FTZs can offer a number of benefits to importers, including:

- *Eliminating delays in customs clearance*. This is particularly important at this time of unprecedented longer supply chains, port security and continued port congestion.

- *Eliminating duty drawback*. Goods that are imported and stored in an FTZ may be re-exported without ever incurring duties. This eliminates the need to file for duty drawback refunds, a lengthy procedure that ties up funds.
- Avoiding duty on waste or scrap. If for some reason goods in the Zone must be destroyed or returned, no duties will be charged.
- *Providing relief from inverted tariffs*. There are instances where companies are actually penalized for manufacturing at home (here in the USA). When the duty on raw materials is higher than that on the finished product, an importer of finished goods has an advantage over the U.S. producer. If the manufacturing takes place in an FTZ, however, the owner pays duty on his end products as they are shipped, thus leveling the playing field. Examples are appliances, solar equipment, pharmaceuticals, chemicals, autos, machinery, pumps and many other industry groups that use the FTZ program to lower parts-tariffs by making the finished product in the Zone.
- *Big savings in processing fees*. The 2000 Trade and Development Act contained a provision that provided for “weekly entry” procedures in all FTZs. This may not seem like a big deal, but companies located outside the Zones pay a 0.3464% (value of merchandise) fee for every shipment processed by CBP. The minimum fee is $25, and maximum (which applies to any shipment valued at $140,000 or above) is $485, regardless of the amount of duty paid.

2.5.7 Rail Services Overview

NS operates an intermodal facility at Rickenbacker. CSX Transportation operates an intermodal facility in West Columbus. These two rail carriers provide a rail link between east coast ports, the ocean carriers who call at these ports and Columbus. By interchanges with the western rail carriers (UP and BNSF) the two serving rail carriers provide inbound and outbound containerized service to cargo owners, freight forwarders and logistics service providers in Columbus. Both CSX and NS contribute to the demand for facilities in the Columbus region.

Norfolk Southern has seen solid growth in intermodal activities at their Rickenbacker Terminal with growth rates of 24.5% in 2013, 11.1% in 2014, 10.8% in 2015 and 12.4% in 2016. CSX activity in Columbus has been flat for the past three years; however, this is due to a shift in intermodal activity to their expanded facility in Marion, OH which has seen solid expansion and growth since the transition began in 2014. CSX operates a joint-venture with Union Pacific (UP) Railroad called UMAX which is their domestic intermodal service.

The GFF firms who support the retailers with logistics services utilize the intermodal solution as the first option for their supply chains. In addition, the availability of two rail carriers with access to both east and west coast ports provides the forwarder with a competitive option for service, routing, and costs. As more freight is delivered by the rail carriers to the Columbus intermodal ramps, more retailers and cargo owners will recognize the value of a distribution or fulfillment center in Columbus.

Columbus has seen significant growth in industrial distribution centers in the past years. This is driven in part by the growth of the intermodal facilities and the demands of the retailers that operate their distribution or fulfillment centers in Columbus. Occupancy rates remain low, occupation of new/spec buildings is almost immediate, and build-to-suit facilities are occurring routinely. Currently, Columbus has 245 million in total industrial rentable square feet in inventory. Of this, 143 million square feet is defined as bulk/modern warehouse or distribution center/facilities over 100,000 square feet. In the third quarter of 2016, 2.6 million in this category was completed and 1.2 million square feet was under construction. There was a 6.6% vacancy rate in this category, while overall in the industrial market, Columbus was at 5.6% vacancy (CBRE Columbus Industrial Report, Q3, 2016). There is a direct link between the growth of industrial products and the support of a growing intermodal platform in a market. According to a recent Jones Lang LaSalle Industrial report, in the past five years, over 146 million square feet of industrial space has been constructed within five miles of key intermodal centers in the United States.

A secondary influence will begin to impact large inland ports such as Columbus. Amazon applied for and was granted a non-vessel operating common carrier license (NVOCC) by the Federal Maritime Commission, which gives them the authority to book, route and move containers for themselves. They will be acting as their own GFF or 3PL. In 2016, Amazon acquired the rights to purchase up to a total of 30% of Atlas Air (Investor's Business Daily 5/5/2016) and 19.9% of ATSG (Cargo Facts 3/9/2016) to supports their air cargo operations in the US and around the world. This new capacity provides a platform for Amazon's global growth in both air and containerized supply-chain activities.

Amazon operates two large fulfillment centers in/near Columbus, three data centers in the region and uses the Wilmington, OH air hub for part of their domestic and global air cargo operations. According to Jon Budish, investment strategist at Fairleigh Dickinson University's Silberman College of Business, Amazon.com accounted for more than 6% of the UPS business in 2015 (US News & World Report, March 28, 2016). Key economic/business development stakeholders in Columbus have been working on creating a strategy and solution to attract more Amazon services and new Amazon Air operations to LCK. However, the recent announcement of a decision by Amazon to locate their operations and hub activity in Cincinnati will diminish the future impact on Columbus and LCK. However, there are numerous other global and national e-commerce providers who have significant "scale" and cross-border volumes that if captured at LCK would replace the expected impact of Amazon.

Both UPS and FedEx use rail intermodal solutions to move cargo between origins and destinations. Rail provides a point-to-point solution, allowing the package carrier to load volumes on domestic containers for transport by rail. In addition, JB Hunt, a North American logistics and trucking firm, ships large numbers of their own domestic containers on NS out of Columbus. JB Hunt contributes as much as 25% of the total volumes processed at the NS intermodal terminal at Rickenbacker. JB Hunt operates the largest fleet of 53-0 domestic intermodal containers and one of the largest drayage fleets across the nation's rail providers. JB Hunt utilizes a strategic partnership with NS in the eastern network and BNSF on their western network. JB Hunt uses the intermodal rail services of the rail carriers for their line-haul, origin to destination, movement and performs the drayage from the rail ramp to customers. Intermodal revenues make up 59% of the company's revenue and load growth increased 12% in 2016 over 2015, with the eastern network outperforming the national growth rate.

The balance of the cargo is made up of international containers arriving from eastern or western coastal ports. The NS and CSX intermodal terminals are a significant and important component of the market's value in terms of logistics infrastructure. FedEx Freight, the second largest less-than-truckload carrier in the nation, said it plans to utilize rail intermodal, with the move expected to shift as much as 10% of FedEx Freight miles from truck to rail. UPS will use rail if a shipment is traveling 400 miles or more (Parcel Industry magazine, 9/2014).

The intermodal operations in Columbus will continue to attract new GFF who will occupy space and bring new tenants and customers to Columbus. Or, the freight owner who has a specific relationship with a GFF will, rather than seek out a new forwarder for a Columbus operation, require/request that their partner occupy space and provide service for this new operation in Columbus. Over time, this relationship will be supported by intermodal and occasional air services. As the relationship and value proposition of a location in Columbus is leveraged, progressively more air, ground, ocean and courier services will be required to support the new GFF operations at or near Columbus.

2.5.8 Key Target Industry Sectors

As the global automotive industry continues to grow and expand into Mexico, adding routes to/from major markets in Mexico City, Monterrey or Guadalajara, Mexico would provide access to the suppliers in Mexico and provide a foundation for supplier expansion in the Columbus region. Ohio is home to many original equipment manufacturers and their suppliers, including Honda/Acura, Ford, Jeep/FCA and GM/Chevrolet. The International Business Convention for the Automotive Industry forecast in 2016, indicated that Mexico's production will reach 4 million units by 2018 and 5 million units by 2020. In 2016, the entire automotive industry in North America was estimated to produce 17.85 units (Automotive News, 12/26/2016). In Mexico, there are 18 production centers located in 11 of their states, and 48 car and light truck models are produced in Mexico. Ohio exported $1.33 billion in automotive parts (HS 87) to Mexico in 2015, and imported $1.93 billion in parts from Mexico (Ohio Development). This industry is seeing a shift from traditional truck to intermodal, and Columbus is well positioned to gain new volumes of imports and exports as trade between Mexico and Ohio continues to grow.

Mexico also has a robust "fresh/cold chain" export initiative that could result in new imports into Columbus and drive demand for new cargo services and new freight forwarders who excel in this market niche. This industry would require new facilities designed to support this new line of business at LCK. Overall, the global cold chain is expected to grow at a compounded annual growth rate of 13.9% from 2015 to 2020 (Zion Research, 2015). According to Zion, the global cold chain market was valued at $110.20 billion in 2014 and is expected to reach $271.9 billion in 2020. A cold chain is a temperature-controlled supply chain that involves the storage and transportation of temperature-sensitive perishable goods. A cold chain is a series of storage and distribution activities at a desired temperature. Cold chain helps to preserve and extend the shelf life of various products including seafood, agricultural produce, frozen food, pharmaceuticals, flowers and related floral products, etc. Food and pharmaceuticals are major end user industries of cold chain services.

The cold chain/storage industry in the US consists of 4.06 billion cubic feet of space within 1,497 facilities. Today, 46% of the North America's inventory is controlled by five companies: Americold Logistics, Lineage Logistics, US Cold Storage, Preferred Freezer and VersaCold Logistics. Total demand for refrigerated space is broken out as 33% for food manufacturing, 33% for food wholesalers and 22% for retailers. However, the major food retailers such as Wal-Mart, Target and Costco are studying and implementing strategies to bypass wholesalers and purchase, store and distribute goods from their own facilities. The remaining 12% of the US cold storage is utilized for pharmaceutical, floral or fur products. (Jones, Lang, LaSalle/JLL, 2015)

According to the International Association of Refrigerated Warehouses (IAWR), Mexico's growth in refrigerated capacity increased 9.29% during 2008-2014. According to MCI (Maersk Container Industry) the global fleet of refrigerated containers will be 3 million units by 2018. As the ocean carriers prepare for increased cold chain activity, a similar increase in cold chain tonnage will occur in air cargo. JLL indicates that about half of the world's top selling drugs, in terms of value, will be temperature sensitive biologics.

The pharmaceutical industry is becoming a global industry. In this sector, there are several GFFs emerging as forwarders of choice for the pharmaceutical producers seeking a partner who demonstrates control and integrity of their product from origin to delivered destination. As drug consumption becomes more globalized and as supply chains become more demanding in terms of control over custody, control of temperature or other environmental requirements, LCK provides the global pharmaceutical provider and their 3PL with a solution that differentiates themselves from other traditional gateways. Compression of the supply chain is a clear value proposition for Columbus and LCK. Glyn Hughes, Global Head of Cargo for IATA, indicated in the Journal of Commerce (January 2017) "The growth in the transport of time and temperature-sensitive goods such as pharmaceuticals likewise provides grounds for optimism. In 2014, this market was estimated to be worth $8.36 billion, and it is projected to rise to $10.28 billion by 2018."

LCK is already well positioned by virtue of significant local efforts to provide live animal shipments. Here, a significant value proposition that distinguishes the LCK option is the ability to move from truck to pen to plane in a very short cycle, which limits the stress on the animals being shipped or received. This industry segment is also dominated by a few GFF/3PL providers who have established their credentials as curators and managers of live animal shipments. As a new product for LCK operations and for regional service providers who specialize in live animal shipments, the initial impact to the overall cargo forecast is not significant. However, in future years, because of the higher revenue yield of this cargo type, it will positively impact operations, if volumes are re-directed from competing gateways.

2.5.9 Freight Stakeholders

Forward Air Freight (FAF), a national expedited trucking firm, operates their national hub at Columbus. While the hub is located at Rickenbacker, FAF refers to this facility as their CMH Hub. FAF also operates another facility in closer proximity to the cargo ramp at Rickenbacker, known as s a Container Freight Station (CFS). This is the facility through which FAF directs arrival and departures to/from the ramp and provides the ground handlers who load or unload the aircraft. This facility is referred to by FAF as their LCK facility.

The FAF network is national and FAF operates their network almost exclusively for the national and global 3PL and GFF community. FAF provides airport-airport or hub-hub and facility to ramp line-hauls for their freight customers. Some freight in the system is routed to an airline cargo ramp for a "drop" for the airline to build into a destination consolidation. Other freight is "dropped" at the destination GFF/3PL facility and the forwarder manages the final mile (for domestic freight) or builds their own consolidation for an airline (freight or passenger/belly move).

45 of the cities on the FAF network are defined as "overnight" from the origin city to their CMH Hub at Rickenbacker. Both FAF and many of the 3PL/GFF operators at Rickenbacker are working on a solution (both pricing and operations) that would allow freight to be terminated and loaded at Rickenbacker rather than trucked by FAF to a more distant gateway, which adds transit time to the cycle between global origins/destinations for the cargo. Succeeding in creating this "termination strategy" for cargo in the FAF network would result in new volumes for exports that could be loaded at LCK.

Today, FAF dispatches line-haul trucks with freight dispatched to either airlines or GFF, in what are the traditional air "gateway operations" of ORD, JFK, ATL and EWR. These gateway operations provide the GFF with options to access both passenger/belly cargo flights and scheduled cargo operations who operate from these gateway cities. FAF sorts over 16 million pounds of freight each week at their CMH facility and dispatches trucks to the four gateways as export cargo loaded in their line-haul trucks. Over twenty trucks per night depart Columbus for these four international gateways.

Each truck moves an average of 30,000 pounds of cargo. This is the context for capturing some volumes of this cargo to be terminated and exported directly on existing or new cargo flights from LCK. **A capture rate of 5% of the total FAF cargo moved to other gateways would produce 9.9 million pounds or better than a <u>13% increase</u> in total yearly cargo activity at LCK over current volumes with no other contributors.**

In addition to the nightly sort that FAF conducts at their CMH Hub, FAF also performs a weekend sort for the entire Pilot Air Freight (Pilot) network. Freight arrives from market stations/franchises in trucks to the Pilot sortation center. FAF staff provide the forklifts, material handling equipment and man power, and freight is sorted to the destination trucks for delivery to the Pilot stations on Sunday or Monday, depending on the distance from Columbus. FAF reports that the Pilot sort averages 750,000 pounds per weekend. Pilot has indicated they are evaluating re-configuring their gateway network program in order to utilize the more-efficient and less-congested gateway at LCK. While not all the freight in the weekend sort conducted by FAF is international or gateway destination cargo, Pilot's new ownership seeks to expand their network overseas and control a higher percentage of international cargo. The immediate contribution to the LCK export volumes would be small, however, in future years such an initiative would provide a strong base for international cargo that today is not routed over LCK. **If 5% of the total Pilot operations was captured as exports in future years, this addition alone would produce 1,950,000 pounds, or a 2.6% increase in annual cargo weight over current LCK volumes**.

2.5.10 International Cross-Border E-commerce Projections

In the past few years, numerous retailers have witnessed significant growth in their e-commerce programs. Initially, most of the growth occurred in the domestic market and retailers have re-configured supply chains and operations to meet the demand for compression between the "click" to buy the product and the "knock" to have the product delivered to the buyer at the buyer's designated delivery location. As the cycle between buy and deliver is compressed, more on-hand inventory is required in more locations, and the seller's data and logistics platforms must be closely synchronized in order to have the delivery match up with the "promise" when the product is ordered.

In 2015, US Customs and Border Protection initiated a policy change for goods bought overseas and shipped or brought to the US, known as the Trade Facilitation and Trade Enforcement Act of 2015 and announced in March 2016. This Act increased the shipment value of merchandise that can be imported duty and tax free by one person, on a single day from $200 to $800. The raising of the de minimis exemption is due to an amendment of the Tariff Act of 1930. This, along with the expansion of e-commerce in high-growth areas of China and Europe, coupled with the international expansion of companies, which includes Amazon, JDH China (which sells on Alibaba), Wal-Mart/JD.com and others) has led to an explosion in cross-border, international e-commerce and demand for high-velocity movement of packages between buyers and sellers. According to e-Marketer, a leading e-commerce news resource, global e-commerce growth will continue to occur at a rate of 15-16% year-over-year through 2020 (as shown in **Figure 2-11 World Ecommerce Sales (2015-2020)**). Significant volumes of growth will occur between the US, China and Europe, with growth in these lanes exceeding the global projections.

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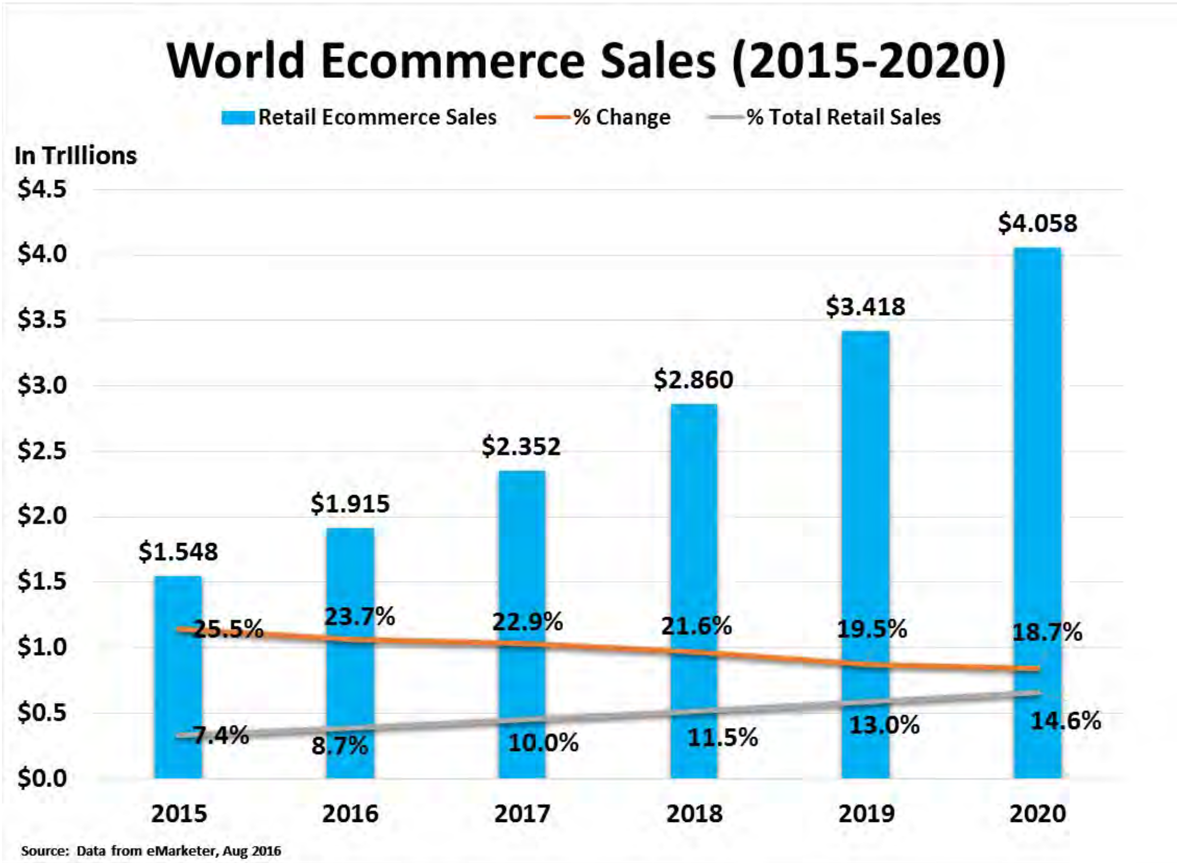
Figure 2-11 World Ecommerce Sales (2015-2020)



Source: Data from eMarketer, Aug 2016

Today, there are numerous e-commerce "aggregators" who operate in the Columbus Region. These companies accept e-commerce orders as packages "picked" from the inventory of multiple retailers and aggregate packages to build a consolidated volume of packages to be shipped to a global destination city or region. Upon arrival in a foreign market, the packages will be "de-aggregated" and moved for delivery by a "last mile" delivery agent in that country. This activity of aggregation and dis-aggregation is occurring in both directions and requires new facilities, linked technologies and significant cargo lift. Many GFF/3PL providers are aligning with their client's e-commerce programs to be selected to provide some/all of the new supply chain solutions for the retailer's e-commerce program. These initiatives will increase the influence of the GFF/3PL over a higher amount of their client's cargo and result in them offering expanded services for delivery and management of the last-mile solutions, either at home in the US or overseas.

One of the numerous global e-commerce fulfillment firms that is a prospect for a facility at Rickenbacker is seeking approval for an express consignment carrier facility (ECCF). The ECCF is a bonded warehouse approved by US CBP at key entry points into the US to process high volume parcel import flow. E-commerce shippers to the US can access these facilities for cost-effective clearance and expedited domestic delivery by postal services (USPS) or regional last-mile carriers. The ECCF is a facility approved for operations by the CBP Port Director for the examination and release of express consignment shipments. The creation and approval of an ECCF at Rickenbacker for LCK arrivals would drive high volumes of new imported e-commerce packages to the airlines that operate at LCK. One global e-commerce provider alone estimates that such a facility would need to process up to 50,000 packages per day. Assuming an average weight of only four pounds per box (verified by FedEx Trade Network), this would increase the inbound volume by 200,000 pounds per day, or 44 million pounds annually, raising the current volume by 58.6% cargo growth over current cargo loads, starting in mid-2017. Each 50,000 package increase in import e-commerce volumes will drive demand for one new freighter operation and immediately impacts the need for new high-volume sortation facilities.

This is inclusive of only one prospect and represents only 10% of the potential volume that could be processed at LCK in the future by this one prospect. This prospect visited LCK and identified this location as a "mid-country" option for e-commerce volumes already arriving under their control to JFK and LAX. Such a surge in growth would require a new purpose-built, high volume sortation facility for the imports and to support sortation of export e-commerce traffic. In addition, such a surge in volume would require a focus by local economic development stakeholders and the CRAA on building a "balance" for the air carriers so that the outbound would match up with the new volumes of inbound cargo.

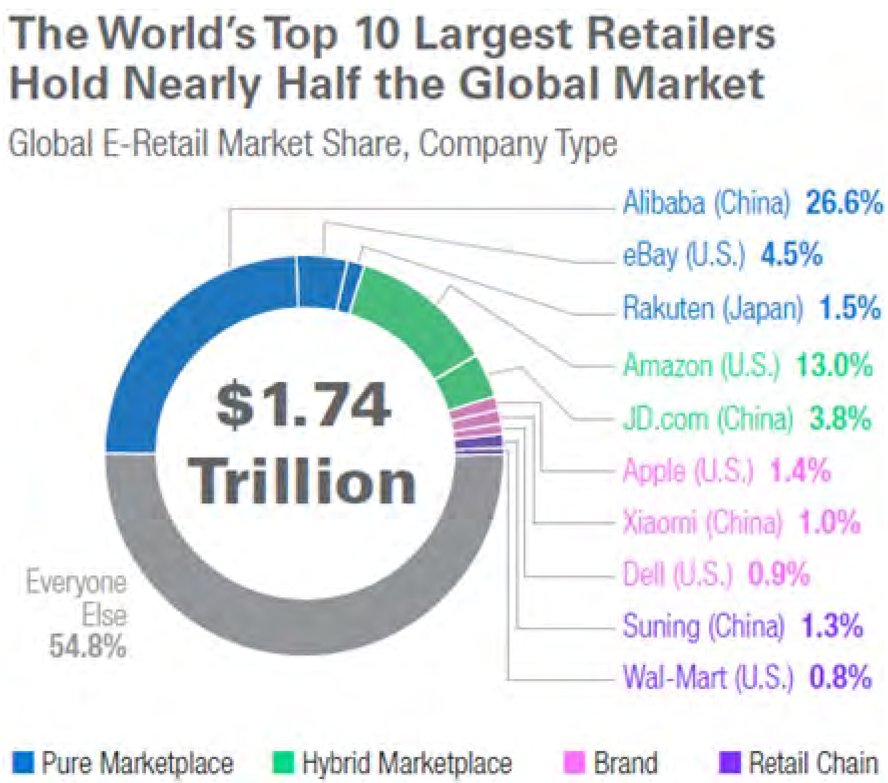
This level of growth would have a ripple impact on demand for new logistics facilities, cargo cross-dock facilities and would require both FedEx and UPS to expand their ground and air facilities and operational capabilities. In most cases, UPS and FedEx accomplish the "last mile" delivery in their ground networks.

Delivering a fully deployed e-commerce solution is a complex operation. Many retailers operate and host their own website to support sales of their products. In addition, retailers also operate "marketplace" sites where a shopper can buy directly from a retailer and also shop for products hosted on the retailer's website but produced by others. These marketplaces provide another "channel" that allows the retailer who supports a traditional storefront relationship to the buyer, an alternative to keep them on the host retailer's site.

Other non-traditional e-commerce sellers do not operate a traditional network of stores, rather they are a "pure e-commerce retailer" choosing to deploy a strategy driven entirely by on-line purchasing and fulfillment. **Figure 2-12 The World's Top 10 Largest Retailers** below shows how the global e-commerce sellers are arrayed as a traditional retailer chain, a site that only sells its own brand, or as one that uses the marketplace platform. What is important to note is only one of the e-commerce sellers has identified an interest in Columbus as a central hub for their e-commerce volumes. The names on the chart below represents companies who will require multiple global hub operations in order to meet the demands of order management, high volume sortation and last mile delivery or first mile pick up. <u>There is potential for other global sellers to follow suit as they seek access to the buyers in the US. This demand could double the size of the air carrier contribution to LCK if one or more of these operators selected LCK as their hub for distribution.</u>

In addition, cross-border trade as exports (sellers who seek to fulfill sales around the globe to individual buyers) is growing at a robust pace. According to Jim Tompkins of Tompkins International, by 2020 the US will sell $486 billion of goods to the world in cross-border e-commerce. In that same timeframe, the US will buy $140 billion of goods from overseas in cross-border e-commerce. This is the context for future impacts and demand for facilities, infrastructure and capacity at LCK, should this new gateway center be chosen as one of the major e-commerce hubs in the US.

Figure 2-12 The World's Top 10 Largest Retailers



Source: Data firm Internet Retailer and Modified by IMSW

If LCK attracts higher e-commerce volumes, downstream, the parcel carriers (FedEx, UPS, USPS and SmartPost) systems would require more productive, larger and more efficient sortation systems at LCK or in Columbus. Thus, future facilities to support this high-volume product flow will need to be planned as volumes increase and other e-commerce service providers establish or expand services at or near LCK. According to the local FedEx freight manager who operates their air cargo operation at LCK, 11 of FedEx's top 20 retail clients operate a distribution facility or fulfillment operations in or near Columbus. This density of the apparel industry, accompanying growth of e-commerce and the ease of conducting cross-border commerce will continue to drive volumes at LCK.

SF Express represents the conveyance of choice for the e-commerce industry in China. In 2015, SF Express was identified as the fastest growing 3PL company in the world. This ranking was driven by the significant volumes of e-commerce shipments that were made across Asia and specifically, China. SF Express with $6.6 billion in revenues derived from e-commerce in China was first on this list, and GeoPost, with revenue of $5.93 billion was third.

2.5.11 Domestic E-commerce Growth Projections

The growth of domestic e-commerce is different than the pace of international growth. Forrester Research (April 2016) forecasts a compounded annual growth rate for just the domestic market to be 8.6%. However, as indicated in the chart below, eMarketer forecasts growth in 2016 (13.0%) 2017 (12.2%) and 2018 (11.6%) with significant shifts away from traditional retail to e-commerce in the US. According to CBRE, January 2016, "e-commerce remains the industrial market's primary growth engine. Citing (other) forecasts from research firm Forrester, US online sales will increase by 9.3% annually over the next five years to $523 billion per year. At that pace, e-commerce will generate roughly 40 million square feet of demand for US industrial space each year throughout 2020, based on the industry rule of thumb that each $1 billion of new online sales creates demand for another 1 million square feet of warehouse and distribution space." These growth projections will impact FedEx and UPS at LCK or in Columbus, however the incremental impact is mitigated as both carriers operate line-haul trucks during the daylight and evening hours to/from their hubs and only operate the aircraft in the late evening to capture all the "last-minute" orders that must make their sorts. Much of the increases in domestic e-commerce will be moved using their ground and intermodal networks.

China's Alibaba, an e-commerce marketplace, is beginning to develop a strategy to enter the US market and will require infrastructure, facilities and personnel to support their trading platform. Alibaba's 2016 "singles day" sales (similar to a Black Friday or Cyber Monday sale in the US) event netted sales of $17.79 billion in revenue in one day. This was up from 19.6 % over the same day sales in 2015, which were $14.3 billion. Key stakeholders in Columbus' economic development and recruitment organizations are working on strategies to attract Alibaba, JDH and GeoPost (who delivered over one billion packages, parcels and e-commerce volumes to 230 countries in 2015) and others to LCK. Competition in Ohio will be tough, as both Cincinnati and Wilmington are pursuing a parallel recruitment strategy for Alibaba.

In December 2016, there was an introductory press release and related articles on a new e-commerce company entering the marketplace named Monarch Fx. Led by the Tompkins International organization, this new model will allow disparate retailers to join the alliance and supplement their own e-commerce platform with the alliance platform. By joining the alliance, companies can utilize the leverage, scale and volumes of multiple retailers to "share" facilities, logistics systems, technology, order and inventory systems, and ultimately deliver a channel of seamless services to customers. This program and effort are still in the early development stages. However, it is tailor made for LCK. LCK could act as the alliance's primary Midwest location for the fulfillment of goods to the world, and for receiving and shipping goods from global sellers to buyers across the nation or region. Being one of the locations chosen for the Monarch Fx e-commerce alliance will be important for LCK, CRAA and economic development stakeholders, as it represents a domestic solution for retailers who seek to offer a competitive alternative to Amazon's scale and network advantages.

The challenge is to correctly quantify the opportunities that could be captured at LCK and to determine when these activities would start and at what level these activities could be expected to occur in the near and longer terms. Therefore, three scenarios are presented as forecasts. The key for the CRAA, LCK and its freight community is to align the necessary efforts to recruit the "right" business to LCK, which aligns well with the air cargo operators and drives new volumes of balanced imports and exports.

2.5.12 Conclusions, Forecast Summaries and Assumptions

Tables 2-14 through **2-19 LCK Cargo Forecasts (Aggressive, Moderate, and Low)** below represent three Cargo Forecast Growth Scenarios: Aggressive, Moderate and Low growth. Each chart includes the basis for the growth projections and the expected schedule for certain critical activities to occur. Freight owners, GFF/3PL firms, along with private and public economic and business development stakeholders, must perform the necessary investments in the LCK Gateway in order for the most aggressive growth forecast/scenario to become a reality.

There are in fact three separate growth forecasts, an aggressive, medium and low. However, within each forecast, there are separate scenarios which plot the differences in growth between the existing international air carriers and other segments that contribute to cargo volumes at LCK. The reason for these two forecasts is because the growth expectation for the international air carrier segment is vastly higher than for the other segments that operate at LCK. These separate forecasts are included in the charts below. The air carriers who contribute to the international freight arrivals and departures are separated from the UPS/FedEx and charter aircraft volumes. Each category of operation is treated with a different multiplier in the forecast. FedEx, UPS and the charter category are treated as flat growth with under 5% growth expected across the forecast timeframe. This is based on both FedEx and UPS efforts to utilize truck conveyances to move cargo from Columbus to their respective hubs in Indianapolis, Memphis and Louisville. As their e-commerce volumes continue to be moved in their ground networks, there will be limited impact to their air networks even with a significant expansion in arriving e-commerce contributed by the global air carriers.

The carriers who operate at LCK will be the key drivers for facility expansion and increased operations. Each chart contains separate columns showing the forecast schedule for expected demand for facilities and the increases in arrivals/departures indicated by the increases in cargo volumes. Also, for this carrier sector, there are variable load scenarios presented as it is expected that as LCK continues to mature as an inland port and cargo gateway, greater density will be seen in the load factors for the carriers. Thus, the "as is" load factor is presented to show the number of aircraft per day that support the volumes. As the load factor increases, the number of aircraft are adjusted to reflect the heavier loads at arrival and departure. As noted earlier in this section, it will be critical for CRAA and economic/business development stakeholders to focus on maintaining a balance between imports and exports at LCK to continue to provide the carriers with denser lift from LCK to destinations around the world.

During the course of interviews with freight stakeholders and cargo owners, one route or air transportation hub was identified as a “gap” in services provided by the incumbent air carriers operating to/from LCK. This gap was identified as transport to East Midlands of England (EMA) which is located between Derby, Nottingham and Leicester. EMA is a major cargo hub, ranked as the second busiest UK airport for freight traffic after London Heathrow airport. A route including this airport was identified as an important consideration for future operations.

Supporting each of the forecast charts is a supplemental chart that demonstrates the requirements and schedule for new facilities and an analysis of the flights required based on load factors of 80 tons per cycle, per day and the target of 120 tons per cycle, per day.

Recommended Cargo Forecast

The factors presented in this Cargo Forecast contain variables that if accomplished, will dictate the growth of cargo at LCK. As noted in the report, there is considerable alignment within Columbus and CRAA to achieve and sustain the growth that will fulfill the vision of a viable global cargo gateway. Economic development stakeholders, air carriers and CRAA staff are all focused on sustaining the current growth and leveraging the value proposition that Columbus and Rickenbacker provide to the freight community with a competitive supply chain option. This alignment will be required to accomplish the Aggressive Forecast. A continued focus on the growth of tonnage per flight and increased export tonnage to match import volumes is critical, and this forecast provides the guidance to accomplish this growth in future years. In addition, there is an expectation that the global fleet will continue to be supported by cargo freighters of 100 to 120-ton capacity, and these will be the aircraft utilized to support the LCK global gateway. This document also predicts that Columbus, CRAA and LCK will become a major part of the global cross-border e-commerce industry, in which case such a global provider would produce results that would easily achieve the Aggressive Forecast projections. Thus, the Aggressive Cargo Forecast is highly achievable based on accomplishing the variables in this report. It is recommended that the Aggressive Cargo Forecast be adapted as the model for future projections for facilities, flights, cargo volumes and infrastructure at LCK. This Aggressive Cargo Forecast can be achieved because the freight community and the freight owners know that utilization of the LCK option for their global cargo movements is more competitive than services offered at other gateways.

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Table 2-14 LCK Aggressive Cargo Forecast

Scenarios	Year	Carrier Total (Pounds)	UPS/FedEx/ Charters (Pounds)	Annual Total (Pounds)
Base Year	2016	75,137,385	127,022,134	202,159,519
Short-term Growth: Carrier 30% UPS/FedEx 5%	2017	97,678,601	133,373,241	231,051,841
	2018	126,982,181	140,041,903	267,024,083
	2019	165,076,835	147,043,998	312,120,833
	2020	214,599,885	154,396,198	368,996,083
	2021	278,979,851	162,116,008	441,095,859
Mid-term Growth: Carrier 20% UPS/FedEx 3%	2022	334,775,821	166,979,488	501,755,309
	2023	401,730,985	171,988,873	573,719,858
	2024	482,077,182	177,148,539	659,225,721
	2025	578,492,619	182,462,995	760,955,614
	2026	694,191,143	187,936,885	882,128,027
Long-term Growth: Carrier 10% UPS/FedEx 3%	2027	763,610,257	193,574,991	957,185,248
	2028	839,971,282	199,382,241	1,039,353,523
	2029	923,968,411	205,363,708	1,129,332,119
	2030	1,016,365,252	211,524,619	1,227,889,871
	2031	1,118,001,777	217,870,358	1,335,872,135
	2032	1,229,801,955	224,406,469	1,454,208,423
	2033	1,352,782,150	231,138,663	1,583,920,813
	2034	1,488,060,365	238,072,823	1,726,133,188
	2035	1,636,866,402	245,215,007	1,882,081,409
	2036	1,800,553,042	252,571,458	2,053,124,500

Forecast Assumptions:

- Based on 5% capture of Pilot weekly sort conducted by FAF in Columbus by 2017-2018.
- Based on increase of 50,000 packages delivered inbound per day to the new ECCF facility.
- Based on 5% capture of the CMH terminated FAF cargo to be loaded at LCK.
- Based on continued CRAA business development efforts in the catchment area.
- Based on one GFF/3PL re-routing their ORD/JFK cargo to LCK per year with 50% capture of imports/exports.
- Assumes construction, expansion of ACT 5 in 2017-2018.
- Assumes construction of new ECCF high volume package sortation facility in 2018-2020.
- Assumes that for new incremental growth of ECCF e-commerce cargo, one new operation will occur.
- Assumes considerable effort by CRAA, public-private economic and business development stakeholders to shift exports to provide carriers with balance for the increases in import e-commerce to the ECCF facility.
- Assumes success in gaining one export, e-commerce aggregator to operate at LCK and route all exports thru LCK.
- For Reference: ORD processed 1.73M metric tons in 2016 (3.8 billion pounds).

Source: IMS Worldwide, 2017

Table 2-15 LCK Aggressive Cargo Operations Forecast

Scenarios	A Year	B Carrier Total (Pounds)	C Annual Flights (80T/ Aircraft)	D Daily Flights (80T/ Aircraft)	E Annual Flights (120T/ Aircraft)	F Daily Flights (120T/ Aircraft)	G Operations per day
Base Year	2016	75,137,385	470	2	313	1	2
Short-term Growth: Carrier 30%	2017	97,678,601	610	3	407	2	4
	2018	126,982,181	794	4	529	2	4
	2019	165,076,835	1,032	5	688	3	6
	2020	214,599,885	1,341	6	894	4	8
	2021	278,979,851	1,744	8	1,162	5	10
Mid-term Growth: Carrier 20%	2022	334,775,821	2,092	10	1,395	6	12
	2023	401,730,985	2,511	11	1,674	8	16
	2024	482,077,182	3,013	14	2,009	9	18
	2025	578,492,619	3,616	16	2,410	11	22
	2026	694,191,143	4,339	20	2,892	13	26
Long-term Growth: Carrier 10%	2027	763,610,257	4,773	22	3,182	14	28
	2028	839,971,282	5,250	24	3,500	16	32
	2029	923,968,411	5,775	26	3,850	17	34
	2030	1,016,365,252	6,352	29	4,235	19	38
	2031	1,118,001,777	6,988	32	4,658	21	42
	2032	1,229,801,955	7,686	35	5,124	23	46
	2033	1,352,782,150	8,455	38	5,637	26	52
	2034	1,488,060,365	9,300	42	6,200	28	56
	2035	1,636,866,402	10,230	47	6,820	31	62
	2036	1,800,553,042	11,253	51	7,502	34	68

Assumptions:

- The carrier (Column B) is a transfer of the total annual pounds from the above Aggressive Forecast
- The Actual Tonnage/Cycle are based on the actual load factor from 2016 of 80 tons per cycle inclusive of all imports/deplaned and exports/enplaned (Column D – Number of flights/day required to support 80 tons per cycle).
- (Columns D and F) assumes 220 days of flight activity per year.
- The Flights (Column E) represent a load factor of 120 tons per cycle inclusive of all imports/deplaned and exports/enplaned (Column F – Number of flights/day required to support 120 tons per cycle).
- (Column G) Two operations per flight represent inbound and outbound activity.

Source: IMS Worldwide, 2017.

Table 2-16 LCK Moderate Cargo Forecast

Scenarios	Year	Carrier Total (Pounds)	UPS/FedEx/ Charters (Pounds)	Annual Total (Pounds)
Base Year	2016	75,137,385	127,022,134	202,159,519
Short-term Growth: Carrier 25% UPS/FedEx 5%	2017	93,921,731	133,373,241	227,294,972
	2018	117,402,164	140,041,903	257,444,067
	2019	146,752,705	147,043,998	293,796,703
	2020	183,440,881	154,396,198	337,837,079
	2021	229,301,102	162,116,008	391,417,109
Mid-term Growth: Carrier 15% UPS/FedEx 3%	2022	263,696,267	166,979,488	430,675,755
	2023	303,250,707	171,988,873	475,239,579
	2024	348,738,313	177,148,539	525,886,852
	2025	401,049,060	182,462,995	583,512,055
	2026	461,206,419	187,936,885	649,143,304
Long-term Growth: Carrier 10% UPS/FedEx 3%	2027	507,327,061	193,574,991	700,902,052
	2028	558,059,767	199,382,241	757,442,008
	2029	613,865,744	205,363,708	819,229,452
	2030	675,252,318	211,524,619	886,776,937
	2031	742,777,550	217,870,358	960,647,908
Long-term Growth: Carrier 5% UPS/FedEx 3%	2032	779,916,427	224,406,469	1,004,322,896
	2033	818,912,249	231,138,663	1,050,050,912
	2034	859,857,861	238,072,823	1,097,930,684
	2035	902,850,754	245,215,007	1,148,065,762
	2036	947,993,292	252,571,458	1,200,564,750

Forecast Assumptions:

- Based on only gaining a single, 50,000 package-per-day ECCF e-commerce importer, requires new facility construction.
- Does not assume any contribution by FAF/CMH terminations, Internal FAF or Pilot routings in favor of LCK.
- Based on continued CRAA business development efforts in the catchment area.
- Based on one GFF/3PL re-routing their ORD/JFK cargo to LCK per year with 50% capture of imports/exports.
- Requires one, new export focused e-commerce provider to upload cargo at LCK starting in 2018

Source: IMS Worldwide, 2017

Table 2-17 LCK Moderate Cargo Operations Forecast

Scenarios	A	B	C	D	E	F	G
	Year	Carrier Total (Pounds)	Annual Flights (80T/ Aircraft)	Daily Flights (80T/ Aircraft)	Annual Flights (120T/ Aircraft)	Daily Flights (120T/ Aircraft)	Operations per day
Base Year	2016	75,137,385	470	2	313	1	2
Short-term Growth: Carrier 25%	2017	93,921,731	587	3	391	2	4
	2018	117,402,164	734	3	489	2	4
	2019	146,752,705	917	4	611	3	6
	2020	183,440,881	1,147	5	764	3	6
	2021	229,301,102	1,433	7	955	4	8
Mid-term Growth: Carrier 15%	2022	263,696,267	1,648	7	1,099	5	10
	2023	303,250,707	1,895	9	1,264	6	12
	2024	348,738,313	2,180	10	1,453	7	14
	2025	401,049,060	2,507	11	1,671	8	16
	2026	461,206,419	2,883	13	1,922	9	18
Long-term Growth: Carrier 10%	2027	507,327,061	3,171	14	2,114	10	20
	2028	558,059,767	3,488	16	2,325	11	22
	2029	613,865,744	3,837	17	2,558	12	24
	2030	675,252,318	4,220	19	2,814	13	26
	2031	742,777,550	4,642	21	3,095	14	28
Long-term Growth: Carrier 5%	2032	779,916,427	4,874	22	3,250	15	30
	2033	818,912,249	5,118	23	3,412	16	32
	2034	859,857,861	5,374	24	3,583	16	32
	2035	902,850,754	5,643	26	3,762	17	34
	2036	947,993,292	5,925	27	3,950	18	36

Assumptions:

- The carrier (Column B) is a transfer of the total annual pounds from the above Aggressive Forecast
- The Actual Tonnage/Cycle are based on the actual load factor from 2016 of 80 tons per cycle inclusive of all imports/deplaned and exports/enplaned (Column D – Number of flights/day required to support 80 tons per cycle).
- (Columns D and F) assumes 220 days of flight activity per year.
- The Flights (Column E) represent a load factor of 120 tons per cycle inclusive of all imports/deplaned and exports/enplaned (Column F – Number of flights/day required to support 120 tons per cycle).
- (Column G) Two operations per flight represent inbound and outbound activity.

Source: IMS Worldwide, 2017.

Table 2-18 LCK Low Cargo Forecast

Scenarios	Year	Carrier Total (Pounds)	UPS/FedEx/ Charters (Pounds)	Annual Total (Pounds)
Base Year	2016	75,137,385	127,022,134	202,159,519
Short-term Growth: Carrier 25% UPS/FedEx 5%	2017	93,921,731	133,373,241	227,294,972
	2018	117,402,164	140,041,903	257,444,067
	2019	146,752,705	147,043,998	293,796,703
	2020	183,440,881	154,396,198	337,837,079
	2021	229,301,102	162,116,008	391,417,109
Mid-term Growth: Carrier 5% UPS/FedEx 2%	2022	240,766,157	165,358,328	406,124,485
	2023	252,804,465	168,665,494	421,469,959
	2024	265,444,688	172,038,804	437,483,492
	2025	278,716,922	175,479,580	454,196,503
	2026	292,652,768	178,989,172	471,641,940
Long-term Growth: Carrier 5% UPS/FedEx 2%	2027	307,285,407	182,568,955	489,854,362
	2028	322,649,677	186,220,334	508,870,012
	2029	338,782,161	189,944,741	528,726,902
	2030	355,721,269	193,743,636	549,464,905
	2031	373,507,332	197,618,509	571,125,841
	2032	392,182,699	201,570,879	593,753,578
	2033	411,791,834	205,602,296	617,394,130
	2034	432,381,426	209,714,342	642,095,768
	2035	454,000,497	213,908,629	667,909,126
	2036	476,700,522	218,186,802	694,887,324

Forecast Assumptions:

- Assumes continued focus by CRAA to re-route cargo from the catchment zone to LCK.
- Based on one GFF/3PL re-routing their ORD/JFK cargo to LCK per year with 50% capture of imports/exports.
- Does not include ECCF, new e-commerce activity outside what is captured by the GFF/3PL community and routed as consolidations/de-consolidations with their other imports or exports which will be seen as steady increases but will not be visible as actual e-commerce trade activity.

Source: IMS Worldwide, 2017

Table 2-19 LCK Low Cargo Operations Forecast

Scenarios	A	B	C	D	E	F	G
	Year	Carrier Total (Pounds)	Annual Flights (80T/ Aircraft)	Daily Flights (80T/ Aircraft)	Annual Flights (120T/ Aircraft)	Daily Flights (120T/ Aircraft)	Operations per day
Base Year	2016	75,137,385	470	2	313	1	2
Short-term Growth: Carrier 25%	2017	93,921,731	587	3	391	2	4
	2018	117,402,164	734	3	489	2	4
	2019	146,752,705	917	4	611	3	6
	2020	183,440,881	1147	5	764	3	6
	2021	229,301,102	1433	7	955	4	8
Mid-term Growth: Carrier 5%	2022	240,766,157	1505	7	1003	5	10
	2023	252,804,465	1580	7	1053	5	10
	2024	265,444,688	1659	8	1106	5	10
	2025	278,716,922	1742	8	1161	5	10
	2026	292,652,768	1829	8	1219	6	12
Long-term Growth: Carrier 5%	2027	307,285,407	1921	9	1280	6	12
	2028	322,649,677	2017	9	1344	6	12
	2029	338,782,161	2117	10	1412	6	12
	2030	355,721,269	2223	10	1482	7	14
	2031	373,507,332	2334	11	1556	7	14
	2032	392,182,699	2451	11	1634	7	14
	2033	411,791,834	2574	12	1716	8	16
	2034	432,381,426	2702	12	1802	8	18
	2035	454,000,497	2838	13	1892	9	18
	2036	476,700,522	2979	14	1986	9	18

Assumptions:

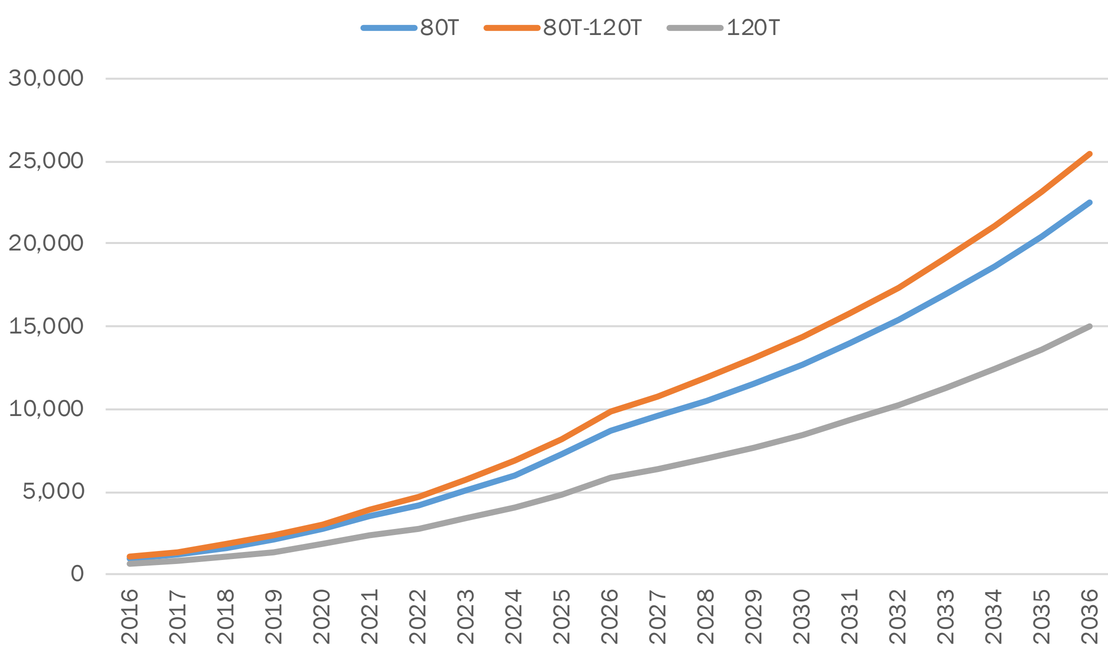
- The carrier (Column B) is a transfer of the total annual tons from the above Aggressive Forecast
- The Actual Tonnage/Cycle are based on the actual load factor from 2016 of 80 tons per cycle inclusive of all imports/deplaned and exports/enplaned (Column D – Number of flights/day required to support 80 tons per cycle).
- (Columns D and F) assumes 220 days of flight activity per year.
- The Flights (Column E) represent a load factor of 120 tons per cycle inclusive of all imports/deplaned and exports/enplaned (Column F – Number of flights/day required to support 120 tons per cycle).
- (Column G) Two operations per flight represent inbound and outbound activity.

Source: IMS Worldwide, 2017.

2.5.13 Forecast of Dedicated Air Cargo Fleet Mix

The air cargo recommendations include an aggressive forecast that would require the construction of additional processing facilities and apron to handle the added volume that is projected through 2036. The aggressive forecast considers the use of two different heavy aircraft and the required number of operations it would take to haul the projected annual tonnage. The 80-ton payload aircraft would be comparable to a Boeing 777 Freighter (777F) and the 120-ton payload aircraft would be comparable to a Boeing 747-8F. **Figure 2-13 International Cargo Operations Forecasts (2016-2036)** and **Table 2-20 Forecast of Dedicated Air Cargo Fleet Mix (2016-2036)** illustrate the actual scenario that is occurring at LCK where both types of aircraft are used to haul international cargo, as opposed to the previous analysis that illustrates how many operations would be needed if payload could be maximized. Because the actual scenario matches current practices and operations levels at LCK, it was carried forward as a potential scenario that is likely to occur in the near-future. However, it is preferential to maximize the payload of each aircraft in order to minimize costs and cycles, as is suggested by the 120-ton payload analysis.

Figure 2-13 International Cargo Operations Forecasts (2016-2036)



Source: Michael Baker International, Inc., 2017.

Table 2-20 Forecast of Dedicated Air Cargo Fleet Mix (2016-2036)

Year	FedEx / UPS		Unfavorable Range 80 Ton Payload		Current Range 80-120 Ton Payload		Favorable Range 120 Ton Payload		FedEx/UPS + Current Range	
	Landings	Total	Landings	Total	Landings	Total	Landings	Total	Landings	Total
2016	3,198	6,396	470	939	531	1,062	313	626	3,729	7,458
2017	3,358	6,716	610	1,221	690	1,381	407	814	4,048	8,096
2018	3,526	7,052	794	1,587	897	1,795	529	1,058	4,423	8,846
2019	3,702	7,404	1,032	2,063	1,167	2,333	688	1,376	4,869	9,737
2020	3,887	7,774	1,341	2,682	1,517	3,033	894	1,788	5,404	10,808
2021	4,082	8,163	1,744	3,487	1,972	3,943	1,162	2,325	6,053	12,106
2022	4,204	8,408	2,092	4,185	2,366	4,732	1,395	2,790	6,570	13,140
2023	4,330	8,660	2,511	5,022	2,839	5,678	1,674	3,348	7,169	14,338
2024	4,460	8,920	3,013	6,026	3,407	6,814	2,009	4,017	7,867	15,734
2025	4,594	9,188	3,616	7,231	4,088	8,176	2,410	4,821	8,682	17,364
2026	4,732	9,463	4,339	8,677	4,906	9,812	2,892	5,785	9,638	19,275
2027	4,874	9,747	4,773	9,545	5,396	10,793	3,182	6,363	10,270	20,540
2028	5,020	10,040	5,250	10,500	5,936	11,872	3,500	7,000	10,956	21,912
2029	5,170	10,341	5,775	11,550	6,530	13,059	3,850	7,700	11,700	23,400
2030	5,325	10,651	6,352	12,705	7,183	14,365	4,235	8,470	12,508	25,016
2031	5,485	10,971	6,988	13,975	7,901	15,802	4,658	9,317	13,386	26,772
2032	5,650	11,300	7,686	15,373	8,691	17,382	5,124	10,248	14,341	28,682
2033	5,819	11,639	8,455	16,910	9,560	19,120	5,637	11,273	15,379	30,759
2034	5,994	11,988	9,300	18,601	10,516	21,032	6,200	12,401	16,510	33,020
2035	6,174	12,347	10,230	20,461	11,568	23,136	6,820	13,641	17,742	35,483
2036	6,359	12,718	11,253	22,507	12,725	25,449	7,502	15,005	19,084	38,167
AAGR 2016-2036	3.50%	3.50%	17.21%	17.21%	17.21%	17.21%	17.21%	17.21%	8.51%	8.51%

Sources: IMS Worldwide Inc., and Michael Baker International, Inc., 2017.
Note: Some numbers may not add correctly due to rounding.
AAGR – Average Annual Growth Rate

2.6 Military Forecasts

Rickenbacker International Airport is home to the 121st Air Refueling Wing (ARW) of the Ohio Air National Guard (ANG). The 121st ARW currently has 12 primary KC-135 Stratotanker aerial refueling jets (KC-135s) and has the capacity to add 12 more if required for a future mission. There are currently 300 full-time ANG personnel based at LCK and approximately 1,800 Drill Status Guardsmen (DSG). The airport also has facilities for the Ohio Army National Guard (ARNG) and military reservist activities. The ARNG primarily flies UH-60 Blackhawk helicopters. The largest military aircraft that occasionally flies into LCK is the Boeing C-17 Globemaster II jet and the airport also serves as a site for military fighter jets such as the Lockheed Martin F-22 stealth jet when they need to temporarily relocate because of poor weather at their home base.

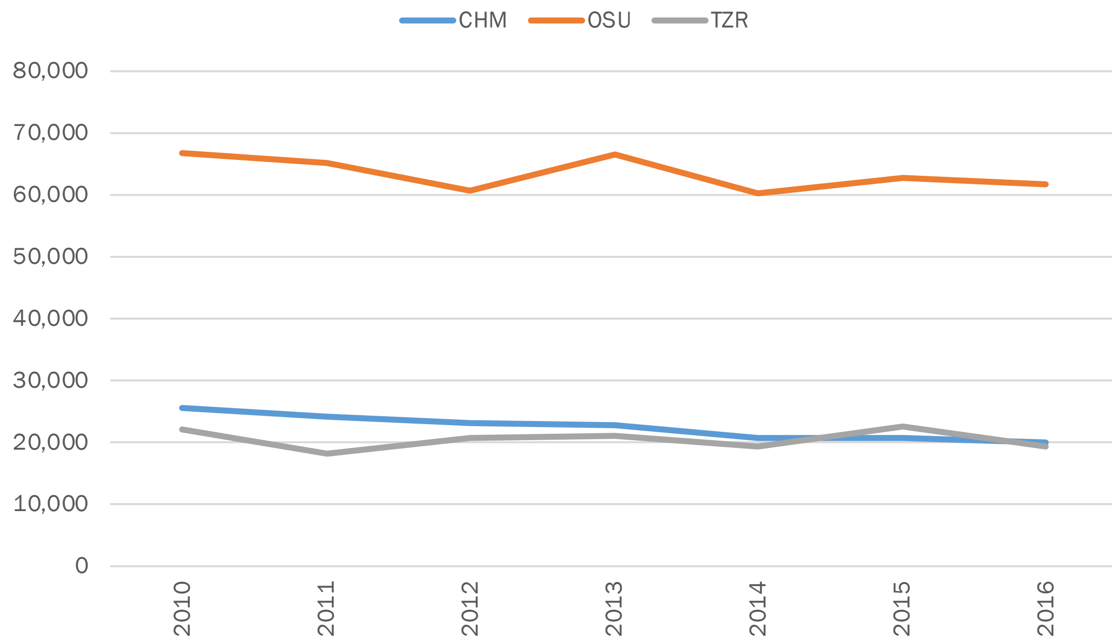
According to the FAA TAF Summary for Fiscal Years 2015-2040, "because military operations forecasts have national security implications, the Department of Defense (DOD) provides only limited information on future aviation activity. Hence, the TAF projects military activity at its present level except when FAA has specific knowledge of a change. For instance, DOD may announce a base closing or may shift an Air Force wing from one base to another." Therefore, the number of local and military operations were held at 2016 levels through 2036: 1,470 itinerant operations and 5,138 local operations.

2.7 General Aviation and Based Aircraft Forecasts

Many elements compose the broad definition of general aviation activity. In simplest terms, general aviation includes all segments of the aviation industry except those conducted by scheduled air carriers and the U.S. military. General aviation activities may include pilot training, sightseeing, aerial photography, law enforcement, and medical flights, as well as business, corporate, and personal travel. General aviation operations are divided into the categories of local or itinerant. Local operations are arrivals or departures performed by aircraft that remain within the airport traffic pattern, or those that occur within sight of the airport. Local operations are most often associated with training activity and flight instruction (e.g., touch-and-goes). Itinerant operations are arrivals or departures that do not remain within the airport traffic pattern and/or originate from another airport. The FAA defines an operation as either a single aircraft landing or takeoff. Under this definition, touch-and-goes are considered two operations (one takeoff plus one landing) and are deemed local operations. Itinerant operations are typically comprised of private, business/corporate, and air taxi flight activity, but may also include law enforcement and medical flights.

Activity records were analyzed for the three other airports in Franklin County with ATCTs to determine if any relevant trends could be identified for regional general aviation activity. The airports include CMH, Bolton Field Airport (TZR), and Ohio State University Airport (OSU). As shown in **Figure 2-14 General Aviation Activity Trends in Franklin County (2010-2016)**, all three airports have experienced an overall decline in general aviation activity since 2010, which is not uncommon for many airports due to the impacts associated with the most recent economic recession; however, there are known opportunities for growth in general aviation activity in Central Ohio and at LCK. For example, OSU (the university and airport) has a busy flight school that conducts operations at many airports in the region, as well as an aviation education program that was started in 1917. According to OSU, they received a $10 million donation in 2015 that was intended to grow the university's aviation program and was named a 'Top Hawk' flight school by Cessna in 2016 and was expected to receive delivery of several new Cessna aircraft over the next several years. At LCK, the new FBO facility may also encourage general aviation growth because of the availability of enhanced amenities, additional aircraft storage capacity, and separation from the commercial airline apron. While the growth potential for LCK and the region is hard to predict for general aviation activity, it should be accounted for so that the need for facilities and services can be planned for as part of this Study.

Figure 2-14 General Aviation Activity Trends in Franklin County (2010-2016)



Sources: FAA Air Traffic Activity Data System (ATADS) database and Michael Baker International, Inc., 2017.

Within the FAA's 2016 TAF for LCK, the FAA projects itinerant general aviation operations to grow at an AAGR of 1.01% between 2016 and 2036 and local general aviation operations to grow at a rate of 1.00%. It is noted that the FAA Aerospace Forecast for Fiscal Years 2016-2036 projects Itinerant General Aviation Operations at Airports with FAA and Contract Traffic Control Service to grow at an AAGR of 0.3% between 2015 and 2036 and Local General Aviation Operations to grow at an AAGR of 0.4% during the same time. As shown in **Table 2-21 Itinerant and Local General Aviation Operations Forecast (2016-2036)**, the stronger growth rates from the FAA's 2016 TAF were applied to forecast general aviation activity throughout the forecast period at LCK. Note that all itinerant activity not counted as airline, air cargo, or military was classified as itinerant general aviation activity. This was done to classify the activity in a way that separated it from the discussions about those different user groups at LCK that have very specific functions and utilize very specific facilities at the airport.

Table 2-21 Itinerant and Local General Aviation Operations Forecast (2016-2036)

Year	Itinerant		Local		Total GA
	Operations	% Total GA	Operations	% Total GA	
2016	7,979	73.86%	2,824	26.14%	10,803
2017	8,059	73.86%	2,852	26.14%	10,911
2018	8,141	73.86%	2,881	26.14%	11,021
2019	8,223	73.86%	2,910	26.14%	11,132
2020	8,306	73.87%	2,939	26.13%	11,244
2021	8,390	73.87%	2,968	26.13%	11,358
2022	8,474	73.87%	2,998	26.13%	11,472
2023	8,560	73.87%	3,028	26.13%	11,588
2024	8,647	73.87%	3,058	26.13%	11,704
2025	8,734	73.88%	3,089	26.12%	11,822
2026	8,822	73.88%	3,119	26.12%	11,941
2027	8,911	73.88%	3,151	26.12%	12,062
2028	9,001	73.88%	3,182	26.12%	12,183
2029	9,092	73.88%	3,214	26.12%	12,306
2030	9,184	73.88%	3,246	26.12%	12,430
2031	9,277	73.89%	3,279	26.11%	12,555
2032	9,370	73.89%	3,311	26.11%	12,682
2033	9,465	73.89%	3,344	26.11%	12,809
2034	9,561	73.89%	3,378	26.11%	12,938
2035	9,657	73.89%	3,412	26.11%	13,069
2036	9,755	73.90%	3,446	26.10%	13,200
AAGR 2016-2036	1.01%	0.00%	1.00%	-0.01%	1.01%

Source: Michael Baker International, Inc., 2017.
Note: Some numbers may not add correctly due to rounding.
AAGR – Average Annual Growth Rate

As shown in **Table 2-22 General Aviation Fleet Mix Forecast (2016-2036)**, the number of general aviation turboprops and jets that operated at LCK in 2016 was extracted from the FAA's Traffic Flow Management System Counts (TFMSC) database. Through discussions with ATCT personnel, the remaining operations were estimated to be conducted by single-engine pistons 60% of the time and by multi-engine pistons 40% of the time. The growth in the general aviation fleet mix was estimated using growth rate projections for turboprops and jets from the FAA Aerospace Forecast Fiscal Years 2016-2036 for General Aviation and Air Taxi Hours Flown.

Table 2-22 General Aviation Fleet Mix Forecast (2016-2036)

Year	Single-Engine	Multi-Engine	Turboprop	Jet	Total GA
2016	5,214	3,476	1,600	513	10,803
2017	5,254	3,503	1,626	529	10,911
2018	5,295	3,530	1,652	545	11,021
2019	5,335	3,557	1,678	562	11,132
2020	5,376	3,584	1,705	580	11,244
2021	5,417	3,611	1,732	598	11,358
2022	5,458	3,638	1,760	616	11,472
2023	5,499	3,666	1,788	635	11,588
2024	5,540	3,693	1,817	655	11,704
2025	5,581	3,721	1,846	675	11,822
2026	5,622	3,748	1,875	696	11,941
2027	5,663	3,776	1,905	718	12,062
2028	5,705	3,803	1,936	740	12,183
2029	5,746	3,831	1,967	763	12,306
2030	5,787	3,858	1,998	787	12,430
2031	5,828	3,886	2,030	811	12,555
2032	5,870	3,913	2,063	836	12,682
2033	5,911	3,941	2,096	862	12,809
2034	5,952	3,968	2,129	889	12,938
2035	5,994	3,996	2,163	916	13,069
2036	6,035	4,023	2,198	945	13,200
AAGR 2016-2036	0.73%	0.73%	1.60%	3.10%	1.01%

Source: Michael Baker International, Inc., 2017.
Note: Some numbers may not add correctly due to rounding.
AAGR – Average Annual Growth Rate

There are currently three based civilian airplanes at LCK that include a Shorts 330 turboprop and two private Cessna single-engine pistons. When the FBO moves to the larger facility to the north of the passenger terminal building, general aviation aircraft owners may have a growing interest to base their plane in the large bulk hangar at LCK. For planning purposes, it was assumed that LCK would be able to attract 10% of the existing based aircraft fleets from the three other public use airports in Franklin County by 2036 (CMH, TZR, and OSU), resulting in the addition of 21 single-engine pistons, four multi-engine pistons, and six jets. Overall, the forecast increases the number of based aircraft by 30 at LCK from three in 2016 to 33 by 2036 (refer to **Table 2-23 General Aviation Based Aircraft Forecast (2016-2036)**).

Table 2-23 General Aviation Based Aircraft Forecast (2016-2036)

Year	Single-Engine	Multi-Engine	Turboprop	Jet	Total GA
2016	2	0	1	0	3
2017	3	1	1	1	6
2018	4	1	1	1	7
2019	5	1	1	2	9
2020	6	1	1	2	10
2021	7	2	1	2	12
2022	8	2	1	2	13
2023	9	2	1	3	15
2024	10	2	1	3	16
2025	11	2	1	3	17
2026	12	2	1	3	19
2027	13	3	1	4	20
2028	14	3	1	4	22
2029	15	3	1	4	23
2030	16	3	1	4	24
2031	17	3	1	5	26
2032	18	3	1	5	27
2033	19	4	1	5	29
2034	20	4	1	5	30
2035	21	4	1	6	32
2036	22	4	1	6	33
AAGR 2016-2036	12.74%	N/A	0.00%	N/A	12.74%

Source: Michael Baker International, Inc., 2017.
Note: Some numbers may not add correctly due to rounding.
AAGR – Average Annual Growth Rate

2.8 Instrument Operations Forecast

According to the FAA report, Forecasting Aviation Activity by Airport, instrument operations consist of "arrivals, departures, and overflights conducted by an FAA approach control facility for aircraft with an Instrument Flight Rule (IFR) flight plan or special Visual Flight Rule (VFR) procedures." At LCK, IFR activity is tracked by the ATCT and consisted of 13,360 operations or 50.79% of total activity. During the forecast period, it is anticipated that the percentage of IFR activity will increase in accordance with the growth in airline and cargo operations. General aviation IFR activity was estimated to grow at an AAGR of 0.70% between 2016 and 2036, which is the FAA's projected AAGR for general aviation IFR traffic from the FAA Aerospace Forecast Fiscal Years 2016-2036. The resulting forecast is presented in **Table 2-24 Instrument Operations Forecast (2016-2036)** and illustrates IFR activity increasing from 50.79% of total activity in 2016 to 75.73% by 2036.

Table 2-24 Instrument Operations Forecast (2016-2036)

Year	Total Operations	Instrument (IFR)		Visual (VFR)	
		Operations	% Total	Operations	% Total
2016	26,307	13,360	50.79%	12,947	49.21%
2017	27,639	14,615	52.88%	13,024	47.12%
2018	28,538	15,435	54.09%	13,103	45.91%
2019	29,562	16,380	55.41%	13,182	44.59%
2020	30,766	17,504	56.89%	13,262	43.11%
2021	32,201	18,858	58.56%	13,343	41.44%
2022	33,372	19,946	59.77%	13,425	40.23%
2023	34,709	21,200	61.08%	13,508	38.92%
2024	36,244	22,652	62.50%	13,592	37.50%
2025	38,016	24,339	64.02%	13,677	35.98%
2026	40,070	26,307	65.65%	13,763	34.35%
2027	41,479	27,629	66.61%	13,850	33.39%
2028	42,997	29,059	67.58%	13,938	32.42%
2029	44,632	30,606	68.57%	14,026	31.43%
2030	46,397	32,281	69.58%	14,116	30.42%
2031	48,304	34,097	70.59%	14,207	29.41%
2032	50,365	36,066	71.61%	14,299	28.39%
2033	52,595	38,204	72.64%	14,391	27.36%
2034	55,011	40,526	73.67%	14,485	26.33%
2035	57,631	43,051	74.70%	14,580	25.30%
2036	60,473	45,797	75.73%	14,676	24.27%
AAGR 2016-2036	4.25%	6.35%	2.02%	0.63%	-3.47%

Source: Michael Baker International, Inc., 2017.
Note: Some numbers may not add correctly due to rounding.
AAGR – Average Annual Growth Rate

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2.9 Peaking Forecasts

This section identifies the peaking forecasts for operational activity to determine whether there will be any needed airfield capacity-enhancing improvements during the planning period at LCK. Peaking forecasts were also identified for commercial airline passengers and operations to evaluate whether the commercial terminal building and associated infrastructure will require improvements. The operational peaking forecasts were conducted using the procedures outlined below and are summarized in **Table 2-25 Peaking Forecast 1 (2016-2036)**.

- **Average Peak Month (APM) –** Through a review of historical ATCT records, it was found that the APM represented 9.73% of annual activity in 2016 (the peak month in 2016 occurred in June).
- **Average Day Peak Month (ADPM) –** An average month contains 30.42 days (365 ÷ 12). The ADMP was calculated by dividing the APM by 30.42. Because facilities are typically designed for average peaking scenarios as opposed to occasional maximum peaks, this ADPM calculation was employed.
- **Average day Peak Hour (ADPH)** – The ADPH can include a combination of touch-and-go training operations and itinerant activity and was estimated at 17.50% of the ADPM. The IFR and VFR peak hours were calculated based on the percentages shown in Table 2-24.

The commercial passenger and operations peaking forecasts were conducted using the procedures outlined below and are summarized in **Table 2-26 Peaking Forecast 2 (2016-2036)**.

- **APM Passengers and Operations –** Through a review of historical CRAA records, it was found that the APM for passengers equaled 13.18% of annual activity in 2016 (the peak month in 2016 occurred in July), which was also similar to the percentage of airline operations in July 2016 to total airline operations.
- **ADPM Passengers and Operations –** An average month contains 30.42 days (365 ÷ 12). The ADMP was calculated by dividing the APM by 30.42. Because facilities are typically designed for average peaking scenarios as opposed to occasional maximum peaks, this ADPM calculation was employed.
- **Average Peak Hour (APH)** – Airline passenger and operations peaks at LCK can be challenging due to the limitations of the terminal facility, staffing demands, and desired turnaround times by Allegiant. Full-time and contract CRAA staff must handle the operations of the terminal building at LCK (ticketing, baggage, fueling, etc.) as well as the other operations of the airport (cargo, general aviation, and other). To best accommodate Allegiant's operations, the historical practice was to have a day shift and a night shift whereby approximately half of the airline operations are accommodated during each shift. The shifts can run for several hours to handle the pre- and post-flight activities, but actual flight activities can be confined to a single hour. Therefore, as shown in **Table 2-26 Peaking Forecast 2 (2016-2036)**, the two-shift approach assumes that the peak hour for airline passengers and operations

accounts for 50% of the ADPM. Because that practice had to be modified to at least a three-shift approach to meet peak hour passenger and operations demands during the planning period, the three-shift approach assigns 33.33% of the ADPM.

Table 2-25 Peaking Forecast 1 (2016-2036)

Year	APM	ADPM	ADPH	IT Peak Hour	Local Peak Hour
2016	2,560	84	15	7	7
2017	2,689	88	15	8	7
2018	2,777	91	16	9	7
2019	2,876	95	17	9	7
2020	2,994	98	17	10	7
2021	3,133	103	18	11	7
2022	3,247	107	19	11	8
2023	3,377	111	19	12	8
2024	3,527	116	20	13	8
2025	3,699	122	21	14	8
2026	3,899	128	22	15	8
2027	4,036	133	23	15	8
2028	4,184	138	24	16	8
2029	4,343	143	25	17	8
2030	4,514	148	26	18	8
2031	4,700	155	27	19	8
2032	4,900	161	28	20	8
2033	5,118	168	29	21	8
2034	5,353	176	31	23	8
2035	5,607	184	32	24	8
2036	5,884	193	34	26	8
AAGR 2016-2036	4.25%	4.25%	4.25%	6.35%	0.63%

Source: Michael Baker International, Inc., 2017.
Note: Some numbers may not add correctly due to rounding.
AAGR – Average Annual Growth Rate

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Table 2-26 Peaking Forecast 2 (2016-2036)

Year	APM		ADPM		APH (2-Shift)		APH (3-Shift)	
	Passengers	Operations	Passengers	Operations	Passengers	Operations	Passengers	Operations
2016	26,791	190	881	6	440	3	294	2
2017	38,083	267	1,252	9	626	4	417	3
2018	38,490	272	1,265	9	633	4	422	3
2019	38,902	275	1,279	9	639	5	426	3
2020	39,318	278	1,293	9	646	5	431	3
2021	39,739	281	1,306	9	653	5	435	3
2022	40,164	284	1,320	9	660	5	440	3
2023	40,594	287	1,334	9	667	5	445	3
2024	41,028	290	1,349	10	674	5	450	3
2025	41,467	293	1,363	10	682	5	454	3
2026	41,911	296	1,378	10	689	5	459	3
2027	42,360	299	1,392	10	696	5	464	3
2028	42,813	302	1,407	10	704	5	469	3
2029	43,271	306	1,422	10	711	5	474	3
2030	43,734	309	1,438	10	719	5	479	3
2031	44,202	312	1,453	10	727	5	484	3
2032	44,675	315	1,469	10	734	5	490	3
2033	45,153	319	1,484	10	742	5	495	3
2034	45,636	322	1,500	11	750	5	500	4
2035	46,124	326	1,516	11	758	5	505	4
2036	46,618	329	1,532	11	766	5	511	4
AAGR 2016-2036	2.81%	2.80%	2.81%	2.80%	2.81%	2.80%	2.81%	2.80%

Source: Michael Baker International, Inc., 2017.
Note: Some numbers may not add correctly due to rounding.
AAGR – Average Annual Growth Rate

2.10 Forecast Summary

According to the FAA's June 2008 Review and Approval of Aviation Forecasts guidance, total enplanements and operations forecasts are considered consistent with the TAF if they differ by less than 10% in the five, 10, and 15-year forecast period. As shown in Table 2-27 Forecast Summary (2016-2036), the forecasts developed for this Study exceed the adjusted TAF thresholds for enplanements, operations, and based aircraft. However, the TAF does not account for the strong short-term passenger and operations growth that is expected and planned for by Allegiant. The forecasts also do not account for the extremely strong long-term growth that is projected for air cargo operations and processing activities at LCK during the planning period. As an example, passenger enplanements are projected to increase by 42,842 in 2017 over 2016 with Allegiant's new route and increased frequency on existing routes, which is not accounted for in the TAF. These forecasts are for planning purposes only and are not considered the justification for facility development nor funding. They will allow CRAA to evaluate and depict development options at LCK in order to help the airport meet the existing and long-term demands of all user groups (airline, cargo, general aviation, and military).

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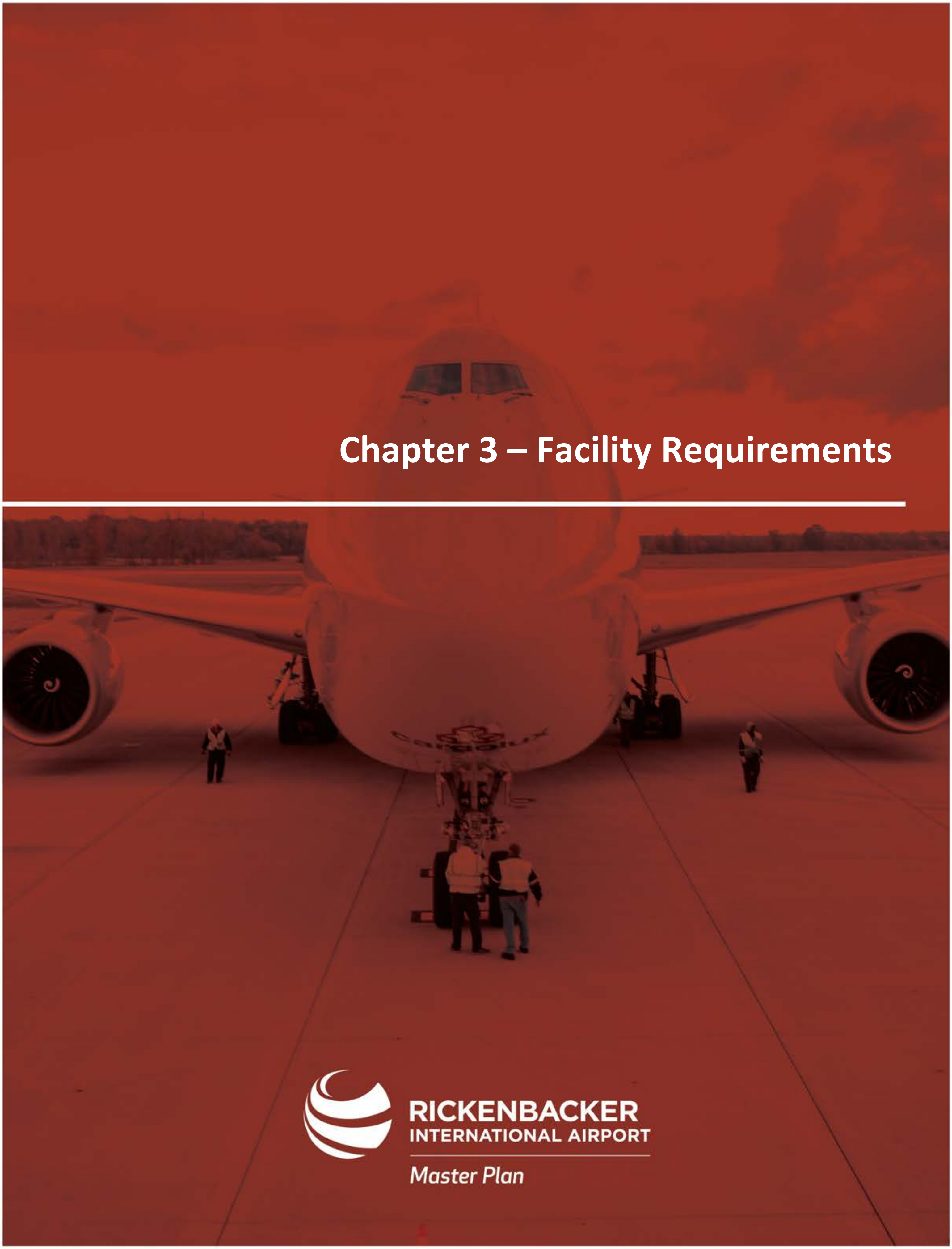
Table 2-27 Forecast Summary (2016-2036)

Year	Passenger Enplanements			Aircraft Operations							Based Aircraft		
	Total	TAF (Corrected)	% Difference	Airline	Cargo	General Aviation	Military	Total	TAF (Corrected)	% Difference	Total	TAF (Corrected)	% Difference
2016	103,289	103,289	0.00%	1,438	7,458	10,803	6,608	26,307	26,307	0.00%	3	3	0.00%
2017	146,131	104,320	40.08%	2,023	8,096	10,911	6,608	27,639	26,556	4.08%	6	3	100.00%
2018	147,695	105,362	40.18%	2,062	8,846	11,021	6,608	28,538	26,807	6.45%	7	3	147.37%
2019	149,275	106,413	40.28%	2,084	9,737	11,132	6,608	29,562	27,061	9.24%	9	3	194.74%
2020	150,872	107,476	40.38%	2,106	10,808	11,244	6,608	30,766	27,318	12.62%	10	3	242.11%
2021	152,486	108,549	40.48%	2,129	12,106	11,358	6,608	32,201	27,576	16.77%	12	3	289.47%
2022	154,118	109,632	40.58%	2,152	13,140	11,472	6,608	33,372	27,838	19.88%	13	3	336.84%
2023	155,767	110,727	40.68%	2,175	14,338	11,588	6,608	34,709	28,101	23.51%	15	3	384.21%
2024	157,434	111,832	40.78%	2,198	15,734	11,704	6,608	36,244	28,368	27.77%	16	3	431.58%
2025	159,118	112,948	40.88%	2,221	17,364	11,822	6,608	38,016	28,636	32.75%	17	3	478.95%
2026	160,821	114,076	40.98%	2,245	19,275	11,941	6,608	40,070	28,908	38.61%	19	3	526.32%
2027	162,542	115,215	41.08%	2,269	20,540	12,062	6,608	41,479	29,181	42.14%	20	3	573.68%
2028	164,281	116,365	41.18%	2,294	21,912	12,183	6,608	42,997	29,458	45.96%	22	3	621.05%
2029	166,039	117,527	41.28%	2,318	23,400	12,306	6,608	44,632	29,737	50.09%	23	3	668.42%
2030	167,815	118,700	41.38%	2,343	25,016	12,430	6,608	46,397	30,019	54.56%	24	3	715.79%
2031	169,611	119,885	41.48%	2,368	26,772	12,555	6,608	48,304	30,303	59.40%	26	3	763.16%
2032	171,426	121,081	41.58%	2,393	28,682	12,682	6,608	50,365	30,590	64.64%	27	3	810.53%
2033	173,260	122,290	41.68%	2,419	30,759	12,809	6,608	52,595	30,880	70.32%	29	3	857.89%
2034	175,114	123,511	41.78%	2,445	33,020	12,938	6,608	55,011	31,172	76.47%	30	3	905.26%
2035	176,988	124,744	41.88%	2,471	35,483	13,069	6,608	57,631	31,468	83.14%	32	3	952.63%
2036	178,881	125,989	41.98%	2,497	38,167	13,200	6,608	60,473	31,766	90.37%	33	3	1000.00%
AAGR 2016-2036	2.78%	1.00%		2.80%	8.51%	1.01%	0.00%	4.25%			12.74%	0.00%	

Source: Michael Baker International, Inc., 2017.
Note: Some numbers may not add correctly due to rounding.
AAGR – Average Annual Growth Rate

Chapter 3 – Facility Requirements



RICKENBACKER
INTERNATIONAL AIRPORT

Master Plan

3.0 Facility Requirements

The facility requirements chapter includes an assessment of the aviation and non-aviation components of Rickenbacker International Airport (LCK) including the runway and taxiway system, navigational aids and approaches, passenger terminal facilities, aircraft storage facilities, supporting infrastructure (e.g. roadways and parking), and undeveloped properties.

This chapter represents a comprehensive evaluation of the airport's needs over the course of the 20-year planning period extending from 2016 to 2036. An analysis of the following airport components is presented within this chapter:

- Identification of Critical Aircraft
- Runway Use and Wind Coverage Analysis
- Airfield Capacity
- Airfield Design Standards Analysis
- Runway Length Analysis
- Runway Strength Analysis
- Airfield Lighting, Marking, Signage, and Navigational Aids
- Terminal Access
- Passenger Terminal Building
- Cargo Facilities
- General Aviation Facilities
- Support Facilities
- Land Area Requirements

3.1 Planning Horizon

The time frame for addressing development needs includes short-term (0-5 years), medium-term (6-10 years), and long-term (11-20 years) planning periods. The short-term analysis focuses on the immediate action items; the medium term focuses on the more detailed analysis. The long term primarily focuses on the ultimate role of the airport in the local area and in the aviation system.

As presented in the Forecast Chapter, actual activity at the airport may vary over time and may be higher or lower than the forecasted demand. Using the time frames as milestones (**Table 3-1 Planning Horizon Activity Levels**) provides the Columbus Regional Airport Authority (CRAA) the flexibility to make decisions and develop facilities according to the need generated by actual demand levels.

Table 3-1 Planning Horizon Activity Levels

Item	Base Year 2016	2021	2026	2036
Enplaned Passengers	103,289	152,486	160,821	178,881
Air Cargo (lbs.)	202,159,519	441,095,859	882,128,027	2,053,124,500
Total Based Aircraft	3	12	19	33
Annual Operations (Combined Local & Itinerant)				
Commercial Service	1,438	2,129	2,245	2,497
Air Cargo	7,458	12,106	19,275	38,167
General Aviation	10,803	11,358	11,941	13,200
Military	6,608	6,608	6,608	6,608
Total Operations	26,307	32,201	40,070	60,473

Source: Michael Baker International, Inc., 2016

3.2 Airfield Capacity

This section evaluates whether LCK's existing airfield configuration is capable of accommodating forecasted levels of demand over the planning period. According to the FAA, airfield capacity is defined by the number of aircraft operations conducted at the airfield over a defined period of time at an acceptable level of delay. An acceptable level of delay is essentially a policy decision about the tolerability of delay being longer than some specified amount, taking into account the technical feasibility and economic practicality of available remedies.[1] Estimates of airfield capacity were developed in accordance with the methods presented in FAA AC 150/5060-5, Airport Capacity and Delay. This methodology, generally known as the "handbook methodology" does not account for every possible situation at an airport, but rather the most common situations observed at U.S. airports at the time the advisory circular was adopted. FAA AC 150/5060-5 provides a methodology for determining the hourly capacity, Annual Service Volume (ASV), and aircraft delay. According to FAA Order 5090.3C Field Formulation of the National Plan of Integrated Airport Systems (NPIAS), the handbook methodology should be used where capacity is not a constraining factor. The hourly capacity and ASV was calculated for existing conditions and for the last year of the planning period at LCK. The results are used for planning purposes to determine if airfield improvements are needed.

- **Hourly Airfield Capacity** – An airport's hourly airfield capacity represents the maximum number of aircraft that can be accommodated under conditions of continuous demand during a one-hour period. Using peak hour forecasts, the hourly airfield capacity is determined for both Visual Flight Rules (VFR) and Instrument Flight Rules (IFR) activity.
- **Annual Service Volume (ASV)** – The ASV estimates the annual number of operations that the airfield configuration should be capable of handling with minimal delays. Consistent with FAA Order 5090.3C Field Formulation of the National Plan of Integrated

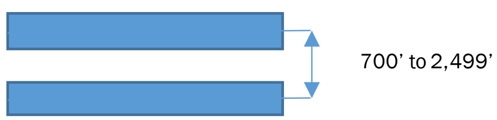
[1] Airfield and Airspace Capacity/Delay Policy Analysis, FAA-APO-81-14 (Washington, DC: Federal Aviation Administration, Office of Aviation Policy and Plans, December 1981).

Airport Systems (NPIAS), delay may be considered minimal when the average delay per operation is four minutes or less. The ASV accounts for peaking characteristics in its calculation of 12-month demand as well as periods of low-volume activity.

- **Delay** – The average anticipated delay is based on a ratio of forecast demand to the calculated ASV. According to the FAA AC 150/5060-5, "as demand approaches capacity, individual aircraft delay is increased. Successive hourly demands exceeding the hourly capacity result in unacceptable delays."

Airfield capacity is estimated based on the Mix Index and the runway configuration. The Mix Index is a mathematical expression that estimates the relative percentage of large aircraft (12,500 to 300,000 pounds) and heavy aircraft (greater than 300,000 pounds). As the weight category of the aircraft increases, particularly as the mix between large and heavy aircraft increases, the wake turbulence separation standards increase. As a consequence, the capacity of the airfield decreases. The Mix Index was estimated to be 88.24%. **Table 3-2 Mix Index vs. Airport Capacity** shows the hourly capacity and the annual service volume for a parallel runway configuration (two runways). The row highlighted in blue shows the hourly capacity and annual service volume associated with the estimated mix index.

Table 3-2 Mix Index vs. Airport Capacity

Runway Configuration	Mix Index	Hourly Capacity Operations/Hour		Annual Service Volume
		VFR	IFR	
	0 to 20	197	59	355,000
	21 to 50	145	57	275,000
	51 to 80	121	56	260,000
	81 to 120	105	59	285,000
	121 to 180	94	60	340,000

Source: Adapted from AC 150/5060-5, Change 2

According to the methodology presented in the AC 150/5060-5, the current runway configuration at LCK has an ASV of 285,000 operations, a VFR hourly capacity of 105 operations, and an IFR hourly capacity of 59 operations. **Table 3-3 LCK Airfield Capacity Calculations** presents the results of the airfield capacity calculations for LCK over the 20-year planning period. By 2036, the number of annual operations is expected to reach 21.22% of ASV, VFR peak hour operations may reach 24.76% of capacity, and IFR peak hour operations may reach 13.56% of capacity. As a result, the current runway configuration meets the capacity needs over the 20-year planning period.

Table 3-3 LCK Airfield Capacity Calculations

Year	Annual		Hourly			
	Operations	% of ASV	VFR Peak Hour	% VFR Capacity	IFR Peak Hour	% IFR Capacity
2016	26,307	9.23%	7	6.67%	7	11.86%
2036	60,473	21.22%	26	24.76%	8	13.56%

Source: Michael Baker International, Inc., 2017

3.3 Identification of Critical Aircraft

According to FAA AC 150/5070-6B, Airport Master Plans, the Critical (Design) Aircraft is defined as "the most demanding aircraft with at least 500 annual operations that operates, or is expected to operate, at the airport." A new FAA advisory circular currently in draft form, FAA AC 150/5000-17, Critical Aircraft and Regular Use Determination, defines the critical aircraft as the most demanding aircraft type, or grouping of aircraft with similar characteristics regularly using the airport. Regular use is defined as 500 annual operations, either a takeoff or landing excluding touch-and-go. The critical aircraft is identified based on documented aeronautical activity, typically for the most recent 12-month period that is available.

The current and conditionally approved Airport Layout Plan (ALP), dated August 4, 2010, identifies the existing and ultimate critical aircraft for LCK as the Boeing 747-400 Freighter jet. This aircraft is classified as Airplane Design Group (ADG) V, Aircraft Approach Category (AAC) D, and Taxiway Design Group (TDG) 5. The air cargo operators are beginning to retire the Boeing 747-400 Freighter and are replacing it with the Boeing 747-8F. In 2016, there were less than one hundred Boeing 747-400 Freighter operations and more than 500 Boeing 747-8F operations at LCK. **Table 3-4 Aircraft with More Than 500 Annual Operations** shows aircraft types with more than 500 total operations in the calendar year 2016. From an airfield design perspective, the most demanding aircraft shown in the table is the Boeing 747-8F. Compared to the other aircraft listed, this aircraft is the most demanding in terms of approach speed, tail height and wingspan characteristics. According to the forecast, the 747-8F will remain the most demanding aircraft and total annual operations are expected to remain at or above the current level. Other aircraft such as the Boeing 737, 757, 767, and 777, as well as different versions of the Airbus 320 are also expected to continue operating at LCK over the 20-year planning period. However, from an FAA standards perspective, these aircraft fall in the same aircraft grouping as the Boeing 747-8F or are less demanding. Therefore, the Boeing 747-8F was defined as the critical aircraft for the 20-year planning period.

Table 3-4 Aircraft with More Than 500 Annual Operations

Aircraft	Departures	Arrivals	Total Operations
Airbus A300-B4-600	912	921	1,833
Cessna 208 Caravan	832	827	1,659
Boeing KC-135 Stratotanker	485	475	960
Airbus A320	411	411	822
Boeing 747-8F	353	353	706
Boeing 757-200	316	317	633
McDonnell Douglas 83/88	262	262	524

Source: FAA Traffic Flow Management System Counts (TFMSC) calendar year 2016

FAA airfield design standards (e.g., required separations and safety area dimensions) are determined based on the approach speed and wingspan of the identified critical aircraft. Each runway is assigned a Runway Design Code (RDC) that is a function of the critical aircraft's Aircraft Approach Category (AAC), the Airplane Design Group (ADG), and the visibility minimums expressed in Runway Visibility Range (RVR). The RDC provides the information required to determine the applicable standards. The Aircraft Approach Category (AAC) is based on the reference landing speed (V_{REF}) when specified, or in cases where a V_{REF} is not specified, the AAC is determined based on 1.3 times the stall speed (V_{SO}) at the maximum certificated landing weight. The Airplane Design Group (ADG) is a design parameter based on the wingspan and tail height of the aircraft. **Table 3-5 Aircraft Approach Categories and Airplane Design Groups** summarizes the parameters that define the AAC and the ADG, and highlights (in blue) the AAC and ADG corresponding to the Boeing 747-8F.

Table 3-6 Visibility Minimums describes the RVR visibility minimums and the associated instrument visibility category. The details of the available instrument procedures were provided in the inventory chapter, and it was determined that Runway 5R has the lowest visibility minimums (RVR 1,200), and Runway 23R has the highest visibility minimums of ¾ mile (Equivalent value of RVR 4,000). Both Runways 5L and 23L have a visibility minimum of RVR 2,400. **Table 3-7 Characteristics of the Critical Aircraft** summarizes the characteristics of the critical aircraft.

Table 3-5 Aircraft Approach Categories and Airplane Design Groups

Aircraft Approach Category (AAC)		Airplane Design Group (ADG)		
Category	Approach Speed (Knots)	Group	Tail Height (Feet)	Wingspan (Feet)
A	<91	I	<20	<49
B	91 to <121	II	20 to <30	49 to <79
C	121 to <141	III	30 to <45	79 to <118
D	141 to <166	IV	45 to <60	118 to <171
E	>166	V	60 to <66	171 to <214
		VI	66 to <80	214 to <262

Source: FAA AC 150/5300-13A, Airport Design Change 1
Note: The shaded areas represent the approach category and design group associated with the critical aircraft (Boeing 747-8F).

Table 3-6 Visibility Minimums

RVR (feet)[1]	Instrument Flight Visibility Category (Statute Mile)
5,000	Not lower than 1 mile
4,000	Lower than 1 mile but not lower than ¾ mile
2,400	Lower than ¾ mile but not lower than ½ mile
1,600	Lower than ½ mile but not lower than ¼ mile
1,200	Lower than ¼ mile

Source: FAA AC 150/5300-13A, Airport Design Change 1
Note: The shaded areas represent the visibility minimums associated with existing instrument approaches at LCK.

Table 3-7 Characteristics of the Critical Aircraft

Characteristics	
Critical Aircraft	Boeing 747-8F
Aircraft Type	Four Engine Wide Body
Aircraft Approach Category (AAC)	D
Airplane Design Group (ADG)	VI
Taxiway Design Group (TDG)	5
Wingspan	224.4 feet
Tail Height	62.7 feet
Length	250.2 feet
Cockpit to Main Gear (CMG) Distance	99.8 feet
Wheelbase	97.3 feet
Main Gear Width (MGW) Outer to Outer	41.8 feet
Approach Speed (V_{REF})	159 knots
Maximum Takeoff Weight (MTOW)	987,000 pounds
Maximum Landing Weight (MLW)	763,000 pounds

Photo of 747-8F at Rickenbacker

Sources: FAA AC 150/5300-13A, Airport Design Change 1, Boeing Aircraft Performance Manual, and Michael Baker International, Inc., 2017. Photo: CRAA

3.4 Airfield Design Standards Analysis

Table 3-8 Airfield Design Parameters summarizes the airfield design parameters that define the applicable standards for the Boeing 747-8F (the critical aircraft). At LCK, both runways and the associated taxiways are currently utilized by the critical aircraft. The existing runway and taxiway configuration was analyzed for compliance with FAA design standards described in AC 150/5300-13A, Change 1, Airport Design. These standards include design, protection, and separation standards that must be followed in order to provide for a safe, effective, efficient, and economical airfield system.

Table 3-8 Airfield Design Parameters

Item	Runway 5L-23R		Runway 5R-23L	
	5L	23R	5R	23L
Critical Aircraft	Boeing 747-8F		Boeing 747-8F	
Aircraft Approach Category (AAC)	D	D	D	D
Airplane Design Group (ADG)	VI	VI	VI	VI
Visibility Minimums (RVR feet)	2,400	4,000	1,200	2,400
Runway Design Code (RDC)	D-VI-2400	D-VI-4000	D-VI-1200	D-VI-2400

Source: Michael Baker International, Inc., 2017

3.5 Runway Configuration Requirements

Table 3-9 Runway Design Standards Analysis summarizes the runway configuration requirements. According to the analysis, the current length of the runways is capable of accommodating operations of the critical aircraft. The orientation of the runways meets the required 95% crosswind coverage for aircraft with 13, 16, and 20 knots maximum allowable crosswind component in all weather, VFR, and IFR operating conditions. The current runway configuration provides approximately 94% of wind coverage for aircraft with a maximum allowable crosswind component of 10.5 knots. However, the forecasted number of operations of aircraft with a maximum allowable crosswind component of 10.5 knots is not significant over the 20-year planning period. Therefore, the current runway orientation is adequate, and additional crosswind runways are not required.

The current configuration of runway shoulders and blast pads do not meet the required dimensional standards. An approved Modification of Standards (MOS) is in place allowing 747-8F operations with the current runway configuration. However, to meet the runway design requirements of the RDC as shown in **Table 3-8 Airfield Design Parameters**, 40 feet of paved shoulders must be added to Runway 5R-23L, and the blast pads located at each end of the runway must be enlarged to a width of 280 feet and a length of 400 feet. In order to accommodate operations of the critical aircraft, the width of Runway 5L-23R must be increased from 150 feet to 200 feet, the corresponding 40-foot paved shoulders must be added, and the blast pads located at each end of the runway must be enlarged to a width of 280 feet and a length of 400 feet.

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Table 3-9 Runway Design Standards Analysis

Design Standard	FAA Required Dimension	Existing Condition/Action Required	
		Runway 5L-23R	Runway 5R-23L
Runway Length	See Section 3.6	☑ 11,902 feet	☑ 12,102 feet
Runway Width	200 feet	Additional 50 feet required	☑
Runway Shoulder Width	40 feet	40-foot shoulders must be added	40-foot shoulders must be added
Runway Blast Pad Width	280 feet	Increase the dimensions of the blast pads to the required dimensions	
Blast Pad Length	400 feet		
Crosswind Component	20 knots	☑ 95% wind coverage	☑ 95% wind coverage

Source: FAA AC 150/5300-13A, Airport Design, Change 1. Michael Baker International, Inc., 2017.

3.6 Runway Length Requirements

Runway length requirements were evaluated in accordance with FAA AC 150/5325-4B, Runway Length Requirements for Airport Design, which provides methodologies for determining runway length requirements by aircraft type. In accordance with Chapter 4 of AC 150/5325-4B, runway length requirements were estimated using the aircraft manufacturer’s airport planning manuals.

The required runway length was estimated using the Boeing 747-8F Airplane Characteristics for Airport Planning manual (published December 2012). The data provided in this document provided runway length requirements for typical engines and operating conditions. The runway length calculations are based on the mean daily maximum temperature of the hottest month, which is 86.8 degrees Fahrenheit, and the field elevation of 744 feet.

Based on the average meteorological conditions, the required takeoff runway length is approximately 11,200 feet. With 25° flaps, the required landing distance is approximately 8,900 feet, and with 30° flaps the landing distance is approximately 8,600 feet. **Table 3-10 Runway Length Analysis** summarizes the runway length analysis. The runway lengths shown are based on maximum design takeoff weights and maximum average ambient temperatures. These extreme operating conditions are generally not expected to occur at LCK. Therefore, the current length of the runway meets the requirements of the critical aircraft.

Other aircraft such as the Boeing 757-200, Boeing 767-300, and Airbus A300-B4-600 currently operate at LCK and are expected to continue operating within the short-term planning period. However, these aircraft generally operate on a short-haul distance and are not considered a demanding aircraft in terms of runway length requirements. In the mid- to long-term planning horizon, the Boeing 777, particularly the future freighter version of the

Boeing 777X family is expected to operate at LCK. Performance data for the Boeing 777X aircraft family is not available yet. However, it is expected that the runway length requirements of the Boeing 777X will be equal to or less than the Boeing 777F which currently operates at LCK.

The Airbus 320 aircraft family is currently operating at LCK in support of commercial passenger operations. In the mid- to long-term planning periods, airlines are expected to operate A320neo (new engine option) or the Boeing 737Max. These aircraft are expected to have higher performance than the Airbus 320 aircraft family, and therefore the current runway length would be sufficient.

Table 3-10 Runway Length Analysis

Aircraft	Maximum Takeoff/Landing Weight (lbs)	Operation Type	Conditions	Required Runway Length (feet)	
				5L-23R	5R-23L
Boeing B747-8F	987,000	Takeoff	Standard Day	10,700	
			Standard Day + 27 °F	11,200	
	763,000	Landing	Standard Day, Flaps 25, Wet Runway	8,900	
			Standard Day, Flaps 30, Wet Runway	8,600	
Boeing B777F	766,800	Takeoff	Standard Day	11,100	
			Standard Day + 27 °F	11,700	
	575,000	Landing	Standard Day, Flaps 25, Wet Runway	7,200	
			Standard Day, Flaps 30, Wet Runway	6,700	
Airbus A320	171,961	Takeoff	Standard Day	7,200	
			Standard Day + 59 °F	8,000	
	142,198	Landing	Standard Day	8,200	

Source: Boeing and Airbus Airport Planning Manuals. Michael Baker International, Inc., 2017.
Notes: Includes adjustment for runway grade.

3.7 Runway Strength Requirements

One of the most important features of airfield pavement is its ability to withstand repeated use by the most weight-demanding aircraft operating at the airport. The current pavement classification number (PCN) calculations denoting the pavement's strength are reported as 92/R/C/W/T (load carrying capacity of pavement/rigid or flexible pavement/subgrade strength/maximum tire pressure/load carrying capacity calculated through technical evaluation or usage) for Runway 5R-23L and 69/F/B/W/T for Runway 5L-23R. The load exerted on the pavement by the critical aircraft (Boeing 747-8F), referred to as the aircraft classification number (ACN), should not exceed the PCN in an effort to prolong the pavement life and prevent possible damage to the pavement. According to Boeing's 747-8 Airplane Characteristics for Airport Planning, the ACN for the Boeing 747-8F on Runway 5R-23L is 88 and is 70 on Runway 5L-23R based upon the aircraft gross weight and the pavement types reported above. As a result, despite the ACN slightly exceeding the PCN for Runway 5L-23R, the aircraft can utilize the runway on a regular basis; however, as rehabilitation becomes necessary, recent, and anticipated aircraft activity should be reviewed during a project level investigation. The actual pavement strength requirements should be evaluated on a project-by-project basis.

3.8 Runway Protection and Separation Requirements

Runway protection areas include areas designed to protect the aircraft in case of excursion from the runway. The dimensional boundaries, grading and object clearance requirements of these areas are defined by the RDC. Runway separation requirements define the minimum distances between the runway centerline, and parallel runways, taxiways, aprons, and fixed objects. The sections below describe the runway protection and separation requirements.

3.8.1 Runway Safety Area

In addition to the dimension requirements shown in **Table 3-11 Runway Protection Standards Analysis**, the Runway Safety Area (RSA) must be:

- Cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations
- Drained by grading or storm sewers to prevent water accumulation
- Capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and firefighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft
- Free of objects, except for objects that need to be located in the RSA because of their function.

The current RSAs meet the required standards. However, at the end of Runway 23R (see photo), sections of pavement from the non-standard bypass taxiway used previously by the military (also known as "Hammerhead") are located in the RSA. These pavement sections are in poor condition and should be removed to improve the grading of the RSA in that area. In addition, the non-standard bypass taxiways adjacent to Taxiway "B" should be removed or appropriately marked to eliminate the potential for aircraft to taxi into the RSA. As part of the ongoing LCK MOS Phase 1 Improvements Project, these pavement sections were removed, therefore improving the condition of the RSA.

3.8.2 Runway Object Free Area

In addition to the dimensional requirements shown in **Table 3-11 Runway Protection Standards Analysis**, the Runway Object Free Area (ROFA) must be clear of ground objects protruding above the RSA edge elevation. The purpose of the ROFA is to enhance the safety of aircraft operations by having the area free of objects, except for objects that need to be located in the ROFA for air navigation or aircraft ground maneuvering purposes. The existing ROFAs meet the current airfield design standard.

3.8.3 Runway Protection Zone

The dimensional standards of the Runway Protection Zones (RPZs) are shown in **Table 3-11 Runway Protection Standards Analysis**. The RPZs are currently located on airport property and under the control of the CRAA. The purpose of the RPZ is to protect people and property on the ground. Therefore, facilities and roads should not be constructed within the RPZs. The existing RPZs meet the current airfield design standard.

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Table 3-11 Runway Protection Standards Analysis

Design Standard	Required Dimension		Runway 5L	Runway 23R	Runway 5R	Runway 23L
Runway Safety Area (RSA)						
Length Beyond Departure End (feet):	1,000 feet		☑	☑	☑	☑
Length Prior to Threshold (feet):	600 feet		☑	☑	☑	☑
Width (feet):	500 feet		☑	☑	☑	☑
Runway Object Free Area (ROFA)						
Length Beyond Runway End (feet):	1,000 feet		☑	☑	☑	☑
Length Prior to Threshold (feet):	600 feet		☑	☑	☑	☑
Width (feet):	800 feet		☑	☑	☑	☑
Runway Obstacle Free Zone (ROFZ)						
Length (feet):	200 feet		☑	☑	☑	☑
Width (feet):	400 feet		☑	☑	☑	☑
Inner-approach OFZ						
Length (feet):	See Note 1		☑	☑	☑	☑
Width (feet):	400		☑	☑	☑	☑
Slope (feet):	50:1		☑	N/A	☑	☑
Inner-transitional OFZ			☑	N/A	☑	☑
Precision Obstacle Free Zone (POFZ)						
Length (feet):	200		☑	☑	☑	☑
Width (feet):	800		☑	☑	☑	☑
Approach Runway Protection Zone (RPZ)	Not Lower than ¾ Mile	Lower than ¾ Mile	Lower than ¾ Mile	Not Lower than ¾ Mile	Lower than ¾ Mile	Lower than ¾ Mile
Length (feet):	1,700	2,500	☑	☑	☑	☑
Inner Width (feet):	1,000	1,000	☑	☑	☑	☑
Outer Width (feet):	1,510	1,750	☑	☑	☑	☑
Departure Runway Protection Zone (RPZ)						
Length (feet):	1,700		☑	☑	☑	☑
Inner Width (feet):	500		☑	☑	☑	☑
Outer Width (feet):	1,010		☑	☑	☑	☑

Source: FAA AC 150/5300-13A, Airport Design, Change 1. Michael Baker International, Inc., 2017. ☑: Meets FAA standard

Notes:

1. *The Inner-approach OFZ begins at 200 feet from the runway threshold at the same elevation of the runway threshold and extends 200 feet beyond the last light of the Approach Lighting System (ALS). The inner-approach OFZ applies only to the runways with an ALS.*

3.9 Taxiway Configuration Requirements

Previous taxiway design guidance was based only on the Airplane Design Group (ADG) and did not take into consideration the size of the aircraft undercarriage. The current guidance described in FAA AC 150/5300-13A, Change 1, is based on the Taxiway Design Group (TDG) which considers the aircraft Main Gear Width (MGW) and the Cockpit to Main Gear Distance (CMG). Taxiways should be designed for "cockpit over centerline" taxiing with sufficient pavement to provide a small amount of error. The error allowance is considered by providing a Taxiway Edge Safety Margin (TESM), which is measured from the outside of the main landing gear to the taxiway edge. Taxiway design requiring "judgmental oversteering", where the pilot must internally steer the cockpit outside the marked centerline, should be eliminated whenever feasible. Appropriate taxiway design ensures that the required TESM is maintained for all aircraft taxi maneuvers. This can be achieved by designing the taxiway with the width and fillet dimensions corresponding to the TDG of the design aircraft.

The taxiway requirements analysis is summarized in **Table 3-12 Taxiway Design Standards Analysis** and **Table 3-13 Taxiway Protection and Separation Standards Analysis**. In order to meet the requirements of the Boeing 747-8F (critical aircraft), all non-compliant taxiways should be designed to TDG 5 dimensional standards. Taxiways should be designed according to the following general design considerations:

- Judgmental oversteering should be eliminated whenever feasible.
- The aircraft nose gear steering angle should not be more than 50 degrees.
- Taxiway intersection should follow the three-node design concept. The three-node concept means that the pilot of the aircraft is presented with no more than three choices at an intersection. As a result, the three-node concept increases situational awareness.
- Taxiway intersection angles should be 90 degrees wherever possible. Where 90 degrees intersections are not possible, standard angles of 30, 45, 60, 90, 120, 135, and 150 degrees should be used.
- Wide expanses of pavement, particularly near the intersection with a runway or other taxiway should be avoided.
- The number of runway crossings should be minimized.
- Taxiway/Runway intersections should be located in the outer thirds of the runway.
- Right angle intersections should be used to increase visibility. Acute angled taxiways may be used to increase the efficiency of the runway; however, they should not be used as runway entrance or crossing points.
- Dual purpose pavements where runways are used as taxiways should be avoided. Runways should be clearly marked.
- Taxiways should not lead directly from an apron to a runway without requiring a turn.

As shown in **Table 3-12 Taxiway Design Standards Analysis** and **Table 3-13 Taxiway Protection and Separation Standards Analysis**, the current taxiway system does not meet the Taxiway Edge Safety Margin (TESM) requirement. The LCK MOS Phase 1 Improvements Project is currently being implemented to improve safety in the existing taxiway system. The incremental improvements associated with the project would bring the taxiway pavement standards up to TDG 5. Future taxiway developments or major taxiway rehabilitation projects should be designed to meet ADG VI and TDG 5 design standards, particularly the application of the appropriate taxiway fillets.

Taxiway A currently does not meet the taxiway object free area (TOFA) requirement. Incremental improvements through the current LCK MOS Phase 1 Improvements Project allows for safe operations of the Boeing 747-8F along Taxiway A. However, Taxiway A can only accommodate the Boeing 747-8F based on wingtip clearance and not the full ADG VI TOFA requirement. The Alternatives phase of this Study will investigate possible options for meeting ADG VI and TDG 5 design standards on Taxiway A in the future.

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Table 3-12 Taxiway Design Standards Analysis

Design Standard	Required Dimension	Taxiway A	Taxiway B	Taxiway C	Taxiway D	Taxiway E	Taxiway G
Taxiway Width (feet)	75	☑	☑	☑	☑	☑	☑
Taxiway Edge Safety Margin (TESM) (feet)	15	☒					
Taxiway Shoulder Width (feet)	30	☑	☑	☑	☑	☑	☑
Taxiway Fillet Dimensions	Table 4-8 in AC 150/5300-13A	Taxiway centerline markings and/or taxiway lead-in fillets for taxiway segments used by the critical aircraft should be designed to TDG 5 requirements					

Source: FAA AC 150/5300-13A, Airport Design Change 1. Michael Baker International, Inc., 2017. ☑: Meets FAA standard ☒: Does not meet FAA standard

Table 3-13 Taxiway Protection and Separation Standards Analysis

Design Standard	Required Dimension	Taxiway A	Taxiway B	Taxiway C	Taxiway D	Taxiway E	Taxiway G
Taxiway Protection							
Taxiway Safety Area (TSA) (feet)	262	☑	☑	☑	☑	☑	☑
Taxiway Object Free Area (TOFA) (feet)	386	☒	☑	☑	☑	☑	☑
Taxilane Object Free Area (feet)	334	N/A	N/A	N/A	N/A	N/A	N/A
Taxiway Separation							
Taxiway Centerline to:							
Parallel Taxiway/Taxilane Centerline (feet)	324	☒	☑	☑	☑	☑	☑
Fixed or Movable Object (feet)	193	☒	☑	☑	☑	☑	☑

Source: FAA AC 150/5300-13A, Airport Design Change 1. Michael Baker International, Inc., 2017. ☑: Meets FAA standard ☒: Does not meet FAA standard

3.10 Pavement Condition Requirements

The CRAA has an established Pavement Management Program (PMP) for LCK. The objective of this program is to evaluate the functional condition of existing landside and airfield pavements, as well as identify and prioritize short- and long-term pavement maintenance and rehabilitation requirements. The most recent report, completed in June 2016, is based on pavement data collected between August 2015 and January 2016. As part of the alternatives development phase of this Study, pavement condition information from the PMP will be used to identify and prioritize future pavement rehabilitation projects.

3.11 Airfield Lighting, Markings, Signage, and Navigational Aids

Based on the current standard instrument procedures available at LCK, all four runway ends are provided with the lighting, marking, and navigational aids necessary to comply with FAA requirements. The existing navigational aids such as approach lighting systems (ALS), PAPIs, and Instrument Landing Systems (ILS) meet the requirements for the currently established approaches at LCK. In the future, as new technologies become available or reduced approach minimums are desired, improvements to the existing instrument landing and approach lighting systems will likely be necessary. It is recommended that these opportunities be considered as part of the Alternatives Analysis.

The incremental improvements of the LCK MOS Phase 1 Improvements Project would require modifications for the current airfield lighting, marking, and signage. Replacing incandescent light fixtures with light emitting diode (LED) light fixtures is recommended. This will also require new regulators in the electrical vault. However, LED light fixtures must not be interspersed with incandescent lights of the same type. FAA AC 150/5340-30J, Design and Installation Details for Airport Visual Aids, indicates that LED light fixtures interspersed with incandescent fixtures may present a difference in perceived color and/or brightness of the light, potentially distorting the visual presentation to the pilot. Therefore, because of the incremental nature of the project, incandescent lights are not being replaced with LEDs during the initial phases of the project.

As airfield lights reach the end of their useful life, conversion from incandescent airfield lights to light emitting diode (LED) lights should be considered in conjunction with other new development and rehabilitation projects. Since LED light fixtures must not be interspersed with incandescent lights of the same type, incremental replacement of incandescent lights should be carefully planned.

3.12 Airport Traffic Control Tower Requirements

The airport traffic control tower (ATCT) facility opened in April 2016. The new ATCT was constructed to comply with the standards for the Federal Contract Tower Program in the event LCK is accepted into the program in the future. The ATCT is in operation 24 hours a day and satisfies the current and anticipated future requirements. Future developments on the airport should carefully consider the ATCT line of sight requirements.

3.13 Passenger Terminal Area

This analysis provides further refined and detailed facility requirements for each building space or function within the Passenger Terminal Building and its surrounding facilities. This will include an estimate of the required size of each space during the planning period along with narrative descriptions of the rationale for space demand.

At non-hub commercial service airports such as Rickenbacker, empirical planning forecasts are not always the best indicator of actual space needs within the terminal. With smaller enplanement numbers, often the usual planning formulas will result in space requirements that fall below real-world minimum space needs. The charter operators, airlines and other tenants require minimum amounts of space to operate their businesses and carry out their required functions. The area calculations included in this section are based upon this assumed activity and forms the basis for the terminal peak hour passenger enplanements (**Table 3-14 Peak Hour Enplanement Assumptions**) used in determining the terminal facility space requirements.

Typical planning models also tend to average out enplanement activity, which works well for most airports. However, at Rickenbacker, airline passenger and operations peaks can be challenging due to the limitations of the terminal facility, staffing demands, and desired turnaround times by existing air carriers. In addition, commercial passenger service may have seasonal fluctuations and daily service is likely to be concentrated at specific points within the day. As most of the commercial passenger service relates directly to the Allegiant operation, the concentration of flights during peak periods is assumed to remain similar throughout the planning period. For the purposes of this terminal analysis, the peak hour passenger activity in the terminal will be represented by the critical aircraft for passenger service (Airbus 320). Given Allegiant's plans to add additional frequencies and simultaneous dual operations at LCK, two Airbus 320 aircraft are assumed to be on the ground simultaneously during the peak hour. The peak hour load factor is assumed to remain constant at 90% over the planning period and is in keeping with typical load factors experienced by Allegiant.

Table 3-14 Peak Hour Enplanement Assumptions

Year	Load Factor	Aircraft on Ground/Peak Hour	Total Seats/Peak Hour	Peak Hour Enplanements[1]
2016	90	2	372	335
2021	90	2	372	335
2026	90	2	372	335
2031	90	2	372	335
2036	90	2	372	335

Source: Michael Baker International, Inc., 2017
Note 1: Assumes that peak hour demand is equivalent to 90% of load of Airbus 320.

It is important to point out that many of the requirements presented in this section are based upon peak hour demand. As a result, this analysis essentially caps peak hour demand to two aircraft on the ground simultaneously as a worst-case scenario, since CRAA does not plan on expanding the terminal structure as part of this plan. The goal of the terminal analysis is to identify facility needs within the existing terminal facility over the 20-year planning period.

3.13.1 Aircraft Parking Apron

The terminal apron is located adjacent to the southwest side of the passenger terminal. It consists of approximately 161,000 square feet of concrete pavement for the parking and maneuvering of commercial aircraft utilizing the terminal for passenger activities. This area is designated as a security identification display area (SIDA) and access is restricted to badged personnel.

The apron provides space capable of accommodating parking for two narrow body aircraft, with two passenger boarding bridges providing access between the aircraft and terminal gates. Both gates are regularly used by Allegiant Air, which currently uses McDonnell Douglas MD-80 series and Airbus 320 aircraft. The apron is well-suited to accommodate Airbus 320 operations (the critical aircraft for passenger service). However, the apron is also marked to accommodate a variety of narrow-body and smaller commuter sized aircraft parking configurations associated with charter passenger activities. The size of the existing terminal apron is sufficient to support the level of passenger activities projected throughout the 20-year planning period.

3.13.2 Terminal Building Requirements

Within each area of this section, existing and future requirements are identified over the 20-year planning period. A comparison of the future demand for such facilities to the existing capacity of the terminal is found in **Table 3-20 Passenger Terminal Facility Requirements** at the end of the Terminal Building Summary section of this chapter.

Ticketing

At smaller terminal facilities, an airline usually requires a minimum of 20 to 24 feet in width to adequately accommodate its, ticket counters, office space and an accessible corridor. If a conveyor is used to transport the checked baggage through this area into baggage make-up, an additional 4 to 6 feet of width is necessary. Under the Allegiant model, passengers are encouraged to use electronic check-in via smart phone devices and computers, resulting in a high percentage of pre-ticketed passengers. The current ticketing counter/office area width is approximately 30 feet wide, and includes access to the office and a conveyor to the outbound baggage make-up. As a result, the current total width of 30 feet should be adequate at LCK.

Typically, a minimum space 25 to 30 feet is an appropriate amount of depth for the airline ticket offices (as shown in **Figure 3-1 Typical ATO Layouts-Single Level Terminals**). The current ticketing office is a single space of approximately 200 square feet. Due to the limited staffing by Allegiant at LCK, the minimum space provided is assumed to be adequate for their operations.

Ticket Counter Area

Based on the Consultant's experience, airlines require a minimum of two agent positions (and usually prefer four) to effectively serve their passengers. Each ticketing agent requires approximately 5 linear feet of counter (3 foot 6-inch desk position and 1 foot 6-inch bagwell). An additional 3 feet of frontage should be allowed for traffic through the counter between each airline area. Within the frontage (30 feet) determined as necessary for the Airline Ticket Office (ATO) area, enough space is provided at the LCK terminal for a total of 6 agent positions. To verify that enough space is provided, the required number of agent positions is determined by taking 60% of the terminal peak hour passengers for a 30-minute peak demand and dividing by 15 for commercial passengers (the maximum number of passengers that can be efficiently processed by one agent in 30 minutes). While electronic ticket kiosks are gaining in popularity and reducing the time required for check-in, airlines have little capital to install such systems, so these are most prevalent at hub and non-hub airports with over 500,000 annual enplanements. Therefore, there are no kiosks at LCK.

The ticket counter area includes the counter and baggage wells, the working space behind the counter and often space for the conveyor. The required area for planning purposes is determined by multiplying the 30 feet of total counter length and through circulation by 10 feet of depth, resulting in an area of 300 square feet. Therefore, the existing 300 square feet of ticket counter area is adequate.

Ticket Lobby

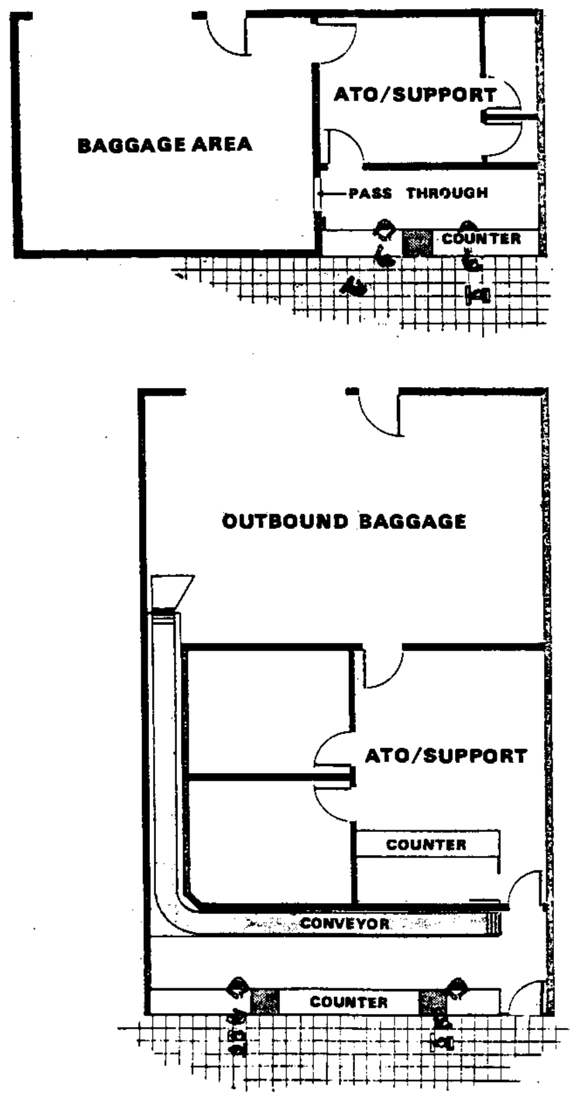
The ticket lobby includes the area required for passengers to queue in front of each agent position, space for the activity occurring at the counter, and some amount of clear circulation space behind queuing. Thirty minutes is the maximum time travelers will typically wait in line without experiencing significant frustration. It is assumed that approximately 2/3 of peak hour enplaned passengers (335) at LCK will check-in at the ticketing counter, with 50% occurring during the peak 30 minutes. Using 12 square feet per person, one can determine the required area of 1,340 square feet for passenger queuing at ticketing. Essentially, the ticketing function is performed by one airline in an alcove area of the terminal. At this time no additional airlines are expected. Therefore, the priority is to provide a minimum of 8 feet of circulation space in front of the ticket counter (industry standard), and the remainder of the area would be dedicated to queuing. There is approximately 1,000 square feet currently available, resulting in a deficiency of approximately 340 square feet. As noted in ACRP Report 55, Passenger Level of Service and Spatial Planning for Airport Terminals, passengers will use adjacent convenient areas (such as the lobby public waiting area at LCK) to avoid excessive congestion. Other options for addressing the queuing deficiency will be considered during the alternatives phase of the Study.

Make-Up (Outbound Baggage) Area

This area is used for processing bags that are checked in at the Ticket Counter. It should be directly behind or beside the ATO and ticket counter area (see **Figure 3-1 Typical ATO Layouts-**

Single Level Terminals) for efficient operations. One baggage cart and the space required to maneuver it requires a minimum of 200 square feet. This represents the physical size of the baggage cart and areas around it for loading bags and connecting to tugs or other carts. A total of six baggage carts (three carts per flight) are required for loading. Therefore, a total of 1,200 square feet is required for the baggage make-up area during the planning period. The existing 1,298 square feet of baggage make-up area is sufficient.

Figure 3-1 Typical ATO Layouts-Single Level Terminals



Source: FAA Advisory Circular AC 150/5360-13A

Baggage Screening

As a result of the events of September 11, 2001, the United States Government created the Transportation Security Administration (TSA). Congress mandated that by December 2002, 100% of all checked baggage be screened for explosives (later extended to December 2003).

The agency met the goal by employing the use of Explosive Trace Detectors (ETD) for the vast majority of non-hub airports. The spatial requirements of these machines and their integration into either the ticketing lobby, baggage make-up area, or some other area of the terminal were determined by the TSA and the airport based on a number of factors including equipment availability, staffing requirements, and capital costs acceptable to the airport. In 2017, a Checked Baggage Inspection System (CBIS) was reallocated by TSA from another airport and installed at LCK. This consists of a Computed Tomography (CT) scanner and ETD components (approximately 285 square feet).

According to the TSA's Planning Guidelines and Design Standards for Checked Baggage Inspection Systems, the TSA standard of 0.70 checked bags per passenger results in a total of 235 bags to screen to meet peak hour demand of 335 outbound passengers. The capacity of the CT scanner is approximately 180 bags per hour per TSA standards. Therefore, the remainder of the bags can be checked by the ETD.

Since check in profiles begin more than one hour before each flight, there is added time for screening of the peak event. Since the bags are typically checked in over a two-hour period, it is likely they will all be scanned by the CT scanner.

The requirements for the ticket counter, ticket lobby, airline offices, and baggage make-up for the planning period are summarized in **Table 3-15 Ticketing Area Facility Requirements**.

Table 3-15 Ticketing Area Facility Requirements

Terminal Area	2016	2021	2026	2036
Ticket Counter Length (LF)	30	30	30	30
Agents Required (EA)	5	5	5	5
Agents Provided (EA)	6	6	6	6
Ticket Counter Area (SF)	300	300	300	300
Ticket Lobby (SF)	1,340	1,340	1,340	1,340
CBIS (SF)	285	285	285	285
Airline Ticket Offices (SF)	200	200	200	200
Baggage Make-Up (SF)	1,200	1,200	1,200	1,200

Source: Michael Baker International, Inc., 2017; ACRP Report 25: Airport Passenger Terminal Planning and Design, 2010

Baggage Claim Lobby

The baggage claim area consists of a waiting lobby, which overlaps with circulation and a baggage display device. Typically, in an airport this size, the baggage display device is a baggage conveyor unit. The linear footage of the device is calculated by assuming 0.7 bags per peak hour deplaning passenger checking baggage (approximately 50%) and allowing for this baggage to be retrieved in a 20-minute period. Due to the peak activity represented by two narrow body jets arriving with approximately 335 passengers, a flat plate conveyor system is appropriate. A flat plate conveyor can display 2.5 bags per linear foot in a 20-minute period. An additional 6 feet of lobby length should be allowed for circulation from the inbound baggage area to the baggage claim lobby. The current baggage claim frontage is 170 feet long versus the requirement of 53 feet.

After determining the length of the claim device, the baggage claim lobby is determined by multiplying 35 feet by the length of the device, plus the additional 6 feet of lobby length for through traffic. The 35 feet provides approximately 25 feet of depth for waiting, retrieving, and stacking baggage, and approximately 10 feet for circulation beyond the claim device. The current baggage claim lobby (with circulation) is 2,845 square feet versus the requirement of 1,855 square feet.

Inbound Baggage Area

The inbound baggage area relates directly to the baggage claim device because a certain amount of space is needed to access the claim device and handle incoming baggage. Again, use of a conveyor is assumed. Twenty-five feet of overall depth for this area allows for one 12-foot tug lane, 6 feet for the depth of the conveyor device, 5 feet of space for unloading equipment and 2 feet for structure. The overall square footage has been determined by multiplying the 25-foot depth by the total lobby length of 50 feet (1,250 square feet), including the 6 feet for through traffic. There is an existing 860 square foot canopy which is suitable for a tug and train of carts. Currently, there is approximately 2,000 square feet of total pavement area available for this purpose.

Rental Cars

A minimum of 100 square feet per rental car vendor should be provided (10-foot counter by 10-foot depth) with an additional 100 square feet for office space per agency. Some allowance should be made for queuing outside of circulation areas (6 to 10 feet in depth is recommended). Assuming the minimum queuing space, a total of 260 square feet per agency is recommended for planning purposes. Although one agency currently serves LCK, they serve the airport from an offsite location and do not occupy space in the terminal. For planning purposes, space should be allowed for new entrants to the market and for other forms of ground transportation service counters. Actual space requirements should be verified with potential tenants prior to proceeding with a schematic design.

The requirements for the baggage claim lobby, inbound baggage area, and rental car areas for the planning period are summarized in **Table 3-16 Baggage Claim Facility Requirements**.

Table 3-16 Baggage Claim Facility Requirements

Terminal Area	2016	2021	2026	2036
Claim Devices (EA)	1	1	1	1
Conveyor Frontage (LF)	53 (47+6)	53 (47+6)	53 (47+6)	53 (47+6)
Claim Lobby w/ Circulation	1,855	1,855	1,855	1,855
Inbound Baggage Operations (SF)	1,250	1,250	1,250	1,250
Rental Car Areas (SF)	520	520	520	520

Source: Michael Baker International, Inc., 2017; ACRP Report 25: Airport Passenger Terminal Planning and Design, 2010

Public Waiting

Public Waiting Area(s) should be provided at an airport for passengers and visitors arriving early before their flight, and for those individuals waiting for ground transportation after their flight arrives. Many small airports do not open the holding areas until shortly before boarding due to staffing requirements at the security screening station. Also, with the current screening regulations, only ticketed passengers are allowed beyond the screening station. Therefore, the public waiting areas need to accommodate 50% of both the terminal peak hour (enplaning) passengers (168 passengers) and an average of one visitor per four passengers (42 visitors). An area of 20 square feet per person (4,200 square feet) is appropriate for small airports such as Rickenbacker to allow for seating and circulation within the waiting area. The current public waiting area is 1,172 square feet versus the requirement of 4,200 square feet. This deficiency is addressed further in **Chapter 4, Airport Alternatives Analysis** (Section 4.6, p. 4-13).

Secure Passenger Holding

The passenger holding area provides secured areas where passengers can sit or stand while they wait to board a flight. As discussed previously, at many small airports these holding areas are not open all the time, and when they are open, only passengers may access them. Due to the current screening regulations, visitors are not allowed beyond the screening station (except in certain circumstances for youth and elderly needing assistance). When sizing these areas, a peak 30-minute load factor of 100% of the terminal peak hour (enplaning) passengers is used (335 passengers). Again, 20 square feet per passenger is used to determine the required area for seating and circulation. Some flexibility in holdroom and waiting areas would accommodate charters with larger passenger capacity. In addition to seating, the holdroom should allow 250 square feet per airline gate (500 square feet total) for queuing and ticket lift station. LCK currently has 7,335 square feet of secure hold room space available to meet the requirement of 7,200 square feet.

Security Screening

The United States Congress mandated that by November 2002, 100% of all passenger screening by TSA screeners be accomplished using the new TSA screening standards. Screening standards required by TSA, employ the use of more extensive review of passengers and their carry-on items which creates new space requirements for body searches, X-ray equipment and Explosive Trace Detectors (ETD). The space required for each lane is approximately 500 square feet. Another 400 square feet (space for 20-25 persons) should be provided for queuing for each lane. Space for private screening of passengers should also be incorporated into any layout. This room should be at least 60 square feet.

Allegiant has simultaneous dual operations at LCK. At times, the flights will be spaced 20-30 minutes apart creating potential impacts to current security screening activities. To accommodate this growth, CRAA and TSA installed an Advanced Imaging Technology scanner (AIT) and an additional x-ray lane within the existing Security Screening Check Point (SSCP) area. This includes a new x-ray machine and an additional Travel Document Checker (TDC) at the entrance into the SSCP area. Due to the limited space available, queuing for the SSCP will be further reviewed as part of the alternatives phase of the Study. As part of the proposed SSCP improvements, an 8.5-foot wide circulation path for deplaning passengers is planned. This is slightly less than the recommended 10-foot width to the circulation area. The total for the Security Screening Area (including queuing, screening, and circulation) considered by TSA is approximately 2,300 square feet, not including office space for the TSA. This allows space for the use of two screening lanes, which is important for future flexibility and to allow for equipment problems or maintenance. The second screening lane was installed in 2017.

The requirements for public waiting, passenger holding, and security screening for the planning period are summarized in **Table 3-17 Concourse Area Facility Requirements** that follows.

Table 3-17 Concourse Area Facility Requirements

Terminal Area	2016	2021	2026	2036
Public Waiting (SF)	4,200	4,200	4,200	4,200
Passenger Holding (SF)	7,200	7,200	7,200	7,200
Security Screening (SF)	2,300	2,300	2,300	2,300

Source: Michael Baker International, Inc., 2017

As noted previously, the requirements presented above are based upon peak hour demand. As a result, this analysis essentially caps peak hour demand to two aircraft on the ground simultaneously as a worst-case scenario, since CRAA does not plan on expanding the terminal structure as part of this plan. The goal of the terminal analysis is to identify facility needs within the existing terminal facility over the 20-year planning period.

Miscellaneous Concessions

Concessions requirements from FAA AC 150/5360-13A, Airport Terminal Planning, are expressed in terms of space requirements per 1 million enplanements. For smaller airports such as LCK, miscellaneous concessions such as newsstands, gift shops, and similar areas need approximately 1 square foot of space for every 200 annual enplanements.

Snack Bar/Restaurant Area

Many times, a small airport cannot support a full-service restaurant; however, this varies from community to community. For the purpose of planning, some space has been programmed to serve as a snack bar/restaurant with a limited kitchen facility. An area 400 to 600 square feet is suggested by FAA AC 150/5360-13A, Airport Terminal Planning, for the size of these areas at small airports. Allow 500 square feet in the program for this function, which includes seating, circulation, and service areas related to the preparation of food. Approximately 500 square feet is currently provided.

Vending

A total vending area of 150 square feet should be provided on both the secure and non-secure portions of the terminal for machines providing drinks and self-service packaged foods. These provide a service to passengers outside the normal operating hours of other concessions. Currently, there is a total of 27 square feet provided (9 SF non-secure area/18 SF secure area).

Public Restrooms

Because of the fluctuating activity of LCK, it is assumed that most of the peak hour (enplaning) passengers may be enplaning or deplaning within a 15-minute period. Airport Cooperative Research Program (ACRP) Report 130, Guidebook for Airport Terminal Restroom Planning and Design (Section 2.4.1), was used as a resource for determining public restroom needs. To determine the number of fixtures for planning purposes, it is assumed that of these passengers, 25% may require the use of restroom facilities and that the facilities can be used three times in the peak 15 minutes. Once the number of fixtures has been determined, approximately 80 square feet per fixture should be provided. This results in a total space requirement of 1,120 square feet. Currently, the terminal has 1,280 square feet available. It is also assumed that of the total number of fixtures necessary, approximately 50% would be utilized by each gender. Currently, there are a total of 16 fixtures (8 men/8 women) located at the terminal (8 pre-security and 8 post-security). This exceeds the total terminal requirement of 14 fixtures.

Some over-sizing of this element can help accommodate larger flights. Also, restrooms are expensive to expand later, since the space is small, but difficult to modify to add only one or two more fixtures. Restroom locations are desirable in both the secure holdroom and the unsecured public areas. The existing restrooms are accessible in accordance with the requirements of the Americans with Disabilities Act (ADA).

The requirements for Concessions, Snack Bar/Restaurant, Vending, and Restrooms for the planning period are summarized in **Table 3-18 Public Area Facility Requirements**.

Table 3-18 Public Area Facility Requirements

Terminal Area	2016	2021	2026	2036
Concessions/Gift Shop (SF)	516	762	804	894
Snack Bar/Restaurant (SF)	500	500	500	500
Vending (SF)	150	150	150	150
Fixture Requirement (M/F)	7/7	7/7	7/7	7/7
Public Restrooms (SF)	1,120	1,120	1,120	1,120

Source: Michael Baker International, Inc., 2017

As noted previously, the requirements presented above are based upon peak hour demand. As a result, this analysis essentially caps peak hour demand to two aircraft on the ground simultaneously as a worst-case scenario, since CRAA does not plan on expanding the terminal structure as part of this plan. The goal of the terminal analysis is to identify facility needs within the existing terminal facility over the 20-year planning period.

Circulation, Mechanical, Maintenance, and Miscellaneous

In addition to the specific functional areas analyzed above for the terminal building, other miscellaneous space is not so readily calculated without a specific layout. The largest of these areas is circulation. In airport terminal buildings, this can account for nearly 50% of the facility.

Approximately 14,500 square feet of the terminal is currently utilized as circulation space. It is quite common for smaller airports to undersize the circulation elements, or to allow queuing, displays, or other elements to obstruct the flow of travelers. Also, other spaces such as mechanical and electrical rooms and janitor's closets have to be included. Guidance from FAA AC 150/5360-13A, Airport Terminal Planning, suggests 12% to 15% of programmed space for these uses. Further, the walls and structure of the building take up about 5% of gross area. Finally, the open circulation in the airport, including vertical circulation such as stairs, elevators, and escalators must be accounted for. A rule-of-thumb for planning terminals of this size is to assume this miscellaneous space to be a total between 35% and 55% of the rest of the terminal (not including administration space) with the percentage declining as the size of the building increases. These areas should be sized to allow for some flexibility due to difficulty in expanding the service core and circulation areas at a later date.

Administration and Support

The administration and support requirements of airports vary to a wide degree due to the different operations at every airport, the number of enplanements and the activities performed by airport administration staff. Currently, none of the passenger terminal area is utilized for administration activities. These functions are accommodated in other facilities on the airport property.

For planning purposes, a minimum amount of administrative and support space has been determined to house maintenance for the passenger terminal and a limited amount of storage. The program includes 500 square feet for these functions.

Security Space Requirements

Airport security procedures and system enhancements continue to be an important priority at our nation's airports. For planning purposes, a minimum 2% allowance of space in the terminal for TSA offices and breakroom, administration and local law enforcement is recommended. There is 1,012 square feet of space currently allocated to law enforcement activities that could be used to meet the 900 square foot requirement. This requirement is based upon the consultant's past experience with planning and designing small commercial passenger terminal facilities.

Miscellaneous, administration, and terminal security space requirements for the planning period are summarized in **Table 3-19 Miscellaneous Facility Requirements**.

Table 3-19 Miscellaneous Facility Requirements

Terminal Area	2016	2021	2026	2036
Circulation/Miscellaneous (SF)[1]	14,910	14,910	14,910	14,910
Administration (SF)	500	500	500	500
TSA Offices and Break (SF)	150	150	150	150
Law Enforcement (SF)	250	250	250	250

Source: Michael Baker International, Inc., 2017
1) Assumes 35% as the ratio of circulation/mechanical/structure/miscellaneous to program spaces, less administrative functions.

Terminal Building Summary

The demand/capacity and facility requirements analysis summary sheet (**Table 3-20 Passenger Terminal Facility Requirements**) takes the information for each area and combines them together to determine overall terminal building needs. The areas allocated are based on the descriptions and formulas applied to the assumed peak hour passenger numbers.

Table 3-20 Passenger Terminal Facility Requirements

Terminal Area	Existing	2016	2021	2026	2036
Ticket Counter Length (LF)	30	30	30	30	30
Agent Positions Required (EA)	6	5	5	5	5
Agent Positions Provided (EA)	6	6	6	6	6
Ticket Counter Area (SF)	300	300	300	300	300
Ticket Lobby (SF)	1,000	1,340	1,340	1,340	1,340
CBIS (SF)	353	285	285	285	285
Airline Ticket Offices (SF)	200	200	200	200	200
Baggage Make-Up (SF)	1,298	1,200	1,200	1,200	1,200
Claim Devices (EA)	1	1	1	1	1
Conveyor Frontage (LF)	170	53 (47+6)	53 (47+6)	53 (47+6)	53 (47+6)
Claim Lobby w/ Circulation (SF)	2,845	1,855	1,855	1,855	1,855
Inbound Bag Operations (SF)	2,000	1,250	1,250	1,250	1,250
Rental Car Areas (SF)	0	520	520	520	520
Public Waiting (SF)	1,172	4,200	4,200	4,200	4,200
Passenger Holding (SF)	7,335	7,200	7,200	7,200	7,200
Security Screening (SF)	2,300	2,300	2,300	2,300	2,300
Concessions/Gift Shop (SF)	0	516	762	804	894
Snack Bar/Restaurant (SF)	500	500	500	500	500
Vending (SF)	27	150	150	150	150
Public Restrooms (SF)	1,280	1,120	1,120	1,120	1,120
AREA SUBTOTAL (SF)	**20,610**	**22,936**	**23,182**	**23,224**	**23,314**
Circulation/Miscellaneous Space at 35% (SF)	14,500	14,910	14,910	14,910	14,910
Administration Space (SF)	0	500	500	500	500
TSA Offices / Break (SF)	200	150	150	150	150
Law Enforcement (SF)	1,012	250	250	250	250
TOTAL AREA (SF)	**36,322**	**38,746**	**38,992**	**39,034**	**39,124**

Source: Michael Baker International, Inc., 2017

3.13.3 Federal Inspection Services

All airports located in the United States that have incoming flights originating from areas outside the United States must have Federal Inspection Services (FIS) with regulated facilities to examine all passengers to determine their admissibility and inspect their cargo. Passengers arriving from international destinations must be completely isolated from domestic passengers until appropriately screened. LCK currently receives international traffic through charter passenger service. On a related note, any aircraft requiring FIS inspection will also reduce the domestic flight capacity of the terminal apron. Therefore, international flights should be scheduled as not to conflict with domestic operations.

The current Federal Inspection Station (FIS) was constructed in 2003 and remains essentially as built at that time. A set of folding partitions and additional doors to connect the FIS to the main baggage claim area, were also constructed in 2003, which allows for separated access to the baggage carousel during FIS use.

The design requirements for FIS facilities have changed several times, most notably in 2002 when the standards were revised by the INS (Immigration and Naturalization Service) and subsequently moved to the jurisdiction of the Department of Homeland Security/Customs and Border Patrol (DHS/CBP) for further revision to the current standards issued in 2012. The design standards indicate the requirements for passenger processing and support space for INS, CBP, and related agencies. Since the standards are baselined for processing of 400 passengers an hour, derivation of the requirements for a lower level is needed.

For LCK, it is appropriate to review the demand based on the processing of a single flight of a specific type of aircraft as an event, not in terms of passengers per hour, as multiple or continuous arrivals are not expected in the planning period. The key to this is that LCK has four INS booths which are capable of processing approximately 180 passengers per hour (45 persons per hour each). The existing FIS facility was designed to accommodate the 150 to 180 passenger loads associated with narrow body flights currently operating at LCK. The facility is capable of handling larger aircraft like the Boeing 757-300 (250 passengers), if the load factor does not create a passenger load that requires more than one hour for all passengers and crew to be cleared. A key consideration is keeping international passenger processing and baggage claim separate when domestic operations are occurring at the same time.

3.13.4 Automobile Parking Requirements

Public Parking

Rickenbacker International Airport is an origin and destination (O & D) airport; therefore, there is a need for parking passengers as well as visitors. Due to the frequency and nature of Allegiant and passenger charter operations, vehicle parking is reported to be constrained during peak operational periods.

As a general rule-of-of-thumb, parking supply should range from 450 to 700 spaces per 500,000 enplaned passengers[2]. As a result, the FAA methodology is not useful to determine parking requirements for this facility. Since most of the passenger activity is related to the leisure travel as opposed to business, it is common for passengers to park at LCK an average of three days at a time. LCK provides a total parking capacity of 894 parking spaces.

Therefore, to accurately predict future public parking demand, a ratio of public parking to annual passenger enplanements was developed. Assuming that 75% of the existing parking capacity, which consists of 586 public parking spaces, and dividing by 103,289 passenger enplanements (2016) resulted in a factor of 0.0043 parking spaces per annual passenger enplanement. Applying this ratio to forecast passenger enplanements for key forecast years resulted in a demand for 769 total public parking spaces by the year 2036.

For ease of use and circulation, it is not suggested that parking be divided into long-term and short-term lots. Per FAA AC 150/5360-13A, Airport Terminal Planning, separation of parking is recommended only after annual enplanements exceed 200,000 per year. Travel distances to the terminal are short and minimally varied. As shown in **Table 3-21 Parking Requirements**, no additional parking capacity is required throughout the 20-year planning period.

Employee Parking

Employee parking associated with the passenger terminal operation is accommodated in the parking area adjacent to the Airport Traffic Control Tower (68 spaces). As of 2019, the ATCT parking lot also serves as a cell phone lot for terminal operations. In addition, CRAA employees utilize other parking areas associated with administration, operations, and maintenance facilities at the airport. Existing employee parking facilities were determined to be sufficient and no additional capacity is required during the planning period.

Ample parking is provided adjacent to existing tenant facilities throughout the airport. In the future, all parking facilities associated with new development proposed in this airport master plan update must meet applicable Ohio and local code requirements.

Rental Car Parking

Rental car parking spaces can be determined by providing one-half to one-third of a space for each peak hour deplaning passenger. Of these spaces, 50% would be considered to be ready/return spaces and the other 50% considered as storage/maintenance spaces. Currently, there is one rental car agency (Enterprise) serving LCK from off-airport facilities. There is one spot at the curbside designated for Enterprise shuttle pick-up. A second more appropriate method for the initial development, described in FAA AC 150/5360-13A, Airport Terminal Planning, is to provide a minimum of 10 spaces for each rental car agency. Based upon further discussions with CRAA personnel regarding the current rental car activities at LCK, 30 parking spaces for rental cars has been allocated in Parking Lot 2. Additional parking may be added when actual demand is demonstrated to exceed this amount.

[2] ACRP Report 25: Airport Passenger Terminal Planning and Design, 2010.

Commercial Vehicle Parking

As passenger activity increases over the planning period, an increase in commercial vehicle activity is expected. The simplest method to accommodate commercial vehicle activity is to provide sufficient curb frontage to allow the vehicles to park at the curbfront, and at the appropriate area for arrivals or departures. However, commercial vehicles including local taxis, rideshare providers and shuttles can contribute to the congested curbfront during peak periods.
Since the vehicle volume exceeds the capacity of the curbfront during peak periods, commercial curb areas can be developed for this purpose. Currently there is no designated commercial vehicle parking at LCK. However, it is desirable to have the vehicles located close to the terminal front for easy transfer of people and baggage. These are better located at the ends of the building so that crossing the curb road is not required. A designated commercial vehicle staging area (prior to the curbfront area, especially for the largest vehicles) should be considered and evaluated as part of the alternatives development process.

Curbside Drop-off Parking

The curb walkway should be a minimum of 12 feet wide, plus room to allow for opened car doors, to allow passengers' movement along the curb at all times. Typically, at least two 12-foot traffic lanes, one for loading/unloading and one for through traffic, should be provided. A 20-foot combined drop-off/traffic lane and a 12-foot through lane is more desirable, while the best level of service adds a second 12-foot through lane for a total curbfront road width of 44 feet.

The existing curbside is comprised of three 12-foot lanes that run the length of the terminal – one lane for loading/unloading of passengers and two lanes for drive-through. There are two crosswalks across the terminal curbside roadways aligned with each major terminal entrance/exit. Under this configuration, the current length of the curbside (235 feet) is inadequate to accommodate passenger loading/unloading during peak periods throughout the planning period. As a result, vehicles are double (sometimes triple) parked along the curb which limits the flow of passenger traffic to the terminal. This condition often results in a backup of vehicles that extends towards the beginning of John Circle Drive.

Curbside parking requirements were determined by allowing for a mix of transport vehicles along the curb for the peak hour passenger load. Of these passengers it is assumed that 90% of them will use the curb for loading and unloading. An average time parked on the curb is assumed to be 3 minutes for passenger cars, taxis, and ride share, thus 30 vehicles may use a single space in one hour. It is assumed that the dwell times for the shuttles (i.e. hotel and car rental) will be as long as 2 minutes. Adequate capacity prevents double parking and speeds the flow of passengers at peak periods. Parking space lengths for the various vehicle types are included in **Table 3-21 Parking Requirements**.

Table 3-21 Parking Requirements

Terminal Area	Existing	2016	2021	2026	2036
Public (spaces)	894	439	655	691	769
Employee (spaces)*	*	68	68	68	68
Rental Car (spaces)	30	30	30	30	30
Total Curb Length (LF)	235	283	283	283	283

Sources: Michael Baker International, Inc., 2017; AC 150/5360-13A; ACRP Report 25
*Note: * No specific parking spaces are allocated for employees. .*

3.13.5 Terminal Access Requirements

Access to the Rickenbacker International Airport is provided from Interstate 270 via Alum Creek Drive, a four-lane divided highway. Terminal access is provided via John Circle Drive from Alum Creek Drive. This terminal loop road begins as a two-lane road which turns into a two-lane one-way loop road providing access to the Passenger Terminal and the two associated parking lots. A third lane is provided for passenger loading/off-loading directly in front of the Passenger Terminal. As mentioned previously, the three-lane section along the terminal curb front experiences high levels of congestion following flight arrivals and preceding flight departures during peak travel periods. This causes a breakdown of vehicular flow that forms behind bottlenecks created in front of the terminal (LOS F). Levels of service are defined in **Table 3-22 Level of Service** below.

According to ACRP Report 07-02, Airport Curbside and Terminal Area Roadway Operations, on-airport roadways, where only a single path is available, LOS C is typically considered to be the minimum acceptable level of service because of the lack of alternative travel paths and the significant negative consequences resulting from travel delays (e.g., passengers missing their flights). Options to remedy this situation will be further evaluated as part of the alternatives analysis presented later in this Study.

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Table 3-22 Level of Service

Level of Service	Definition
A	Represents operations where free-flow speeds prevail. The ability of each driver to maneuver within the traffic stream, change lanes, merge, or weave is almost completely unimpeded by other vehicles because of low traffic densities. The effects of transient blockages or incidents (e.g., an accident, vehicle breakdown, or other event that impedes the flow of traffic) are easily absorbed at this level of service.
B	Represents conditions in which free-flow speeds are maintained. The ability of each driver to maneuver within the traffic stream, change lanes, or weave is only slightly restricted by the presence of other vehicles. The general physical and psychological comfort of drivers is still high. The effects of minor incidents and point breakdowns (e.g., a breakdown in traffic flow where traffic enters, leaves, or crosses a roadway) are still easily absorbed.
C	Represents traffic flow with speeds at or near the free flow speeds of the roadway. Freedom to maneuver within the traffic stream is noticeably restricted (by the presence of other vehicles) and lane changes may require more care and vigilance on the part of the driver because of high traffic densities. Minor blockages or incidents may still be absorbed, but the local deterioration in service will be substantial. Queues may be expected to form behind any significant blockage.
D	Represents the level at which speeds begin to decline slightly with increasing flows, and density (on freeways and other roadways with uninterrupted flows) begins to increase somewhat more quickly. Freedom to maneuver within the traffic stream is more noticeably limited (because of the lack of gaps between successive vehicles), and the driver experiences reduced physical and psychological comfort. Even minor blockages or incidents can be expected to quickly create queues because the traffic stream has little space to absorb disruptions.
E	Represents operations at or near capacity. Operations at this level are volatile because there are virtually no usable gaps in the traffic stream. Vehicles are closely spaced, leaving little room to maneuver (or allow for lane changes or weaving) within the traffic stream. Any disruption of the traffic stream, such as vehicles entering from a ramp or a vehicle changing lanes, can disrupt upstream traffic flows. At capacity, the traffic stream has no ability to absorb even the most minor disruptions, and any incident can be expected to produce a serious breakdown with extensive queuing. Maneuverability within the traffic stream is extremely limited and the level of physical and psychological comfort afforded the driver is poor.
F	Represents breakdowns in vehicular flow. Such conditions generally exist within queues forming behind bottleneck points. Bottlenecks occur as a result of (1) traffic accidents or incidents, (2) typical traffic congestion areas, such as lane drops, weaving segments, or merges, (3) parking maneuvers, or (4) traffic conditions when the projected hourly flow exceeds the estimated capacity of the roadway segment.

Source: ACRP Report 40, Airport Curbside and Terminal Area Roadway Operations, 2010

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3.14 Air Cargo Facility Requirements

In the forecast chapter of this Study, the planning team recommended that an Aggressive Cargo Forecast, referred to earlier in **Tables 2-14 LCK Aggressive Cargo Forecast** (page 2-47) **and 2-20 Forecast of Dedicated Air Cargo Fleet Mix (2016-2036)** (Page 2-54), be utilized to show the growth in air tonnage enplaned or deplaned at LCK. Included in this report are the accompanying demand schedules and timeframes for new facilities, ramp space and parking for the aircraft that would arrive and depart LCK during the 20-year planning period. The analysis contained in this section identifies space requirements needed to support the selected forecast of cargo demand.

3.14.1 Cargo Forecast Business Development Considerations

The Aggressive Cargo Forecast contains several inputs related to the efforts for equally aggressive business development actions that must be conducted in order to accomplish the growth of tonnage at LCK. These actions, enumerated below, require multiple efforts to capture new cargo volumes from the region and to expand the impact of LCK to include the development of a global e-commerce hub for both imports and exports. These contingency actions by the CRAA Business Development staff, and others in the community who have economic development responsibilities, are critical if the Aggressive Cargo Forecast is to become a reality. The forecast also addresses the facilities and the parallel requirements for ramp/apron space as each infrastructure element will be essential to the success of LCK. The CRAA and economic development stakeholders will need to advance these contingencies and turn them from opportunity to reality in the timeframe that matches the schedules for cargo growth and the supporting facilities and infrastructure to support this new growth.

Table 3-23 LCK Aggressive Cargo Forecast below contains the Aggressive Cargo Forecast (Columns AA, BB and CC) for the global air carriers who are active at LCK today. Based on the past success and current business development efforts, the increases in cargo volumes will align with the future prediction for growth. This will also drive the demand for new facilities and the supporting infrastructure at LCK. In this report, the planning team provided inputs related to the schedule for delivery of new cargo facilities, aircraft parking/apron requirements, GSE storage requirements, pad site requirements for facilities, and an analysis that demonstrates the total amount of acres required to support the forecast. In addition, the planning team provided an analysis of the demand for parking on the landside of the new facilities and the total number of access points required for each facility on the landside and on the airside. The methodologies utilized and the ratios applied to support the recommendations are enumerated in this section.

3.14.2 Factors Impacting Facilities and Infrastructure Requirements

The planning team considered the significant growth over the short period while LCK has operated as a global cargo hub or gateway. Until 2014, LCK served as a destination for ad-hoc charters and did not have global carriers operating scheduled freighters loaded and unloaded at the airport. However, in recent years, the global carrier loads have increased dramatically with new export volumes being added to the high volumes of imports that arrive on the global carrier schedules. As cargo loads increase, the load factors change. Load factors were considered as a strategy to determine the parking and ramp space required; however, Airports Council International, North America - Air Cargo Guide for 2013 recommends a more simplistic demand ratio that is linked to the delivery of new facilities rather than linked to the relationship between loads, load factors and aircraft arrivals and departures. This provided the planning team with an alternative to forecasting the highly variable and rapidly changing growth of exports that impact the overall load factor for the airport. The ultimate goal of having aircraft arrive "full" and depart "full" also presented challenges to the planning team as some of the carriers prefer to make LCK one of two stops in the US, while other carriers are unloading and loading at LCK and are provided enough volume that a second stop is not required. Changes in load factors will impact the number of operations required to support the overall volumes in the forecast. Assigning higher load factors reduces the operations, while lowering the load factor increases the operations required to support the forecast volumes.

Table 2-20 Forecast of Dedicated Air Cargo Fleet Mix (2016-2036) (page 2-54), is not materially impacted even if some of the carriers accomplish a "full" load on both inbound and outbound activities. The planning team reviewed the impact for the scheduled carriers anticipating higher load factors reaching a "full" load for the aircraft assigned to the route. In the context of the overall count of operations for LCK, if some of the carriers operate on the single stop at LCK and others apply a multiple stop strategy, the overall operations count is not impacted materially. In 2026 and in 2036, the application of all aircraft as "fully loaded" is under 10% of the total of dedicated aircraft in the forecast. Given that some future airlines will apply the multiple stop strategy, the planning team does not consider the impact to meet the requirement to revise the forecast.

It should also be noted that assigning higher load factors to the aircraft that operate at LCK does not impact the schedule for delivery of new facilities. These two factors are independent of each other. Assigning higher loads to cargo aircraft operating at LCK changes the number of aircraft that are required to move the forecast volume for that particular period of time. The demand for new cargo facilities as scheduled and presented are a function of applying space requirement ratios based on the forecast tonnage requirements over the 20-year planning period.

In **Table 3-23 LCK Aggressive Cargo Forecast**, below, the Additional Facilities column reflects the year in which the tonnage milestone requiring a new facility to be delivered for occupancy is reached. The supporting requirements are presented later in this section. For planning purposes, each additional facility is anticipated to be 100,000 square feet in size, however in later years, it may be prudent to deliver a larger facility to support the demand. Further, for planning purposes, CRAA will need to review the timeframe from selected contractors to determine when the construction must start to deliver a finished facility on time. The schedule may provide some flexibility by shifting carrier arrivals and departures and handling of cargo operations, so the facilities are utilized for longer hours per day, allowing more throughput to be achieved. ACT 3 could also be utilized as a buffer if necessary. However, this facility will only accommodate a modest amount of cargo in the 46,000 square feet footprint.

Table 3-23 LCK Aggressive Cargo Forecast

Year	Additional Facilities	AA Carrier (US Tons)	BB Carrier (Metric Tons)	CC Carrier Total (Pounds)
2016		37,568	34,081	75,137,385
2017		48,838	44,305	97,678,601
2018		63,490	57,597	126,982,181
2019		82,537	74,876	165,076,835
2020		107,298	97,339	214,599,885
2021		139,487	126,541	278,979,851
2022		167,385	151,849	334,775,821
2023		200,862	182,219	401,730,985
2024	Yes	241,034	218,663	482,077,182
2025		289,241	262,395	578,492,619
2026	Yes	347,089	314,874	694,191,143
2027		381,798	346,362	763,610,257
2028		419,978	380,998	839,971,282
2029	Yes	461,976	419,097	923,968,411
2030		508,173	461,007	1,016,365,252
2031	Yes	558,991	507,108	1,118,001,777
2032		614,890	557,819	1,229,801,955
2033	Yes	676,379	613,601	1,352,782,150
2034		744,016	674,961	1,488,060,365
2035	Yes	818,418	742,457	1,636,866,402
2036	Yes	900,260	816,702	1,800,553,042

3.14.3 Forecast Overview

The Aggressive Forecast shown in Column AA was presented and recommended as the model for predicting air cargo growth, facilities, and infrastructure requirements over the course of the cargo forecast. The key considerations in this forecast are:

1. The sustained growth of the carriers' import and export volumes, and
2. The addition of new carriers for arrivals and departures at LCK.

This sustained growth must be accompanied with corresponding growth in facilities to support aircraft arrivals and departures, along with the enplanement and deplanement of global cargo volumes.

Facilities planning must consider ramp space for parking and storage of aircraft and the related ground support and snow removal equipment, as well as the equipment needed to support the build-up or break-down of cargo. Ramp parking is only one element in the design and capacity of ramp space, as throughput for loading or unloading must also be considered. The design for the total aircraft infrastructure is critically linked to the number of aircraft arrivals and departures that can be sustained at each building daily during the operations cycles at the facilities.

In addition to new facilities, efficiencies in terms of airport operations including loading/unloading and servicing for aircraft must be monitored to maintain a competitive environment for the carriers. Reviews of arrival/departure schedules must be maintained for ground handling and services to be efficiently accomplished. Operational planning must take into consideration the differences between "peak" operations and normal operations. Based on shifts in trends and demand, CRAA must include during their operational planning sessions, how they can accommodate a higher number of aircraft while maintaining a high level of the necessary corresponding services and infrastructure that would be required for loading or unloading of cargo at LCK. Details such as tail height, wingspan, overall aircraft length or "total area" for each aircraft will need to be considered in the space surrounding the facilities.

The Aggressive Forecast presented in this narrative requires planning, execution, and flexibility in adapting to new growth industries and sectors where global demand is exceeding projections for cargo growth worldwide. Seeking these high growth industries or sectors will be critical to the success of the LCK forecast model. Industries such as the "cold supply chain" made up of frozen, perishable, or temperature-controlled conditions not only drive growth, but create an opportunity for incremental contribution to the value proposition and profit for the supply chain stakeholders. Cross-border e-commerce represents another significant growth opportunity to create a new global e-commerce processing center, for both arriving volumes and departing consolidations. While the attending facilities and technology infrastructure are significant, the opportunity is available to LCK if driven by the right mix of vision and dedication by CRAA and other business development/economic development stakeholders in Columbus.

As a final consideration, strategic and operational planning must accommodate the requirements for future cargo configuration including sorting, handling, and storage requirements. As new industry sectors are added to the cargo volumes at LCK, the CRAA must consider and implement the necessary operational efficiencies to ensure that appropriate personnel, from private or public sectors, are in place and can manage the increase in freight supply chains to ensure that they will not impact the overall pace of throughput at LCK.

- Global "cold chain" (food, pharma, perishables) is a strong growth sector, but today there are only minor volumes of this industry sector loaded or discharged at LCK. However, if this industry sector becomes a part of the carriers' supply chain requirements, it will be necessary to determine the specific requirements and prepare environmentally controlled areas and handling procedures applicable for this type of cargo.
- In the forecast volumes presented in this Study, there was an expectation for a new high-volume package sortation operation to be established at LCK. This sortation facility would support both import and export shipments and require expedited handling of e-commerce packages to ensure that these goods can be moved rapidly into the final delivery cycle. The e-commerce providers who would move this cargo will also have a responsibility to connect with US Customs and Border Protection (CBP) or other governmental agencies who have a role in the clearance and release of imports to individuals. The rapid release and transfer to the final mile delivery carrier is critical to the success of e-commerce fulfillment at LCK. As demand for international e-

commerce grows, it will be necessary to accommodate a future logistics provider who would aggregate volumes for disparate retailers and sellers for exports. These consolidations require expedited processing and rapid deployment between the arriving ground carriers and loading activity for the air carriers' export program.

3.14.4 Facilities Ratios/Volumes, Capacity and Related Infrastructure Considerations

The Guidebook for Air Cargo Facility Planning and Development, published by the Airport Cooperative Research Program (ACRP) in 2015, established two primary approaches to determining the requirements for air cargo facility planning. In preparation for this cargo analysis, the planning team sought input from several industry users who manage large air cargo facilities in major US markets to support their air carrier customers. Their input provides supplemental guidance, decision support and perspective for defining when there will be demand for new facilities at LCK, and what accompanying parking, ramp, apron, or support infrastructure will be necessary for planning purposes.

Application of ACRP Tonnage Ratios for Facilities:

- According to ACRP, the "area per annual ton ratio" defines the average building throughput rates at US airports as between 1.0 and 2.5 SF per ton. The reason for the high variance is due to the efficiencies in processing cargo within the facility and handling protocols on the ramp.
- According to ACRP, the "annual tonnage per area ratio" defines the annual tons of cargo that can be processed per square foot of cargo floor space. This ratio is typically between 0.5 tons/SF to 3.0 tons/SF. The ACRP supports these high variances in throughput based on the efficiencies applied by the operator of the facility and the combination or configuration of cargo in the build-up or break-down process.
    - The ACRP provides guidance for this ratio related to international gateway operations and suggests using a ratio of 0.81 tons/SF for all cargo carriers and third-party logistics providers at these airports.
- According to Total Air Cargo Services (TAS), who operates significant operations in support of global carriers and their clients at LCK and elsewhere, the ratio applied at their major gateway services is 1 million kilos per 1,000 SF (11,002 tons per 1,000 SF) annually.

3.14.5 Facilities Requirements Scenarios

The cargo facility requirements in this section are based on the space in ACT 4 and ACT 5 which is 153,000 square feet. The ratios are applied to demonstrate when this available capacity will be fully utilized. Each of the ratios below reflect when new facilities of 100,000 square feet are required to support continued cargo operations. There is not a direct correlation between the actual ratio calculation and the demand for space, rather it demonstrates the year in which the milestone for weight/tonnage occurs. An optional strategy is the utilization of ACT 3 with 46,000 square feet of space that could become available to support the growth of new cargo volumes. However, the small footprint of ACT 3 and accompanying volume of cargo throughput that could be achieved does not materially change the timing for the first facility requirement delivery in/near 2024.

- By applying the ACRP international gateway annual tonnage per area ratio to the above forecast, the requirement for a new 100,000 SF facility would occur in 2022, 2025, 2028, 2031, 2033, and 2035. For this narrative, each new facility delivered for use by cargo stakeholders at LCK was assumed to be 100,000 SF in space. Ratios and calculation for freight supporting infrastructure was based on this assumption. During the 20-year planning period, a total of six (6) additional facilities will be required based on the application of the current ACRP ratio. This does not take into consideration any specialized cargo categories such as cold chain or e-commerce, which may or may not require a purpose-built facility in addition to the demand outlined in this scenario.
    - Annual Tonnage Per Area Ratio = 0.81 tons per SF
    - 2022 forecast is for 167,385 tons x 0.81 = 135,582 SF
    - 2023 forecast is for 200,860 tons x 0.81 = 162,698 SF
    - This indicates that the next facility will need to be delivered between 2022 and 2023.
- Applying the ACRP's area per annual ton ratio, the demand for new facilities of 100,000 SF would come in 2024, 2026, 2028, 2031, 2032, 2034, and 2036. This scenario requires a total of seven facilities to be constructed over the planning period.
    - Area Per Annual Ton Ratio = 1.0 SF per annual ton
    - 2024 forecast is for 241,034 tons x 1.0 = 241,034 SF Required
    - This indicates that the next facility will need to be delivered by 2024.
- Applying the industry standard utilized and recommended by TAS, the demand for facilities of 100,000 SF is slower, and the overall number of facilities required to support demand is reduced. Seven new facilities would be needed in 2024, 2026, 2029, 2031, 2033, 2035, and 2036 based on this ratio. This ratio and throughput does not take into consideration any specialized cargo categories such as cold chain or e-commerce.
    - Total Air Cargo Services Ratio = 1m kilos/1000 SF annually
    - The threshold for delivery is at 235,000 x 1.102 = 278,806 tons = 258,970 SF
    - 2024 forecast is for 241,034 tons
    - 2025 forecast is for 289,241 tons
    - This indicates that the next facility will need to be delivered between 2024 and 2025.
- When considering the three demand ratios together there is evidence of a consensus that demonstrates it will be necessary to start delivery of new facilities in 2024. In addition, a minimum of 1,166,667 square feet of land, or 26.78 acres, will be the required to support this forecast. These facility requirements only demonstrate the demand for actual cargo handling facilities and do not consider demand for ramp, parking, ground handling and related space outside the facilities. Those considerations are addressed later in this section.

The three ratios above were used together as the baseline, instead of the wide-ranging ACRP "tonnage per area ratio" (0.5 tons/SF to 3.0 tons/SF) which significantly shifts requirements based on how the range of demand is applied to the ratio calculation.

Finally, this demand forecast applies to current cargo handling operation protocols for building up or breaking down cargo from tugs/dollies and sortation of cargo with labor applied on the facility floor. It does not accommodate future demands for high-volume sortation or aggregation of global cross-border packages moving for e-commerce providers. Such a sortation facility for e-commerce could be located off-airport.

Industrial real estate requires planning for new facilities to include the amount of land required to support a specific building "footprint." This additional ratio, the Floor Area Ratio (FAR), uses the measurement of a building's floor area in relation to the size of the land that is beneath the building. FAR is calculated by dividing the gross floor area of a building(s) by the total buildable area. The allowable FAR is determined by local governments. The City of Columbus defines the "maximum total calculated floor area permitted for any lot" as 0.6, unless it is either a "substantial rehabilitation of an original contributing building involving an increase in floor area or a change of use" or a "project that replaces a noncontributing building not original to the lot."

Applying a 0.6 FAR to the seven new 100,000 square foot air cargo facilities, a minimum of 1,166,667 square feet of land, or 26.78 acres, will be required to support the projected new cargo facilities at LCK. The ramp, apron, parking, and related infrastructure requirements below, are in addition to the planning for locating and managing the flow of goods, trucks, personnel, and aircraft to/from these new facilities.

3.14.6 Aggressive Cargo Forecast Sales, Business Development Assumptions

The assumptions when building the Aggressive Cargo Forecast included specific actions by the CRAA Business Development staff and regional economic development stakeholders in order to divert, capture or shift volumes toward LCK for both origin and destination gateway centers. These actions and their outcomes are critical to the success of implementing this Aggressive Cargo Forecast and include the following elements, which will result in new cargo volumes at LCK:

- A 5% capture of the Pilot Air Freight weekly sort conducted by Forward Air Freight (FAF) in Columbus by 2017-2018 as new export volumes loaded at LCK
- A growth of up to 50,000 e-commerce packages delivered inbound per day to the new Expedited Carrier Consignment Facility (ECCF) at or near LCK
- A 5%-10% capture of the CMH-terminated FAF hub facility cargo to be loaded as new export volumes at LCK rather than trucked by FAF to ORD, JFK, EWR or ATL
- Continued CRAA business development efforts in the catchment area and increases in forwarder freight (both imports and exports) from new forwarders who operate in the catchment area of CVG, IND, PIT, CLE, SDF and DTW
- One global freight forwarder or third-party logistics provider re-routing their ORD/JFK cargo to LCK per year with 50% capture of imports/exports
- Construction/utilization of existing off-airport property or a new ECCF high volume package sortation facility as soon as volumes demand

- Considerable effort by CRAA, public-private economic and business development stakeholders to expand export volumes in order to provide the air carriers with balance for the increase in import e-commerce to the ECCF facility
- Success in gaining one new export e-commerce aggregator to utilize LCK to route cross-border export e-commerce from LCK rather than competing hubs

3.14.7 Ramp, Apron, Parking and Infrastructure Considerations

The ACRP also provides advice regarding ramp, parking, and ground support equipment (GSE). This is supplemented by the Airports Council International-North America which provides general guidelines for facility guidelines. **Table 3-24 Additional Cargo Infrastructure Requirements** utilizes both sources to define the total additional land utilization requirements over the course of the planning period.

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Table 3-24 Additional Cargo Infrastructure Requirements

Time Period	Number of Cargo Buildings (100,000 SF each)	Aircraft Parking/Apron Area		GSE Storage Area		Floor Area Ratio (FAR) Area		TOTAL Area	
		SF	Acres	SF	Acres	SF	Acres	SF	Acres
2016-2021		0	0	0	0	0	0	0	0
2021-2026	2	1,200,000	27.5	231,727	5.32	333,333	7.65	1,765,060	40.47
2027-2031	2	1,200,000	27.5	231,727	5.32	333,333	7.65	1,765,060	40.47
2032-2036	3	1,800,000	41.42	347,591	7.98	500,000	11.48	2,647,591	60.88
TOTAL	7	4,200,000	96.42	811,045	18.62	1,166,666	26.78	6,177,711	141.82

Source: IMS Worldwide, 2017

From Airports Council International, North America - Air Cargo Guide 2013: *"For general purposes, a very rough rule-of-thumb for estimating apron requirements assumes six square feet of apron for every one square foot of available cargo building area. This must also consider the fleet mix of the potential tenants and users. This number includes taxiways/taxilanes, service roads, marshalling areas and aircraft parking positions." For the table above, the ratio used is number of buildings multiplied by 100,000 SF.*

From ACRP Report 143: *The GSE Storage Ratio is determined by taking the total tons estimated for 2036 at 900,260 and dividing by 1.11 to determine the SF required for GSE which will total 811,045 as reflected above.*

From City of Columbus Code of Ordinances 3372.567: *The Floor Area Ratio is based on their local requirement of total number of SF divided by 0.6.*

By applying the ACRP's ratios for parking space (1.2 SF of parking space for every square foot) and square feet to truck dock/door ratio (2,900 SF/door), it was determined that a 100,000-square foot facility will require 120,000 square feet of parking space, which means 840,000 square feet will be needed for the seven new facilities combined. Each facility will require up to 35 truck dock/doors or access points on both the landside and airside of the facility (i.e. ACT 5 has 24 truck/landside doors and two drive-in ramps for a total of 26 truck landside access points). ACRP recommends that for all warehouses, 25% of doors are required on the airside of the building, while 75% are required on the landside.

3.14.8 Additional Considerations

Ground handling operations occur at different paces in different markets. The "turn time" for a fully loaded Boeing 747-8 or 777 with a complete unload and a complete upload, or "taxi in" to "taxi out" times, varies greatly depending on the airport and the operator. Compression of this cycle is one of the clear advantages LCK has over large, more congested gateways. If a carrier chooses to use LCK for their inbound rotation but not fully load for their outbound operation, this will impact the total time required to support the combined operations. At LCK, as loads for imports and export match-up in terms of volumes, it will change the cycle time for the aircraft on the ramp. During this transition, it will be necessary to add labor and facilities in order to manage dwell time once both inbound and outbound operations are full down/up loads rather than partial loads.

This may not be a critical consideration during normal operations, but during peak season the timing of arrivals and departures and aircraft dwell time on the ramp/apron will directly impact the utilization of the apron and ramp. Another element that must be included is the access available to aircraft by loaders and snow-removal service equipment, which must be built into the demand expectation for the ramp and apron. On the landside, accommodations for parking of employees, pick-up, delivery, and line-haul vehicles will need to be factored as will the storage space required for support equipment that can be located outside the cargo security space.

3.15 General Aviation Facilities

General aviation (GA) typically accommodates a wide range of facilities and businesses, including all aviation segments except commercial passenger, air cargo, or military. At most airports, the general aviation fleet consists primarily of small single- and multi-engine aircraft, as well as small to mid-sized corporate business jets. However, at LCK, general aviation activity does not follow this common pattern. The majority of the small general aviation aircraft in the area, including small business jets are accommodated at Bolton Field Airport (TZR) and The Ohio State University Airport (OSU). Mid-sized to large corporate business jets are accommodated at John Glenn Columbus International (CMH). At LCK, general aviation includes a wide range of aircraft types, from small single-engine aircraft to large charter aircraft. However, the focus of the GA facilities and services is primarily on large aircraft. Rickenbacker Aviation, currently housed in Building 532, provides a wide variety of FBO services, including aircraft fueling, aircraft de-icing, ground service equipment, and ground handling of aircraft. Rickenbacker Aviation is capable of servicing large aircraft such as the Boeing 747-8F, as well as other cargo, passenger, and small general aviation aircraft. Planning guidance for general aviation facilities provided in FAA and ACRP guidebooks are primarily oriented towards facilities serving ADG I and II aircraft. However, general aviation facilities at LCK should be able to accommodate aircraft as large as ADG IV. Therefore, the analysis of the general aviation requirements at LCK needs special attention and adaptation of the design guidelines. In addition, planning for general aviation facilities at LCK is largely dependent upon the airport business plans and marketing efforts directed to attract certain kinds of general aviation market segments, as well as the need for the continuation of services and the availability of facilities currently being provided to general aviation users.

The requirements for the GA area are based on data presented in the inventory, activity forecasts, and information obtained during meetings with CRAA staff. The primary components analyzed include:

- Aircraft Storage (Hangar & Aircraft Tie-down Facilities)
- General Aviation Terminal Facilities
- Fixed Base Operator (FBO)

3.15.1 General Aviation Facilities Basic Requirements

According to ACRP Report 113, Guidebook on General Aviation Facility Planning, the guidelines shown in **Table 3-25 General Aviation Facilities Basic Requirements** are general requirements and principles for planning general aviation facilities.

Table 3-25 General Aviation Facilities Basic Requirements

Safety	Facilities should be developed according to FAA standards. New facilities should not create hazards to air navigation or obstruct the line-of-sight. Location of new facilities should be planned to minimize the potential for runway incursions.
Efficiency	Facilities should be planned to maximize the development of space, consider the flow of traffic, minimize conflicts between operations and service providers, and provide adequate and efficient ground access.
Economics	Facility developments should take into consideration the benefits versus the costs. New facilities should be planned based on reasonable construction costs and a reasonable financial plan, providing opportunities for revenue generation to support the operation and maintenance of the facilities.
Expansion	Facilities should be planned to facilitate expansion when the demand triggers are reached. New facilities should not constrain the available space for future development.
Balance	Facilities should be planned consistent with the airplane design group (ADG). Facilities should be consistent with other facilities and the runway/taxiway capability.
Consistency	Facilities should be planned consistent with the CRAA's visions, community goals and plans, the ALP, FAA grant assurances, and the established airport minimum standards.

Source: Adapted from ACRP Report 113 Guidebook on General Aviation Facility Planning

3.15.2 Based Aircraft Storage

Table 3-26 Based Aircraft Parking Preferences shows the general aviation user preferences regarding the type of aircraft storage. Small single-engine aircraft can be accommodated in T-Hangars, which are generally designed to accommodate 5 to 20 aircraft in a single building. A lower cost option is the apron tie-down. However, apron tie-down parking positions do not protect aircraft from the environment. Multi-engine and turbo-prop aircraft are more expensive aircraft and users generally prefer the protection provided by a T-Hangar or, in the case of larger aircraft, a conventional hangar. The general preference is to store jet aircraft in conventional hangars. Helicopters, depending on their use, are generally stored in conventional hangars or on the tie-down apron. Smaller helicopters may be accommodated in T-Hangars. Large general aviation aircraft are usually chartered from airlines or other aircraft operators, and typically they remain on the apron for a short period.

Table 3-26 Based Aircraft Parking Preferences

Storage Type	Single Engine	Multi-Engine	Turboprop	Jet	Helicopter
Apron Tie-Down	20%	20%	0%	0%	50%
T-Hangar	80%	60%	0%	0%	10%
Conventional Hangar	0%	20%	100%	100%	40%
Total	100%	100%	100%	100%	100%

Source: Michael Baker International, Inc., 2017

The aircraft storage percentages were applied to the based aircraft forecasts for the 20-year planning period to identify the storage needs at the five-year benchmarks. **Table 3-27 Aircraft Storage Demand** identifies the based aircraft requirements for each aircraft type. The number of based aircraft is forecasted to increase from 3 in 2016 to 33 by 2036.

Table 3-27 Aircraft Storage Demand

Storage Type	Single-Engine	Multi-Engine	Turboprop	Jet	Helicopter	Total
2016						
Apron	2	0	0	0	0	2
T-Hangar	0	0	0	0	0	0
Conventional	0	0	1	0	0	1
Total	2	0	1	0	0	3
2021						
Apron	2	0	0	0	0	2
T-Hangar	5	2	0	0	0	7
Conventional	0	0	1	2	0	3
Total	7	2	1	2	0	12
2026						
Apron	3	0	0	0	0	3
T-Hangar	9	2	0	0	0	11
Conventional	0	0	1	3	0	4
Total	12	2	1	3	0	18
2031						
Apron	3	0	0	0	0	3
T-Hangar	14	3	0	0	0	17
Conventional	0	0	1	5	0	6
Total	17	3	1	5	0	26
2036						
Apron	4	0	0	0	0	4
T-Hangar	18	4	0	0	0	22
Conventional	0	0	1	6	0	7
Total	22	4	1	6	0	33

Source: Michael Baker International, Inc., 2017.
Note: Numbers may not add up due to rounding.

Currently there are no T-Hangars or conventional hangars for general aviation aircraft storage at LCK. However, the multi-tenant building is now the home of the FBO and provides hangar space for general aviation aircraft. Development of additional hangar space will depend on the CRAA's business plan, cost/benefit analysis, and/or the ability of these facilities to generate revenue and be self-sustaining.

3.15.3 Transient Aircraft Apron

As previously noted in the inventory chapter, the FBO Apron, adjacent to the multi-tenant facility (Building 7250), is the primary apron for transient general aviation aircraft parking. This FBO Apron provides approximately 418,000 square feet (46,444 square yards) of apron space. The apron adjacent to the former FBO (Building 532) and apron adjacent to the Airnet

II hangar (Building 1001) provide a total of 141,000 square feet (15,666 square yards). The approximate total general aviation apron space available is 559,000 square feet (62,111 square yards).

The demand for an aircraft parking apron can be estimated based on itinerant aircraft operations. This demand is estimated assuming that 50% of average day peak month (ADPM) are itinerant aircraft that will be using the apron. The area required per aircraft for a typical itinerant/transient apron will vary based on the design aircraft or fleet mix. The analysis assumes space requirements to include 300 square yards (SY) for small GA aircraft and 1,000 (SY) for larger aircraft (i.e. jets and multi-engine turboprop aircraft). Based on historical and forecasted operations data, the split between small aircraft and large aircraft was estimated to be approximately 50%. As presented in **Table 3-28 Transient Apron Demand**, a need for transient apron parking space is not required over the 20-year planning period compared to the total apron area available. However, this estimated area would accommodate primarily ADG I and ADG II aircraft. Due to the nature of the GA operations at LCK previously described, the transient apron can also accommodate up to ADG IV aircraft. Based on taxilane and parking position markings, the current size of the FBO Ramp would provide sufficient space for ADG I through ADG IV aircraft. However, the required dimensions of the taxilane object free area would limit the number of ADG III and ADG IV aircraft that could use the apron simultaneously. Different taxilane and parking position markings will be analyzed in the Alternatives Chapter.

Table 3-28 Transient Apron Demand

Year	ADPM	50% ADPM	300 SY Per Aircraft		1,000 SY Per Aircraft		Total SY
			50%	SY	50%	SY	
2016	84	42	21	6,300	21	21,000	27,300
2021	103	52	26	7,800	26	26,000	33,800
2026	128	64	32	9.600	32	32,000	41,600
2031	155	78	39	11,700	39	39,000	50,700
2036	193	97	49	14,550	49	48,500	63,050

Source: Michael Baker International, Inc., 2017

3.15.4 General Aviation Multi-Tenant Building

General aviation includes a variety of users and activities, from recreational flyers to large corporate flight departments, from small aircraft maintenance facilities to large maintenance, repair, and overhaul (MRO) facilities. As a result, planning for general aviation facilities does not depend just on the forecast of general aviation activity, but it is largely dependent upon the airport business plans and marketing efforts directed to attract certain kinds of general aviation market segments.

In 2017, CRAA consolidated their FBO, administration and operations functions into a new location (Building 7250). This 149,000 SF multi-tenant building consists of two floors. The first and second floors will include approximately 44,000 SF of space for CRAA administration and the FBO operation, including space for public reception, ground handling staff, a pilot's lounge, a bistro, and a conference room. In addition, approximately 13,000 SF on the first floor, and nearly 9,000 SF on the second floor are anticipated to be leased to an aeronautical activity business. Approximately 17,000 SF of the first floor and 14,000 SF of the second floor will be dedicated to offices for either aeronautical or non-aeronautical administrative (office). Office space is available on each floor in support of hangar tenant functions.

The new location also includes approximately 50,000 SF of hangar space in support of the FBO and future tenant activities. Approximately 8,500 SF of the hangar is anticipated to be leased by an aeronautical user. The hangar is a high-capacity space suitable for aircraft storage, corporate aircraft maintenance, repair and overhaul activities and a corporate flight department. The hangar is equipped with a fire suppression system, radiant floor heat, and air conditioning and electric throughout. Shop space is located adjacent to the hangar. On the west side of the facility there is outside space available for ground support equipment storage and fuel truck parking. The FBO Apron is located adjacent to the facility's southwest side.

According to the ACRP Report 113, Guidebook on General Aviation Facility Planning, the size of the facility can be estimated using a factor of 2.5 people (pilots and passenger) per peak-hour operation. The square footage per person will depend on the functions anticipated to occur inside the building. For planning purposes, an area of 100 to 150 square feet can be considered adequate to accommodate the peak-hour traffic. **Table 3-29 General Aviation Facility Requirements** shows the general aviation facility capacity demands for the 20-year planning period at five-year milestones.

Table 3-29 General Aviation Facility Requirements

Year	Factor	Square Feet	Peak Hour Operations (IFR and VFR)	Required Building Square Footage
2016	2.5	100-150	3	750 – 1,125
2021	2.5	100-150	5	1,250 – 1,875
2026	2.5	100-150	5	1,250 – 1,875
2031	2.5	100-150	5	1,250 – 1,875
2036	2.5	100-150	5	1,250 – 1,875

Source: Michael Baker International, Inc., 2017

Table 3-29 General Aviation Facility Requirements represents the minimum space required to accommodate the recreational and corporate aviation segment. Within this space the minimum services such as restrooms, flight planning rooms, and small waiting areas can be accommodated. Additional space is required to accommodate other segments of general aviation, such as large maintenance facilities and large business or charter aircraft. This multi-tenant facility is capable of accommodating the airport's FBO and airport administration requirements throughout the planning period.

3.16 Support Facilities

As described in AC 150/5070-6B, support facilities include a wide range of functions intended to ensure the smooth, efficient, and safe operation of the airport. The FAA provides design guidelines for these facilities in the Advisory Circulars and ACRP reports. However, the requirements for these facilities were also based on interviews with airport staff, airport tenants, and users which facilitated a better understanding of the existing and future facility requirements.

3.16.1 Aircraft Rescue and Firefighting Services

The airport is currently a 14 CFR Part 139, Class I certificated airport, categorized as ARFF Index B. However, the facility maintains equipment capable of meeting Index E requirements. Over the 20-year planning horizon, a requirement to increase the ARFF Index is not expected. The availability of this equipment is expected to continue over the 20-year planning horizon. Therefore, there are no additional ARFF requirements.

3.16.2 Aircraft Fuel Storage Requirements

The objective of the analysis below is to determine the fuel storage requirements at LCK. The analysis is based on the ability of the fuel farm to maintain a five-day supply of Jet-A and a two-week supply of AvGas (100 LL) fuel. The analysis begins by classifying the forecasted operations by the type of fuel, as shown in **Table 3-30 Operations Forecast by Fuel Type**. The classification assumes that single- and multi-engine general aviation aircraft use AvGas and all other operations use Jet-A.

Table 3-30 Operations Forecast by Fuel Type

Year	Jet-A Operations				AvGas Operations
	Air Carrier	Air Cargo	General Aviation	Total	General Aviation[1]
2016	1,438	7,458	2,113	11,009	8,690
2021	2,129	12,106	2,330	16,565	9,028
2026	2,245	19,275	2,571	24,091	9,370
2031	2,368	26,772	2,841	31,981	9,714
2036	2,497	38,167	3,143	43,807	10,058

Source: Michael Baker International, Inc., 2017
Notes:
1. *Assumes that all single- and multi-engine general aviation aircraft use AvGas*

Table 3-31 Year 2016 Fuel Flowage shows the monthly and annual average fuel flowage, as well as the approximate average fuel supply required.

Table 3-31 Year 2016 Fuel Flowage

Month	Jet-A (gallons)	AvGas (gallons)
January	463,926	1,192
February	375,738	1,471
March	479,233	1,882
April	420,548	960
May	520,889	587
June	563,351	1,826
July	584,375	1,933
August	546,837	1,184
September	535,360	829
October	612,461	421
November	616,611	393
December	792,554	595
Annual Total	6,511,883	13,273
Average Five-Day (Jet-A)[1] /Two-Week (AvGas)[2]	89,204	511
Annual Gallons per Annual Operations Ratio[3]	591.51	1.53

Source: CRAA

Notes:

1. *Estimated by dividing the annual fuel flowage by 73*
2. *Estimated by dividing the annual fuel flowage by 26*
3. *Estimated based on the 2016 operations shown in Table*

The estimated fuel storage requirements shown in **Table 3-32 Fuel Storage Requirements** assume that the annual gallons per annual operations ratio will remain constant over the planning period. Currently there are eight 50,000-gallon underground Jet A tanks and one 20,000-gallon above ground AvGas tank. The underground tanks date back to 1953 and provide a total capacity of 400,000 gallons of Jet-A. Therefore, based on the assumptions, the current fuel farm is capable of providing an adequate average fuel supply throughout the 20-year planning period.

Table 3-32 Fuel Storage Requirements

Year	Jet A (gallons)		AvGas (gallons)	
	Annual Requirement	Average Five-Day Requirement	Annual Requirement	Average Two-Week Requirement
2016	6,511,883	89,204	13,273	511
2021	9,798,287	134,223	13,789	530
2026	14,249,957	195,205	14,312	550
2031	18,916,934	259,136	14,837	571
2036	25,912,077	354,960	15,362	591

Source: Michael Baker International, Inc., 2017

Based upon the methodology assumptions above, approximately 354,960 gallons of Jet-A and 591 gallons of AvGas storage would be required to provide an average five-day supply of Jet-A fuel and two-week supply of AvGas fuel at LCK by the end of the 20-year planning period. Based upon the age of the fuel storage facilities, the use of above ground fuel tanks tied into the fuel hydrant system should be considered in conjunction with the future expansion of fuel farm capacity. Different expansion alternatives and locations will be evaluated in the development alternatives chapter.

3.16.3 Snow Removal Equipment

FAA AC 150/5220-20A, Airport Snow and Ice Control Equipment provides guidance regarding the selection of the appropriate snow and ice control equipment for airport use. As a general requirement, runways and taxiways should be maintained, if possible, to a no worse than wet condition. In other words, there should be no accumulation of contaminants (snow or ice) during winter storms.

The minimum snow and ice control equipment requirements are defined by two parameters, the total square footage of the Priority 1 paved area, and the airport's service classification area. The Priority 1 airfield clearing area is described in the LCK Snow and Ice Control Plan (SICP), and includes the following areas:

- Runway 5R-23L
- Taxiways A, B, and G
- Ramp 1 taxilane route to Ramp 1 aircraft parking spaces
- Ramp 2 aircraft parking spaces
- Terminal Ramp (if flights are scheduled)
- Ramp 3 parking spaces
- FBO Ramp (adjacent to Building 7250)
- Emergency access roads
- ILS critical areas

FAA AC 150/5200-30D, Airport Field Condition Assessments and Winter Operations Safety, defines the minimum clearance times for commercial service airports. The clearance times for commercial service airports are determined by the total annual airplane operations (including cargo operations). Over the 20-year planning period, the total annual aircraft operations are forecasted to increase from 26,307 operations in 2016 to 60,473 operations in 2036. According to this operational level, the minimum time to clear 1 inch of falling snow weighing up to 25 lb/ft^3 on the Priority 1 areas is one hour. According to the current SICP, historically LCK averages approximately 28 inches of snow per winter year and most snow and ice events produce less than 4 inches of total contaminant accumulation. The SICP also indicates that the current clearance time for the Priority 1 areas is typically under two hours.

Table 3-33 Minimum Required Snow Removal Equipment shows the minimum snow removal equipment requirements described in FAA AC 150/5220-20A. **Table 3-34 Snow Removal Equipment Inventory** shows the existing inventory of snow removal equipment as of 2018. The current snow and ice removal equipment at LCK exceeds the minimum requirements. Additional supplemental equipment such as plow trucks, front-end loaders, and solid deicer are also available. The equipment is currently housed in the Snow Removal Equipment (SRE) building located in the airport maintenance complex. Future equipment requirements are dependent upon the square footage of the future Priority 1 area, which may increase as new critical areas such as taxiways and aprons are developed in the future.

Table 3-33 Minimum Required Snow Removal Equipment

Equipment	Minimum Required[1]
High-Speed Rotary Plows	2
Displacement Plows	4
Sweeper	8[2]
Hopper Spreader	8[3]
Front End Loader	3[4]

Source: Snow and Ice Control Plan, CRAA. FAA AC 150/5220-20A Airport Snow and Ice Control Equipment
Notes:
1. *Determined using the FAA Central Region Airport Division Planning Section snow removal equipment calculation spreadsheet provided by CRAA*
2. *One per 750,000 square feet pavement*
3. *One hopper spreader per 750,000 square feet of pavement*
4. *One front end loader per 500,000 square feet of critical apron space*

Table 3-34 Snow Removal Equipment Inventory

Equipment Type	Brand	Model	Mfg Year	Size/Capacity
Tractor/Plow	John Deere	2500	2008	14 ft Ramp Hog
Tractor/Plow	John Deere	2500	2008	14 ft Ramp Hog
Tractor/Plow	John Deere	2500	2008	14 ft Ramp Hog
Tractor/Plow	New Holland	2500	2014	Small Loader Bucket/Ramp Hog
6x4 Plow/Sander	Oshkosh	7400	1990	18 ft Polycarb Blade/ Spreader
6x4 Plow/Sander	Oshkosh	7400	1990	18 ft Plow
6x6 Plow/Sander	Oshkosh	7400	1996	22 ft Plow/V-bed-Rub
6x6 Plow/Sander	Oshkosh	2654	1997	22 ft Plow/V-bed-Rub
Dump/Plow Truck	International	2654	1999	11 ft Plow/V-bed
Dump/Plow Truck	Oshkosh	7400	1990	21 ft Sectional
Frontend Loader	Michigan	7400	1990	20 ft Ramp Hog
Frontend Loader	Case	7400	2002	20 ft Ramp Hog
Liquid De-icer Spray Truck	Ford	HB2518-16	1989	2,000-gal tank w/50 ft boom
Runway Broom	Oshkosh	HB2518-16	1997	18 ft Broom head
Runway Broom	MB	HA2318-53116	2016	18 ft Broom head
Runway Broom	MB	HA2318-53116	2016	18 ft Broom head
Runway Broom	FWD/Wausau	HB2518-53116	2006	18 ft Broom head
Runway Broom	FWD/Wausau	HB2518-53116	2006	18 ft Broom head
Runway Broom	FWD/Wausau	4900-2000	2006	18 ft Broom head
Runway Broom	Oshkosh/MB	4900-2000	1992	16 ft Broom head
Runway Broom	Oshkosh/Sweepster	6430	1997	16 ft Broom head
Runway Broom	Oshkosh/Sweepster	6430	2000	16 ft Broom head
Skid Steer Loader	Kubota	721	2016	Small Loader Bucket
Snow Blower	Idaho Norland	721	1990	3,000 ton/hour
Snow Blower	Wausau	721	2013	6,000 ton/hour
Snow Blower	Wausau	921	2013	6,000 ton/hour
Solid De-icer/Plow Truck	International	HB2518-3000	2019	12 ft Rollover Plow/V-bed

Source: CRAA (March 2019)

3.16.4 Aircraft and Airfield Pavement Deicing Activities

The CRAA is responsible for deicing common airfield paved surfaces using potassium acetate and sodium formate, and the U.S. Environmental Protection Agency (USEPA) prohibits the use of urea. The CRAA also plows runways, taxiways, and aprons as necessary and performs limited deicing for walkways and other paved areas using conventional pavement deicers. Tenants at LCK are responsible for pavement deicing in their leasehold areas. Minimal pavement deicer chemicals are applied, and controls are not expected unless significant airfield pavement expansions occur. Propylene glycol-based aircraft deicing fluids (ADF) and aircraft anti-icing fluids (AAF) are applied by individual carriers or the LCK FBO at dedicated locations within the terminal and cargo ramps following FAA safety guidelines. The amount of ADF/AAF applied varies greatly depending on weather conditions and flight schedules, but entities performing aircraft deicing/anti-icing activities apply the minimum amount of fluid that allows for safe operation of the aircraft and minimizes the impact on storm water discharges.

LCK operates in accordance with a National Pollutant Discharge Elimination System (NPDES) permit issued by Ohio EPA (expires December 31, 2021). While no deicing effluent limitations are contained in the permit, projected 30-day average effluent limitations for $CBOD_5$ (200 mg/l), ethylene glycol (140,000 ug/l), and propylene glycol (71,000 ug/l) are provided. Should projected effluent limitations be consistently exceeded, additional operational or structural controls will be necessary.

In 2019, CRAA will purchase a glycol recovery vehicle (GRV) to assist in the collection of high strength ADF-impacted stormwater runoff from aircraft deicing/anti-icing application areas. While the GRV is expected to reduce discharges based on current operations, additional controls may be needed as cargo and passenger flights increase. These controls may include structural or operational controls within the cargo and passenger ramp areas using the existing drainage systems, block, and pump, additional GRVs or a combination of controls.

3.16.5 Airport Maintenance Complex

Airport maintenance facilities are located within the maintenance complex off Club Road, northwest of the existing CRAA administrative offices (Building 7250). The complex includes facilities for the storage of maintenance equipment, a maintenance garage, fueling station and a triturator for disposing of airline waste. Recommendations for future maintenance facility improvements are highlighted below.

Maintenance Storage Facilities

CRAA has two maintenance storage facilities (Buildings 556 and 557) that are currently used to store sand, sodium formate and salt materials used for snow and ice control. The buildings are severely deteriorated, in poor condition and the doors and heating systems are not functional. The facilities are adequate for storage of snow removal material; however, during periods of increased aircraft activity CRAA must replenish the supply more often. In addition, CRAA should consider providing a heated space in support of the FAA recommendation of heating the sand prior to spreading. This best practice helps to prevent clogging and ice blockage of equipment. It is recommended that a larger heated facility be assessed during the alternatives phase of this Study in support of future airport development plans.

Maintenance Garage

The Maintenance Garage (Building 558) consists of three maintenance bays (including one drive-on lift), one bay with a 7.5-ton crane, and one wash bay. The facility is in good condition, functional and is well maintained. Originally, the garage facility was designed to work on smaller equipment and small trucks. Since CRAA became the fixed base operator at the airport, this facility is now used to maintain over 139 pieces of larger FBO support equipment. At times maintenance personnel must use the wash bay for maintenance activities due to size limitations of the existing bays. As the airport operation continues to grow, CRAA should consider expanding this facility to provide an additional larger service bay capable of accommodating current equipment. With the increase of service technicians, additional offices and technical room areas will also be needed. Recommendations related to future expansion will be addressed during the alternatives phase of this Study.

Snow Removal Equipment Building

The Snow Removal Equipment (SRE) building is used to store large snow removal equipment. The facility is equipped with drive through bays, a fire protection system, adjacent offices, a break room, rest rooms and a storage room. The facility is in good condition, well maintained, and is heated. The SRE facility serves its purpose by keeping the snow removal equipment fleet in ready condition in accordance with the airport's approved Snow and Ice Control Plan. Because this building is heated, crews often park snow removal trucks loaded with sand inside the main garage area to keep the material warm prior to spreading. In the future, additional snow removal equipment storage capacity may be needed in support of future airfield expansion. This would occur if the snow removal priority areas increase in size. This increase will be determined as part of the alternatives analysis phase of this Study.

Other Maintenance Facilities

Within the airport maintenance complex, CRAA maintains a series of other facilities which include additional maintenance storage (Building 558B), a fueling station (Building 558A), and a triturator (Building 559). These facilities are in good condition and well maintained. Beyond regular maintenance, no additional expansion of these facilities is required during the planning period.

Perimeter Road

As mentioned in the inventory section of this Study, an Airport Perimeter Road is located just outside the security fence line of the airport. By definition, an Airport Perimeter Road is commonly used by airport support vehicles to access areas of the airport to perform work functions without having to cross active taxiways and runways or travel on public roadways.

As new warehouse and distribution facility development continues to occur outside the southern and southeastern boundaries of the airport, opportunities to inspect the fence are reduced. Therefore, it is recommended that an Airport Perimeter Road be developed inside the fence line to remedy this situation. In addition, an inner perimeter road would have the added benefit of reducing the number of vehicle crossings of open movement area on the airfield. According to CRAA operations staff, equipment regularly crosses movement areas to gain access to the east side of the airfield. This also results in the need to provide movement area training to individuals only for the purpose of trying to gain access to the far side of the airfield. Options for providing the inner perimeter road access will be evaluated as part of the airport development alternatives process.

3.17 Utilities

Utility services at LCK are provided primarily by off-airport organizations. Utility organizations include the City of Columbus (storm drainage/sewer/water), Franklin County (water/sewer), Earnhart Hill (water/sanitary), Columbia Gas (natural gas), South Central Power (electric), American Electric Power (electric), Spectrum (telecommunications), Sprint (telecommunications), and AT&T (telecommunications).

The existing utility infrastructure systems meet the current needs and demand of airport users. However, future growth in existing and undeveloped areas may require additional utility infrastructure enhancements. For example, future development of the south side of the airport will require coordination with the respective utility organizations as infrastructure is limited or nonexistent in this area. As CRAA implements the capital improvement program developed in this Study, the Authority should consult and coordinate with utility organizations to ensure the efficient upgrade of utility infrastructure.

CRAA, utility, and tenant representatives should be actively engaged during the development process. It is recommended that coordination be conducted during the planning and preliminary design stages to help ensure that airport users are sufficiently served by utility services. Coordination efforts should also focus on preserving appropriate and compatible land area for the implementation of utility infrastructure.

A detailed description of the existing utility infrastructure and services at LCK is included in **Chapter 1, Inventory of Existing Conditions** (Section 1.2.16, page 1-56).

3.18 Airspace and Obstruction to Air Navigation

Based on the airfield capacity analysis it was determined that LCK is currently not constrained by its capacity to handle future aviation demand. The capacity analysis concluded that additional runways or major airfield reconfigurations are not necessary over the 20-year planning period. Therefore, reconfiguration of the airspace or major re-design of the existing standard instrument procedures is not required. However, with the implementation of NextGen technologies and flight procedures, continuous airspace obstruction analysis is recommended to ensure availability and capability of future technologies for standard instrument procedures.

The ultimate location of the runway ends is not expected to change over the 20-year planning period. Therefore, the location and dimensions of the Part 77 surfaces and obstacle clearance surfaces are not expected to change. Analysis of potential penetrations of the Part 77 surfaces and obstacle clearance surfaces will be performed as part of the evaluation of the proposed development alternatives.

3.19 Land Area Requirements

The purpose of the land area requirements is to review the airport's facilities in comparison to FAA standards in order to identify additional property that may be required for inclusion into the land property envelope. The additional properties may be necessary for land use compatibility purposes, future development needs, or to obtain control over an RPZ. For LCK, the developments envisioned in this Study should not require additional property acquisition during the planning period. However, the establishment of additional avigation easements will be further assessed based upon the results of the noise analyses performed as part of this Study.

In addition to possible easements, CRAA should continue to work with the Cities of Columbus and Groveport, the Village of Lockbourne, and Franklin and Pickaway Counties to ensure prevention of future incompatible land uses. It is noted that the City of Columbus, Groveport, and Franklin County have established an Airport Environs Overlay (AEO). The general purpose of the AEO is to protect public health, safety, and welfare by regulating development and land use within the areas surrounding the airport. Updated noise contour information and land use compatibility recommendations developed as part of this Study will also be shared with the Mid-Ohio Regional Planning Commission (MORPC) for use in their 2018 Rickenbacker Area Comprehensive Study.

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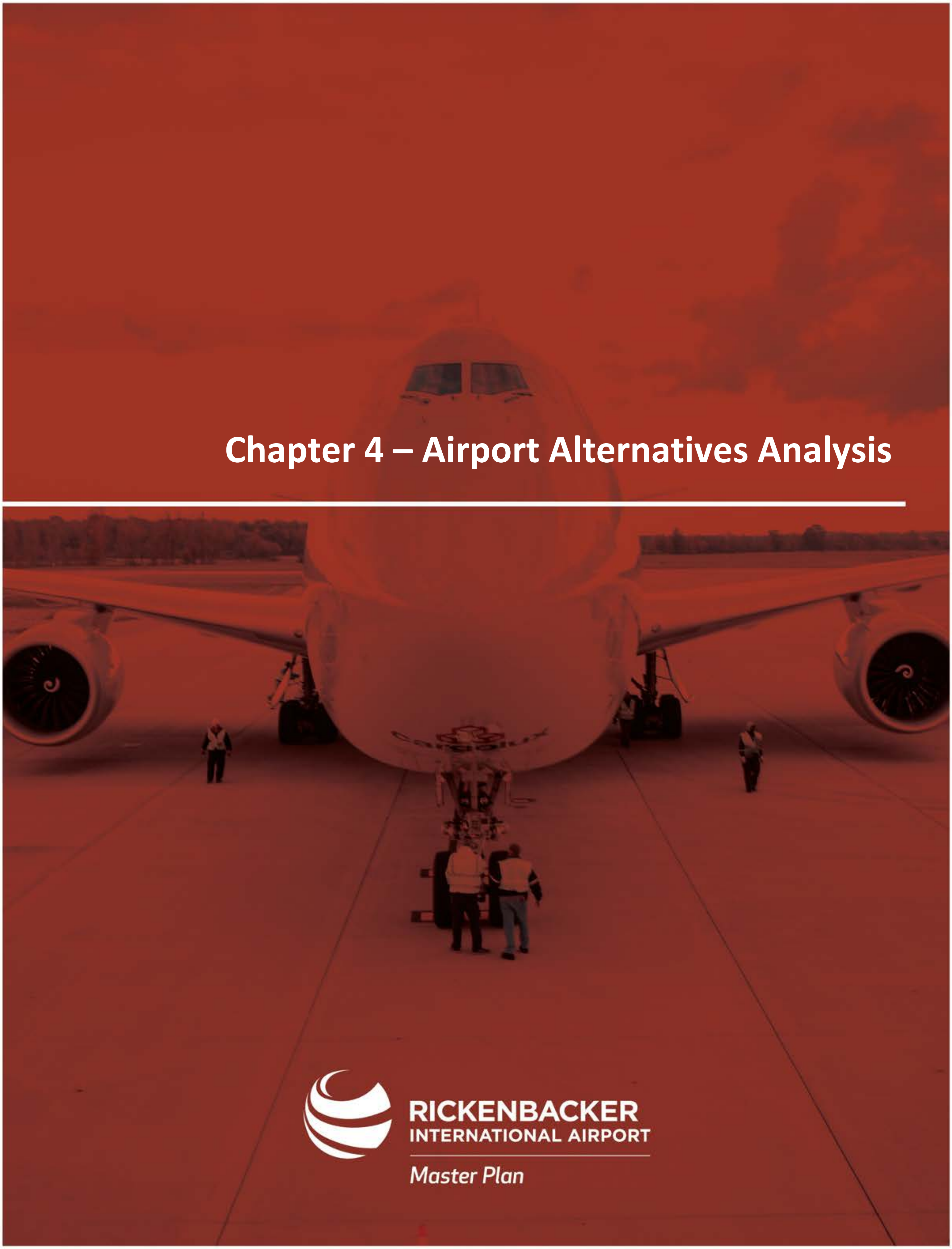
Chapter 4 – Airport Alternatives Analysis



RICKENBACKER
INTERNATIONAL AIRPORT

Master Plan

4.0 Airport Alternatives Analysis

This section includes the development of graphical alternatives which depict methods to either resolve deficiencies or to construct new facilities as necessary to meet future demand expectations at Rickenbacker International Airport (LCK). The alternatives include potential improvements to both airside and landside facilities and also include a review of land use compatibility.

This chapter introduces the preliminary alternatives for the Rickenbacker International Airport, which are intended for discussion purposes between the various stakeholders including CRAA, the Stakeholder Advisory Committee (SAC) for this Study, and the public. The individual components of each preliminary alternative were evaluated to aid in the selection of a preferred alternative that represents the desired development plan for the 20-year planning period. For that reason, the preliminary alternatives should be viewed as flexible development plans that may be refined or combined to best satisfy the needs of the airport's stakeholders. The main intent of the preliminary alternatives is to evaluate realistic airfield development options that would satisfy the facility requirements identified in the previous chapter and to analyze the aviation and non-aviation development and redevelopment possibilities for vacant parcels on the airport property. The preferred alternative, as presented in Chapter 5, will illustrate the recommended layout of all landside developments, such as air cargo facilities, the passenger terminal, hangars, aprons, and support facilities. The preliminary alternatives should subsequently be viewed as a broad examination of relationships between required and desired airside and landside developments in order to provide a clear understanding of the airport's possibilities and limitations.

The following elements are covered within this chapter:

- Development Constraints
- Airfield Analysis
- Instrument Approach Analysis
- Land Use Analysis
- Passenger Terminal
- Air Cargo
- General Aviation
- Support Facilities

4.1 Alternatives Analysis Process

The alternatives analysis process is based on guidance provided in the Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5070-6B, Airport Master Plans. The development and analysis of alternatives incorporates input from CRAA, stakeholders, and the general public. An organized approach to identifying and evaluating a variety of alternatives is essential to effective planning. This includes identifying a standard set of evaluation criteria based on the goals and objectives of CRAA and existing constraints which will impact the development of alternatives.

4.1.1 Evaluation Criteria

In AC 150/5070-6B, the FAA recommends a standard set of criteria to evaluate development alternatives according to an airport's unique situation. The evaluation process should feature "generally accepted planning principles, be replicable, consistently applied, and documented." As a result, a set of evaluation criteria were established for use in this alternatives analysis. The criteria are strategic, qualitative, and quantitative to ensure that the evaluation process remained at a master planning level of detail. The selected criteria shown in **Table 4-1 Evaluation Criteria** include:

Table 4-1 Evaluation Criteria

Criteria	Definition
Achievement of Objective	This criterion is based on achieving the specific need identified in the Facility Requirements chapter. Alternatives are assessed based on the degree to which they satisfy the objective.
Airport Design Standards	The proposed development should satisfy applicable airport design standards and maintain or improve the safety and efficiency of the airport.
Flexibility	The alternative should support a reasonable level of flexibility to accommodate changes in demand and include the ability to expand in the future.
Collateral Impacts	This criterion evaluates the extent to which an alternative requires changes or improvements to existing airport facilities which otherwise would not require changes or improvements (e.g. Relocation of a road that is impacted by a cargo alternative is considered a collateral impact).
Probable Cost	The preferred alternative should be cost effective, within the means of CRAA to secure funding, and minimize the long-term financial commitment by the Authority or its tenants.
Efficiency of Construction Phasing	Construction of the proposed improvements should be implemented without undue interference to existing operations.
Environmental Compatibility	The preferred alternative should be consistent with environmental regulations and minimize impacts to the environmental impact categories identified in FAA Orders 1050.1F Environmental Impacts: Policies and Procedures Desk Reference and 5050.4B, National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions. Future development should support growth while minimizing impacts to the environment.

Source: AC 150/5070-6B; Michael Baker International, 2017

4.2 Development Constraints

Land uses on and near the airport property consist of airport-related infrastructure, commercial and industrial developments, warehouse, agriculture, institutional features, and open space. There are few land uses surrounding LCK that would be incompatible with the continued expansion of the airport's airfield and landside facilities (e.g., residential development). However, the current runway configuration is adequate and further expansion is not required. There are also vehicular and utility access limitations to some portions of the airport property that would need to be addressed in order to maximize the development potential of the property. As shown in **Figure 4-1 Development Constraints**, there are several wetlands and streams within the project area. These elements in addition to other environmental concerns are more fully discussed in **Appendix A, Environmental Overview** (Section A.16, p. A-28). If possible, new development should be avoided within these areas and expansion of some of the drainage features would likely be necessary in order to maintain sufficient stormwater capacity. Specific development areas identified in this analysis are more fully addressed in **Chapter 5, Refinement of Alternatives**. In addition, there is the potential for threatened and endangered species to be present in these areas. Other potential constraints considered during the alternatives analysis phase include previous ordnance activities, fuel investigations, hazardous waste contamination and monitoring sites.

All airport development actions must also avoid floodplain impacts whenever there is a practicable alternative. In addition, the design must also minimize the adverse impacts to the floodplain's natural and beneficial values and minimize the likelihood of flood-related risk to human life, health, and welfare. Based on a review of the current FEMA Federal Insurance Rate Maps (refer to **Figure 4-1**), portions of the project area are located within a 100-year floodplain and additional portions of the property boundary are located within a 500-year floodplain. Efforts to minimize impacts to those floodplain areas must be considered with any proposed development action. A more in-depth analysis of potential environmental impacts is provided in conjunction with the preferred alternative.

4.3 Airfield Analysis

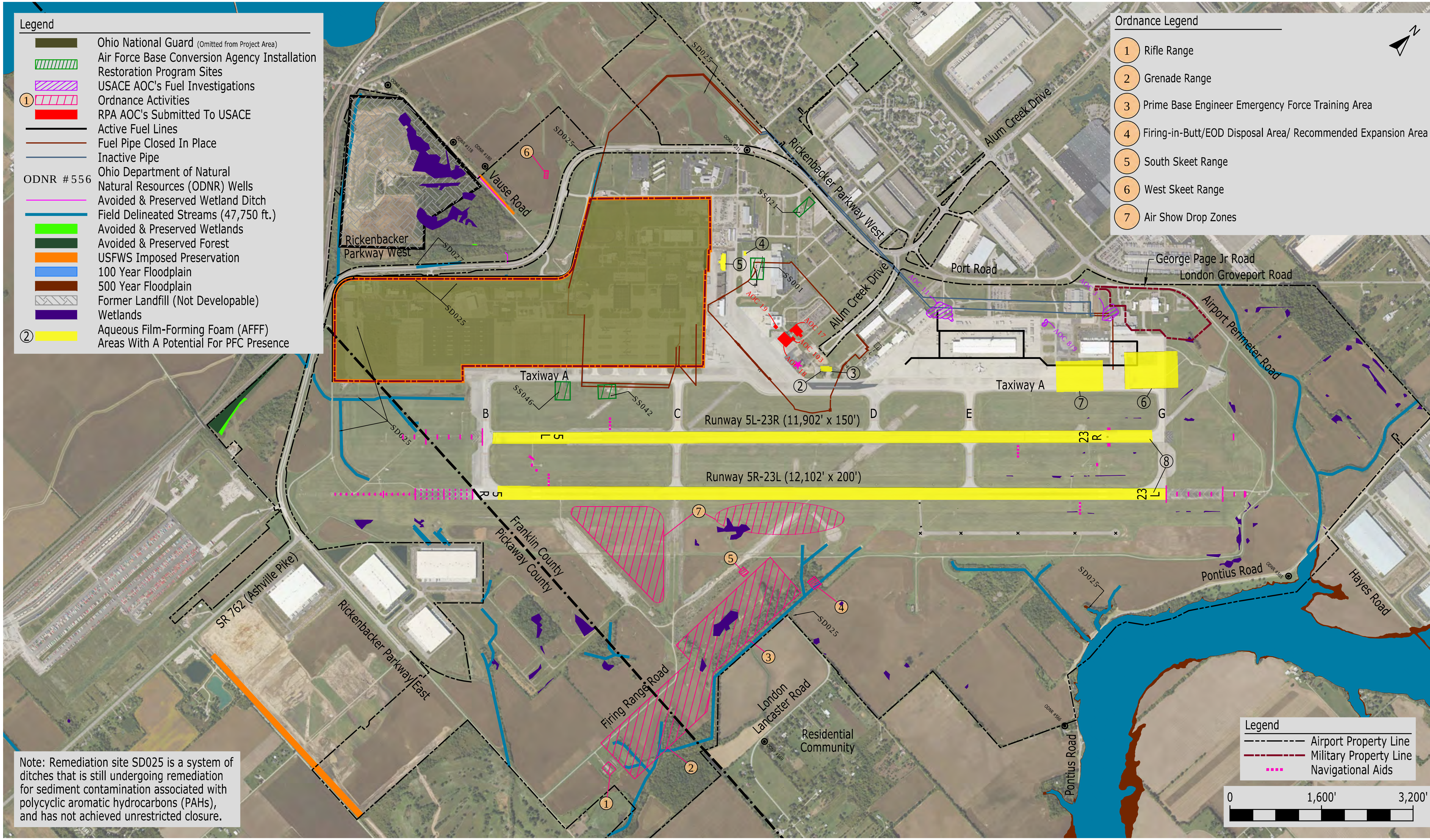
This section presents a series of airfield improvements that address the capacity, efficiency and safety requirements identified in **Chapter 3, Facility Requirements**. In addition, the following improvements, also shown in **Figure 4-2 Airfield Pavement Analysis**, are recommended to achieve compliance with FAA Airplane Design Group (ADG) VI and Taxiway Design Group (TDG) 5 design standards associated with the Boeing 747-8F critical aircraft:

Runway Width: In order to meet ADG VI design standards, portions of Runway 5L-23R will need to be widened by 50 feet to a total width of 200 feet. This improvement will be incorporated into the preferred development plan.

Runway and taxiway stabilized shoulder pavement: paved shoulders are recommended by the FAA for runways and taxiways which accommodate ADG III or higher. Runway and taxiway shoulder improvements are shown for ADG VI aircraft and will be incorporated into the preferred development plan. In addition to the taxiway shoulder improvements shown, shoulders are needed for portions of Runway 5L-23R and for the full length of Runway 5R-23L.

Taxiway Fillet Geometry: In order to meet TDG standards, taxiway fillet improvements are shown for TDG 5 aircraft and will be incorporated into the preferred development plan.

Runway Blast Pads: As identified previously in this Study, blast pads will be improved to meet the 280 feet wide by 400 feet long requirement as part of the preferred development plan.


Legend
Ohio National Guard (Omitted from Project Area)
Air Force Base Conversion Agency Installation Restoration Program Sites
USACE AOC's Fuel Investigations
Ordnance Activities
RPA AOC's Submitted To USACE
Active Fuel Lines
Fuel Pipe Closed In Place
Inactive Pipe
ODNR #556
Ohio Department of Natural Natural Resources (ODNR) Wells
Avoided & Preserved Wetland Ditch
Field Delineated Streams (47,750 ft.)
Avoided & Preserved Wetlands
Avoided & Preserved Forest
USFWS Imposed Preservation
100 Year Floodplain
500 Year Floodplain
Former Landfill (Not Developable)
Wetlands
Aqueous Film-Forming Foam (AFFF) Areas With A Potential For PFC Presence
Ordnance Legend
1 Rifle Range
2 Grenade Range
3 Prime Base Engineer Emergency Force Training Area
4 Firing-in-Butt/EOD Disposal Area/ Recommended Expansion Area
5 South Skeet Range
6 West Skeet Range
7 Air Show Drop Zones
Legend
Airport Property Line
Military Property Line
Navigational Aids
0
1,600'
3,200'
Note: Remediation site SD025 is a system of ditches that is still undergoing remediation for sediment contamination associated with polycyclic aromatic hydrocarbons (PAHs), and has not achieved unrestricted closure.
Runway 5L-23R (11,902' x 150')
Runway 5R-23L (12,102' x 200')
Taxiway A
Rickenbacker Parkway West
Vause Road
Alum Creek Drive
Port Road
George Page Jr Road
London Groveport Road
Airport Perimeter Road
Pontius Road
Hayes Road
SR 762 (Ashville Pike)
Rickenbacker Parkway East
Franklin County
Pickaway County
Firing Range Road
London Lancaster Road
Residential Community
SD025
SS021
SS001
SS046
SS042
SD027

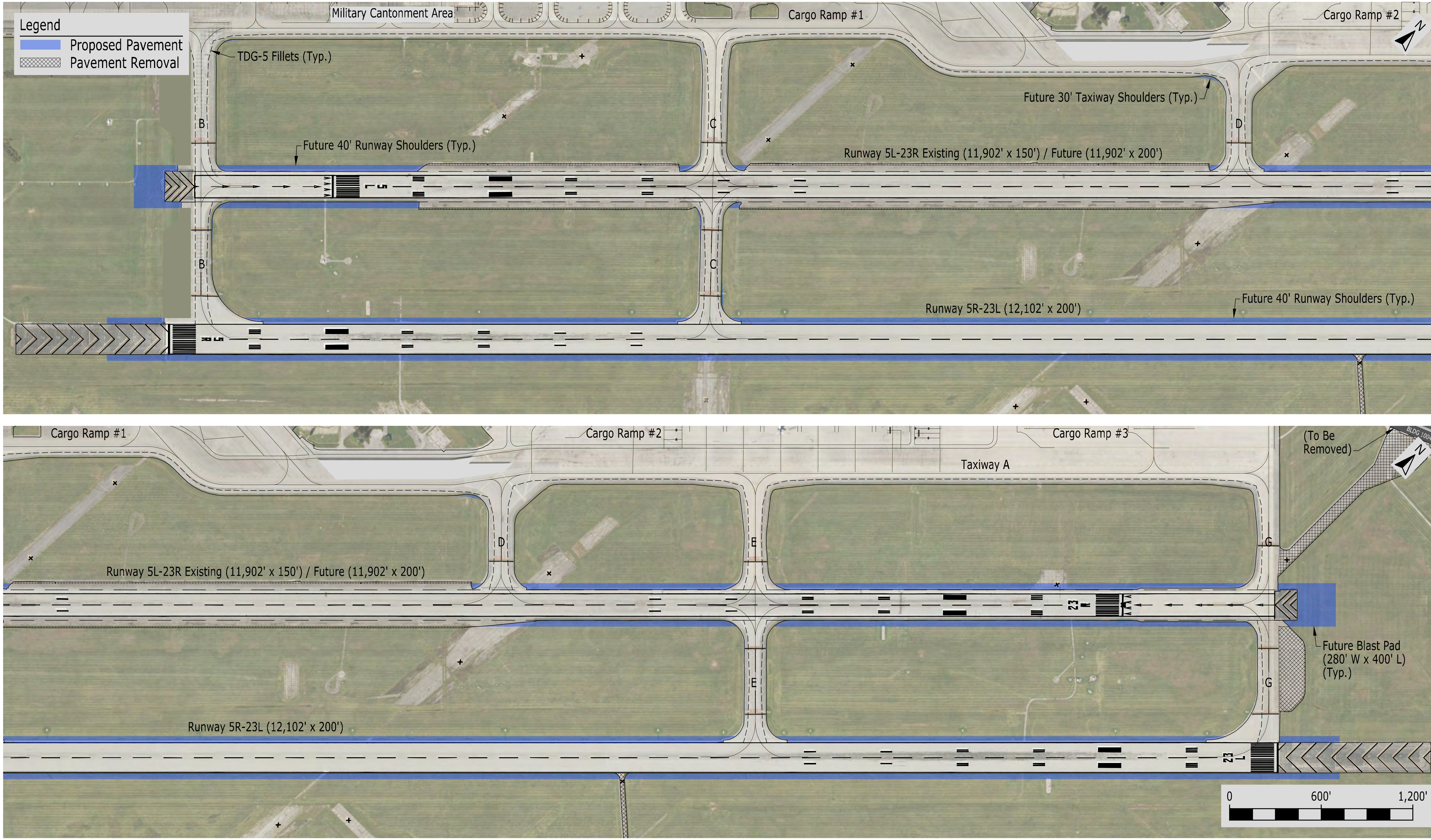


Figure 4-2 Airfield Pavement Analysis

4.3.1 Parallel Taxiway Alternatives

In the Facility Requirements chapter of this Study, the Planning Team determined that the existing parallel Taxiway A did not entirely meet the design standards associated with Airplane Design Group (ADG) VI aircraft. As discussed in **Chapter 3, Facility Requirements** (Section 3.9, p.3-13), converting the existing taxiway to meet ADG VI taxiway object free area (TOFA) standards would impact the row of existing military aircraft parking positions closest to Taxiway A. As such, this section considers two taxiway development concepts designed to meet current FAA airfield design requirements.

North Parallel Taxiway Alternative 1

Figure 4-3 North Parallel Taxiway Alternative 1 is designed to accommodate ADG VI/TDG 5 aircraft and take advantage of the portions of Taxiway A that currently meet the ADG VI TOFA requirement of 193 feet. This alternative maintains a runway centerline to taxiway centerline separation of 860 feet to the southwest. In addition, a partial parallel taxiway is provided near Taxiways E and G at a runway centerline to taxiway centerline separation of 550 feet. This separation preserves the future capability of establishing Category II approaches to Runway 5L-23R and eliminates direct access between the cargo ramp areas and the runway. The centerline of this partial parallel taxiway is located 310 feet from the centerline of Taxiway A. This spacing would allow for the simultaneous movement of Boeing 747-8 and AN-124 aircraft on these taxiways. Additional taxiway connections and pavement removal on Taxiways D, E and G are shown to eliminate direct access to the runway from the cargo ramps.

Although portions of this concept exceed the required minimum runway centerline to taxiway centerline separation of 550 feet, it results in a solution requiring less pavement overall. As a result, the TOFA associated with the new taxiway development remains clear of existing aircraft parking positions located in the military cantonment area. However, implementing this alternative will require closing a portion of the existing Taxiway A and establishing individual taxiway connectors to the military cantonment area and removal of pavement as the taxiway centerline to taxiway centerline separation requirement for ADG VI aircraft cannot be achieved.

North Parallel Taxiway Alternative 2

Figure 4-3 North Parallel Taxiway Alternative 2 depicts a new full-length parallel taxiway (11,740 feet long by 75 feet wide) capable of accommodating ADG VI/TDG 5 aircraft. By maintaining a minimum runway centerline to taxiway centerline separation of 550 feet, this alternative meets the prescribed design standards associated with the critical design aircraft while preserving for future Category II approach capability to Runway 5L-23R. Under this alternative, existing Taxiway A would continue to be used as a taxilane to serve the military cantonment area and cargo ramps. Similar to Alternative 1, direct access between the cargo ramp areas and the runway are eliminated by providing additional taxiway connections and removing pavement on Taxiways D, E and G as shown. Compared to North Parallel Taxiway Alternative 1, Alternative 2 requires additional pavement and taxiway lighting. However, additional connectors to the military cantonment area and pavement removal is not needed in this area under this alternative. The primary benefit of Alternative 2 over Alternative 1 is the ability to continue using Taxiway A without impacting operations and having to construct additional taxiway connectors leading into the military cantonment area.

South Parallel Taxiway Alternative

The South Parallel Taxiway Alternative shown in **Figure 4-3 Parallel Taxiway Alternatives**, depicts a new full-length parallel taxiway system south of Runway 5R-23L. This concept is designed to meet ADG VI/TDG 5 aircraft requirements and provide access to new airport facilities anticipated for the currently undeveloped south side of the airport. Development of the future parallel taxiway will likely involve consideration of previous military ordnance activities (referenced in **Figure 4-1 Development Constraints**) and removal of several abandoned facilities and pavement areas.

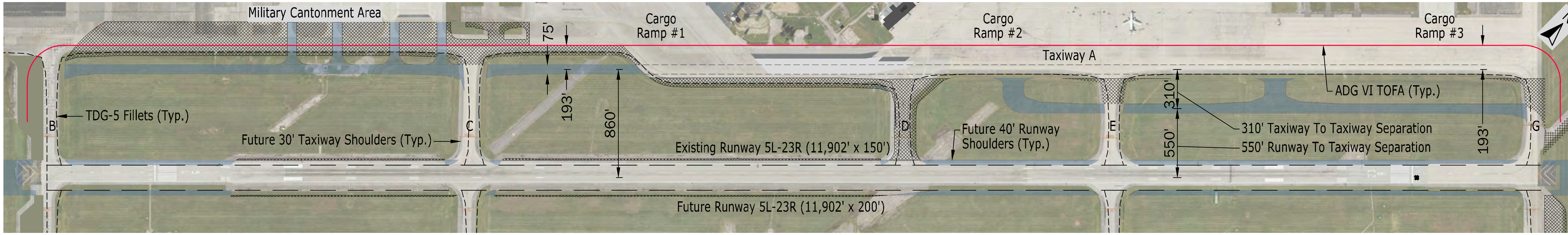
4.4 Instrument Approach Analysis

As part of the refined airfield alternatives analysis, the associated instrument approach procedures and implementation of new instrument approach technologies, such as Ground Based Augmentation System (GBAS), was considered for the existing ends of both runways.

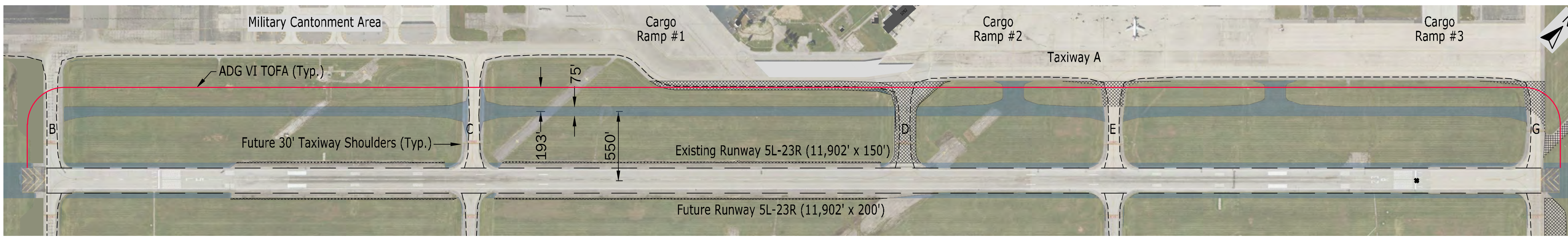
The airport is currently served by four separate traditional ground-based Category-I Instrument Landing Systems (ILS) supporting Precision-Instrument Approach Procedures (IAPs) to each runway end having published cloud base and visibility minimums down to 200 feet and ½ mile respectively. Runway 5R is also served by a Category-II ILS Precision-Instrument Approach Procedures offering published cloud base and visibility minimums down to 100 feet and 1,200 Runway Visibility Range (RVR).

Utilizing the FAA's space-based Wide Area Augmentation System (WAAS), the airport is also served by four RNAV (GPS) IAPs that provide Localizer Performance with Vertical (LPV) guidance capabilities that are similar in precision to the ground-based Localizer and Glideslope facilities of an ILS. Currently, each published LPV IAP serving each runway end provides cloud base and visibility minimums down to 200 feet and ½ mile (except Runway 23R offering ¾ mile) that are mirror those of the Category-I ILS.

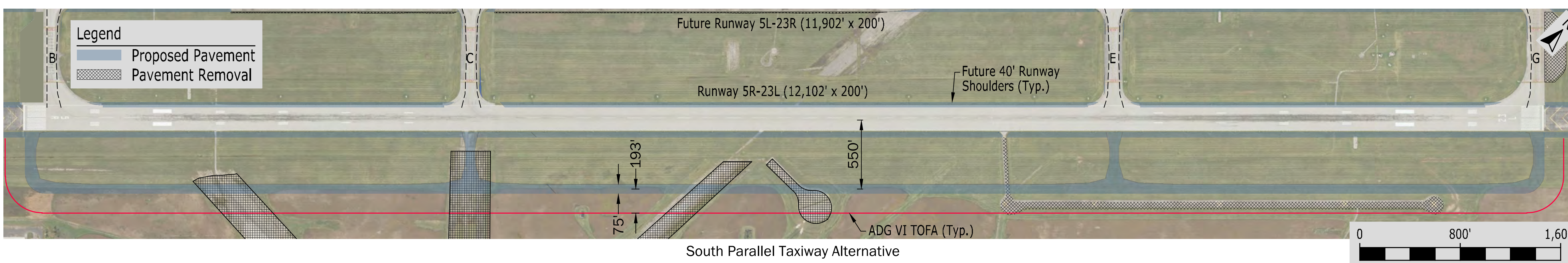
The FAA's continued effort to enhance WAAS space-based navigation systems and infrastructure is envisioned to allow equipped and qualified pilots the ability to take advantage of much more precise procedures without the need for traditional ground-based legacy navigational systems such as the Very High Frequency Omni-Directional Range antennas (VORs) and the ILS. It is anticipated that as the WAAS is further developed, such space-based navigation capabilities may someday serve to fully replace legacy VOR and ILS navigation systems.



North Parallel Taxiway Alternative 1



North Parallel Taxiway Alternative 2



South Parallel Taxiway Alternative

The FAA is currently enhancing the WAAS with its on-going development the Ground-Based Augmentation System (GBAS) that is envisioned to provide differential corrections and integrity monitoring of Global Navigation Satellite Systems (GNSS) offering navigation with extremely high accuracy, availability, and integrity necessary for Category I, and eventually Category II, and III precision approaches.

The FAA's potential development of the GBAS will be encouraged by CRAA as these emerging technologies and opportunities for implementation at LCK become available.

The analysis focused on identifying any existing or potential Threshold Siting Surface (TSS) obstructions. Unlike the Federal Aviation Regulations (FAR) Part 77 surfaces that are primarily used to adopt building height and land use restrictions around airports, the TSS is the surface that is evaluated to determine if one or more of the following actions are necessary:

- Obstacle clearing, marking, or lighting within the TSS.
- Displacement of the runway threshold because obstacles cannot be cleared from the TSS, resulting in a shorter landing distance.
- Modification of the approach glide path and/or threshold crossing height.
- Prohibition of nighttime operations unless an approved Visual Glide Slope Indicator (VGSI) is in use.

As a result of this evaluation, there were no known or surveyed objects that were determined to be detrimental to the protection of navigable airspace to and from each of the airport's four runway ends.

4.5 Land Use Analysis

Considering the airfield development shown under the Airfield Analysis and Parallel Taxiway Alternatives (Section 4.3, p. 4-3), the remaining vacant sections of the airport property were analyzed in terms of their potential use, aircraft and automobile access, and feasibility of development. The intent was to evaluate the best use for the developable areas, as well as to determine if additional property should be acquired to accommodate the airport's growth initiatives. Furthermore, this land use analysis should provide the airport with a plan to maximize development opportunities on the property and to generate additional revenues. The information included in this analysis places priority on reserving as much space as possible for aviation development and expansion. Ongoing CRAA business development activities should be viewed in conjunction with this analysis in order to determine practicable methods of encouraging both aviation and non-aviation development on the airport property. The areas are illustrated in **Figure 4-4 Land Use Analysis** and evaluated in **Table 4-2 Land Use Analysis**.

Table 4-2 Land Use Analysis

Landside Zone	Approximate Acreage	Current/Potential Use	Access	Feasibility of Development
1	350	Military	Vehicle access is provided via Rickenbacker Parkway and 2nd Street.	To be developed as determined in the current Base Area Development Plan (by others).
2	11	Aeronautical-Related	Vehicle access would be provided from 2nd Street and Reserve Road.	It is anticipated that this area will continue to be used in support of MRO activities or other aviation-related use due to its proximity to existing airfield facilities. To be developed as warranted by demand. Hazardous materials potentially present that would require coordination with Ohio EPA.
3	4.25	Aeronautical-Related	Vehicle access would be provided via Alum Creek Drive and John Circle Drive.	It is anticipated that this area will continue to be used in support of MRO activities due to the remaining useful service life of the existing facility and its proximity to existing airfield facilities. To be developed as warranted by demand. Hazardous materials potentially present that would require coordination with Ohio EPA.
4	15.5	Aeronautical Support	This site is accessible from 2nd Street and Club Road.	This area is well-suited for continued airport maintenance use.
5	37	General Aviation	Vehicle access to this area is provided by 2nd Street and Jerrie Mock Avenue.	This area is well-suited for general aviation development. It is anticipated that facilities for general aviation and corporate aircraft would be constructed in this area. To be developed as warranted by demand. Hazardous materials potentially present that would require coordination with Ohio EPA.
6	29	Passenger Terminal Area	The site is accessible from Alum Creek Drive and John Circle Drive.	This area is well suited in its current role. Roadway access, curbfront and parking improvements are anticipated in this area. Hazardous materials potentially present that would require coordination with Ohio EPA.
7	61.6	Commercial/Non-Aeronautical	Vehicle access to this area could be provided from Rickenbacker Parkway W, Club Road, 2nd Street, Alan Schwarzwalder Street, Jerrie Mock Avenue, and Alum Creek Drive	Area has good accessibility to Rickenbacker Parkway W. Due to the location, this area is capable of accommodating multi-story structures. To be developed as warranted by demand. Hazardous materials potentially present that would require coordination with Ohio EPA.
8	1.5	Government/ Airport Traffic Control Tower	Vehicle access is provided via Alum Creek Drive.	This area is well-suited for its current use.
9	2.75	Recreation/Open Space	Vehicle access is provided via Alum Creek Drive.	Members of the local community desire to establish a public viewing area in this location. This area is well-suited for a viewing area and the proposed use is compatible with adjacent uses. Hazardous materials potentially present that would require coordination with Ohio EPA.
10	311	Cargo/Logistics	Vehicle access to the western portion of the area is provided via Alum Creek Drive. Central portion of the site is accessible via Port Road. Northeast portions of the site are accessible from George Page Jr. Road. Vehicle access to undeveloped areas could be provided from George Page Jr. Road and London Groveport Road.	Continued development of this area for cargo/logistics facilities is recommended due to availability of existing airfield pavement facilities, developable land, and utility infrastructure. Environmental – Wetlands present that could potentially require wetland permitting and mitigation with Ohio EPA and USACE. Potential to impact endangered species that would require coordination with USFWS, potential studies, permitting and mitigation. Hazardous materials potentially present that would require coordination with Ohio EPA.
11	9	Aeronautical Support	Vehicle access is provided via Port Road and Tarawa Drive.	Due to the centralized location and proximity to the existing hydrant fuel system, continued use of this area for fuel storage is recommended. Aboveground fuel tank storage is recommended as existing underground storage tanks reach the end of their useful service life. There is potential for petroleum hydrocarbon impacts that would require coordination with Ohio EPA.
12	9	Commercial/Non-Aeronautical	This site is accessible from Alum Creek Drive and Port Road.	To be developed as warranted by demand. There is potential for petroleum hydrocarbon impacts that would require coordination with Ohio EPA.

Table 4-2 Land Use Analysis

Landside Zone	Approximate Acreage	Current/Potential Use	Access	Feasibility of Development
13	376.3	Aeronautical-Related	Access could be provided by planned Rickenbacker Parkway extension.	This area is suitable for aviation-related development (i.e. cargo/logistics, MRO) due to its accessibility to airfield facilities. This site should be reserved to accommodate long-term demand for cargo/logistics facilities. To be developed as warranted by demand. Utility infrastructure does not currently exist in this area. Environmental – Wetlands present that could potentially require wetland permitting and mitigation with Ohio EPA and USACE. Potential to impact endangered species that would require coordination with USFWS, potential studies, permitting and mitigation. Hazardous materials potentially present that would require coordination with Ohio EPA.
14	1,169.6	Warehouse	Site is accessible via Rickenbacker Parkway W., Airbase Road and planned Rickenbacker Parkway extension.	To be developed as warranted by demand. Limited utility infrastructure exists in this area. Environmental – Wetlands present that could potentially require wetland permitting and mitigation with Ohio EPA and USACE. Potential to impact endangered species that would require coordination with USFWS, potential studies, permitting and mitigation. Hazardous materials potentially present that would require coordination with Ohio EPA.
15	322.9	Warehouse	Site is accessible via Rickenbacker Parkway W.	To be developed as warranted by demand. Environmental – Wetlands present that could potentially require wetland permitting and mitigation with Ohio EPA and USACE. Potential to impact endangered species that would require coordination with USFWS, potential studies, permitting and mitigation. Hazardous materials potentially present that would require coordination with Ohio EPA. (Note: these constraints have already been cleared for the Rail Campus; however, a cell phone antenna exists.)
16	167	Open Space	Site is accessible via Rickenbacker Parkway W.	This site contains a former landfill with development restrictions and should be left as open space.
17	34.8	Open Space and Non-Aeronautical	Site is accessible via Rickenbacker Parkway W.	This site contains drainage facilities and could be developed for non-aeronautical (space permitting) or left as open space. Environmental – Wetlands present that could potentially require wetland permitting and mitigation with Ohio EPA and USACE. Potential to impact endangered species that would require coordination with USFWS, potential studies, permitting and mitigation.
18	127.1	Warehouse	Site is accessible via Alum Creek Drive and Rohr Road.	To be developed as warranted by demand.
19	141.4	Warehouse	Site is accessible via Alum Creek Drive and Rohr Road.	To be developed as warranted by demand.
20	17.75	Warehouse	Site is accessible via Alum Creek Drive.	To be developed as warranted by demand.
21	52	Open Space	Site is accessible via Rickenbacker Parkway W.	Site should be left as open space to protect approaches.

Source: Michael Baker International, Inc., 2017.

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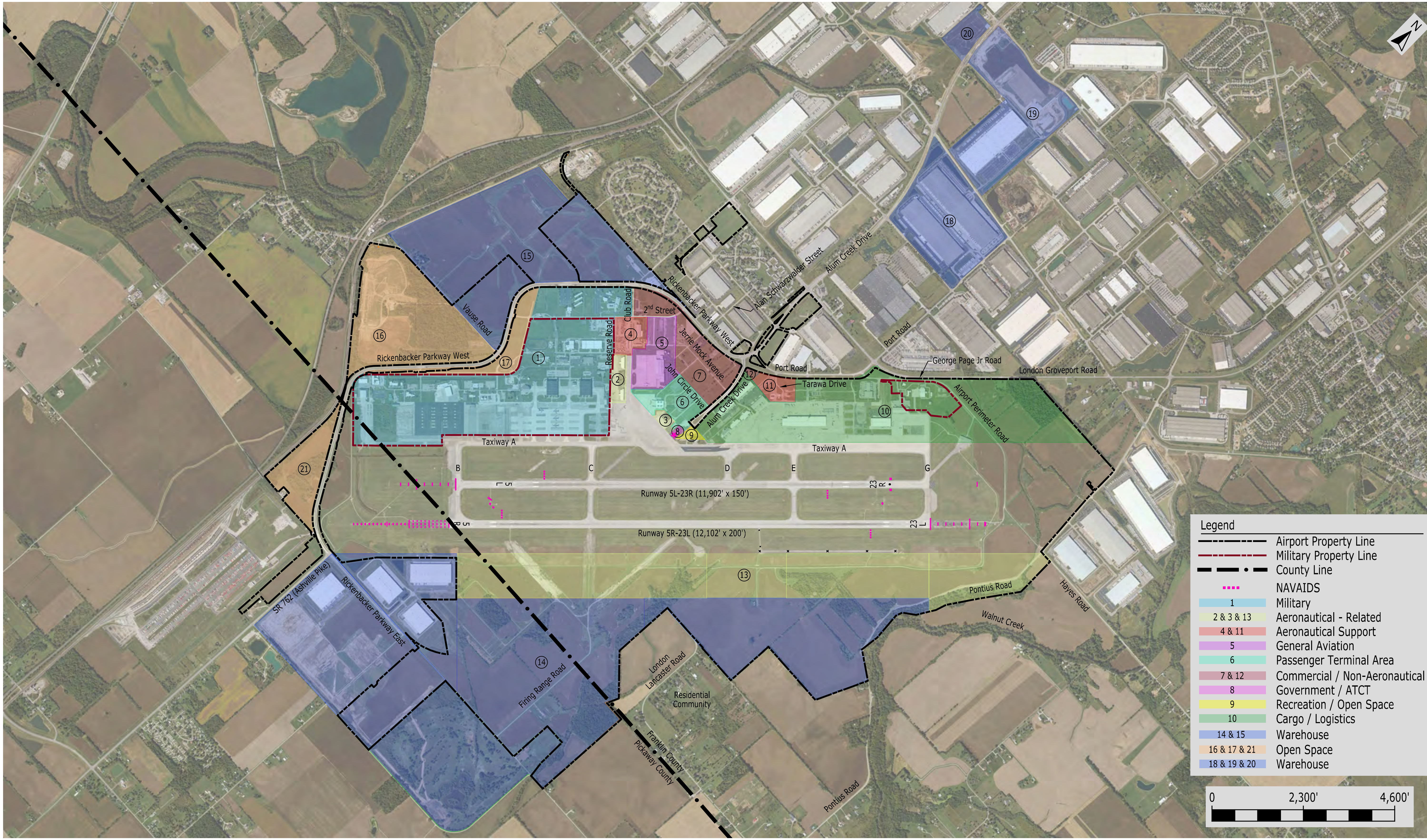


Figure 4-4 Land Use Analysis

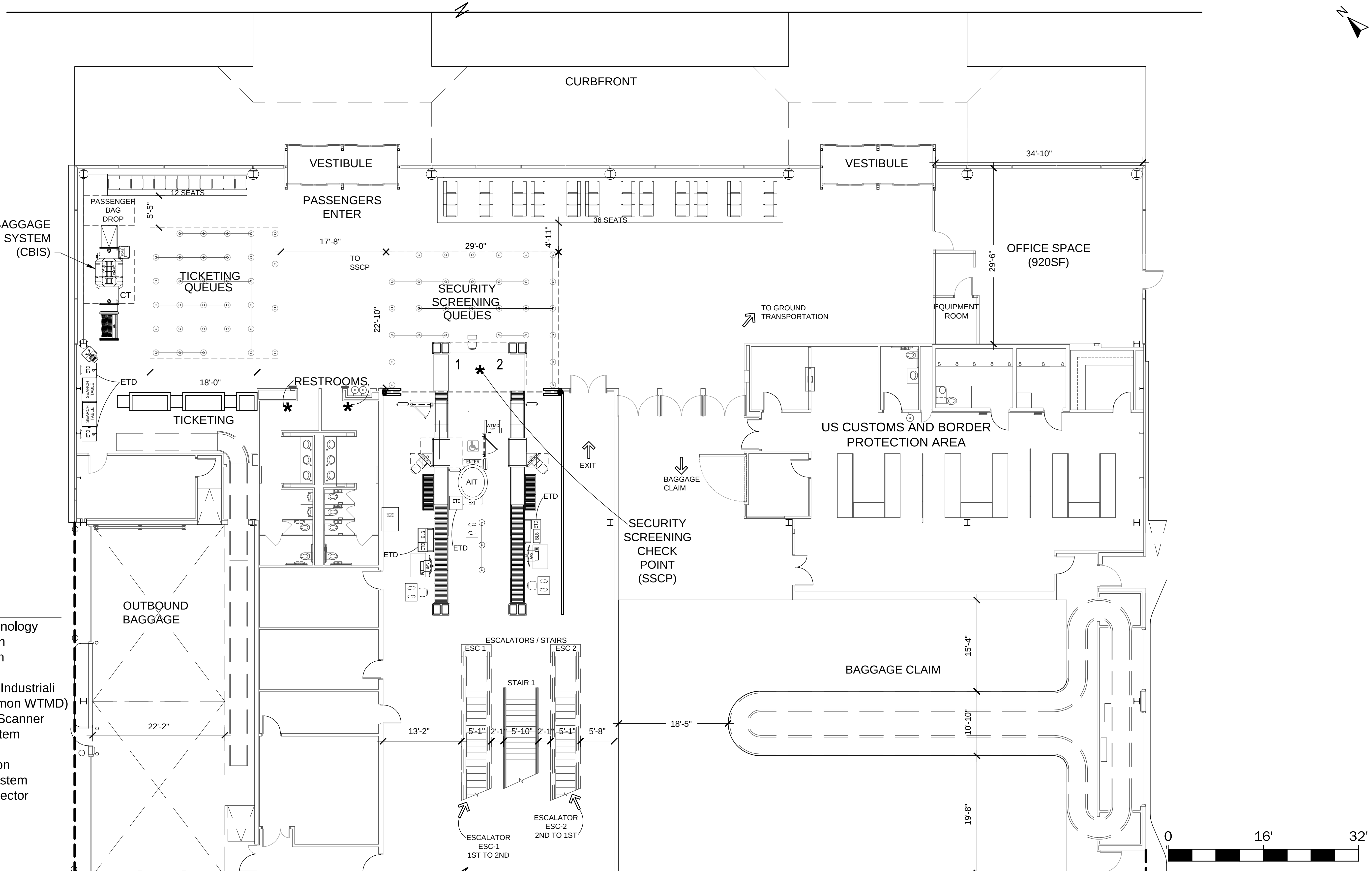
4.6 Passenger Terminal

The passenger terminal building at LCK faces the opportunity of accommodating simultaneous arrivals or departures of narrow body aircraft, as large as the Airbus A320. This represents a total of 372 seats. With average load factors (the number of occupied seats) for planning of 90% as identified in **Chapter 3, Facility Requirements** (Section 3.13, p. 3-17), this represents 335 passengers during a peak period. Presently, the LCK passenger terminal experiences peak conditions (two aircraft at terminal) 3-4 times per week. Based upon the FAA-approved forecast of aviation demand discussed in **Chapter 2, Forecasts of Aviation Demand** (Section 2.9, p. 2-61), this is anticipated to increase to 5-7 times per week. The terminal should provide an acceptable level of service throughout the process, including check-in, checked baggage screening, passenger security screening, vertical and horizontal circulation, passenger waiting and seating area, concessions, and amenities. Some other factors considered in development of the terminal concepts include:

- Similar to other airports across the industry that are served by low-cost air carriers, the majority (about 95%) of passengers at LCK currently travel for leisure and recreation. This tends to increase the amount of checked baggage, the length of dwell time in the terminal prior to flights, and subsequently the demand for concessions and amenities.
- LCK does not have, and will not have a dedicated TSA Pre-Check lane. However, Pre-Check passengers do receive the expedited screening process associated with that status.
- Future development should consider arrivals of groups via transit (bus or shuttle).
- The baggage claim is a shared-use facility for domestic passengers as well as international arrivals.
- The size (capacity) and condition of the restrooms (lighting, wayfinding) are noted as concerns.
- Facilities for rental car transactions may be needed in the terminal and near the landside parking area.
- It is preferred to maximize the use of the existing facilities and building envelope before any additions are considered.

4.6.1 Current Improvements

The current conditions noted during the inventory phase of this Study are indicated in **Figure 4-5 Existing Terminal - Floor 1**. Since the beginning of this Study, CRAA has implemented several improvements to better accommodate the current and projected peak period traffic. These include the installation of an automated scanner (CT-80DR) for checked baggage inspection screening (CBIS) in the ground floor lobby. Based upon industry standards, the automated screening via the computed tomography (CT) scanner can handle the majority of the checked baggage (approximately 180 bags per hour), with the relocated explosive trace detection (ETD) machines and tables handling additional demand to meet peak period requirements (335 peak passengers x 0.70 bags average = 234 bags per hour).



LEGEND

AIT	Advanced Imaging Technology
AVS	Alternate Viewing Station
BVS	Baggage Viewing Station
BLS	Bottle Liquid Scanner
CEIA	Costruzioni Elettroniche Industriali Automatismi (Most common WTMD)
CT	Computer Tomography Scanner
CT-80FX	Explosive Detection System (Mfg. By Reveal)
ETD	Explosive Trace Detection
FDRS	Field Data Recording System
WTMD	Walk Through Metal Detector

Figure 4-5 Existing Terminal - Floor 1

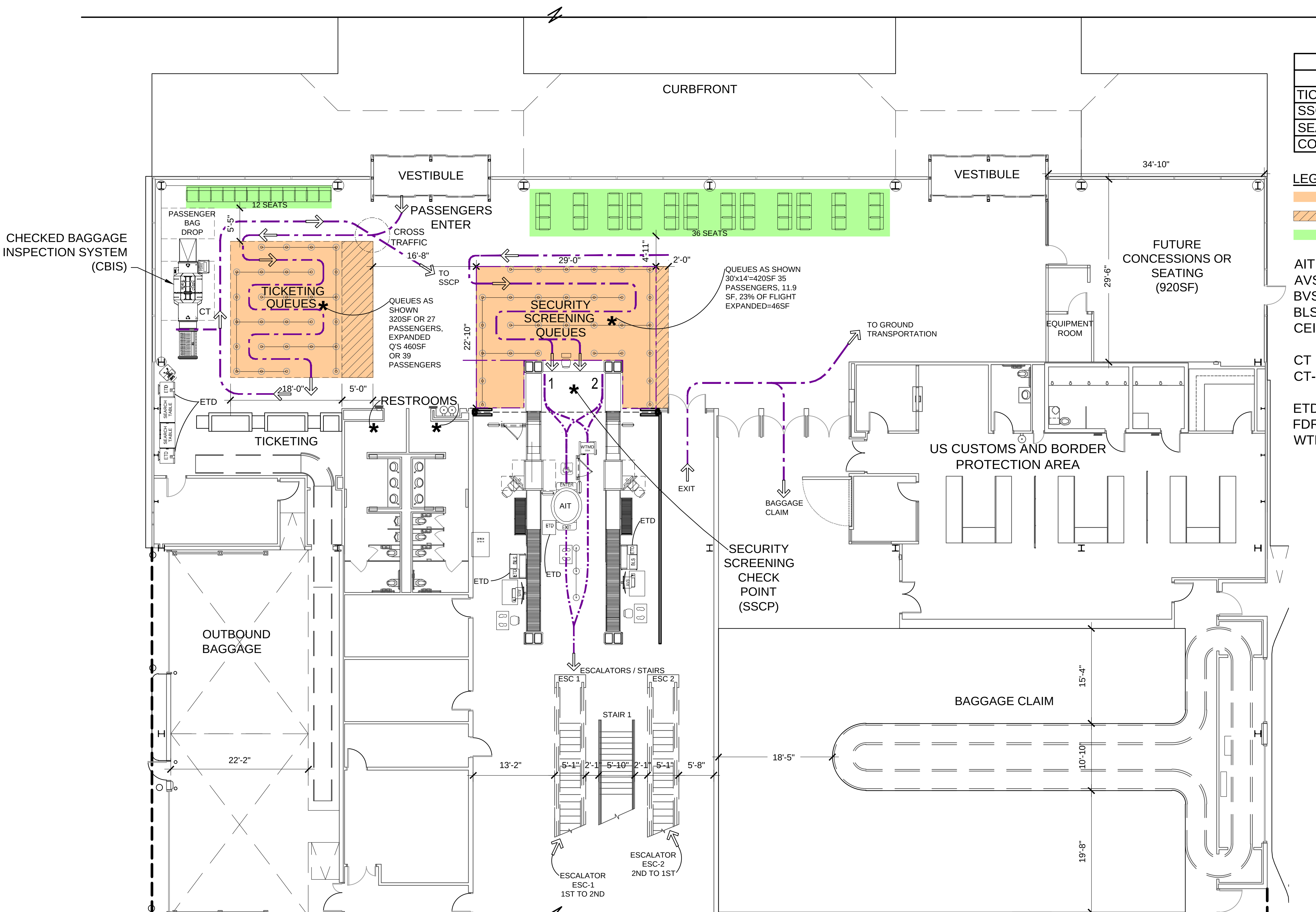
Also, a second screening lane and an advanced imaging technology (AIT) body scanner at the passenger security screening checkpoint (SSCP) was installed in 2017 on the first floor. The total capacity of the two-lane checkpoint will meet the demand requirements. The layouts of these improvements are shown in **Figure 4-6 Terminal Concept 1 – Floor 1**. The current provisions for seating and queuing in light of these improvements are also shown in Terminal Concept 1.

Advantages of Terminal Concept 1 include the increased capacity to meet requirements for checked baggage screening and passenger peak volumes. However, there are areas of concern related to the queuing and circulation paths. The indicated queuing area at the check-in counter is approximately 320 square feet or approximately 27 passengers (at 11.9 square feet/person). This represents less than 10% of the 335 peak hour passengers. There is also potential conflict of cross traffic as passengers exit the Checked Baggage Inspection System (CBIS) bag drop area to move to the SSCP versus those that may still be queuing for the check-in counter. Similarly, the SSCP queue area is approximately 420 square feet, or approximately 35 passengers, representing just 10% of the peak period passengers. Finally, the aisles between the seating and the queues are only 5 to 6 feet wide, allowing only single file circulation and can easily be blocked by a person stopping while in the pathway.

Figure 4-7 Terminal Concept 2 – Floor 1 looks at improvements to the queuing and circulation in the ground floor lobby. Also, it is suggested that some of the administrative uses in the northeast corner of the lobby be located near the U.S. Customs and Border Protection portion of the terminal where additional office space is currently available. This would provide room for ground floor mixed use concessions (food/beverage/retail), which could serve the passengers as well as other on-airport tenants. Terminal Concept 2 retains the capacity improvements of Terminal Concept 1. The check-in queues are expanded horizontally to increase the capacity to 460 square feet/39 passengers. The SSCP queue entry is relocated to minimize cross traffic across the lobby seating, and the area is increased to 848 square feet/71 passengers. With the added seating in the lobby and in the snack bar, there is enough space for queuing, waiting, or seating for 65% of the peak hour passengers simultaneously (218 out of 335 peak hour passengers). This exceeds the industry standard of providing seating for 60% of peak hour passengers.

Terminal Concept 2 still retains the weakness related to the cross traffic exiting the check-in area, and to a lesser extent, the narrow aisles between seating and queuing noted in Concept 1. Advantages include increased capacity due to better definition and use of the lobby space, and an increased level of amenities for passengers (and other airport users) in the non-secure area of the terminal.

Figure 4-8 Terminal Concept 3 – Floor 1 retains the benefit of improved queuing at the SSCP as shown in Concept 2. However, it suggests that the ticket counters be relocated to the west side of the lobby. This eliminates the cross-traffic conflict and consolidates the TSA CBIS area and bag drop function next to the outbound baggage conveyor. The check-in queues are expanded further to increase the capacity to 600 square feet/51 passengers.



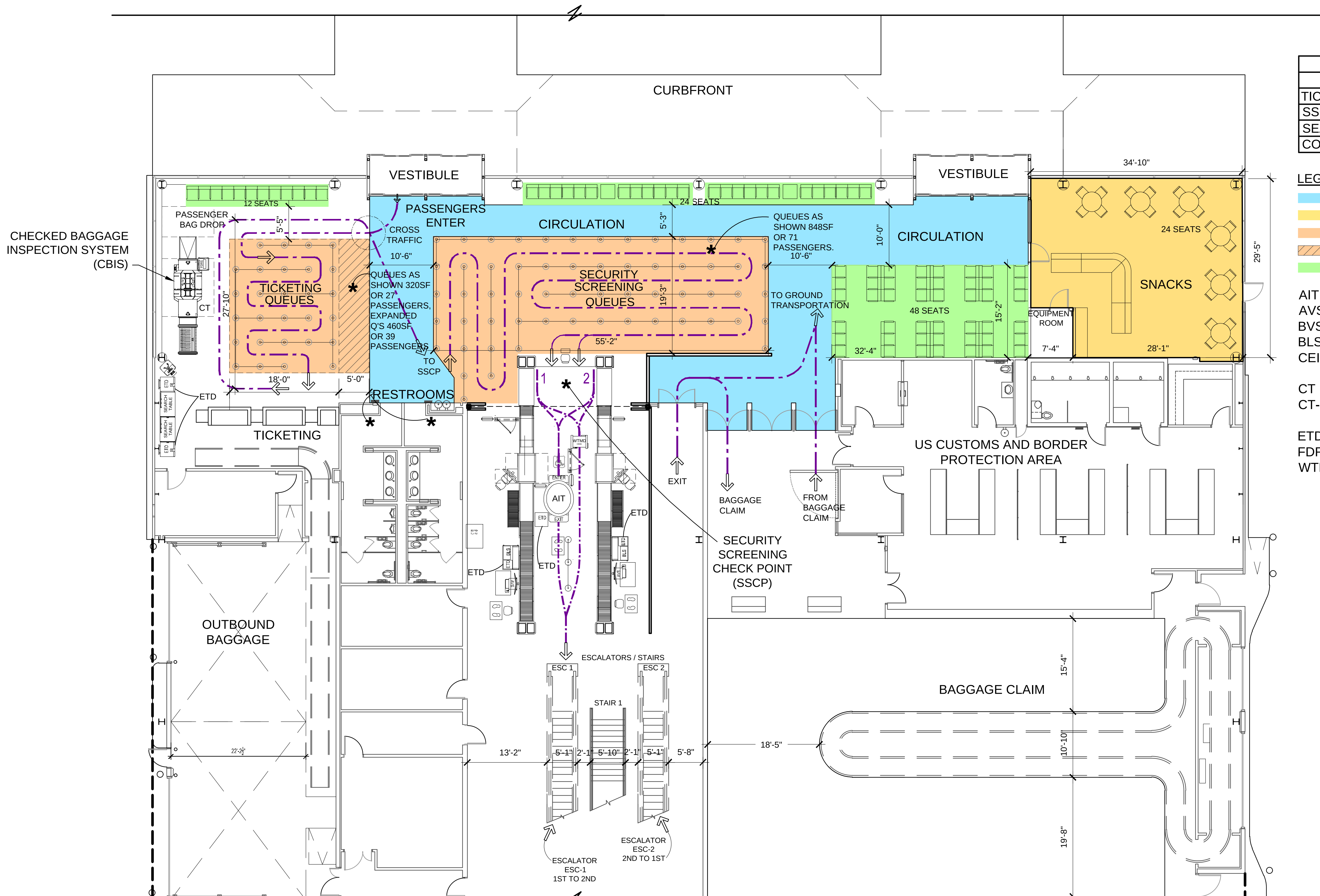
SUMMARY TABLE		
ELEMENT	AREA (SF)	PASSENGERS
TICKETING QUEUE	460	39
SSCP QUEUE	420	35
SEATING	520	48
CONCESSIONS	920	-

LEGEND

- QUEUES
- QUEUE EXPANSION
- SEATING

AIT	Advanced Imaging Technology
AVS	Alternate Viewing Station
BVS	Baggage Viewing Station
BLS	Bottle Liquid Scanner
CEIA	Costruzioni Elettroniche Industriali Automatismi (Most common WTMD)
CT	Computer Tomography Scanner
CT-80FX	Explosive Detection System (Mfg. By Reveal)
ETD	Explosive Trace Detection
FDRS	Field Data Recording System
WTMD	Walk Through Metal Detector

Figure 4-6 Terminal Concept 1 - Floor 1



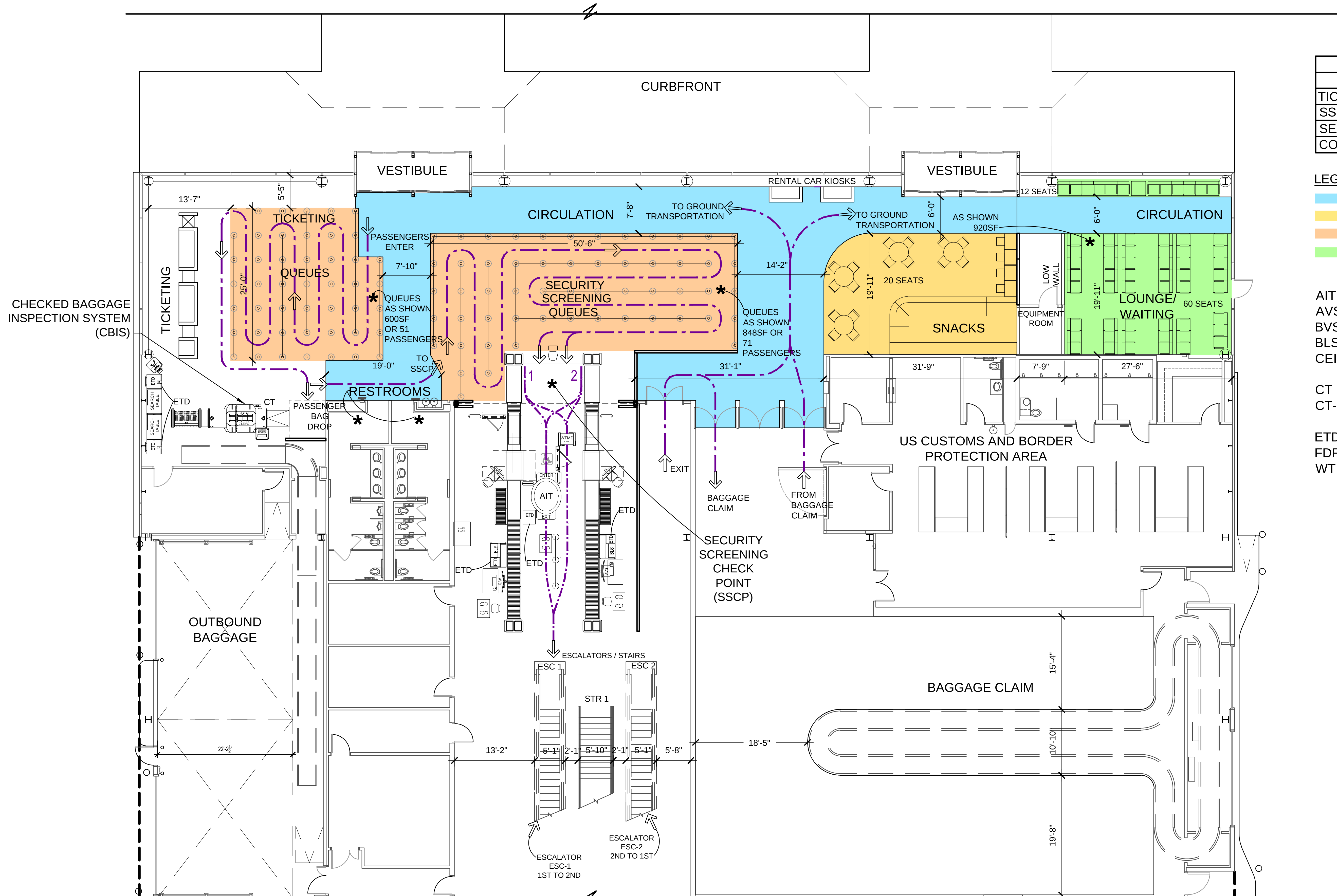
SUMMARY TABLE		
ELEMENT	AREA (SF)	PASSENGERS
TICKETING QUEUE	460	39
SSCP QUEUE	848	71
SEATING	775	84
CONCESSIONS	975	-

LEGEND

- CIRCULATION
- CONCESSIONS
- QUEUES
- QUEUE EXPANSION
- SEATING

AIT	Advanced Imaging Technology
AVS	Alternate Viewing Station
BVS	Baggage Viewing Station
BLS	Bottle Liquid Scanner
CEIA	Costruzioni Elettroniche Industriali Automatismi (Most common WTMD)
CT	Computer Tomography Scanner
CT-80FX	Explosive Detection System (Mfg. By Reveal)
ETD	Explosive Trace Detection
FDRS	Field Data Recording System
WTMD	Walk Through Metal Detector

Figure 4-7 Terminal Concept 2 - Floor 1



SUMMARY TABLE		
ELEMENT	AREA (SF)	PASSENGERS
TICKETING QUEUE	600	51
SSCP QUEUE	848	71
SEATING	623	60
CONCESSIONS	620	-

LEGEND

- CIRCULATION
- CONCESSIONS
- QUEUES
- SEATING

AIT	Advanced Imaging Technology
AVS	Alternate Viewing Station
BVS	Baggage Viewing Station
BLS	Bottle Liquid Scanner
CEIA	Costruzioni Elettroniche Industriali Automatismi (Most common WTMD)
CT	Computer Tomography Scanner
CT-80FX	Explosive Detection System (Mfg. By Reveal)
ETD	Explosive Trace Detection
FDRS	Field Data Recording System
WTMD	Walk Through Metal Detector

Figure 4-8 Terminal Concept 3 - Floor 1

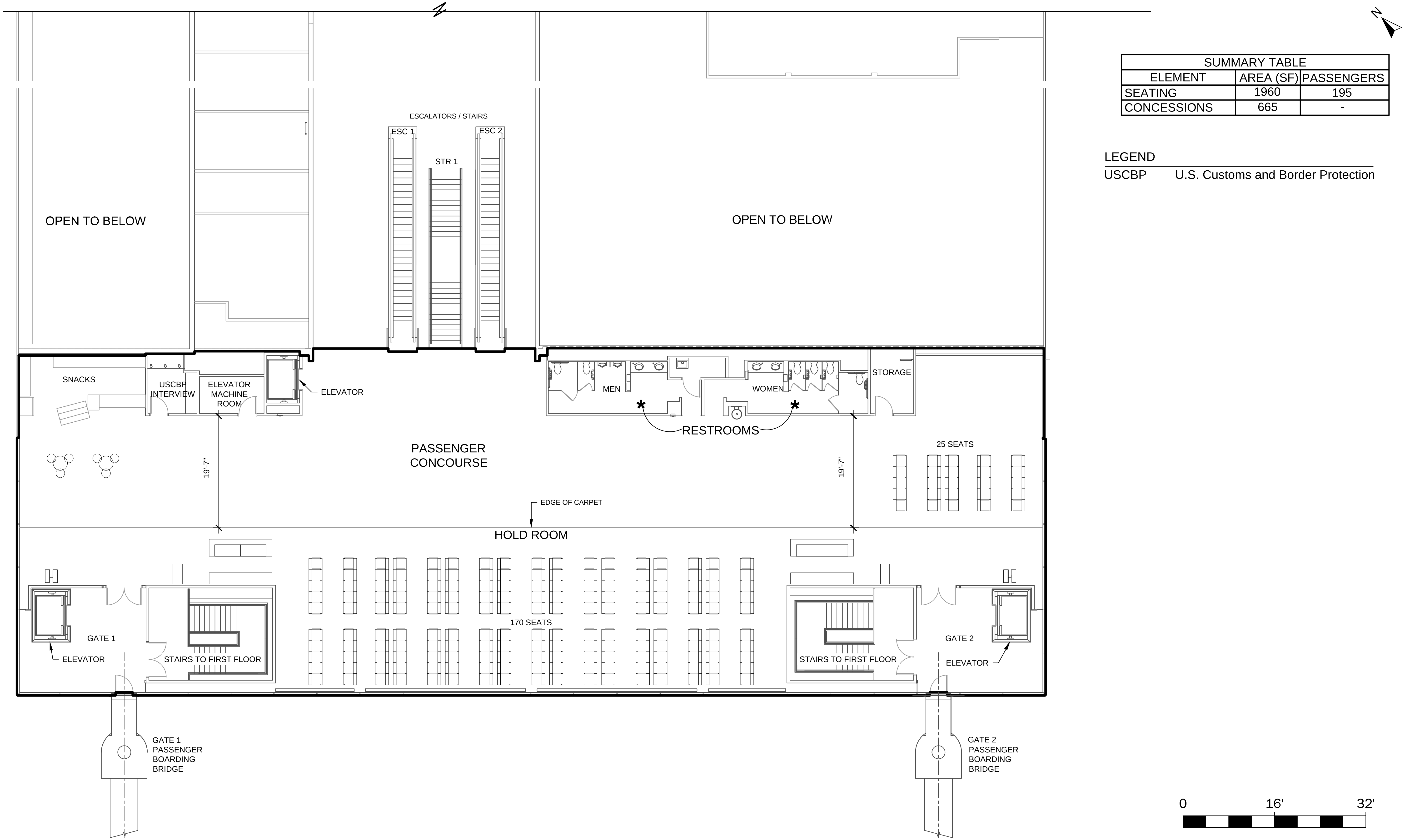
With the added seating in the lobby and in the snack bar, there is enough space for queuing, waiting, or seating for 60% of the peak hour passengers simultaneously (202 out of 335 passengers).

It further suggests that the concessions amenity be placed in the lobby for better visibility and access. At the request of CRAA, two rental car kiosks/desks are included in this concept to support rental car operations. The lounge/seating/waiting area is consolidated away from the circulation paths to reduce potential conflicts with circulating versus seated passengers.

Terminal Concept 3 removes the weakness related to the cross traffic exiting the check-in area, and the narrow aisles between seating and queuing noted in Concepts 1 and 2. Compared to Concept 1, advantages include increased capacity due to better definition and use of the lobby space, and an increased level of amenities for passengers (and other airport users) in the non-secure area of the terminal, including consideration of rental car activity.

Once passengers have cleared security on the ground floor, they move via escalator, elevator, or open stairs up to the secure airline holdroom and concourse located on the 2nd floor. The current conditions are indicated in **Figure 4-9 Existing Terminal - Floor 2**. The agent desks and loading bridges are located near the ends of the concourse with seating between them. A small snack bar area and some table seating is located at the west end of the concourse. The limits of the carpeted versus polished concrete area generally define the waiting (hold room) and circulation (walk) areas.

Second Floor Concourse and Hold Room Area



SUMMARY TABLE		
ELEMENT	AREA (SF)	PASSENGERS
SEATING	1960	195
CONCESSIONS	665	-

LEGEND

USCBP U.S. Customs and Border Protection

Figure 4-10 Terminal Concept 4 - Floor 2 shows the capacity to increase the seating areas to better meet the requirements of the two peak hour departures. The proposed seating consists of 9-foot double rows, consisting of seating facing each other and approximately 5 feet clear for circulation. A total of 365 seats represents 109% of the peak hour passengers (335). Peak hour passengers were determined to be 335 in **Chapter 3, Facility Requirements**, (Section 3.13, p. 3-17). It should be noted that people often leave gaps or store bags on adjacent seats to increase their personal space to a more comfortable level. The International Air Transport Association (IATA) recommends at least 65% of passengers be seated.

The concept shows circulation aisles away from seating at least 10 feet, which corresponds to an industry standard of 2 or 3 persons walking abreast. The circulation paths shown exceed the requirements referenced in FAA AC 150/5360-13A, Airport Terminal Planning. Due to the limited nature of flights and number of gates, there is minimal cross traffic/two-way traffic.

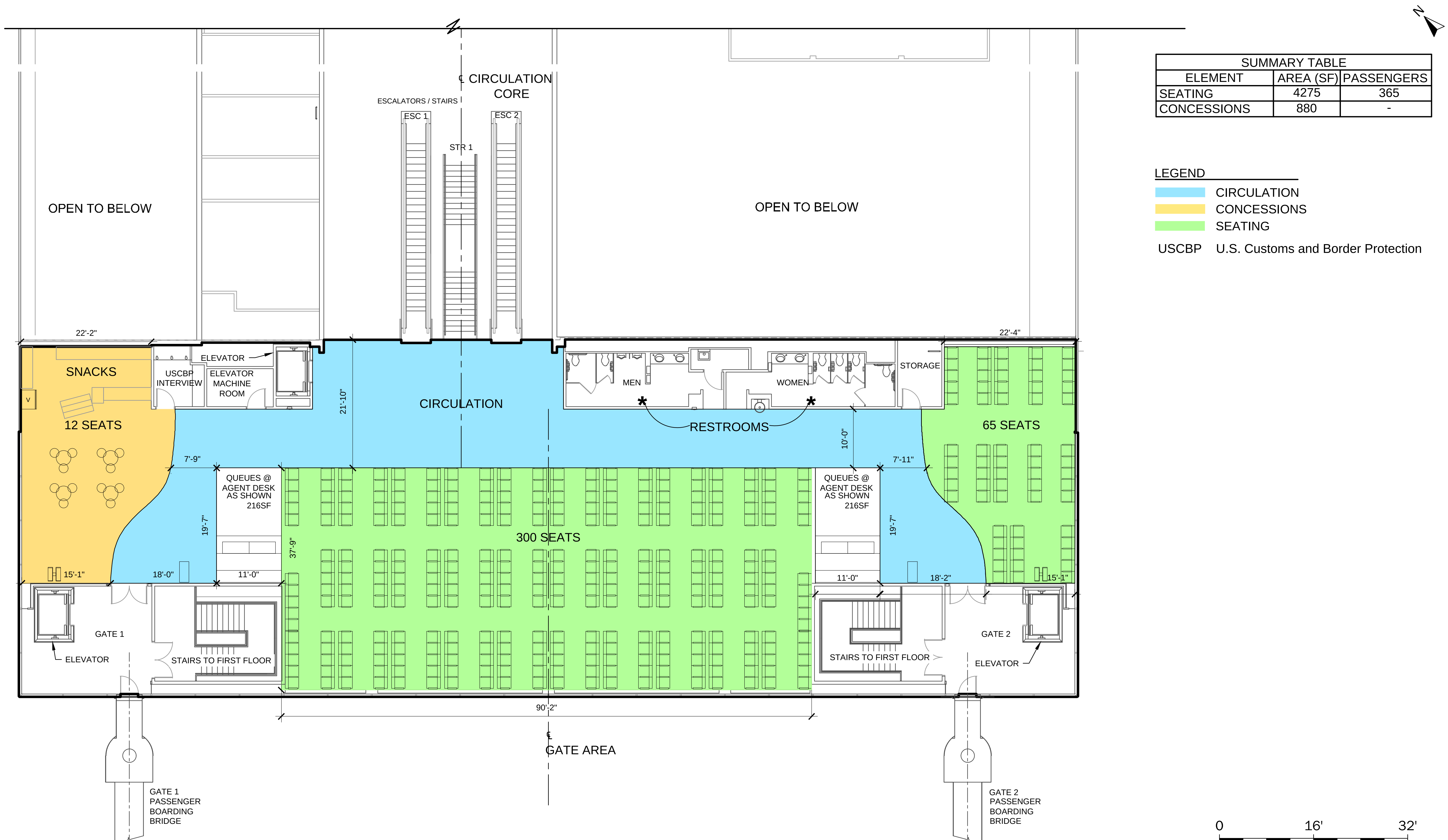
Terminal Concept 4 indicates that accommodation of seating and circulation of passengers for the peak hour can be achieved within the current space available. Based on recommended standards for Level of Service C, contained in the IATA Airport Development Reference Manual, 9th edition, a minimum of 65% of the passengers can be seated using a minimum of 18.3 square feet per seated passenger.

For the minimal costs of increased seating units and perhaps some redefinition of space use via floor finishes, the requirements can be met. This option addresses future seating requirements: however, the solution is somewhat unbalanced, since almost 20% of the seats are at one end. Also, there is a trade-off in that the level of amenities has not been increased in an effort to better serve the added passengers.

Figure 4–11 Terminal Concept 5 - Floor 2 recommends that the current gate counters and associated equipment be shifted to the far ends of the concourse. This provides capacity for seating equivalent to Concept 4, but is balanced between the gates. Space in the northeast corner of the concourse could be used to add other concessions or vending options for the passengers. Again, this is a fairly simple option relating to seating and floor finishes, but with the added costs of relocation of the gate equipment.

Figure 4–12 Terminal Concept 6 - Floor 2 preserves the improvements suggested in Concept 5 as to balancing the seating between the wider spaced gate locations. However, it suggests two further improvements to take full advantage of the space available. The seating capacity is more than needed for a good level of service (i.e. 65% of peak hour passengers). As recommended in ACRP Report 55, Passenger Level of Service and Spatial Planning for Airport Terminals, it is suggested that the concessions be enlarged into a single location with added seating, taking advantage of the airside view.

The proximity and visibility to all passengers as they enter the space should enhance sales. Furthermore, the far northeast and northwest corners of the concourse would be freed up for work stations or small group table seating to offer options beyond the typical rows.

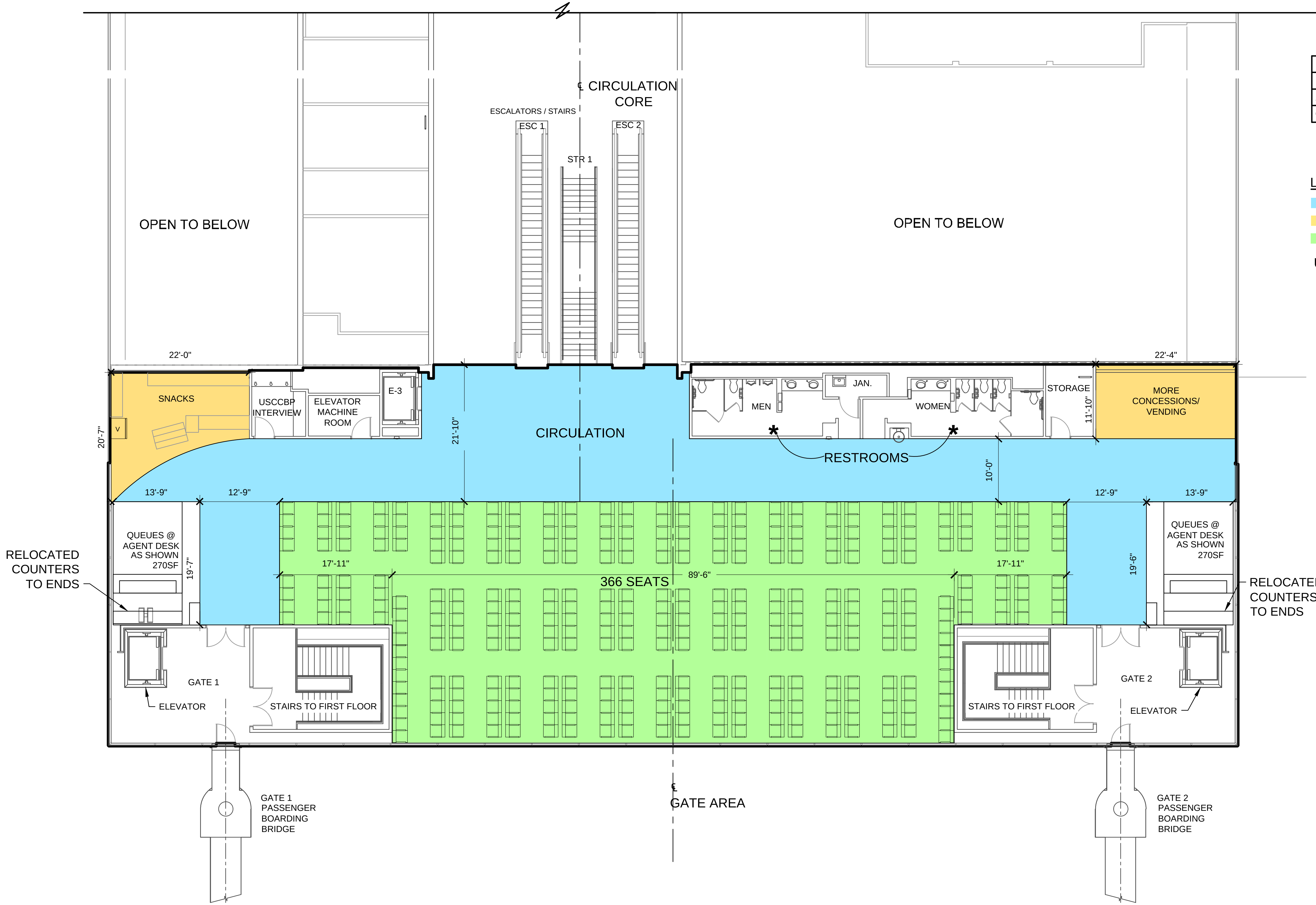


SUMMARY TABLE		
ELEMENT	AREA (SF)	PASSENGERS
SEATING	4275	365
CONCESSIONS	880	-

LEGEND

- CIRCULATION
- CONCESSIONS
- SEATING

USCBP U.S. Customs and Border Protection



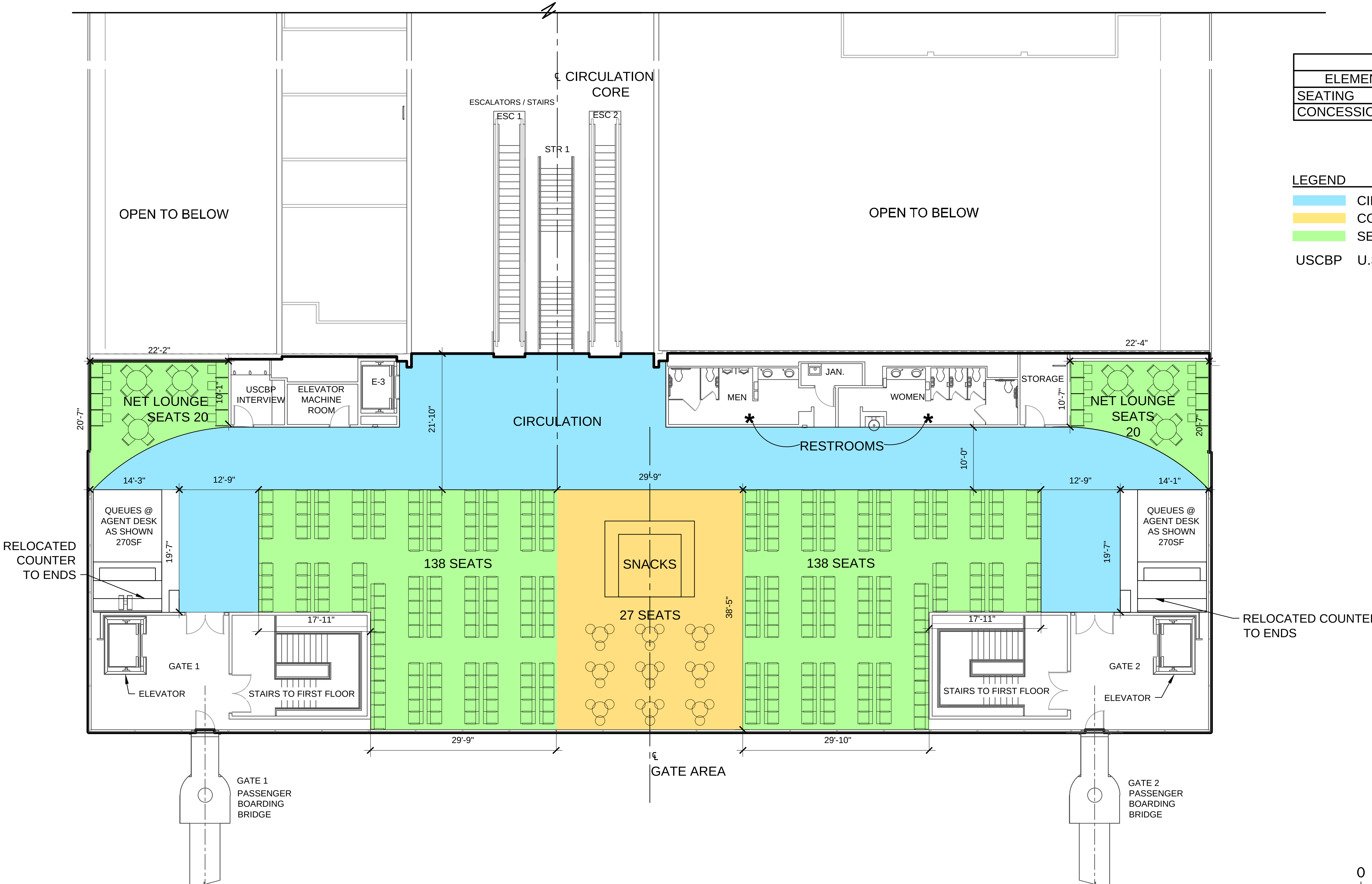
SUMMARY TABLE		
ELEMENT	AREA (SF)	PASSENGERS
SEATING	4140	366
CONCESSIONS	535	-

LEGEND

- CIRCULATION
- CONCESSIONS
- SEATING

USCBP U.S. Customs and Border Protection

Figure 4-11 Terminal Concept 5 - Floor 2



SUMMARY TABLE		
ELEMENT	AREA (SF)	PASSENGERS
SEATING	4185	316
CONCESSIONS	612	-

LEGEND

- CIRCULATION
- CONCESSIONS
- SEATING

USCBP U.S. Customs and Border Protection

Figure 4-12 Terminal Concept 6 - Floor 2

Concept 6 is preferred as it offers a variety of seating options and the highest level of amenities. It does require work similar to Concept 5, plus the costs of the snack bar relocation and expansion. Specific work items include;

- Relocation of snack bar (includes associated plumbing and electrical)
- Establish lounge areas (includes associated electrical)
- Relocation of agent desks counters (includes associated electrical and communications)
- Hold room improvements (includes seating, electrical and communications)

4.7 Parking and Access

4.7.1 Public Parking

As mentioned in the Facility Requirements chapter, vehicle parking is reported by CRAA operations staff to be constrained during peak operational periods due to the frequency and nature of Allegiant Air and passenger charter operations. In response to this situation, CRAA completed Lot #3 which provides an additional 338 parking spaces in a new surface parking lot located east of Lot #1. The additional parking spaces and sidewalk improvements shown in **Figure 4-13 Terminal Area Access & Parking** are designed to meet future 20-year parking requirements for 769 public parking spaces as identified in **Chapter 3, Facility Requirements** (Section 3.13.3, p. 3-28).

4.7.2 Rental Car Parking

During the planning period, rental car activity is projected to increase in response to increased passenger enplanement activity, as shown in **Chapter 2, Forecasts of Aviation Demand** (Section 2.4.5, p. 2-22). Therefore, demand for 10 rental cars per agency was confirmed. As shown in **Figure 4-13 Terminal Access and Parking**, an area capable of accommodating parking demand for 30 rental cars (15 per rental agency), as determined in **Chapter 3, Facility Requirements** (Section 3.13.3, p. 3-29), is provided in Terminal Parking Lot #2. Additional parking may be added when actual demand is demonstrated to exceed this amount.

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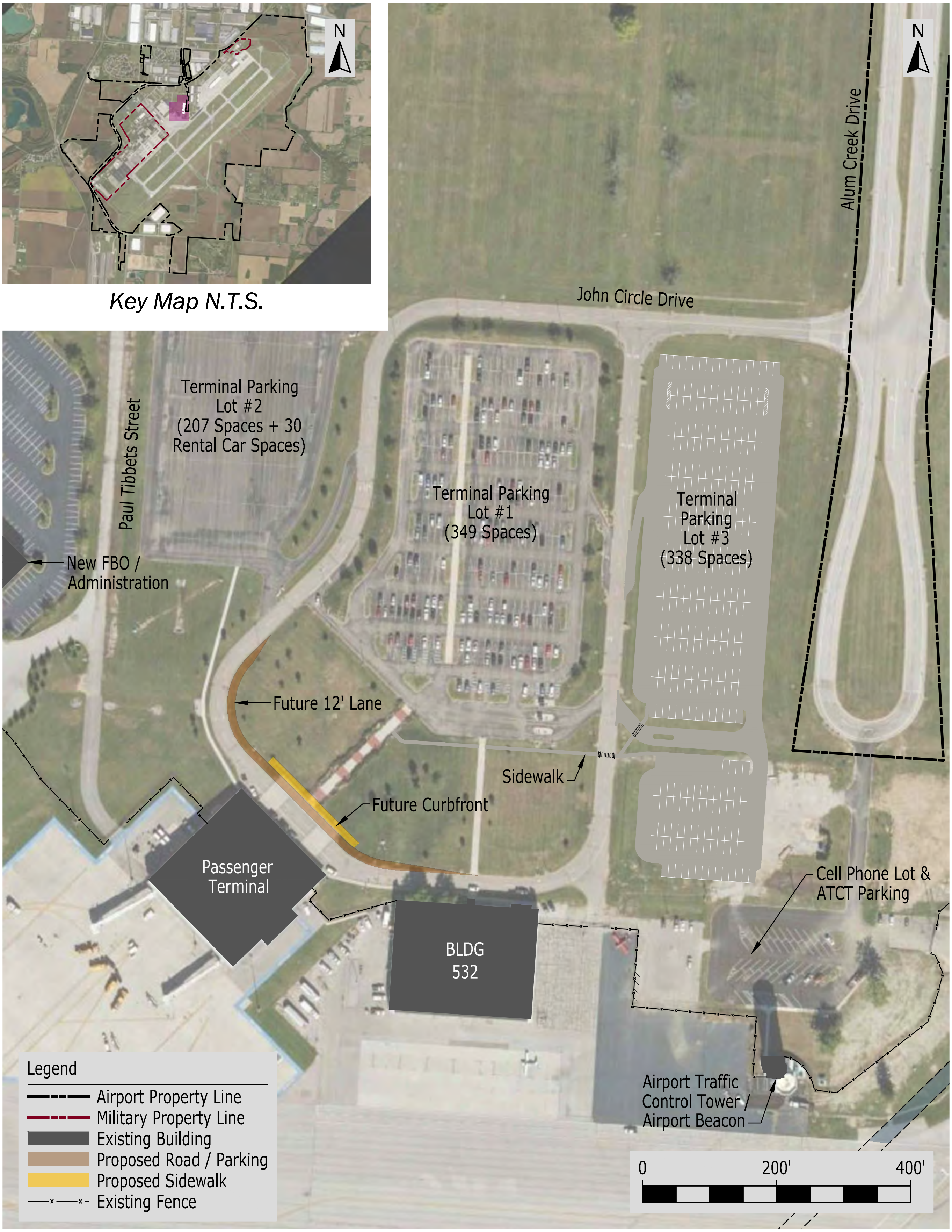

Figure 4-13 Terminal Area Access & Parking

4.7.3 Curbside Access

Based upon the results of the curbside analysis shown in **Chapter 3, Facility Requirements** (Section 3.13.3, p. 3-30), it was determined that the existing curbside is not long enough to accommodate passenger loading and unloading during peak periods. In addition, this deficiency limits the flow of traffic directly in front of the terminal. Due to the physical constraints associated with the area, such as limited area to extend the lane and the existing roadway configuration, it was determined that widening the curbfront roadway is the only practicable solution to address this need. As shown in **Figure 4-13 Terminal Area Access and Parking**, an additional 12-foot lane is proposed northeast of the existing lanes for a total of four lanes directly in front of the passenger terminal. This additional lane is recommended to address a deficiency in curb frontage and improves the flow of traffic by reducing double/triple parked cars and provides additional curb frontage for commercial vehicle loading and unloading on the northeast side of the roadway.

4.8 Air Cargo

A total of up to seven new cargo facilities are required over the 20-year planning period as determined in **Chapter 3, Facility Requirements** (Section 3.14, p. 3-35). Three cargo forecasts, shown in **Chapter 2, Forecasts of Aviation Demand** (Section 2.5.12, p.2-46), were presented for consideration, and the Aggressive Cargo Forecast was recommended and approved by the FAA for use in this Study. The Aggressive Forecast was based on the growth of the current scheduled international cargo freight activities that have been operating since 2014. This growth has been well received by the freight stakeholders in the region, and already the volumes are exceeding the early projections for growth. The records for the airport (provided by the CRAA) indicate that over 75 million pounds of international scheduled freight was processed in 2016. In addition, in 2017 over 124 million pounds of cargo was processed while the cargo forecast predicted 97 million pounds of cargo would be processed in 2017. This is projected in the master plan forecast to become 1.8 billion pounds of freight over the planning period. Utilizing the Airport Cooperative Research Program's (ACRP) recommended tons per area ratio as contained in ACRP Report 143, Guidebook for Air Cargo Facility Planning and Development, and submitted in **Chapter 3, Facility Requirements** (Section 3.14.5, p. 3-37), the milestones for when new cargo facilities would be required were identified. For the benefit of this Study, it is recommended that the growth occur in increments of facilities sized at 100,000 square feet for cargo operations. These increments were based on the economic growth factors reported in the 2014 Economic Impact Study prepared for Air Cargo Terminal 5 (ACT5) by Regionomics of Columbus and IMS Worldwide.

Based on the current mix of cargo, it was determined in **Chapter 3, Facility Requirements** (Section 3.14.2, p. 3-35), that the first new facility would need to be delivered for utilization in the 2024 timeframe when ACT5 is fully utilized. Even in the short time since the forecast was created, the product mix in exports has shifted toward materials and commodities that require significantly more space and handling than bulk air cargo. Therefore, the forecast for the next delivery will need to be closely monitored to ensure that the facility schedule for construction and occupation is updated to properly support this new requirement.

The Study also considered the requirements for additional ramp/aircraft parking space to support the new volume of operations projected in the forecast, along with required access to facilities for truck and private vehicle parking. Applying the ACRP-recommended model, referenced in ACRP Report 143, Guide Book for Air Cargo Facility Planning and Development, produced the accompanying demand for ramp/aircraft parking space and landside parking for trucks and private vehicles. These models and the application of the ratios were presented earlier in sections 3.14.4 and 3.14.5 (p. 3-37). However, strong emphasis was placed on identifying which sites would produce the best utilization of existing ramp and parking space whenever possible, in order to minimize the need for new infrastructure.

A guiding principle during the planning process was to develop solutions that aggregated cargo handling and processing-both inbound and outbound in the same area of the airport. This will result in much of the ground support operations and related build-up or break-down of cargo occurring in adjacent or near-by facilities. One of the benefits of the LCK gateway over competing traditional gateway operations (such as those at ORD, JFK or ATL) is that cargo throughput is much faster. This speed of throughput is one of the key factors behind the growth of cargo volumes. The global freight forwarders, moving goods for retailers or manufacturers, recognize that compressing the supply chain between origins and destinations produces a distinct benefit that can be monetized for both the producer, the third-party services provider, and the air cargo carrier. One effective way to continue this competitive advantage for the users at LCK is to find solutions that aggregate cargo activities together.

4.8.1 Cargo Concept 1A

ACT5 was constructed and became operational in 2016. At the time the facility was built, it was done so in a manner to leave space for a “mirror” facility to be constructed next to ACT5. This strategy reduces the cost of new architectural input requirements and utilizes lessons learned in the construction and operation of ACT5. ACT5 has 100,000 square feet of cargo operations space and approximately 40,000 square feet of office and meeting space. In addition, the facility has a small security cage for segregation of high-value merchandise and a small environmental facility for handling cold chain products. This model can be easily replicated to create the next scheduled facility requirement in the cargo forecast. **Figure 4-14 Cargo Concept 1A – Maximize Development of Areas Near ACT 4 and ACT 5**, shows the expansion to the southwest of ACT5 and demonstrates that parking and ramp space can be accommodated on the airside utilizing existing ramp capacity. New parking and storage for trucks and private vehicles will be required, but there is land readily available to meet this requirement. The ACT5 “mirror” expansion should be constructed to meet the delivery requirement for the new facility in the 2023-2024 timeframe unless the cargo mix and throughput pace requires an earlier delivery for the next facility. The proposed facility is located in an Area of Concern (AOC 9) for petroleum contamination. Regulatory closure has not been achieved for these sites.

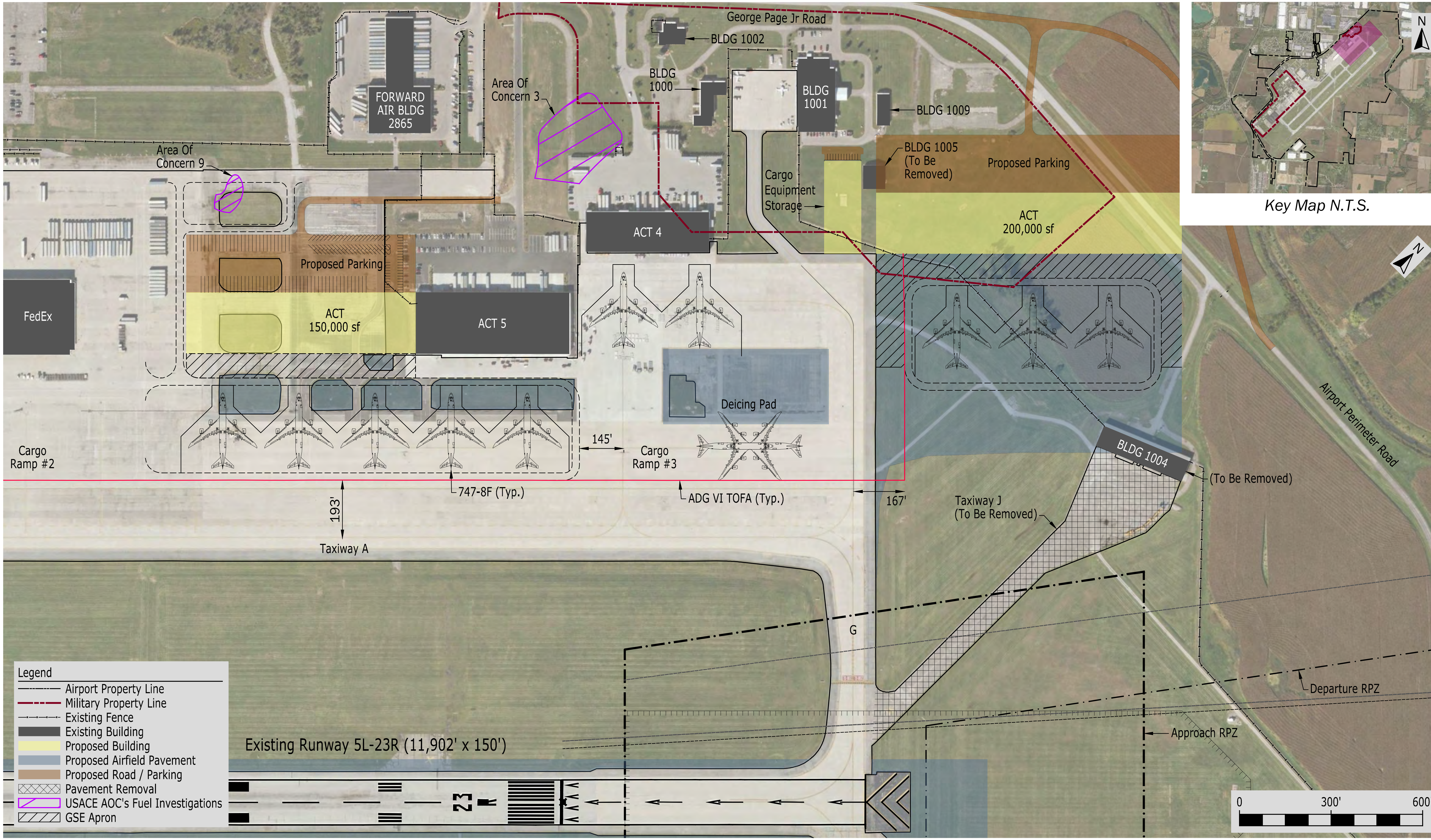

Figure 4-14 Cargo Concept 1A - Maximize Development of Areas Near ACT 4 and ACT 5

Required actions associated with development for this area are addressed in **Chapter 5, Alternatives Refinement** (Section 5.2.2, p. 5-13). This should be considered during design and construction activities. This would typically require:

- Coordination with Ohio EPA regarding activity on the site
- Monitoring of excavated soils
- Disposal of potentially impacted soils

Cargo Concept 1A also provides a future alternative for growth after the ACT5 mirror expansion is complete and fully occupied. This new construction, shown to the northeast of the existing ramp and north of existing Building 1004 requires new facility, ramp, parking and access considerations. This future ACT expansion is shown in a 200,000 square foot facility. However, it is recommended that this facility be delivered in two stages of 100,000 square feet per delivery stage unless the demand for cargo facilities is accelerated. Developing this project in two separate phases will improve CRAA's ability to more readily implement the improvements.

This concept demonstrates that it is also possible to provide up to a 50,000 square foot pole barn facility for parking aircraft loading equipment in a nearby location that minimizes the distance the loaders must travel between the storage and operations areas. The ground handlers who support aircraft operations have confirmed that such a facility in close proximity to loading operations is favorable over a location that requires the loaders to travel significant distances specifically impacted by inclement weather. This action will reduce equipment maintenance costs and enable CRAA to improve aircraft turnaround times by being more operationally responsive. This new concept requires creation of significant new ramp/aircraft parking space and re-alignment of an interior airport perimeter road to support truck and private vehicle parking and access. There are potential stream/wetland impacts and permitting requirements associated with the relocation of the road which will require diligence in advance of implementing this alternative. As such, there may be associated threatened and endangered species concerns. Further environmental study will be required to determine their presence in the area. This concept also requires the removal of Buildings 1004 and 1005.

In the event that CRAA contemplates expansion of this new facility beyond 200,000 square feet in the future, consideration may be given to the relocation/demolition of the general aviation facility (Building 1001). This would allow an additional 100,000 square feet of expansion in this area, and further support the guiding principle of aggregation of activity concentrated in this area of the airport. This scenario would require additional construction between the facility and the existing ACT4 facility along with expanded landside access. However, this proposed scenario would require relocation of the proposed cargo equipment storage building and minimize the ramp and aircraft parking availability.

A more detailed discussion of the deicing pad shown in both Cargo Concepts 1A and 1B is provided as part of the alternatives refinement process in **Chapter 5, Alternatives Refinement** (Section 5.2.2, p 5-16)

4.8.2 Cargo Concept 1B

Depending on the choice of alternatives for Cargo Concept 1A and the decision to implement either a 200,000 square foot or 300,000 square foot solution, there is another option for future facilities that matches the guiding principle of aggregation of activities in close proximity to existing cargo operations. **Figure 4-15 Cargo Concept 1B – Maximize Development Areas Near ACT 4 and ACT 5** provides new facilities of up to 300,000 square feet to the east of existing Cargo Ramp 3.

Building a facility in this location will in effect limit future expansion to the east of Cargo Ramp 3, and will require construction of new ramp/aircraft parking, new facilities, new truck and private vehicle parking and access. It will also require the re-alignment of George Page Jr. Road and an interior airport perimeter road. There are potential stream/wetland impacts and permitting requirements associated with the relocation of the road. As such, there may be associated threatened and endangered species concerns which must be considered before this alternative is implemented. Further environmental study will be required to determine their presence in the area. While this alternative also requires the demolition of Building 1004, it preserves the general aviation facility (Building 1001) while also accommodating the requirement for a facility to locate ground handling and loading equipment in close proximity to the campus of air cargo operations.

4.8.3 Cargo Concept 1C

During the planning process, members of the Stakeholder Advisory Committee inquired about the potential of relocating the current Air Cargo Terminal (currently occupied by FedEx) off the cargo ramp area in an effort to increase the utility of Cargo Ramp 2 for additional aircraft parking and air cargo related activities. In response to this request, **Figure 4-16 Cargo Concept 1C - Maximize Development of Cargo Ramp #2** is designed to maximize use of the existing apron and the developable area between the existing fuel farm and Building 2865, Forward Air. As shown, it is possible to construct a total of 450,000 square feet of Air Cargo Terminal facilities and approximately 449,600 square feet of parking and access facilities while reconfiguring approximately 1.22 million square feet of the adjacent apron area to accommodate the movement and parking of Airplane Design Group (ADG) IV to VI aircraft. This would also require the reconfiguration and addition of fuel hydrant positions and the demolition of the existing Air Cargo Terminal located in the center of the apron. This development concept accommodates parking for five Boeing 747-8F aircraft, five ADG IV aircraft, and an area suitable for parking smaller feeder aircraft. An additional 265,700 square feet of area is provided for the storage of cargo containers and ground support equipment.

Aircraft fuel storage facilities will be located adjacent to the proposed development. Three 356,000-gallon vertical tanks are shown to meet the future requirements for Jet-A fuel storage, settlement, and additional expansion capability. The aircraft fuel storage facilities would be connected to the existing hydrant system. The proposed concept would allow fuel off-load lanes to be separate from fueling lanes by a secured fence.

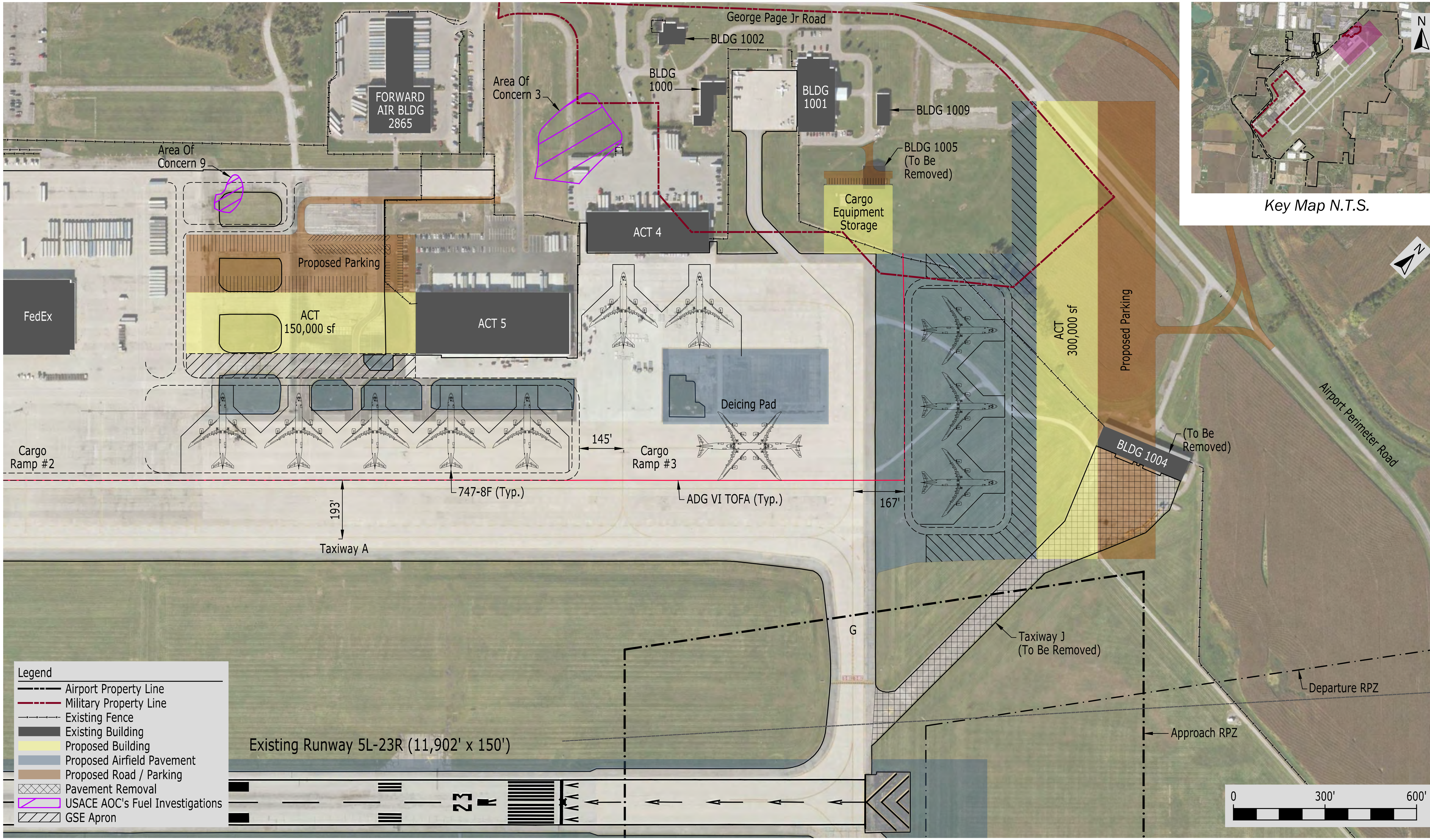

Figure 4-15 Cargo Concept 1B - Maximize Development of Areas Near ACT 4 and ACT 5

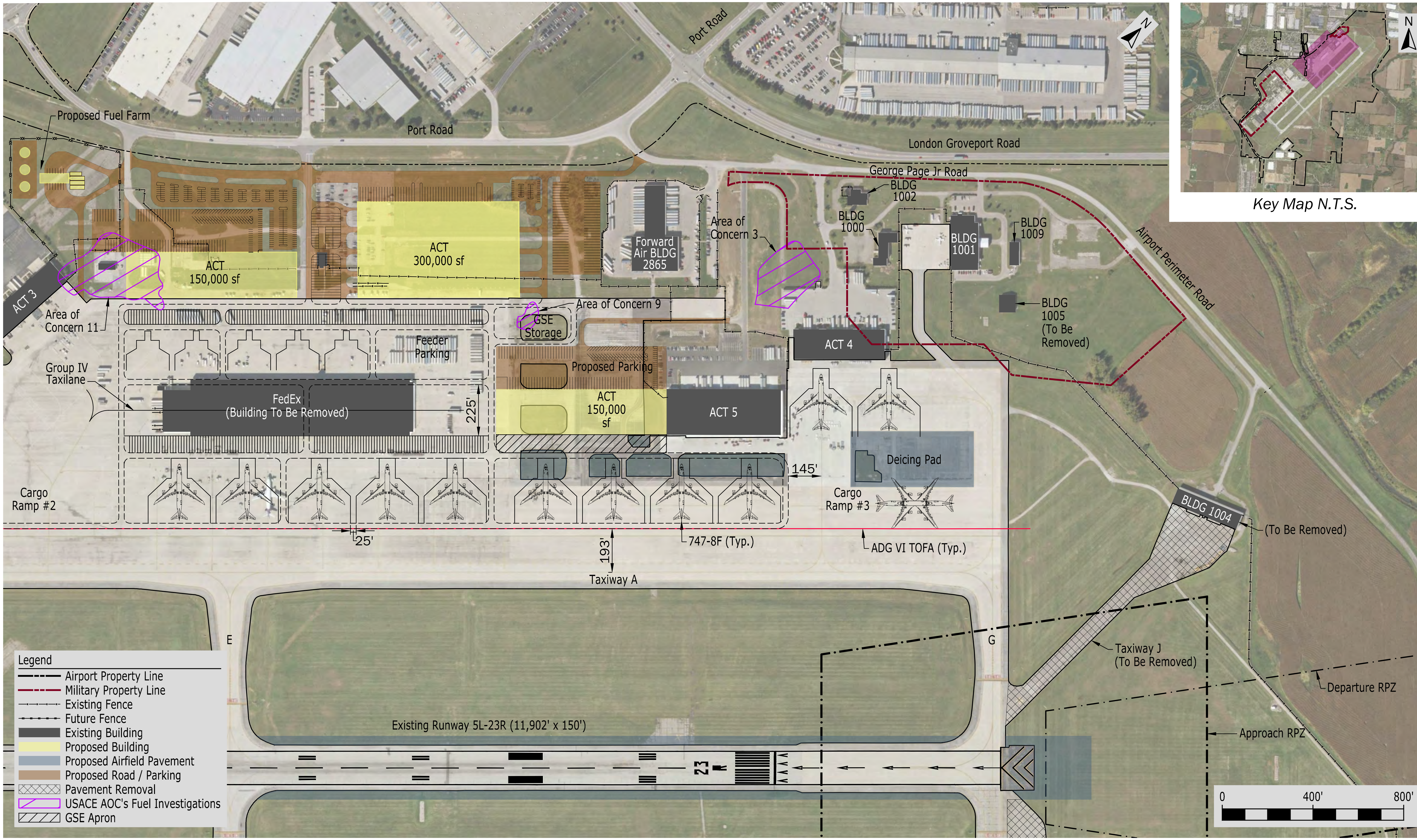

Figure 4-16 Cargo Concept 1C - Maximize Development of Cargo Ramp #2

Cargo Concepts 1A, 1B and 1C produce a solution for the facilities to accommodate forecast growth until the 2031-2033 timeframe. The forecasts are subject to the mix of cargo and any automation or technology enhancements that may impact cargo throughput within the facilities. Should high volume package (e-commerce) throughput become part of the cargo activities, these higher volume levels must also be reviewed to determine the preferred strategy for performing these sortation activities, whether on or off the ramp.

In addition, as the CRAA constructs new facilities, key milestone decisions must be considered regarding the occupation and leasing of these facilities. Several global freight forwarders in the region have been identified, who are already engaged in retail and logistics activities and have indicated a desire to participate in occupying facilities that offer ramp and aircraft access. These freight forwarders understand the incremental value of compressing the supply chain and taking advantage of the increased throughput benefits that could be gained with airside access for their distribution and future fulfillment business.

4.8.4 Cargo Concept 2

Figure 4-17 Cargo Concept 2 - Redevelopment of ACT 2 Area occurs mid-field in the area where the original ACT1, ACT2 and ACT3 exist. These facilities were designed to support lower volumes and throughput, and were not constructed to meet the requirements of the current array of cargo freighters that are serving LCK. ACT3 remains useful as it provides the smaller user with both ramp and truck loading capability. It is a “dual-loaded” facility, which means that it can be accessed from the airside with cargo and from the landside by trucks with cargo or private vehicle access. ACT1 and ACT2 were constructed away from the ramp. These facilities are single-loaded, which means that cargo arriving or departing occurs only on one side of the facility. The other side of the facility is only used for private parking and employee access. Cargo from the landside of ACT1 and ACT2 cannot directly access the ramp; it must be trucked through a secure gate for access to the cargo operations and aircraft loading activities. To the southeast of ACT 3 there are three legacy facilities, Cargo Buildings 1090, 1091 and 1092. These facilities have ramp access and are located between the ramp and the current ACT2. In order to accomplish the future alternative for enhanced cargo operations at LCK, the existing electrical vault (Building 1093) would need to be relocated, and the three legacy facilities (Buildings 1090, 1091, and 1092) and ACT2 would need to be demolished so that a new state of the art cargo facility can be constructed in this location. This would create a new 200,000 square foot facility over the footprint of ACT2, and would require additional construction of new private vehicle/truck parking and access between this new facility and Alum Creek Drive at John Circle Drive. There is an old hydrant fuel system that is closed in place near the vicinity of the proposed ACT and associated vehicle parking area. Potential impacts of this system upon the proposed development will be considered during the design and construction phases of development.

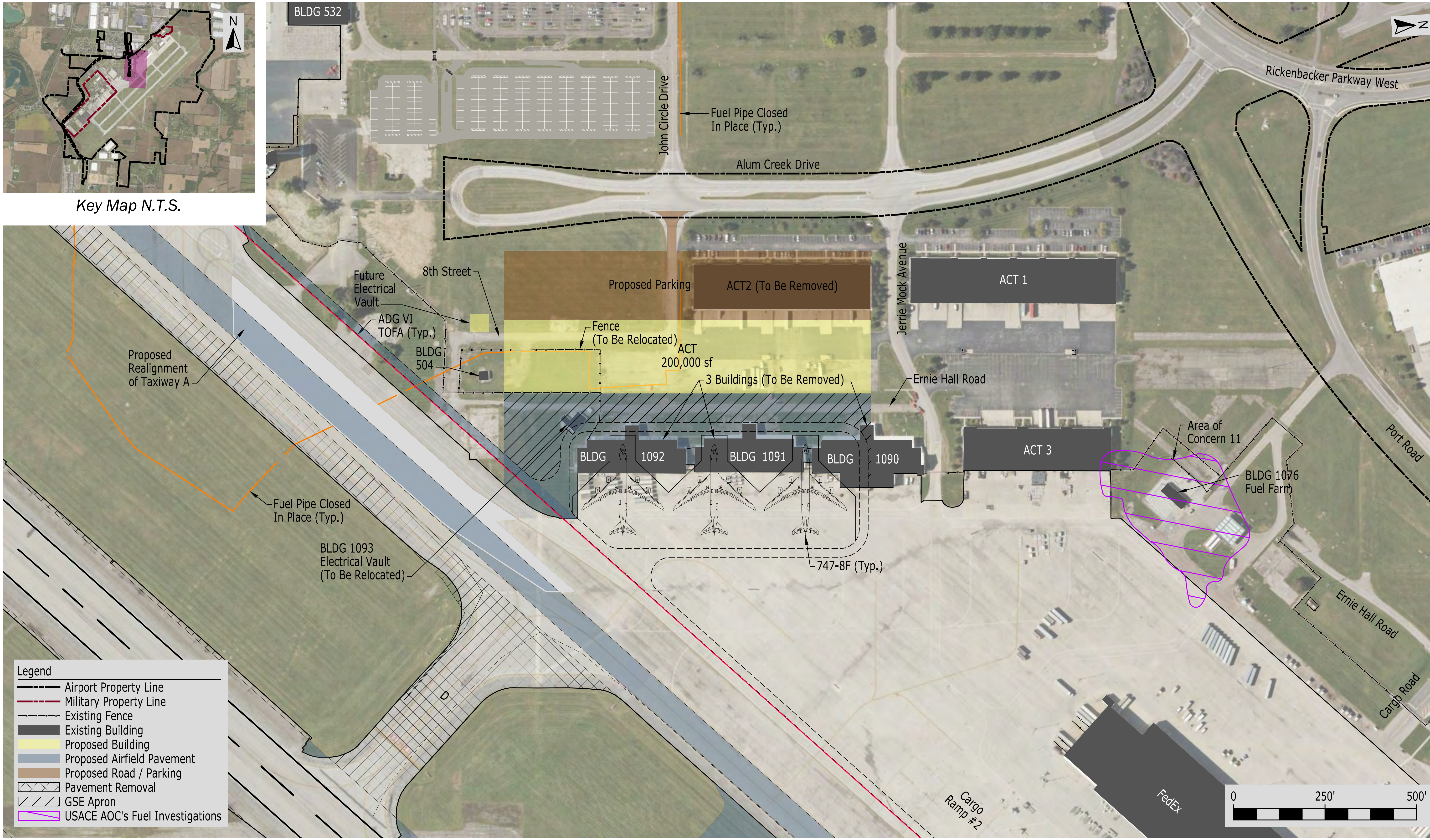

Figure 4-17 Cargo Concept 2 - Redevelopment of ACT 2 Area

This concept also depicts expansion of new ramp space to support aircraft parking and cargo operations. This expansion strategy aligns with the guiding principle of cargo activity aggregation as it keeps all current cargo operations on the north side of the airport and does not require the freight forwarder, the retailer or the ground handler to segregate, sort or manage cargo from two locations on opposite sides of the airport. By keeping the freight operations on the north side of the airport, CRAA can continue to offer prospective tenants the value and benefits of a compressed supply chain. If in the future, cargo operations are located to the south side of the airport, this separation would significantly impact the pace of activity and effectively equalize operations with similar segregation and separation of cargo activities occurring at the larger gateways such as ORD or JFK.

This Study has made every effort to develop a long-term strategy for the CRAA and freight stakeholders to preserve, to the greatest extent possible, an aggregation of cargo activities to maintain LCK's competitive advantage.

From a phasing perspective, Cargo Concept 2 could occur upon completing the expansion west of ACT5, and prior to implementing the northeastern component of Cargo Concept 1A or 1B. Cargo Concept 1C is not currently recommended in the earlier portions of the Study (short-term and intermediate-term planning periods). This is due to the higher cost associated with developing new apron facilities and associated infrastructure.

4.8.5 Cargo Concept 3

This future concept should be considered by CRAA when all other alternatives on the north side of the airport complex are fully constructed and all alternative space considerations and enhanced cargo handling protocols have been implemented. While **Figure 4-18 Cargo Concept 3 - South Development Area** demonstrates that an entire campus of three cargo facilities could be constructed, it also requires new taxiways (including a full-length parallel taxiway south of Runway 5R-23L), ramp/aircraft parking construction and utilities infrastructure in order to access the facilities from the south side of the airport. In the present forecast, all three of the indicated facilities are not required unless the CRAA chooses not to fully implement the earlier noted alternatives on the north side of the airport. Proposed development of this area will create some stream and wetland impacts. As a result, there may be associated threatened and endangered species concerns. Further environmental study will be required to determine their presence in the area. It is recommended that CRAA preserve space for future air cargo operations so that when demand levels are met, there is available land to the south for new industrial users who contribute to the future growth of cargo and logistics activities. As there is no available utility infrastructure to the south of the airport today, this concept is the least desirable alternative to be recommended for development. However, as new industrial users occupy space to the southwest within the Air Cargo and Intermodal South Campuses, considerations should be taken to preserve space for future air cargo requirements.

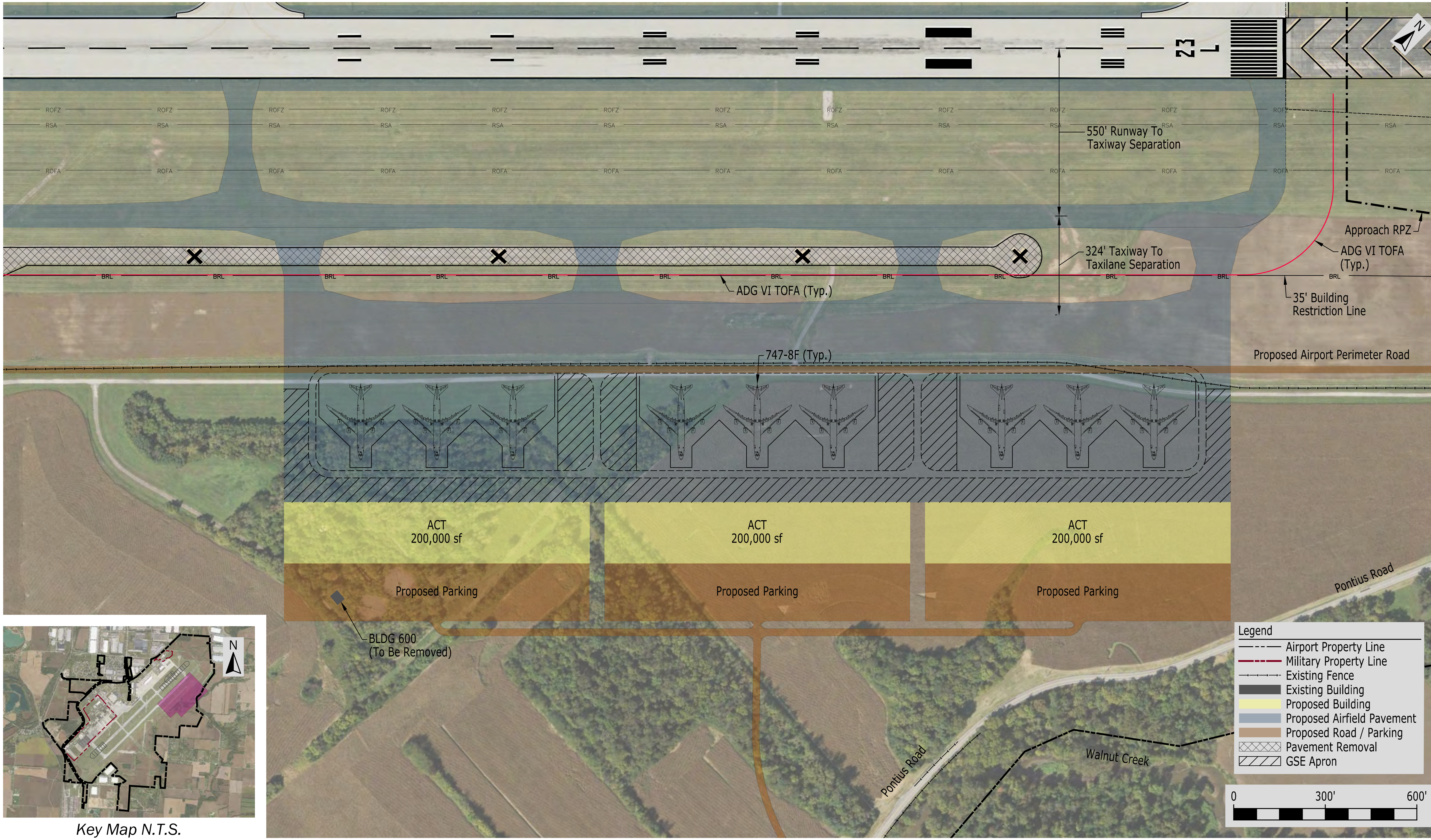

Figure 4-18 Cargo Concept 3 - South Development Area

4.8.6 Air Cargo Summary

The concepts provided in this narrative offer alternatives that support air cargo growth through the forecast period, 2016-2036. The resounding value of the Rickenbacker advantage of a compressed supply chain is resonating around the world, not only with the air carriers but also with global retailers and manufacturers who realize how competitive this advantage is in their global systems. The freight forwarders and third-party logistics service providers who support the freight owner's supply chains will continue to aggregate at LCK and Columbus because this advantage cannot be duplicated anywhere in the region. Thus, the catchment area for freight in Pittsburgh, Detroit, Cleveland, Cincinnati, Louisville, and Indianapolis will expand as LCK is already drawing freight from greater distances in order for users to take advantage of the value proposition for throughput at LCK. Additionally, as global e-commerce volumes increase, those carriers supporting cargo rotations at LCK will operate in routes that align with the demand for high volume package distribution between LCK's origins and destinations. This will drive a significant increase in future cargo volumes at the airport.

The alignment of the airport with two of the largest intermodal terminals in the region for Norfolk Southern and CSX Transportation provides a strong foundation for the expansion of new global manufacturing and production in/near Columbus and potentially in the Rickenbacker area. Global trade seeks locations where advantages in supply chains create a competitive differential and accelerate goods movements between origins and destinations. LCK produces that competitive advantage. The growth of new cargo, given these alternatives, can support future growth in global trade at LCK and within the Columbus region.

Table 4-3 Evaluation of Cargo Concepts summarizes and compares the alternatives based upon the evaluation criteria identified in **Table 4-1 Evaluation Criteria** (p. 4-2). It is important to note that the "Achievement of Objective" ratings are reflected as partial because no single alternative satisfies this criterion alone. As a result, the selected course of development will likely be a hybrid of the concepts shown.

Table 4-3 Evaluation of Cargo Concepts

Criteria	Concept				
	1A	1B	1C	2	3
Achievement of Objective	Partial	Partial	Partial	Partial	Partial
Airport Design Standards	Yes	Yes	Yes	Yes	Yes
Flexibility	Good	Poor	Good	Fair	Good
Collateral Impacts	Fair	Fair	Fair	Fair	Poor
Probable Cost	To be determined in conjunction with the preferred alternative.				
Efficiency of Construction Phasing	Fair	Fair	Fair	Fair	Fair
Environmental Compatibility	Mitigation Required	Mitigation Required	Mitigation Required	In place fuel line considerations	Mitigation Required

Source: Michael Baker International, 2017

4.9 General Aviation

The recommended facilities for general aviation operations include additional aircraft storage and parking facilities. Due to the diverse mix of commercial, military and general aviation aircraft activity at LCK, it is important to consider how this diverse mix of aircraft activity will interact in the future. Therefore, it was determined that the area located near the FBO complex would aid in providing a buffer between larger commercial and military operations from smaller general aviation aircraft activity.

As noted in **Chapter 3, Facility Requirements** (Section 3.15, p. 3-42), demand for hangars is based upon the approved forecast of aviation demand. Recommendations for aircraft hangar storage include providing T-Hangar storage for approximately 22 units (one small general aviation aircraft per T-hangar unit), adding space for up to seven conventional hangars (larger, multi-aircraft capability) and making taxilane fillet improvements to facilitate the movement of larger charter aircraft Taxiway Design Group (TDG 4) through the FBO ramp area. Although forecast general aviation needs are addressed in this section, phasing and development of proposed facilities will ultimately be market driven.

As shown in **Figure 4-19 General Aviation Development Area – Concept 1**, the general aviation complex is proposed in an underutilized area of land located northwest of the FBO hangar. In addition to taxilane connector and fillet improvements associated with operating TDG 4 charter aircraft (i.e. Boeing 757) on the FBO apron, this development option requires the construction of additional taxilanes capable of accommodating general aviation (ADG II/TDG 2) aircraft. The existing pavement can accommodate an occasional pass of the Boeing 757; however, pavement may experience advanced deterioration and should be monitored by CRAA staff. Concept 1 provides two T-Hangar buildings (12 units each) and three 10,000 square foot hangars. This alternative minimizes pavement required due to reduced apron area adjacent to the conventional hangars. Additional conventional hangar needs can be accommodated in the recently renovated FBO hangar. The area makes use of existing roadway infrastructure for parking and access needs, and is accessible via 2nd Street and Jerrie Mock Avenue. The area also has expansion capability to meet future aircraft hangar storage needs beyond the 20-year planning period.

Similar to the previous alternative, **Figure 4-20 General Aviation Development Area – Concept 2** provides similar taxilane access to the FBO apron and the 24 units of T-Hangar parking. However, this development option is configured to accommodate additional apron area associated with three 6,400 square foot conventional hangars. This option was provided with a focus on accommodating smaller jet or multi-engine piston aircraft. Additional conventional hangar needs can be accommodated in the FBO hangar.

The area makes use of existing roadway infrastructure for parking and access needs, and access can be provided via 2nd Street and Jerrie Mock Avenue. The proposed development can be expanded to meet future aircraft hangar storage needs beyond the 20-year planning period.

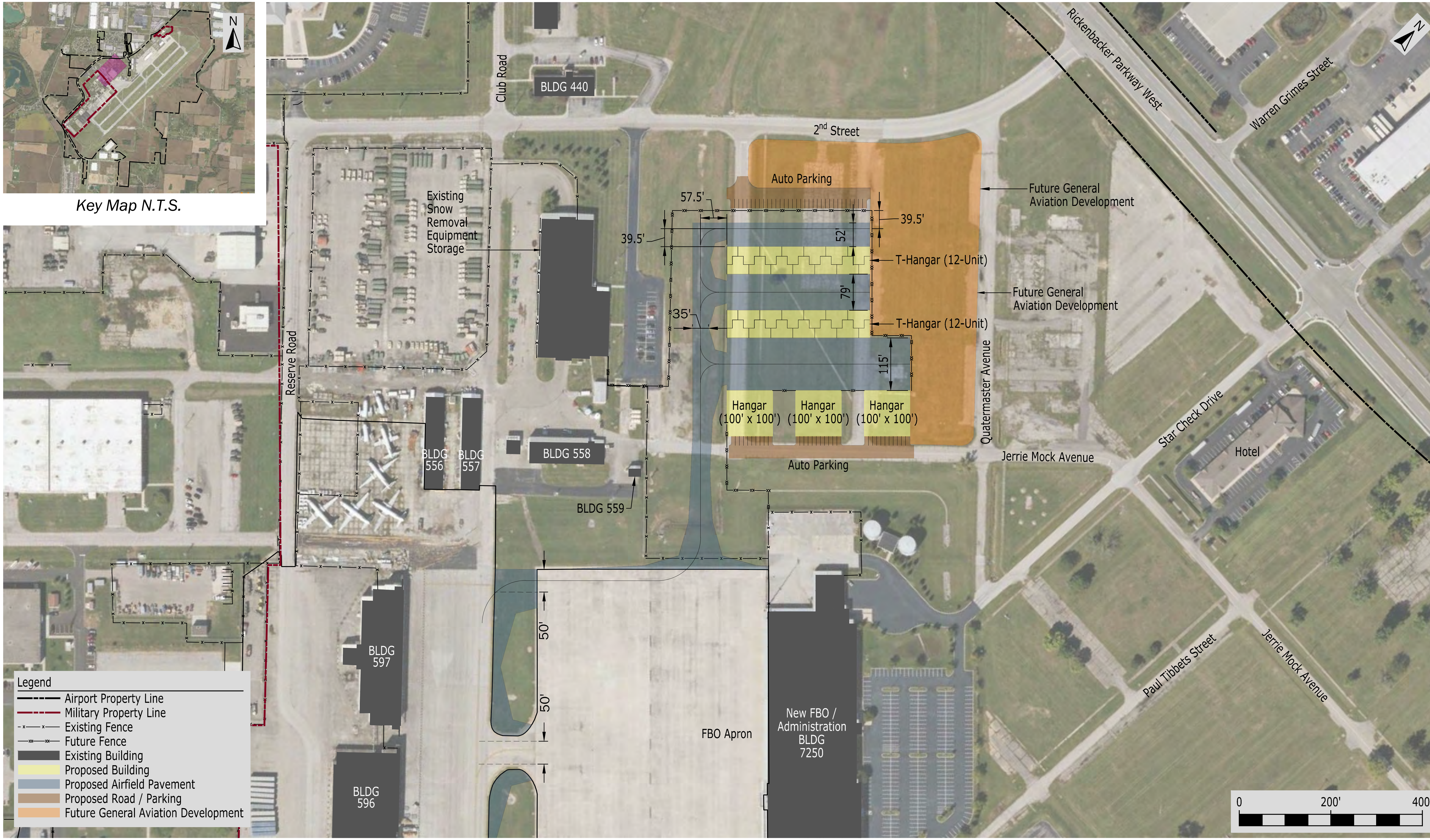

Figure 4-19 General Aviation Development Area - Concept 1

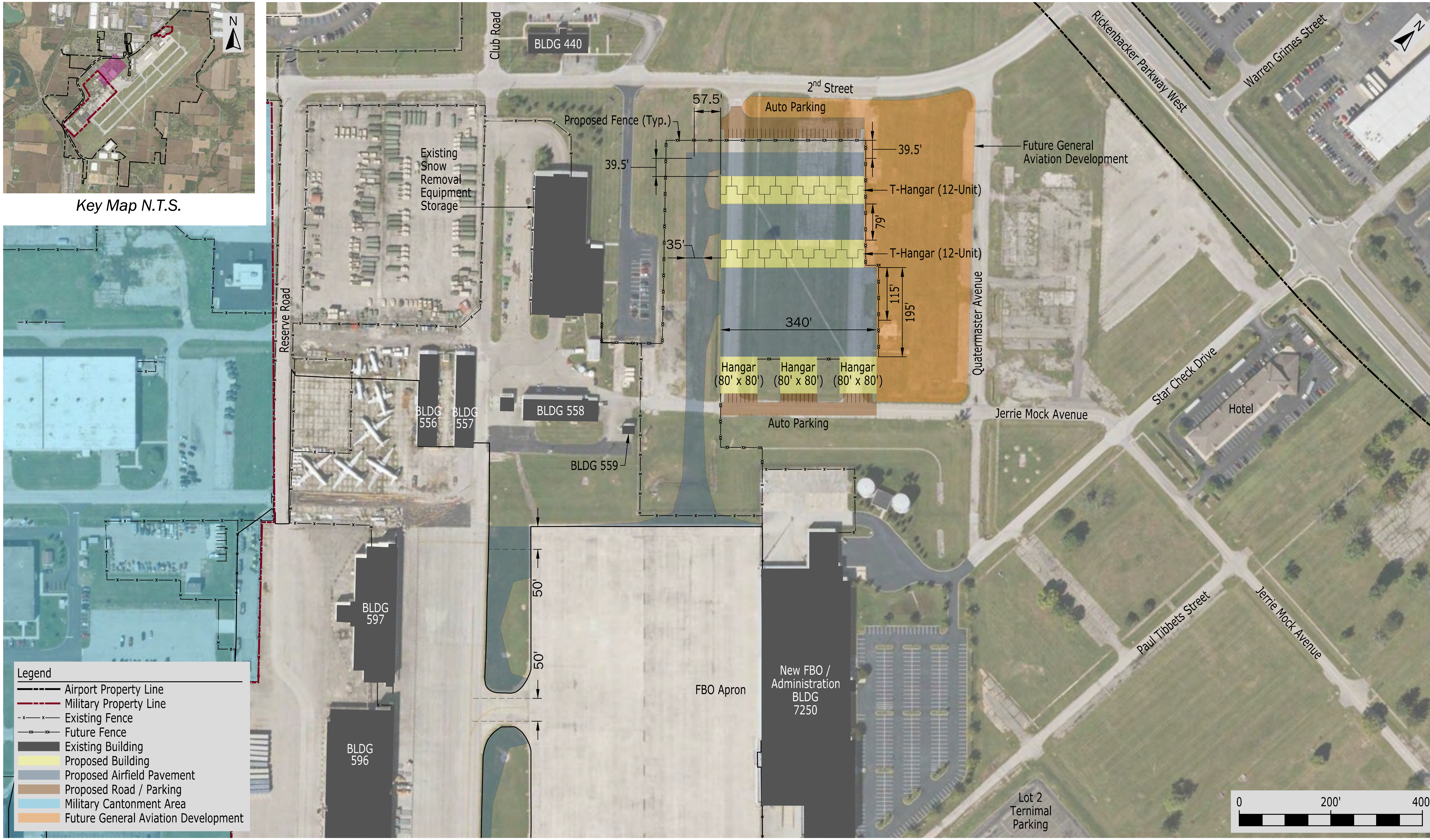

Figure 4-20 General Aviation Development Area - Concept 2

Table 4-4 Evaluation of General Aviation Concepts summarizes and compares the alternatives based upon the evaluation criteria identified in **Table 4-1 Evaluation Criteria**. Like other comparisons discussed in this chapter, several criteria are subjective in nature. For example, both general aviation alternatives provide the flexibility to meet future needs beyond the 20-year forecast period and have limited collateral impacts. Also, construction of each concept can be phased efficiently.

Table 4-4 Evaluation of General Aviation Concepts

Criteria	Concept	
	1	2
Achievement of Objective	Yes	Yes
Airport Design Standards	Yes	Yes
Flexibility	Good	Good
Collateral Impacts	Good	Good
Probable Cost	To be determined in conjunction with the preferred alternative.	
Efficiency of Construction Phasing	Good	Good
Environmental Compatibility	No Impacts Anticipated	No Impacts Anticipated

Source: Michael Baker International, 2017

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4.10 Support Facilities

As described in earlier chapters of the Study, support facilities include a wide range of functions intended to ensure the smooth, efficient, and safe operation of the airport. The FAA provides design guidelines for these facilities in the Advisory Circulars and ACRP reports. However, the requirements for these facilities were also based on interviews with airport staff, airport tenants, and users which facilitated a better understanding of the existing and future facility requirements.

4.10.1 Aircraft Fuel Storage

Based upon the analysis contained in **Chapter 3, Facility Requirements** (Section 3.16.2, p. 3-48), it was determined that approximately 354,960 gallons of Jet-A storage would be required to provide an average five-day supply of fuel at LCK by the end of the 20-year planning period. The current fuel farm is capable of providing an adequate average five-day fuel supply throughout the 20-year planning period. The five-day supply used in this analysis reflects the current conditions and was confirmed by the CRAA Director of Operations. However, considering the age of the existing underground fuel storage facilities, the use of above ground fuel tanks tied into the fuel hydrant system was recommended in conjunction with the future expansion of fuel farm capacity.

In an effort to remain in close proximity to the hydrant fuel system and accommodate future Jet-A fuel storage needs over the 20-year planning period, it was determined that 356,000 gallons of above ground tank storage would be needed, as shown in **Figure 4-21 Aircraft Fuel Storage Alternatives**. The benefit of constructing a vertical above ground tank in this area allows for expansion to occur within a smaller site footprint. It is important to note that underground tank removal must be performed in accordance with the Ohio Bureau of Underground Storage Tank Regulations (BUSTR). In addition, potential petroleum contamination should be considered during design and construction activities as this area is identified as an active fuel investigation site. The three alternatives shown are capable of meeting the future needs and provide flexibility for future expansion, if needed. Each concept has limited collateral impacts; however, the construction of Option 3 would allow fuel off-load lanes to be separate from fueling lanes by a secured fence. This option also provides ample expansion capability of up to three (3) 356,000-gallon tanks to support future back-up storage, fuel settling and inspection needs, and improves the future development potential of the area northeast of the site.

The existing 20,000 gallon above ground AvGas tank was determined to be sufficient in meeting future needs. During the long-term development phase of the Study, additional above ground Jet-A fuel storage will be needed in support of cargo facilities proposed for the south side of the airfield. The location of the south side fuel facility will be addressed in the alternatives refinement phase of this Study.

4.10.2 Airport Maintenance

Airport maintenance facilities are located within the maintenance complex off Club Road, southeast of the former CRAA administrative offices (Building 440). The complex includes facilities for the storage of maintenance equipment, a maintenance garage, fueling station and a triturator for disposing of airline waste. Recommendations for future maintenance facility improvements are incorporated into **Figure 4-22 Airport Maintenance Facilities**.

Maintenance Storage Facilities

CRAA has two maintenance storage facilities (Buildings 556 and 557, 8,220 square feet and 8,260 square feet respectively) that are currently used to store sand, sodium formate and salt materials used for snow and ice control. The buildings are severely deteriorated, in poor condition and the heating systems are not functional. The recommendation for a larger 24,400 square foot heated facility is depicted in **Figure 4-22 Airport Maintenance Facilities**. This proposed expansion was determined based upon on site discussions with CRAA maintenance and operations staff. This space allocation is designed to replace the site footprint of the existing storage facilities.

Maintenance Garage

The existing 7,560 square foot Maintenance Garage (Building 558) consists of three maintenance bays (including one drive-on lift), one bay with a 7.5-ton crane, and one wash bay. As the airport operation continues to grow, expanding this facility to provide an additional larger service bay capable of accommodating current equipment is needed. An 8,700 square foot expansion to mirror the existing facility is shown in **Figure 4-22 Airport Maintenance Facilities**. This proposed expansion was determined based upon on site discussions with CRAA maintenance and operations staff.

Snow Removal Equipment Building

The Snow Removal Equipment (SRE) Storage building (40,540 square feet) is used to store large snow removal equipment. In the future, additional snow removal equipment storage capacity may be needed in support of future airfield expansion. This would occur if the snow removal priority areas increase in size. Based upon the availability of developable area within the airport maintenance complex, approximately 24,400 square feet of future SRE storage capacity is depicted in **Figure 4-22 Airport Maintenance Facilities**. This proposed expansion is tied to future airfield expansion and was determined based upon on site discussions with CRAA maintenance and operations staff.

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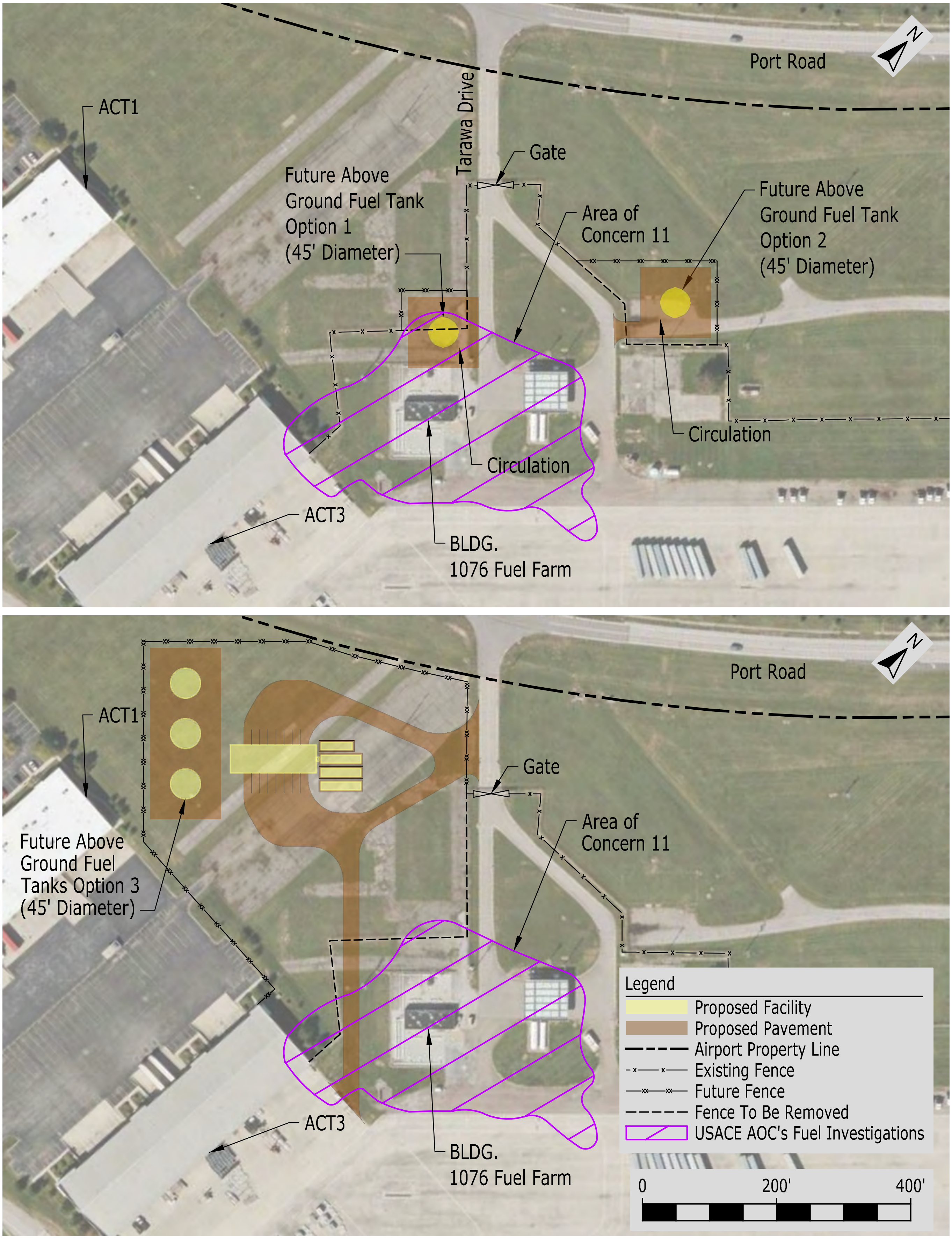


Figure 4-21 Aircraft Fuel Storage Alternatives

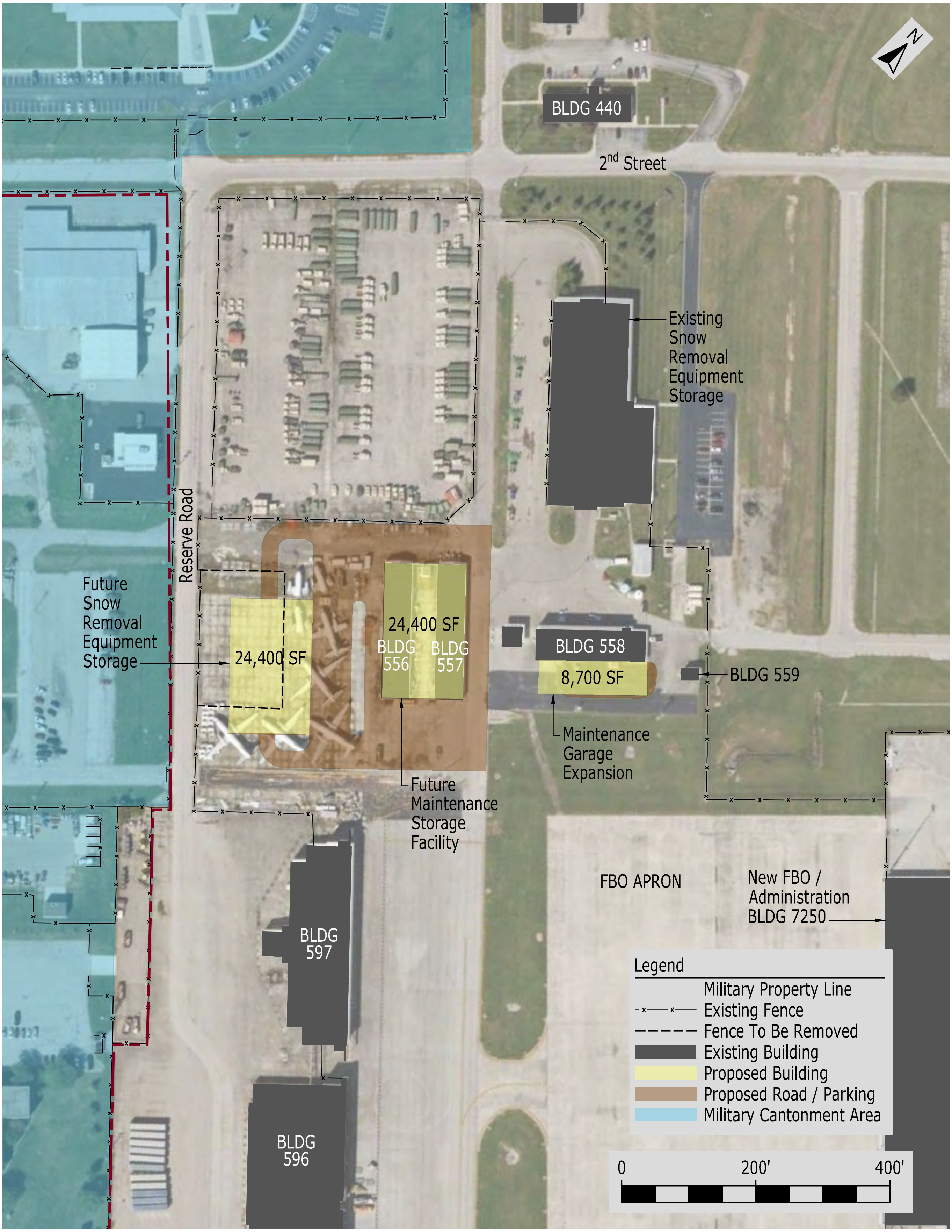
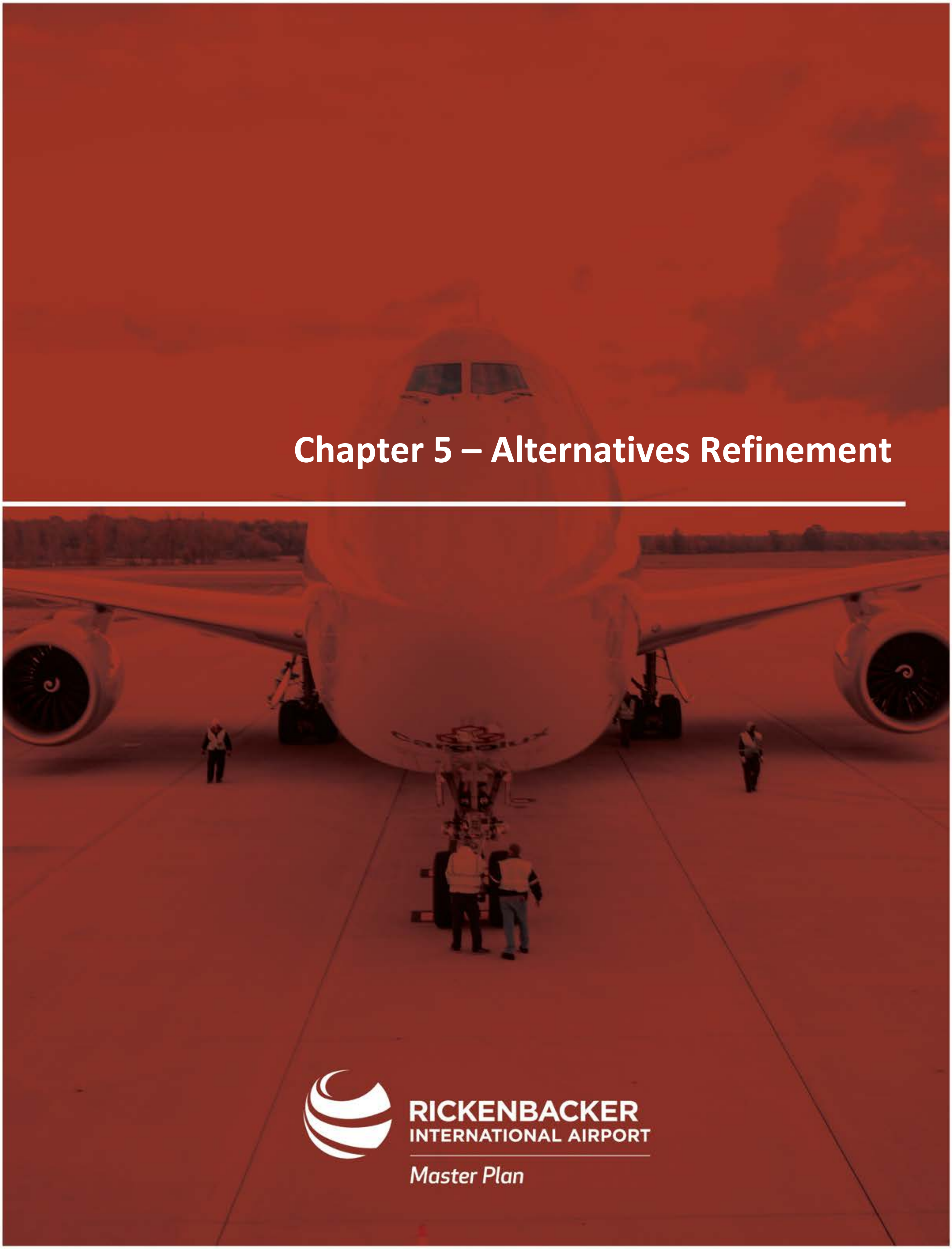


Figure 4-22 Airport Maintenance Facilities

Chapter 5 – Alternatives Refinement



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5.0 Alternatives Refinement

Based on input from CRAA staff and Stakeholder Advisory Committee (SAC) members, as well as comments from the public, refinements to the analysis of alternatives is needed to address issues raised or direction received during the review process. As a result, this process involves the revision of options or the combination of individual alternatives into a new development alternative for implementation. This chapter identifies and documents the rationale for the refinement of the alternative, and each refinement is discussed and reviewed using similar criteria to that used to evaluate the initial set of alternatives. At the end of this process, the revised analysis highlights the Study's recommendations. In addition, a more detailed list of capital improvement projects is documented at the end of this chapter in **Table 5-6 Preliminary Environmental Review of Preferred Alternative** (p.5-55). The preferred alternative will ultimately be utilized as the foundation for development of the Airport Layout Plan drawing set.

The preferred development concept presented in this section reflects the refinement and consolidation of the previously identified preferred development scenarios for airfield, air cargo, terminal, landside, and support facilities. This section also includes a more in-depth discussion of environmental impacts, regulatory requirements, and mitigation measures, as applicable.

5.1 Environmental Requirements Relevant to Proposed Projects

The project concepts proposed as part of the preferred alternative were screened for relevant environmental regulatory categories based on anticipated impacts and the need for consultation with agencies, field studies, permits, and mitigation. Currently proposed project locations and footprints, as well as anticipated project features (e.g., stationary equipment) and associated changes in airport operations (e.g., increases in the number or size of flights) were compared to readily available data on known environmental features, as well as triggers for permit requirements and agency consultation. Environmental regulatory categories that were reviewed for each project are listed below, along with assumptions and resources used to perform the review, and a general overview of regulatory requirements. Project-specific findings are summarized in the subsections in **Sections 5.2 Preferred Alternative** (p. 5-6) and **5.3 Rickenbacker Parkway Extension** (p. 5-41), as well as in **Table 5-6, Preliminary Environmental Review of Preferred Alternative**.

5.1.1 Site Contamination

Project extents were reviewed to determine if they are likely to result in the disturbance of historically contaminated sites. This evaluation was performed based on contaminated sites depicted on **Figure 4-1 Development Constraints** (p. 4-4), including:

- Air Force Base Conversion Agency Installation Restoration Program Sites,
- United States Army Corps of Engineers (USACE) Areas of Concern (AOCs) from fuel investigations,

- Rickenbacker AOCs submitted to USACE,
- ordnance activity areas, and
- former aqueous film-forming foam (AFFF) application areas with a potential for presence of perfluorinated compounds.

Historical cleanup and closure reports, as well as current cleanup and closure status reports supplied by CRAA were reviewed to determine closure status. The review also covered sites with active, inactive, or closed-in-place fuel lines that are not known to be contaminated, but present a risk for impacted soils to be encountered during construction. Hazardous materials sites that overlap with project areas are identified in the project-specific subsections in **Sections 5.2 Preferred Alternative** and **5.3 Rickenbacker Parkway Extension**, using the letter code designations from **Figure 4-1 Development Constraints**.

For projects impacting sites that have not achieved unrestricted closure, it is necessary to consult with the Ohio Environmental Protection Agency (OEPA) during the project planning phase to determine the current status of site remediation and closure activities, collect information about current known extents of contamination and pollutants of concern, identify development restrictions, and determine measures needed to minimize impacts during construction. Notification to OEPA is not required for projects impacting sites that have achieved unrestricted closure, but existing site documentation should be reviewed (including the closure report) to confirm pollutants of concern, pollutant levels, and impacted areas.

All projects impacting sites with known contamination or potentially impacted soils should prepare for the event that impacted soils will be encountered during construction. Potential risks regarding the disturbance of contaminated sites include spreading of the contamination beyond existing contamination extents, as well as health and safety risks to construction personnel. Prior to construction within potentially contaminated sites, including sites with unrestricted closure, it is recommended that a work plan be developed that outlines the approach to follow when contamination is encountered in the field, including the management and disposal of impacted soils and groundwater in accordance with applicable regulations. The work plan would inform construction contractors of what they might expect to encounter, how to visually identify contamination, and how to manage and dispose of impacted soils. A health and safety plan is also recommended to minimize exposure of construction personnel to hazardous materials and minimize associated health and safety risks. Coordination with an environmental professional during the construction process is also recommended to assist with developing the work plan, facilitating compliance with the work plan, assisting with development of the site health and safety plan, collecting environmental samples if needed, and assisting with OEPA consultation if contamination is encountered.

5.1.2 Construction Stormwater

Projects were evaluated to determine if they will result in a soil disturbance of at least one acre, which triggers the need for coverage under the Ohio National Pollutant Discharge Elimination System (NPDES) general permit for stormwater discharges associated with construction activities, and preparation of a construction Stormwater Pollution Prevention Plan (SWPPP).

5.1.3 Air Quality

Projects were evaluated for the need for air emission source permits from OEPA based on the anticipated installation of stationary equipment that are considered to be sources of air pollution, including boilers, emergency generators, and aboveground fuel storage tanks (ASTs). Additionally, projects were reviewed for whether they will increase air traffic. Increases in air traffic will trigger the need for additional studies, such as a detailed inventory of mobile and stationary sources and air quality modeling, to determine potential impacts on air quality in Franklin and Pickaway Counties. These projects also trigger the need to consult with the OEPA, to allow the agency to assess the effects on the State Implementation Plan (SIP). The SIP, required by the Clean Air Act, outlines a plan to reduce pollutant emissions and concentrations to maintain non-attainment areas in compliance with the standards.

Franklin County is currently in nonattainment with the 2015 8-hour ozone standard. Pickaway County is in full attainment for all NAAQS. A proposed project alternative would be considered to have a significant impact on air quality if the action would cause pollutant concentrations to exceed one or more of the NAAQS pollutants (such as ozone), as established by the U.S. EPA under the Clean Air Act. Attainment status may be impacted in the future by increased urban development within the counties, which could result in the implementation of more stringent review and permitting requirements for future projects.

5.1.4 Surface Waters and Wetlands

Projects were evaluated for potential impacts to surface waters and wetlands by comparing proposed project locations and extents against wetlands and streams identified in the document *Unpermitted Areas with Potential Jurisdictional Waters Rickenbacker Airport and Associated Properties Franklin and Pickaway County, Ohio* (TranSystems, March 2013). As wetlands and project extents are subject to change, a jurisdictional determination will need to be performed at the project site during the design phase to confirm the extents and types of wetlands or surface waters present on site at that time. Consultation will be needed with USACE and OEPA to determine potential impacts, permitting needs, and mitigation requirements. Specific wetlands and streams that overlap with project areas are identified in the project-specific subsections in **Sections 5.2 Preferred Alternative** and **5.3 Rickenbacker Parkway Extension**, using the letter code designations from the TranSystems report, along with potential permitting requirements.

5.1.5 Biological Resources

Projects were reviewed for impacts to potential habitats for threatened or endangered species, based on wetland and stream impacts described above, as well as impacts to wooded areas visible on aerial photography (acquired October 4, 2016) obtained as part of this Study. Wetlands and streams provide a potential habitat for aquatic endangered species, including the Scioto madtom (fish) and five species of mussels. Wooded areas, including well-developed riparian woods along stream corridors, provide maternity and foraging habitat for the Indiana bat and northern long-eared bat. Impacts to wetlands, streams, and wooded areas present a risk of impacting endangered species, and require coordination and consultation with the Ohio Department of Natural Resources (ODNR) and the U.S. Fish and Wildlife Service (USFWS). The agencies will determine if endangered species are present, potential impacts to these species, and mitigation requirements based on these impacts. An Incidental Take permit through the USFWS, is required when non-Federal activities will result in a take of threatened or endangered species. A habitat conservation plan or "HCP" must accompany the application for an incidental take permit. Projects involving impacts to potential habitat for threatened or endangered species are identified in the project-specific subsections in **Sections 5.2 Preferred Alternative** and **5.3 Rickenbacker Parkway Extension**.

5.1.6 Building Demolition

Project concepts were reviewed for existing buildings that will require demolition. Building demolition requires submittal of a Notification of Demolition and Renovation form to OEPA at least 10 working days before beginning demolition activity, even if no asbestos-containing materials are present in the structures. Submittal of waste shipment records may also be required in the event of asbestos-containing material removal and disposal. Projects involving building demolition are identified in the project-specific subsections in **Sections 5.2 Preferred Alternative** and **5.3 Rickenbacker Parkway Extension**.

5.1.7 Farmlands

Projects were evaluated for impacts to existing farmlands based on aerial photography (acquired October 4, 2016) obtained as part of this Study. These impacts will require a determination of whether any of the impacted land is designated as prime, unique, or statewide and locally important farmland. This determination can be performed by the FAA or requested to be performed by the Natural Resources Conservation Service (NRCS), a division of the United States Department of Agriculture, through completion of Form AD-1006, “Farmland Conversion Impact Rating.” Based on this determination, the value of the impacted farmland and significance of the impacts will be assessed. Consultation with NRCS is required to determine mitigation requirements based on identified impacts. Projects involving impacts to farmlands are identified in the project-specific subsections in **Sections 5.2 Preferred Alternative** and **5.3 Rickenbacker Parkway Extension**.

5.1.8 Noise

Noise impacts were evaluated for the overall airport based on the future aircraft fleet mix. As this evaluation was performed based on overall airport operations, and not on a project-specific basis, it is described in **Section 5.4 Noise Contours and Land Use Compatibility** (p.5-44) rather than in the project-specific subsections below.

5.1.9 City Requirements

Proposed project locations were also reviewed to determine if any are located within the City of Columbus, which would trigger additional local permitting requirements. As shown in **Figure 1-2 Location/Vicinity Map** (Section 1.1.3, p. 1-7), much of the airport is currently outside the limits of the City of Columbus, other than a corridor on the west side of Star Check Drive (east of 2nd Street) that continues south to the FBO hangar and parking lot, as well as areas along Port Road to the east. As the currently assumed locations and sizes of proposed projects do not fall within City limits, City permitting requirements are not applicable to the project-specific subsections in **Sections 5.2 Preferred Alternative** and **5.3 Rickenbacker Parkway Extension**. However, when additional annexation occurs or project extents change, it may be necessary to revisit the applicability of City requirements to individual projects.

5.1.10 Additional Considerations

Additional environmental regulatory considerations that do not fall under the above categories but are relevant to a particular project are identified under “Additional Considerations” in the project-specific subsections in **Sections 5.2 Preferred Alternative** and **5.3 Rickenbacker Parkway Extension**.

5.1.11 National Environmental Policy Act Documentation

Based on the evaluation of relevant environmental regulatory categories to each project, as described above, assumptions were made about the significance of impacts and potentially required National Environmental Policy Act (NEPA) documentation. The actual significance of impacts and NEPA requirements will ultimately be determined through consultation with regulatory agencies and site-specific studies. This initial evaluation was performed based on key language from FAA Order 1050.1F, Environmental Impacts: Policies and Procedures, which is described below.

FAA Order 1050.1F, Environmental Impacts: Policies and Procedures, provides the FAA policy and procedures to ensure compliance with the requirements of the National Environmental Policy Act (NEPA) for FAA funded projects and lists the type of NEPA documentation required for each project type. Chapter 5 of FAA Order 1050.1F contains advisory and emergency actions and categorically excluded projects and actions. Categorically excluded projects and actions are those that meet the criteria contained in 40 CFR 1508.4 and represent actions that do not normally require an Environmental Assessment (EA) or Environmental Impact Statement (EIS) and do not individually or cumulatively have a significant effect on the environment.

Chapter 5 of FAA Order 1050.1F also identifies extraordinary circumstances in which a normally categorically excluded action may have a significant environmental impact that then requires an EA or EIS. Examples of extraordinary actions include:

- An adverse effect on cultural resources;
- Impacts on properties protected under 4(f);
- Impacts on natural, ecological, or scenic resources such as Endangered Species or proposed critical habitat;
- Impacts to resources protected by the Fish and Wildlife Coordination Act, as well as wetlands, floodplains, designated prime and unique farmlands;
- A division or disruption of an established community;
- An increase in congestion from surface transportation;

- Impacts on noise levels of noise sensitive areas;
- Impacts on air quality or violation of Federal, state, tribal, or local air quality standards;
- Actions with an impact on water quality; and
- Likelihood of causing environmental contamination by hazardous materials or of disturbing an existing hazardous material contamination site such that new environmental contamination risks are created.

Chapter 3 of FAA Order 1050.1F provides a summary of requirements for environmental assessments and findings of no significant impact (FONSI) and lists examples of actions or projects that normally require an EA, which include but are not limited to:

- Actions that are not categorically excluded;
- Actions that are categorically excluded but involve at least one extraordinary circumstance that may significantly impact the environment;
- Acquisition of land greater than three acres for, and the construction of, new office buildings and essentially similar FAA facilities;
- Actions that require a Section 404 Individual permit;
- Establishment of fuel storage and distribution systems; and
- Federal financial participation in or unconditional airport layout plan approval of a major runway extension

5.2 Preferred Alternative

As shown in **Figure 5-1 Preferred Alternative**, the figure includes a combination of the airfield and landside development alternatives that were presented in **Chapter 4, Airport Alternatives Analysis**. A detailed listing of airfield projects that are anticipated during the planning period is presented within the Capital Improvement Program (CIP) included in **Chapter 6, Financial Plan**.

5.2.1 Airfield Pavement Improvements

The primary airfield recommendation is to create a runway and taxiway system that meets current FAA design standards for Airplane Design Group (ADG) VI/Taxiway Design Group (TDG) 5 aircraft. This includes the widening of the entire length of Runway 5L-23R to 200 feet (from the current 150 feet) and 40-foot wide shoulder improvements to both Runways 5L-23R and 5R-23L.

Taxiway improvements include constructing a full-length parallel taxiway (11,740 feet long by 75 feet wide) to address taxiway separation deficiencies identified in **Chapter 3, Facility Requirements** (Section 3.9, p. 3-13). By maintaining a minimum runway centerline to taxiway centerline separation of 550 feet, this alternative meets the prescribed design standards associated with the critical design aircraft while preserving for future Category II approach capability to Runway 5L-23R. As discussed in **Chapter 4, Airport Alternatives Analysis** (Section 4.3.1, p. 4-6), existing Taxiway A would continue to be used to serve the military cantonment area and cargo ramps. Also, direct access between the cargo ramp areas and the runway are eliminated by providing additional taxiway connections and removing pavement on Taxiways D, E and G. In the long-term, a full-length parallel taxiway (12,934 feet long by 75 feet wide) designed to meet ADG VI/TDG 5 standards, is recommended south of Runway 5R-23L to support anticipated future aviation-related development opportunities on the south side of the airport. Other related future airfield modifications designed to accommodate the critical aircraft (Boeing 747-8F) include increasing the size of blast pads on Runway 5L-23R to 280 feet by 400 feet, and minor taxiway fillet improvements as shown in **Figure 5-1 Preferred Alternative**. Minor fillet improvements are indicated for Taxiways C and D.

The following impacts, actions, and permit requirements are anticipated with the proposed airfield pavement improvements (runway width, shoulders, fillets, and blast pads), based on the evaluations described in **Section 5.1 Environmental Requirements Relevant to Proposed Projects**:

- Hazardous Materials – Construction activities will disturb the following sites illustrated on **Figure 4-1 Development Constraints** (p. 4-4):
    - Ordnance area #7, associated with the former Air Show Drop Zones, is southeast of Runway 5R-23L, both east and southeast of Taxiway C. Site investigations have indicated that this site has impacts to groundwater that are above threshold screening levels. The extent of contamination has not been fully determined and additional investigation is required. The site has not achieved unrestricted closure.
    - Both Runways 5L-23R and 5R-23L are designated as Air Force Area 8, which is a former aqueous film-forming foam (AFFF) application area with a potential for presence of perfluorinated compounds. Site investigation has been completed and analytical results did not exceed current regulatory screening levels; however, the site has not achieved unrestricted closure.

  Consultation with OEPA is required for any sites that have not achieved unrestricted closure at the time of development. Prior to construction within potentially contaminated sites, including sites with unrestricted closure, it is recommended that a work plan be developed that outlines the approach to follow when contamination is encountered in the field, including the management and disposal of impacted soils and groundwater in accordance with applicable regulations. A health and safety plan is also recommended to minimize exposure of construction personnel to hazardous materials and minimize associated health and safety risks.

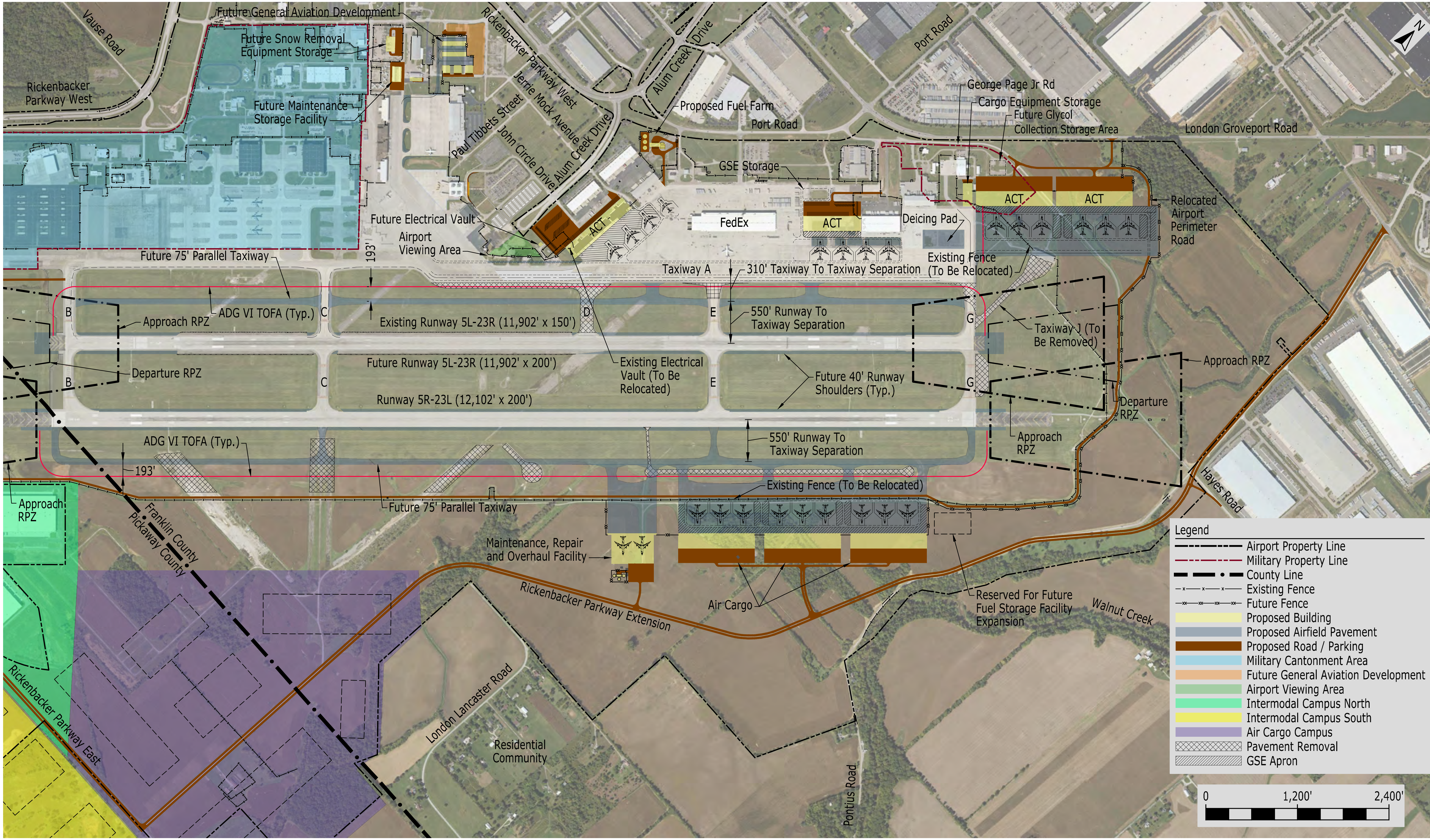


Figure 5-1 Preferred Alternative

- Construction Stormwater – As this project will disturb more than one acre, coverage under the Ohio National Pollutant Discharge Elimination System (NPDES) general permit for stormwater discharges associated with construction activities will be required, including preparation of a construction Stormwater Pollution Prevention Plan (SWPPP).

- Air Quality – This project accommodates increased air traffic. To assess impacts to Franklin and Pickaway Counties' air quality resulting from increased air traffic, additional studies such as a detailed inventory of mobile and stationary sources and air quality modeling will be conducted. Consultation with the OEPA will be conducted in order to allow the agency to assess the effects on the State Implementation Plan (SIP).

- NEPA Documentation – In accordance with Chapter 5-6 of FAA Order No.1050.1F, Environmental Impacts: Policies and Procedures, this type of development would be considered construction that is minor in nature and would potentially qualify for a CatEx. However, Chapter 5-2 states that projects may require an EA if they disturb an existing hazardous material contamination site, such that new environmental contamination risks are created. Based on this statement, this project may require an EA if contaminated site Ordnance Area #7 has not completed remediation or achieved unrestricted closure at the time of development.

The following impacts, actions, and permit requirements are anticipated for the proposed parallel taxiway development, based on the evaluations described in **Section 5.1 Environmental Requirements Relevant to Proposed Projects**:

North Parallel Taxiway

- Hazardous Materials - Construction activity will disturb the following sites illustrated on **Figure 4-1 Development Constraints:**

  - Closed-in-place fuel lines from the Ohio Air National Guard (OHANG) Military Ramp fuel system extend south of the Military Ramp and Taxiway A into the infield areas on the east and southeast sides of Taxiway C. Generally, the presence of closed-in-place fuel lines presents a risk that petroleum-impacted soils will be encountered during construction activities and will require disposal.
  - Remediation site SS042 is undergoing in-situ chemical oxidation remedial activities. Performance monitoring is ongoing and regulatory closure has not been achieved for this site.
  - Remediation site SS046 is a Bureau of Underground Storage Tank Regulations (BUSTR) site. Underground storage tanks have been removed. Contaminants were identified in the groundwater and site remediation work continues. Regulatory closure has not been achieved for this site.

  Consultation with OEPA is required for any sites that have not achieved unrestricted closure at the time of development. Prior to construction within potentially contaminated sites, including sites with unrestricted closure, it is recommended that a work plan be developed that outlines the approach to follow when contamination is encountered in the field, including the management and disposal of impacted soils and groundwater in accordance with applicable regulations. A health and safety plan is also recommended to minimize exposure of construction personnel to hazardous materials and minimize associated health and safety risks.

- Surface Waters and Wetlands – The currently planned location and footprint for this project will impact a 0.003-acre isolated wetland designated as Wetland CG in the document *Unpermitted Areas with Potential Jurisdictional Waters Rickenbacker Airport and Associated Properties Franklin and Pickaway County, Ohio* (TranSystems, March 2013). Based on this impact, it is anticipated that the project will require coverage under the OEPA Level 1 Isolated Wetland General Permit.

- Construction Stormwater – As this project will disturb more than one acre, coverage under the Ohio NPDES general permit for stormwater discharges associated with construction activities will be required, including preparation of a construction Stormwater Pollution Prevention Plan (SWPPP).

- Air Quality – This alternative accommodates increased air traffic. To assess impacts to the counties' air quality resulting from increased air traffic, additional studies such as a detailed inventory of mobile and stationary sources and air quality modeling will be conducted. Consultation with the OEPA will be conducted, in order to allow the agency to assess the effects on the State Implementation Plan (SIP).

- Biological Resources - As this project will result in wetland impacts (described above under "Surface Waters and Wetlands"), it has the potential to impact aquatic endangered species such as the Scioto madtom (fish) and five species of mussels. As described in Section 5.1 Environmental Requirements Relevant to Proposed Projects, coordination and consultation with the Ohio Department of Natural Resources and the U.S. Fish and Wildlife Service will be required to determine impact to these species and mitigation requirements. If the project is found to result in a take of threatened or endangered species, an Incidental Take permit and habitat conservation plan will be required.

- NEPA Documentation – In accordance with Chapter 5-6 of FAA Order 1050.1F, Environmental Impacts: Policies and Procedures, this type of development would be considered construction that is minor in nature and would potentially qualify for a CatEx. However, Chapter 5-2 states that projects may require an EA if they disturb an existing hazardous material contamination site, such that new environmental contamination risks are created. Based on this statement, this project may require an EA if contaminated sites SS042 and SS046 have not completed remediation or achieved unrestricted closure at the time of development.

South Parallel Taxiway

- Hazardous Materials - Construction activities will disturb the following sites illustrated on **Figure 4-1 Development Constraints**:

    - Ordnance area #7, which is associated with the former Air Show Drop Zones, is southeast of Runway 5R-23L, both east and southeast of Taxiway C. Site investigations have indicated that this site has impacts to groundwater that are above screening levels. The extent of contamination has not been fully investigated and additional investigation is required. The site has not achieved unrestricted closure.

  Consultation with OEPA is required for any sites that have not achieved unrestricted closure at the time of development. Prior to construction within potentially contaminated sites, including sites with unrestricted closure, it is recommended that a work plan be developed that outlines the approach to follow when contamination is encountered in the field, including the management and disposal of impacted soils and groundwater in accordance with applicable regulations. A health and safety plan is also recommended to minimize exposure of construction personnel to hazardous materials and minimize associated health and safety risks.

- Surface Waters and Wetlands – The currently planned location and footprint for this alternative will impact a portion of a 1.6-acre isolated wetland designated as Wetland BH in the document *Unpermitted Areas with Potential Jurisdictional Waters Rickenbacker Airport and Associated Properties Franklin and Pickaway County, Ohio* (TranSystems, March 2013). As wetlands and project extents are subject to change, a jurisdictional determination will need to be performed during project design to confirm the extents and type of wetlands on site, as well as potential impacts and permitting needs. Based on this impact, it is anticipated that the project will require an OEPA Level 2 Isolated Wetland Individual Permit.

- Construction Stormwater – As this project will disturb more than one acre, coverage under the Ohio NPDES general permit for stormwater discharges associated with construction activities will be required, including preparation of a construction Stormwater Pollution Prevention Plan (SWPPP).

- Air Quality – This alternative accommodates increased air traffic. To assess impacts to the counties' air quality resulting from increased air traffic, additional studies such as a detailed inventory of mobile and stationary sources and air quality modeling will be conducted. Consultation with the OEPA will be conducted in order to allow the agency to assess the effects on the State Implementation Plan (SIP).

- Biological Resources - As this project will result in wetland impacts (described above under "Surface Waters and Wetlands"), it has the potential to impact aquatic endangered species such as the Scioto madtom (fish) and five species of mussels. As described in **Section 5.1 Environmental Requirements Relevant to Proposed Projects**, coordination and consultation with the Ohio Department of Natural Resources and the U.S. Fish and Wildlife Service will be required to determine impact to these species and mitigation requirements. If the project is found to result in a take of threatened or endangered species, an Incidental Take permit and habitat conservation plan will be required.

- NEPA Documentation – In accordance with Chapter 5-6 of FAA Order 1050.1F, Environmental Impacts: Policies and Procedures, this type of development would be considered construction that is minor in nature and would potentially qualify for a CatEx. However, Chapter 5-2 states that projects may require an EA if they disturb an existing hazardous material contamination site, such that new environmental contamination risks are created, or if they adversely affect a wetland or associated wildlife or fish habitat. Based on this statement, this project may require an EA if contaminated site Ordnance Area #7 has not completed remediation or achieved unrestricted closure at the time of development, or if impacts to Wetland BH or associated biological resources are found to be significant based on consultation with regulating agencies.

The proposed airside and landside improvements discussed in this chapter are tailored to separate the traffic on the airport by type of aircraft operation (i.e. cargo, passenger, general aviation). Development options for air cargo, maintenance, repair and overhaul (MRO), the passenger terminal area, general aviation, access improvements, and airport support facilities are discussed in the following sections.

5.2.2 Air Cargo Facilities

Record levels of growth in global air cargo volume are occurring at Rickenbacker International Airport (LCK). The FAA has approved a new 20-year cargo forecast that reflects growth projected to 1.8 billion pounds of cargo. This represents approximately 30% growth (1-5 years), 20% growth (6-10 years), and 10% growth (11-20 years). The records for the airport (provided by the CRAA) indicate that over 75 million pounds of international scheduled freight was processed in 2016. In addition, in 2017 over 124 million pounds of cargo was processed while the cargo forecast predicted 97 million pounds of cargo would be processed in 2017. In 2018 over 179 million pounds of cargo was processed compared to a forecast of approximately 127 million pounds of cargo.

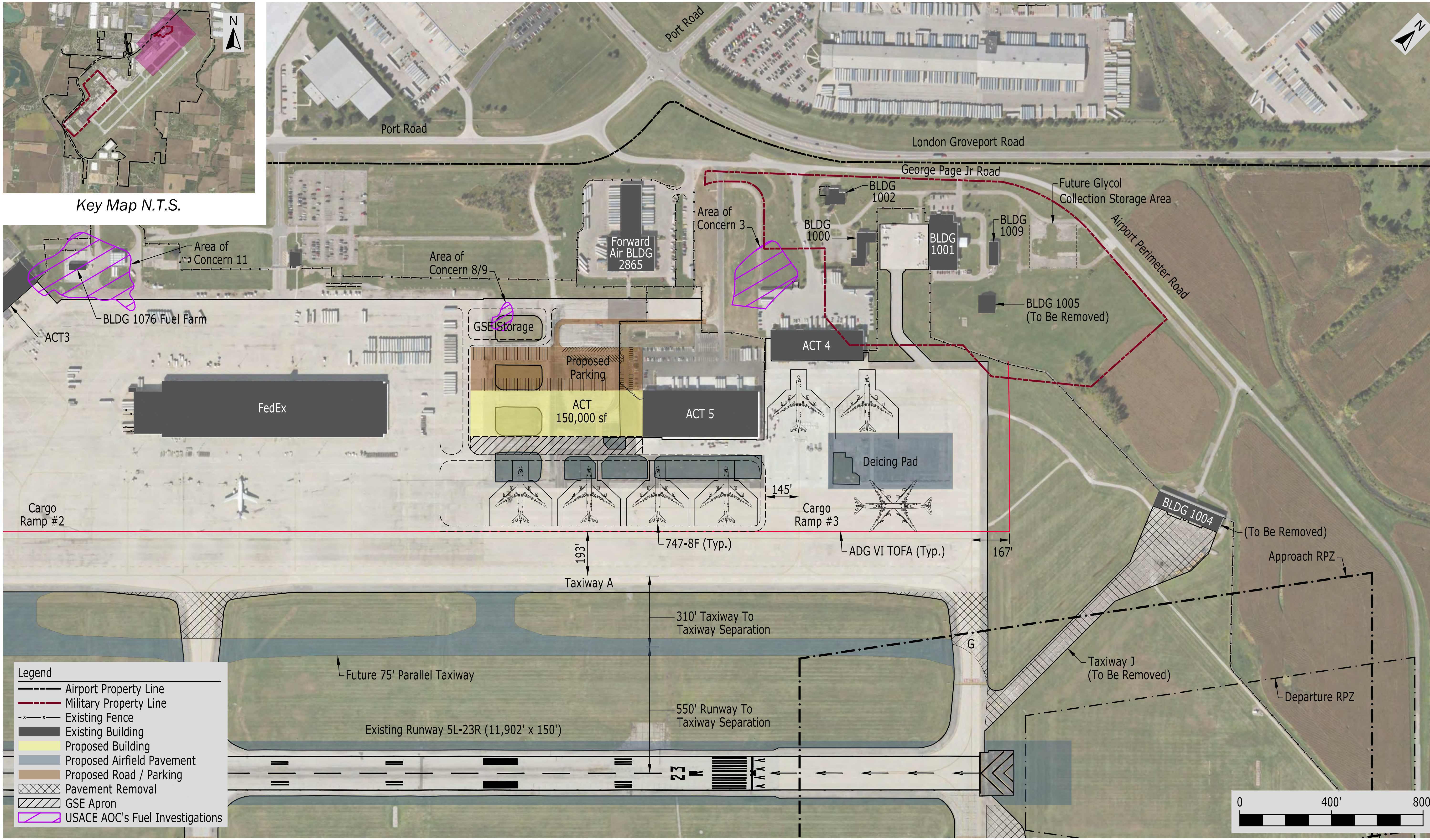
Based on this finding, the planning for new cargo facilities must be viewed as a priority. It will be important that careful observation of the actual growth over the scheduled projections be monitored in terms of total cargo and weight to accurately manage the construction of new facilities. If the projections for growth continue into 2018 at the current accelerated pace, four years of growth will have occurred in only two years, thereby compressing the time between the initial schedule for building the next facility and the reality of when it will need to be delivered. In addition, the “mix” of cargo, the shift from imports to a more balanced import/export load composition and the growth of exports, which have a different dwell time in Columbus, will impact the decision timeframe for determining when the next cargo facility must be constructed.

Based upon input from CRAA staff, Stakeholder Advisory Committee (SAC) members, and internal reviews, the following locations and sequencing for cargo facilities are recommended. The refined cargo recommendations presented in this section are based on the order in which they should be constructed and delivered for operations. Given that one of the recommendations for future cargo facilities also included demolition of existing facilities, it will be critical to schedule the timeframe for starting the next facility with the amount of work to be done before construction can begin to deliver the new facility. As determined in **Chapter 4, Facility Requirements**, each facility is presented utilizing the Airport Cooperative Research Program (ACRP) guidelines (ACRP Report 143, Guide Book for Air Cargo Facility Planning and Development) outlining requirements for external truck and automobile parking, and ramp for aircraft parking, cargo operations and equipment storage.

Air Cargo Terminal 5 Expansion

Air Cargo Terminal 5 was constructed in 2016. At the time of construction, there was a vision that ACT 5 could be expanded beyond the current 100,000 square feet of operations space and the 40,000 square feet of office space. The facility contains a small security cage for segregation of materials and an area for cold chain storage of goods in transit. The expansion plan vision was to create a “mirror” of ACT 5 next to or adjoining the current facility, thus creating up to an additional 150,000 square feet for operations and office space. This development option includes expanding the existing aircraft parking apron to accommodate up to five Boeing 747-8F aircraft, fuel hydrant system improvements to serve the new aircraft parking configuration, and the addition of a deicing pad proposed to be located east of ACT 5. Although there are cost savings associated with developing in this area, approximately 734,300 square feet of new pavement will also be required to support access improvements, truck and automobile parking, and ramp area for cargo operations and equipment storage. The construction of this new 150,000 square foot facility would provide new space to support increases in import and export processing, as well as new e-commerce processing. It would also provide an opportunity for other cargo handlers or freight forwarders to occupy ramp space to support their current and future cargo activities at LCK. Electric, water, stormwater, sanitary, and hydrant fuel utilities are available on site.

Figure 5-2 Air Cargo Facility (ACT 5 Area), identifies the location of the new facility and depicts the requirements for ramp/aircraft parking, access, truck staging and parking, and automobile parking for employees. As reaffirmed during the master planning process, this facility continues the guiding principle of keeping the air cargo operations activities aggregated together in close proximity to the airfield. This principle is applied throughout this plan so cargo operations at LCK can continue to compete with the traditional gateways. The key to LCK’s success is these operations are performed in hours, not days as with the JFK and ORD gateways.


Key Map N.T.S.
N
Port Road
Port Road
London Groveport Road
George Page Jr Road
Future Glycol
Collection Storage Area
Airport Perimeter Road
BLDG 1002
BLDG 1000
BLDG 1001
BLDG 1009
BLDG 1005
(To Be Removed)
Area of
Concern 3
Forward
Air BLDG
2865
Area of
Concern 11
Area of
Concern 8/9
BLDG 1076 Fuel Farm
ACT3
GSE Storage
Proposed
Parking
ACT 4
FedEx
ACT
150,000 sf
ACT 5
Deicing Pad
145'
Cargo
Ramp #2
Cargo
Ramp #3
747-8F (Typ.)
ADG VI TOFA (Typ.)
167'
193'
Taxiway A
BLDG 1004
(To Be Removed)
Approach RPZ
310' Taxiway To
Taxiway Separation
G
Future 75' Parallel Taxiway
Taxiway J
(To Be Removed)
Departure RPZ
550' Runway To
Taxiway Separation
Existing Runway 5L-23R (11,902' x 150')
23
Legend
Airport Property Line
Military Property Line
Existing Fence
Existing Building
Proposed Building
Proposed Airfield Pavement
Proposed Road / Parking
Pavement Removal
GSE Apron
USACE AOC's Fuel Investigations
0
400'
800'

This value proposition favors the continued growth of LCK as an alternative gateway, producing real benefits that can be monetized for the freight forwarder or their global retail and manufacturing clients.

The following impacts, actions and permit requirements are anticipated with the ACT 5 expansion, based on the evaluations described in **Section 5.1 Environmental Requirements Relevant to Proposed Projects**:

- Hazardous Materials – Construction activity will disturb the following sites illustrated on **Figure 4-1 Development Constraints**:

    - USACE AOC 9, which is located between ACT 5 and FedEx, is a remediation site for former underground storage tanks that involve petroleum hydrocarbon contamination. Regulatory closure has not yet been achieved for this site.
    - Air Force Area 7 is an aqueous film-forming foam (AFFF) application area with a potential for presence of perfluorinated compounds.
    - Former KC-135 crash site. This site, which is located southeast of ACT 5, has received unrestricted regulatory closure.

  Consultation with OEPA is required for any sites that have not achieved unrestricted closure at the time of development. Prior to construction within potentially contaminated sites, including sites with unrestricted closure, it is recommended that a work plan be developed that outlines the approach to follow when contamination is encountered in the field, including the management and disposal of impacted soils and groundwater in accordance with applicable regulations. A health and safety plan is also recommended to minimize exposure of construction personnel to hazardous materials and minimize associated health and safety risks.

- Construction Stormwater – As this project will disturb more than one acre, coverage under the Ohio NPDES general permit for stormwater discharges associated with construction activities will be required, including preparation of a construction Stormwater Pollution Prevention Plan (SWPPP).

- Air Quality – This alternative accommodates increased air traffic. To assess impacts to the counties' air quality resulting from increased air traffic, additional studies such as a detailed inventory of mobile and stationary sources and air quality modeling will be conducted. It is possible that an air permit may be required as part of this proposed development. Consultation with the OEPA will be conducted in order to allow the agency to assess the effects on the State Implementation Plan (SIP).

- NEPA Documentation – In accordance with Chapter 5-6 of FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, this type of development would be considered construction that is minor in nature and would potentially qualify for a CatEx. However, Chapter 5-2 states that projects may require an EA if they disturb an existing hazardous material contamination site, such that new environmental contamination risks are created. Based on this statement, this project may require an

EA if contaminated sites AOC 8 and AOC 9 have not completed remediation or achieved unrestricted closure at the time of development.

Deicing Pad

As required by state and federal law, the airport is covered by an individual industrial National Pollutant Discharge Elimination System (NPDES) permit. The Clean Water Act (CWA) prohibits a facility from discharging pollutants from a point source into a regulated water of the United States without an NPDES permit. The LCK NPDES permit, number 4IN00085*FD, contains effluent limitations, monitoring requirements, and reporting requirements. Effluent limitations are intended to limit the discharge of pollutants associated with airport industrial activities including fueling, maintenance, washing, waste management, chemical and material storage, and deicing. Increases in airport industrial activities could increase the risk of discharges of pollutants in airport stormwater and potential exceedances of effluent limitations.

The current LCK NPDES permit includes effluent limits for pH and oil and grease, and projected effluent limitations for parameters associated with deicing chemicals in stormwater. Future increases in airport flights will increase the amount of aircraft deicer applied, increasing the frequency and concentration of deicer in stormwater discharges. Should airport discharges have a reasonable potential of exceeding the projected effluent limits in the existing LCK industrial NPDES permit, new discharge limits will be developed by Ohio EPA for the LCK NPDES permit necessitating management of stormwater containing deicing chemicals.

Aircraft deicing discharges have caused exceedances of the current permit’s projected effluent limits in the past when significant winter events coincided with significant flight operations. Currently, exceedance of these projected effluent limitations triggers additional monitoring requirements for the airport. Future increases in airport flights may increase the frequency and magnitude of exceedance of the projected effluent limitations, which may lead OEPA to develop discharge limits necessitating management of stormwater containing deicing chemicals.

In anticipation of the potential need for future management of aircraft deicing chemical discharges, the ACT 5 expansion includes a deicing pad to facilitate collection of aircraft deicing chemicals. The deicing pad, which is illustrated on **Figure 5-1 Preferred Alternative,** and **Figure 5-2 Air Cargo Facility (ACT 5 Area)**, is proposed to be located within what is currently a partially-paved infield area on the existing ramp southeast of ACT 5.

A detailed deicing study would need to be conducted to determine, based on the anticipated future demand, and peak hour departure rate, how many deicing slots and how much area would need to be dedicated to the deicing pad. The study would consider which aircraft would utilize the deicing pad and which aircraft would deice on the ramp, and if the air carriers might employ any source reduction technologies. Winter weather patterns anticipated at LCK and the projected effluent limits would be used to estimate how often stormwater and deicing chemicals from that area would need to be collected, and an economically supportable means of storing and disposing of the chemicals. Typically, collected stormwater containing deicing chemicals is stored on-site in an underground vault, aboveground storage tanks, or a basin prior to discharge to the local sanitary sewer, treatment on-site, or recycling if economically beneficial. Depending on the volume of stormwater collected, and the discharge rate to treatment, management of collected deicing chemicals could be a small underground storage tank under the ramp or infield area, or large aboveground tanks similar to what is installed at John Glenn Columbus International Airport.

Figure B.3 Sanitary Utilities, found in **Appendix B, Utilities Figures**, illustrates the location of current and potential future sanitary sewer connections. Collected stormwater containing deicing chemicals could potentially be discharged to the Canal Winchester wastewater treatment plant or the Southerly wastewater treatment plant. CRAA would need to provide the sanitary sewer with an estimate of potential discharge volumes and loads from a deicing study, confirm with the sanitary sewer that there is sufficient available capacity in the conveyance lines and at the plant, and obtain a permit to connect and discharge to the sewer.

The following impacts, actions, and permit requirements are anticipated with the proposed deicing pad, based on the evaluations described in **Section 5.1 Environmental Requirements Relevant to Proposed Projects**:

- Construction Stormwater – As this project will disturb more than one acre, coverage under the Ohio NPDES general permit for stormwater discharges associated with construction activities will be required, including preparation of a construction Stormwater Pollution Prevention Plan (SWPPP).

- Hazardous Materials – Construction activity will disturb the following sites illustrated on **Figure 4-1 Development Constraints**:

    - Air Force Area 6 is an aqueous film-forming foam (AFFF) application area with a potential for presence of perfluorinated compounds along the northwest end of Taxiway G. Site investigations in this area indicate impacts to the uppermost groundwater zone. This site has not achieved unrestricted regulatory closure.

  Consultation with OEPA is required for any sites that have not achieved unrestricted closure at the time of development. Prior to construction within potentially contaminated sites, including sites with unrestricted closure, it is recommended that a work plan be developed that outlines the approach to follow when contamination is encountered in the field, including the management and disposal of impacted soils and groundwater in accordance with applicable regulations. A health and safety plan is also recommended to minimize exposure of construction personnel to hazardous materials and minimize associated health and safety risks.

- Additional Considerations – The existing LCK NPDES permit for stormwater associated with industrial activities may need to be modified depending on the results of a reasonable potential analysis for exceedance of existing permit thresholds for deicing-related parameters. Should discharge to a sanitary sewer be selected for disposal of runoff collected at the deicing pad, an industrial pre-treatment permit would need to be obtained for connection and discharge to the sewer. Runoff collection infrastructure installed near the pad may entail its own environmental impacts.

- NEPA Documentation – In accordance with Chapter 5-6 of FAA Order 1050.1F, Environmental Impacts: Policies and Procedures, this type of development would be considered construction that is minor in nature and would potentially qualify for a CatEx. However, Chapter 5-2 states that projects may require an EA if they disturb an existing hazardous material contamination site, such that new environmental contamination risks are created. Based on this statement, this project may require an EA if contaminated site Air Force Area 6 has not completed remediation or achieved unrestricted closure at the time of development.

Air Cargo Facility (ACT 2 Area)

Figure 5-3 Air Cargo Facility (ACT 2 Area), depicts a new 200,000 square foot facility to accommodate future air cargo demand. This reflects a refinement of Cargo Concept 2, (p. 4-34) which avoids the demolition of ACT 2. However, this facility will require the demolition of three facilities. The site is located adjacent to Cargo Ramp 2, southwest of the existing FedEx cargo facility, and is projected to be constructed over the footprint of Buildings 1090, 1091, and 1092. This facility can be constructed as a single one-time facility or phased as two construction cycles of 100,000 square feet each. Truck and automobile access to the proposed site would be provided via Alum Creek Drive and John Circle Drive. Electric, water, stormwater, and sanitary utilities are available on site. Hydrant fuel is located in the area but not on site. It is also important to note that development of this option would eliminate the aircraft parking position (#25) currently used to accommodate Antonov 124 (AN-124) aircraft parking. Although parking of the AN-124 is possible on Cargo Ramps 1 and 3, the aircraft would have to be fueled by truck in lieu of a hydrant pit at these locations.

This facility requires reconstruction of approximately 661,550 square feet of apron for aircraft parking and cargo operations. The proposed 320,380 square feet of landside pavement development will also require the relocation of the existing electrical vault (Building 1093). In an effort to reduce the cost of relocation, it is recommended that the new electrical vault be constructed approximately 375 feet southwest of the proposed air cargo facility. ACT 1, ACT 2, and ACT 3 will remain in use by tenants even after construction. The configuration of the new ACT is similar in design to ACT 5 and the expansion of ACT 5 as described previously. It is recommended that the design, architecture, and appearance of all cargo facilities be similar to enhance the identity of CRAA to the public and reduce costs by using similar design and construction elements. This is the next proposed air cargo facility after the ACT 5 expansion is completed. When the ACT 5 expansion is 60% utilized, planning for this new ACT should begin.

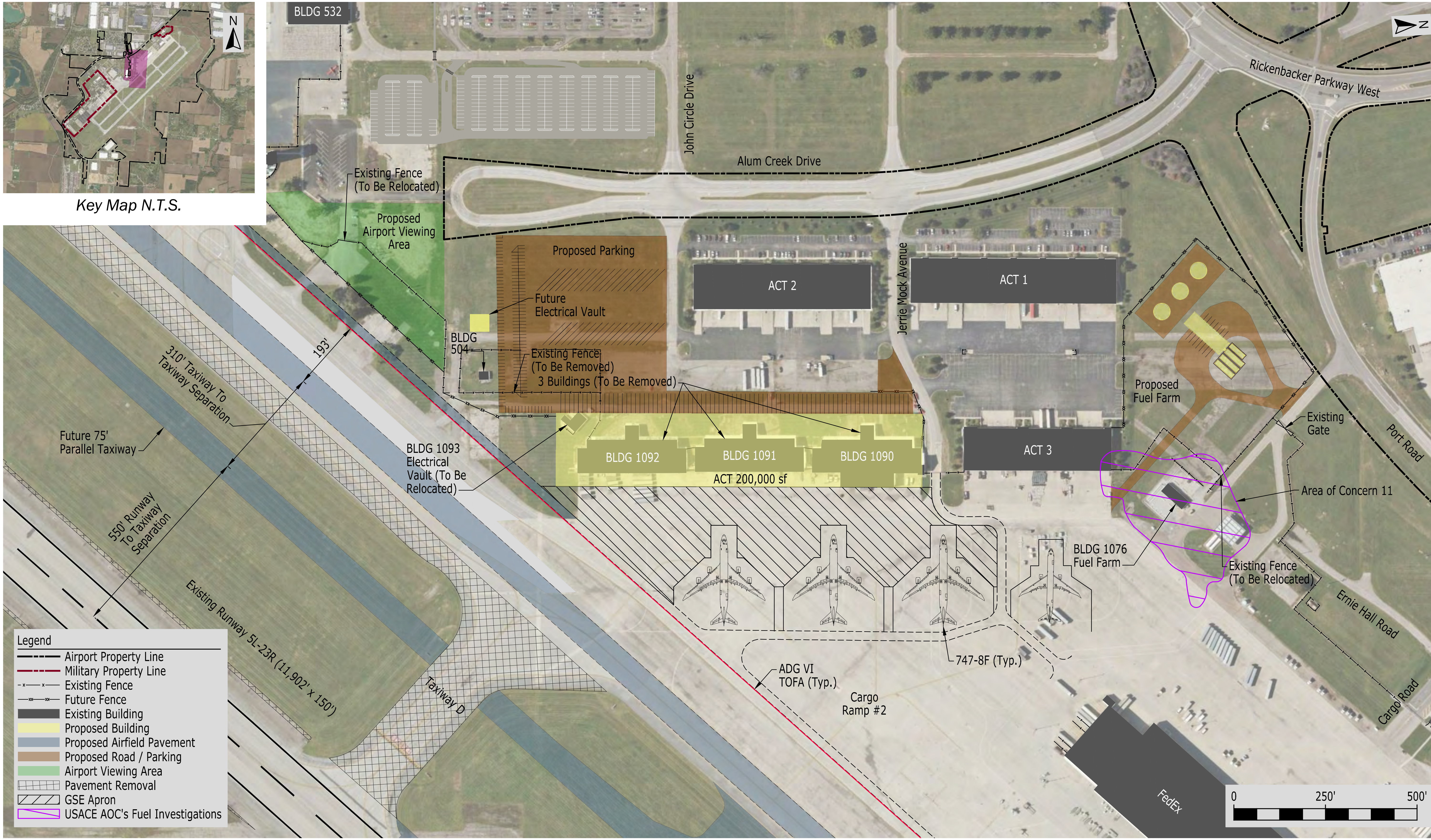


Figure 5-3 Air Cargo Facility (ACT 2 Area)

When the ACT 5 expansion reaches 80% utilization, construction on this facility should begin to ensure facilities are in place without impacting operations throughput at LCK.

The following impacts, actions, and permit requirements are anticipated and may be required for the proposed development of air cargo facilities near ACT 2, based on the evaluations described in **Section 5.1 Environmental Requirements Relevant to Proposed Projects**:

- Air Quality – This alternative may require OEPA air emission source permits prior to construction if stationary air pollution sources such as boilers or emergency generators will be installed. This alternative also accommodates increased air traffic. To assess impacts to the counties' air quality resulting from increased air traffic, additional studies such as a detailed inventory of mobile and stationary sources and air quality modeling will be conducted. Consultation with the OEPA will be conducted in order to allow the agency to assess the effects on the State Implementation Plan (SIP).

- Building Demolition – This project involves demolition of Buildings 1090, 1091, 1092 and the existing electrical vault – Building 1093, which will require submittal of a Notification of Demolition and Renovation form to OEPA, even if no asbestos containing materials are present in the structures. Submittal of waste shipment records may also be required in the event of asbestos-containing material removal and disposal.

- Hazardous Materials - Construction activity will disturb the following sites illustrated on **Figure 4-1 Development Constraints**:

  - Air Force Area 2 is a former aqueous film-forming foam (AFFF) application area with a potential for presence of perfluorinated compounds. This site has known impacts within site soils and the uppermost groundwater zone. It has not yet achieved regulatory closure. Consultation with OEPA is required for any sites that have not achieved unrestricted closure at the time of development.
  - As shown in **Figure 4-17, Cargo Concept 2 – Redevelopment of ACT 2 Area** (p. 4-35), a network of closed-in-place fuel lines (orange line) runs east-west along the south side of existing ACT 2 between Alum Creek Drive and Ernie Hall Road, north-south between 8th Street and Ernie Hall Road, and southeast across Taxiway A. These lines require coordination with OEPA regarding removal, remediation, and disposal of potentially impacted soils.

  Prior to construction within potentially contaminated sites, including sites with unrestricted closure, it is recommended that a work plan be developed that outlines the approach to follow when contamination is encountered in the field, including the management and disposal of impacted soils and groundwater in accordance with applicable regulations. A health and safety plan is also recommended to minimize exposure of construction personnel to hazardous materials and minimize associated health and safety risks.

- Construction Stormwater – As this project will disturb more than one acre, coverage under the Ohio NPDES general permit for stormwater discharges associated with construction activities will be required, including preparation of a construction Stormwater Pollution Prevention Plan (SWPPP).

- NEPA Documentation – In accordance with Chapter 5-6 of FAA Order 1050.1F, Environmental Impacts: Policies and Procedures, this type of development would be considered construction that is minor in nature and would potentially qualify for a CatEx. However, Chapter 5-2 states that projects may require an EA if they disturb an existing hazardous material contamination site, such that new environmental contamination risks are created. Based on this statement, this project may require an EA if contaminated site Air Force Area 2 has not completed remediation or achieved unrestricted closure at the time of development.

Air Cargo Facilities (Northeast Area)

Several air cargo development concepts are considered for the northeast area of the airport in **Chapter 4, Airport Alternatives Analysis**. The key goal is to identify a location that will provide a minimum footprint of 300,000 square feet for new air cargo facilities and support amenities. The reason for seeking a 300,000 square-foot solution is to aggregate most of the facilities required to accommodate future demand on the northeast side of the airport. This continues to enhance the pace of throughput for cargo at LCK and aggregates all airside activities in the same area, taking advantage of existing utilities and transportation infrastructure. Positioning the facility perpendicular to Taxiway A, at the end of Taxiway J that is oriented on a north/south axis, would support a facility of this size but would limit the ability to expand in the future.

A building constructed on a parallel line to ACT 5 produces a similar outcome without restricting future expansion potential on airport property. This development option requires the relocation of George Page Jr. Road/Airport Perimeter Road and new landside access and parking for trucks and automobiles. Based upon input received during the preliminary alternatives review process, the Planning Team further evaluated the ability to expand upon the proposed 300,000 square foot air cargo development proposed in Alternative 1A (see **Chapter 4**, page 4-28). As a shown in **Figure 5-4 Air Cargo Facilities (Northeast Area)**, this concept was refined to include a total of 400,000 square feet of air cargo terminal facilities and 1.42 million square feet of aircraft parking apron capable of accommodating six Boeing 747-8F aircraft. Access to the proposed development from London-Groveport Road, George Page Jr. Road and the reconfiguration of the Airport Perimeter Road is provided. Electric, stormwater, and sanitary utilities are available on site. A water main extension in this area is planned in the future. Hydrant fuel is located in the area but not on site.

This proposed solution also provides for the development of a new 35,000 square foot cargo equipment storage building that will provide storage of cargo loading equipment near where cargo operations are concentrated. This facility was reduced in size after receiving comments from CRAA during the alternatives refinement process. This will result in less travel by the cargo loading and related equipment and have no impact on other near-by operations.

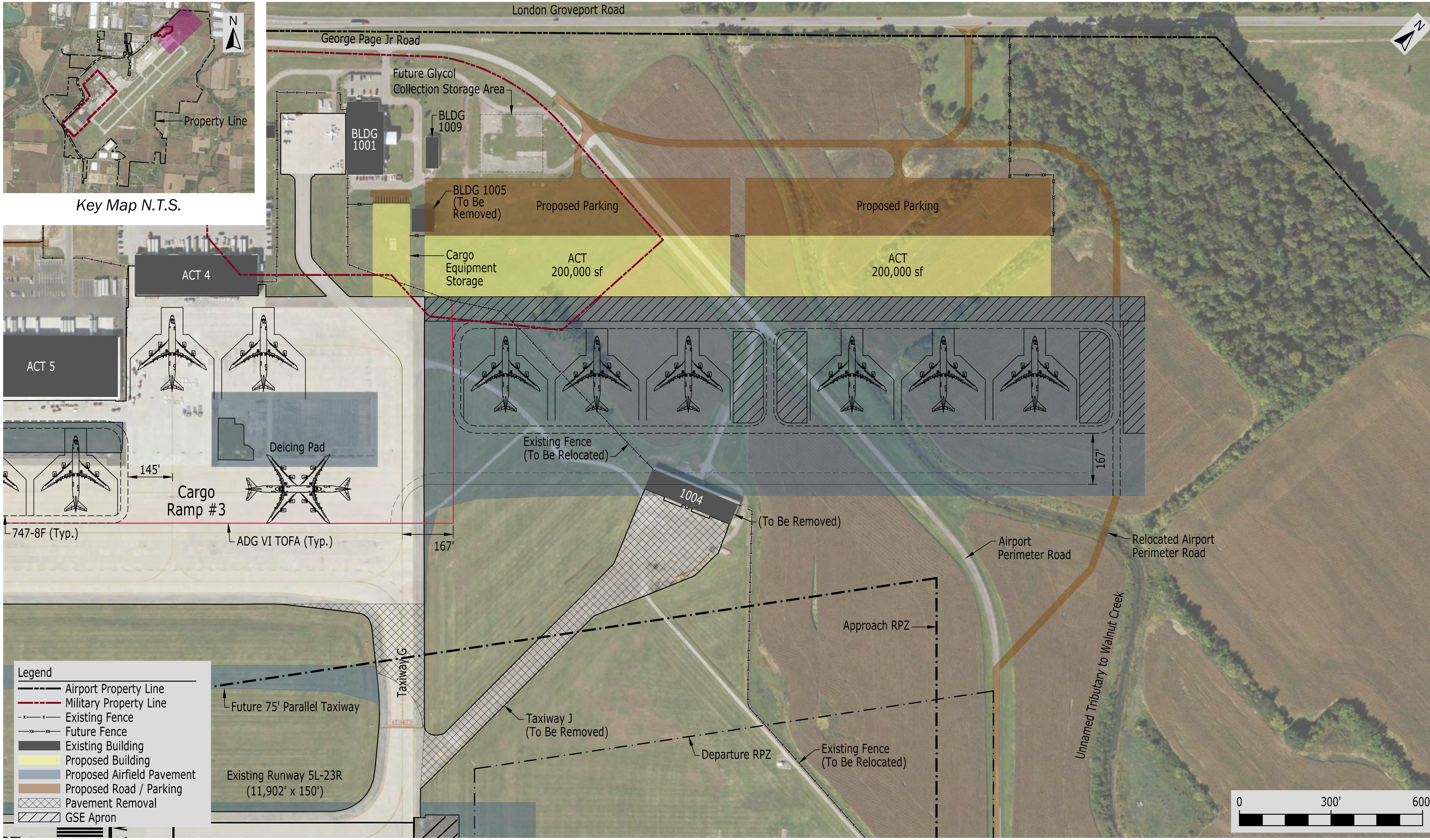


Figure 5-4 Air Cargo Facilities (Northeast Area)

The following impacts, actions, and permit requirements are anticipated with the proposed air cargo development in the northeast area of the airport, based on the evaluations described in **Section 5.1 Environmental Requirements Relevant to Proposed Projects**:

- Air Quality – This alternative may require OEPA air emission source permits prior to construction if stationary air pollution sources such as boilers or emergency generators will be installed. This alternative also accommodates increased air traffic. To assess impacts to the counties' air quality resulting from increased air traffic, additional studies such as a detailed inventory of mobile and stationary sources and air quality modeling will be conducted. Consultation with the OEPA will be conducted in order to allow the agency to assess the effects on the State Implementation Plan (SIP).

- Surface Waters and Wetlands – The currently planned location and footprint for this alternative will impact Wetlands X, Y, Z, AA, AH, and AI, as identified in the document *Unpermitted Areas with Potential Jurisdictional Waters Rickenbacker Airport and Associated Properties Franklin and Pickaway County, Ohio* (TranSystems, March 2013). In total, the current project will impact 0.5 acres of isolated wetlands and less than 0.1 acres of non-isolated wetlands. It will also impact over 1,300 feet of a tributary of Walnut Creek to the northeast. Based on these impacts, it is anticipated that the project will require coverage under the OEPA Level 1 Isolated Wetland General Permit for isolated wetland impacts, and a USACE Section 404 individual permit and Section 401 Water Quality Certification for stream and non-isolated wetland impacts.

- Construction Stormwater – As this project will disturb more than one acre, coverage under the Ohio NPDES general permit for stormwater discharges associated with construction activities will be required, including preparation of a construction Stormwater Pollution Prevention Plan (SWPPP).

- Biological Resources - As this project will result in wetland and stream impacts (described above under "Surface Waters and Wetlands"), as well as impacts to wooded areas, it has the potential to impact endangered species such as the Scioto madtom (fish), five species of mussels, northern long-eared bat, and Indiana bat. As described in **Section 5.1 Environmental Requirements Relevant to Proposed Projects**, coordination and consultation with the Ohio Department of Natural Resources and the U.S. Fish and Wildlife Service will be required to determine impact to these species and mitigation requirements. If the project is found to result in a take of threatened or endangered species, an Incidental Take permit and habitat conservation plan will be required.

- Farmlands – The northeast portion of this project site contains land that is currently used as farmland. Coordination and consultation with Natural Resources Conservation Service (NRCS) is required to determine if the impacted land includes prime, unique, or statewide and locally important farmland, the significance of the impacts, and potential mitigation requirements.

- Building Demolition – This project alternative involves demolition of Buildings 1004 and 1005, which will require submittal of a Notification of Demolition and Renovation form to OEPA, even if no asbestos containing materials are present in the structures. Submittal of waste shipment records may also be required in the event of asbestos containing material removal and disposal.

- Hazardous Materials – Construction activity will disturb the following sites illustrated on **Figure 4-1 Development Constraints**:

  - Air Force Area 6 is an aqueous film-forming foam (AFFF) application area with a potential for presence of perfluorinated compounds along the northwest end of Taxiway G. Site investigations in this area indicate impacts to the uppermost groundwater zone. This site has not achieved unrestricted regulatory closure.

  Consultation with OEPA is required for any sites that have not achieved unrestricted closure at the time of development. Prior to construction within potentially contaminated sites, including sites with unrestricted closure, it is recommended that a work plan be developed that outlines the approach to follow when contamination is encountered in the field, including the management and disposal of impacted soils and groundwater in accordance with applicable regulations. A health and safety plan is also recommended to minimize exposure of construction personnel to hazardous materials and minimize associated health and safety risks.

- Additional Considerations – As this project crosses into undeveloped and previously undisturbed areas, State Historic Preservation Office (SHPO) consultation is recommended to identify potential archaeological resources in the project area.

- NEPA Documentation – In accordance with Chapter 5-6 of FAA Order 1050.1F, Environmental Impacts: Policies and Procedures, this type of development would be considered construction that is minor in nature and would potentially qualify for a CatEx. However, Chapter 5-2 states that projects may require an EA if they disturb an existing hazardous material contamination site, such that new environmental contamination risks are created, or if they adversely affect a wetland or associated wildlife or fish habitat. Based on this statement, this project is likely to require an EA for the combination of impacts to stream, wetlands and contaminated site Air Force Area 6.

Air Cargo Facilities (South Airfield)

The south side of the airfield is the last available land for cargo and other large-scale aviation-related development. As shown in **Figure 5-5 South Airfield Development - Air Cargo and MRO Facilities**, sufficient land is preserved for the future development of up to 600,000 square feet of air cargo terminal facilities, aircraft parking apron and support functions.

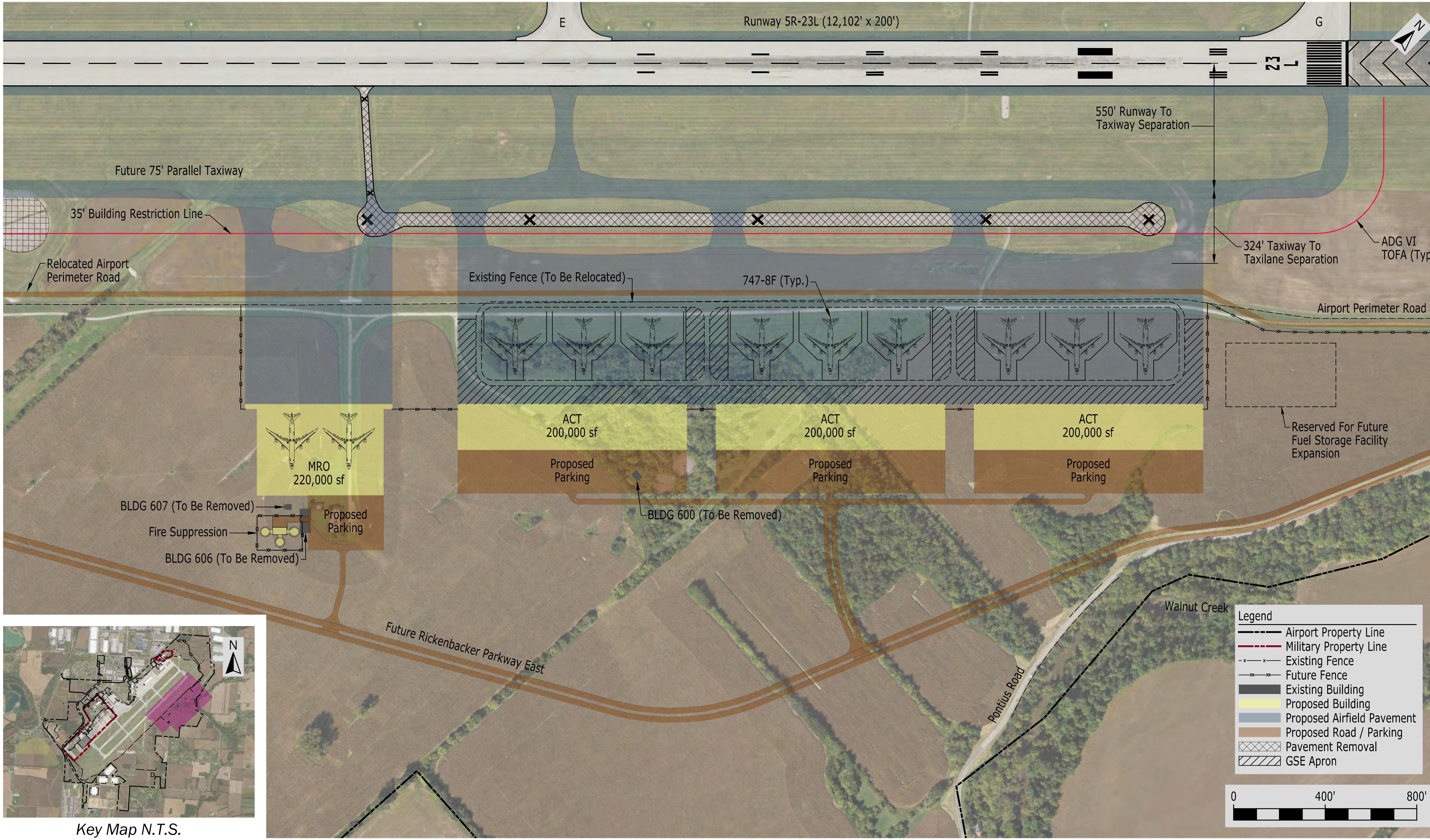


Figure 5-5 South Airfield Development - Air Cargo and MRO Facilities

During the forecast process, it was assumed that the new facilities will support "dry" or "bulk" cargo, and that users who require "cold chain" (pharma, food, perishables) will seek facilities that are outside the forecast demand. Also, new e-commerce volumes may demand additional high-volume processing space on/near the airport. When aggregated together, these "other" supply chain operations and major manufacturing (automotive, electronics, pharmaceuticals) sectors, could drive the demand for other non-aviation related development on the south side and produce freight forwarders or logistics service providers who would occupy other facilities on this side of the airport.

In **Figure 5-5 South Airfield Development - Air Cargo and MRO Facilities**, the facilities shown provide sufficient space for cargo operations while also supporting future development of nearby land for cargo-related uses via air, truck, and rail. Electric and stormwater utilities are available on site. Water main and sewer main extensions in this area are planned in the future.

The key for CRAA staff is to align the growth of air cargo with the schedule for delivery of new facilities to support cargo expansion. Any significant de-coupling between the demand for facilities and the delivery of facilities will be detrimental to the value proposition of the LCK brand.

Velocity and throughput are the catalysts that have created this growth and supporting this differential is critical. The south airfield cargo alternative requires significant new construction of ramp and parking space for aircraft (approximately 2.33 million square feet total or 778,000 square feet per ACT), new access and parking for trucks and automobiles, and investment in utilities infrastructure (water, power, sewer) to support new facilities.

Should a major user or users seek to occupy most of the space on the south side of the runway, this can accelerate delivery of infrastructure and roadway access. Pontius Road, located southeast of the proposed development area, is the closest existing roadway infrastructure. Access in the future would be provided via the proposed Rickenbacker Parkway Extension. Additionally, utilities infrastructure to this area is not currently available. Building out this infrastructure for a single new cargo facility will render the costs unjustifiable.

As noted in **Chapter 4, Airport Alternatives Analysis** (Section 4.8.5, p. 4-36), this option should only be considered when the proposed air cargo options outlined above (northeast quadrant of the airport) are at capacity. Another reason to consider development on the south side of the airport is if market conditions support the demand for other aviation-related facilities (i.e. maintenance, repair and overhaul facility) that cannot be accommodated elsewhere at LCK.

The following impacts, actions, and permit requirements are anticipated with the proposed South Airfield Air Cargo and MRO development, based on the evaluations described in **Section 5.1 Environmental Requirements Relevant to Proposed Projects**:

- Air Quality – This alternative may require OEPA air emission source permits prior to construction if stationary air pollution sources such as boilers or emergency generators will be installed. This alternative also accommodates increased air traffic. To assess impacts to the counties' air quality resulting from increased air traffic, additional studies such as a detailed inventory of mobile and stationary sources and air quality modeling will be conducted. Consultation with the OEPA will be conducted so that the agency can assess the effects on its State Implementation Plan (SIP).

- Building Demolition – This project involves building demolition, which will require submittal of a Notification of Demolition and Renovation form to OEPA, even if no asbestos containing materials are present in the structures. Submittal of waste shipment records may also be required in the event of asbestos-containing material removal and disposal.

- Surface Waters and Wetlands – The currently planned location and footprint for this project will impact streams identified in the document *Unpermitted Areas with Potential Jurisdictional Waters Rickenbacker Airport and Associated Properties Franklin and Pickaway County, Ohio* (TranSystems, March 2013). Approximate impacts include 5,100 linear feet of unnamed stream tributaries to Walnut Creek (Streams 7-10 and 12-13). Based on these impacts, it is anticipated that the project will require a USACE Section 404 individual permit and an OEPA Section 401 Water Quality Certification.

- Construction Stormwater – As this project will disturb more than one acre, coverage under the Ohio NPDES general permit for stormwater discharges associated with construction activities will be required, including preparation of a construction Stormwater Pollution Prevention Plan (SWPPP).

- Biological Resources – As this project will result in impacts to streams and wooded areas, it has the potential to impact endangered species such as the Scioto madtom (fish), five species of mussels, northern long-eared bat, and Indiana bat. As described in **Section 5.1 Environmental Requirements Relevant to Proposed Projects**, coordination and consultation with the Ohio Department of Natural Resources and the U.S. Fish and Wildlife Service will be required to determine impact to these species and mitigation requirements. If the project is found to result in a take of threatened or endangered species, an Incidental Take permit and habitat conservation plan will be required.

- Hazardous Materials - Construction activity will disturb the following sites illustrated on **Figure 4-1 Development Constraints**:

    - Remediation site SD025 is a system of ditches that is still undergoing remediation for sediment contamination associated with polycyclic aromatic hydrocarbons (PAHs), and has not achieved unrestricted closure.

  Consultation with OEPA is required for any sites that have not achieved unrestricted closure at the time of development. Prior to construction within potentially contaminated sites, including sites with unrestricted closure, it is recommended that a work plan be developed that outlines the approach to follow when contamination is encountered in the field, including the management and disposal of impacted soils and groundwater in accordance with applicable regulations. A health and safety plan is also recommended to minimize exposure of construction personnel to hazardous materials and minimize associated health and safety risks.

- Farmlands – This project may impact land that is currently used as farmland. Coordination and consultation with NRCS is required to determine if the impacted land includes prime, unique, or statewide and locally important farmland, the significance of the impacts, and potential mitigation requirements.

- NEPA Documentation – In accordance with Chapter 5-6 of FAA Order 1050.1F, Environmental Impacts: Policies and Procedures, this type of development would be considered construction that is minor in nature and would potentially qualify for a CatEx. However, Chapter 5-2 states that projects may require an EA if they disturb an existing hazardous material contamination site, such that new environmental contamination risks are created, or if they adversely affect a wetland or associated wildlife or fish habitat. Based on this statement, this project is likely to require an EA for the combination of impacts to streams, wetlands and contaminated sites.

Air Cargo Summary

Each of the cargo alternatives proposed in this section contains gaps in meeting the "best" alternative as earlier discussed in **Chapter 4, Airport Alternatives Analysis** (Section 4.8.6, p. 4-38). The recommendations presented in this section represent solutions that will continue to support the expected cargo growth at the airport and in the region. The phasing or order of development of air cargo facilities presented in this section has been specifically designed to support the growth of cargo anticipated by the forecast. A detailed phasing plan for future facilities is presented in **Chapter 6, Financial Plan**.

During the Stakeholder review process, it was asked if the Study would consider the potential for future unmanned aircraft systems (UAS) activity at LCK. Although the UAS industry is in its infancy, it continues to grow rapidly. Based upon UAS technology and trends observed in 2018, the master plan team determined that UAS operations could be accommodated on the landside portions of the airport near existing and proposed cargo facilities recommended in the study. Areas designated to accommodate future UAS activity would be designed, as much as feasible, to maintain separation from fixed wing and rotor aircraft operations.

5.2.3 Maintenance, Repair and Overhaul Facilities

During the Airport Alternatives evaluation process, results of the land use analysis indicated that several existing hangar facilities (i.e. Buildings 532, 595 and 597) could be renovated to accommodate smaller scale MRO or aviation manufacturing facilities. However, CRAA staff and SAC members provided feedback indicating their desire to preserve an area to develop large scale MRO or aviation manufacturing facilities capable of accommodating larger wide-body aircraft (i.e. Boeing 747-8F and Boeing 777). As a result, a 220,000-square foot MRO hangar facility is proposed west of the south airfield air cargo development, as shown in **Figure 5-5 South Airfield Development - Air Cargo and MRO Facilities**. The MRO hangar and approximately 513,885 square feet of apron facilities shown can accommodate up to two Boeing 747-8F aircraft. It is important to note that this is one of the few areas available for future large-scale development and the proposed site is conveniently located near the planned future expansion of Rickenbacker Parkway. However, new airfield development (i.e. parallel taxiway, airfield lighting, and apron improvements), roadway access, and utility infrastructure will be required. The proposed development will require the demolition of the abandoned communications and power stations (Buildings 606 and 607) and removal of associated pavements. Anticipated impacts, actions, and permit requirements associated with the proposed MRO development were mentioned previously in **Section 5.2.2, Air Cargo Facilities (South Airfield)**.

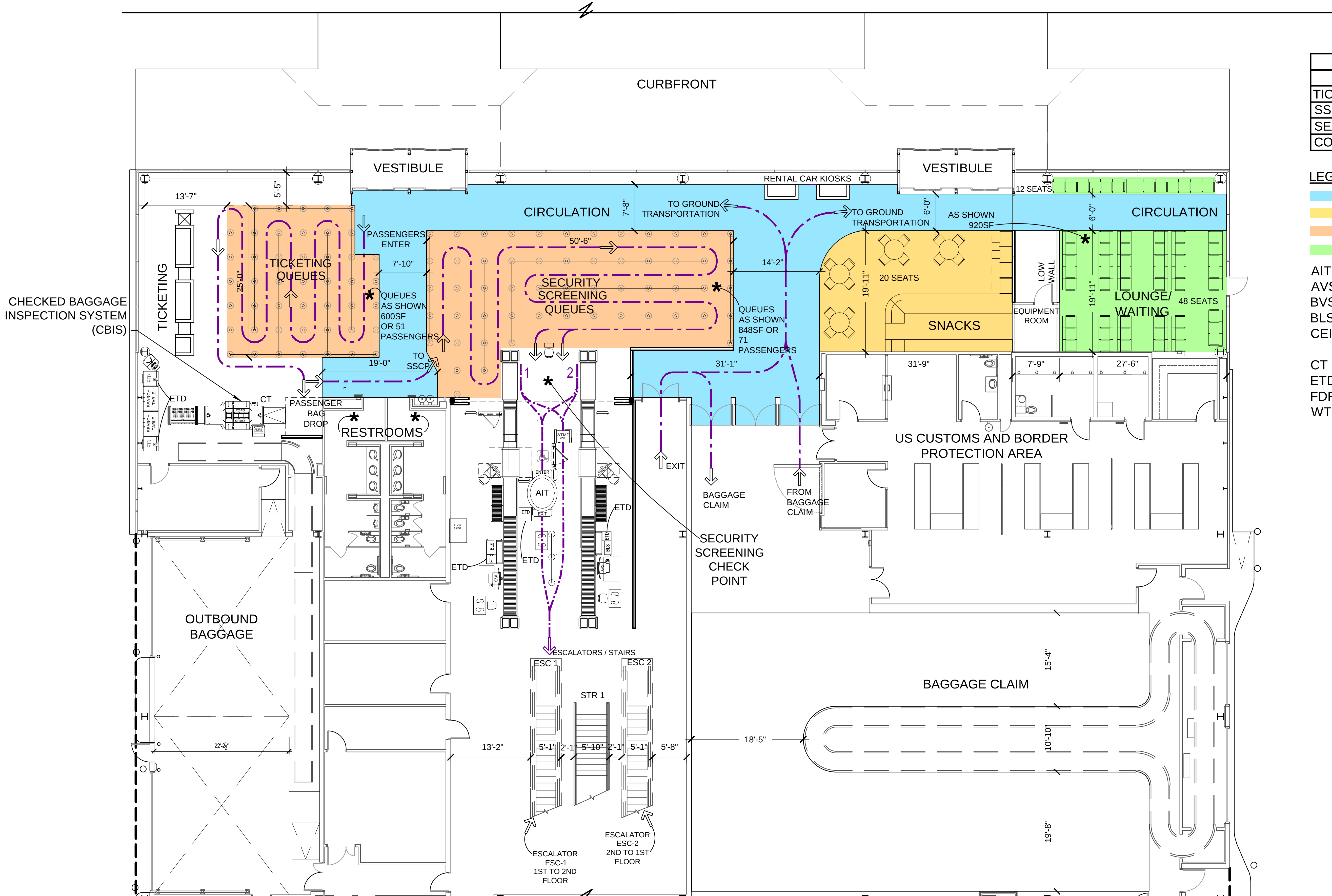
5.2.4 Passenger Terminal Facilities

A total of six passenger terminal alternatives were considered for future improvements within the existing terminal facility. Each concept proposed options for addressing future needs including increased queuing in the ticketing and security screening checkpoint areas, expansion of passenger waiting areas, and concession improvements. Terminal Concepts 3 and 6 from **Chapter 4, Airport Alternatives Analysis** (see **Figures 4-8 and 4-12**, pages 4-18 and 4-24), are recommended as the preferred course of development based upon the ability to maximize passenger queuing, and provide improved seating and circulation that is balanced with increased concession opportunities on each floor. Additionally, CRAA staff and SAC members favored the ability to make incremental improvements in response to passenger demand. The preferred terminal development is depicted in **Figure 5-6 Preferred Terminal Development – 1st Floor** and **Figure 5-7 Preferred Terminal Development – 2nd Floor**.

Preferred Terminal Development – 1st Floor

As shown in **Figure 5-6 Preferred Terminal Development - 1st Floor**, ticket counters are to be relocated to the west side of the lobby resulting in improved queuing at the Security Screening Checkpoint (SSCP). This eliminates the cross-traffic conflict and consolidates the TSA Checked Baggage Inspection System (CBIS) area and bag drop function next to the outbound baggage conveyor. The check-in queues are expanded further to increase the capacity to 600 square feet/51 passengers. With the added seating in the lobby and in the snack bar, there is enough space for queuing, waiting, or seating for 60% of the peak hour passengers simultaneously (202 out of 335 passengers).

It is further recommended that a concessions amenity be placed in the lobby for better visibility and access. At the request of CRAA, two rental car kiosks/desks are included in this concept to support rental car operations. The lounge/seating/waiting area is also consolidated away from the circulation paths to reduce potential conflicts with circulating versus seated passengers. These recommendations provide increased capacity due to better definition and use of the lobby space, and an increased level of amenities for passengers (and other airport users) in the non-secure area of the terminal, including consideration of rental car activity.



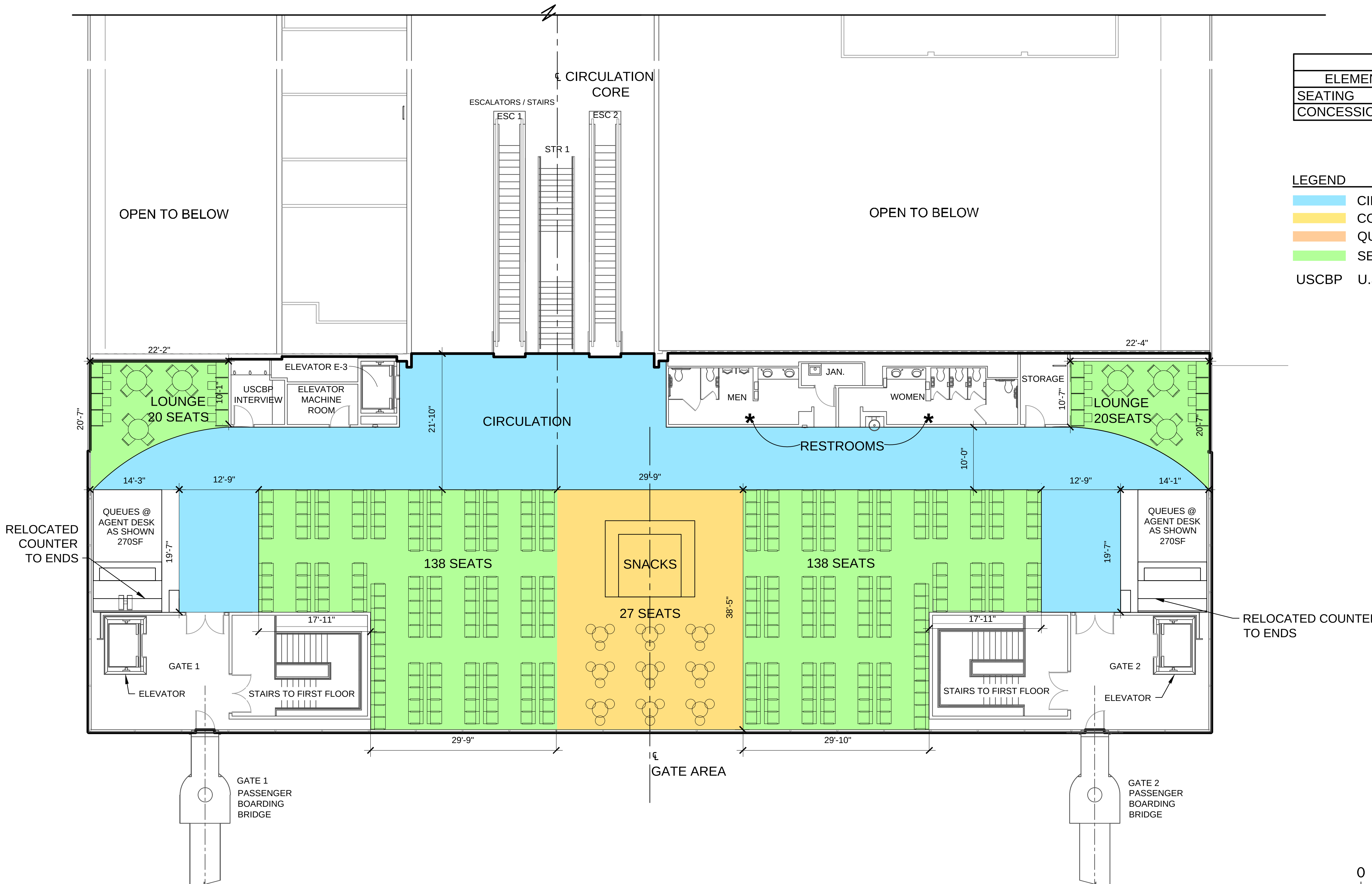
SUMMARY TABLE		
ELEMENT	AREA (SF)	PASSENGERS
TICKETING QUEUE	600	51
SSCP QUEUE	848	71
SEATING	623	60
CONCESSIONS	620	20

LEGEND

- CIRCULATION
- CONCESSIONS
- QUEUES
- SEATING

AIT	Advanced Imaging Technology
AVS	Alternate Viewing Station
BVS	Baggage Viewing Station
BLS	Bottle Liquid Scanner
CEIA	Costruzioni Elettroniche Industriali Automatismi (Most common WTMD)
CT	Computer Tomography Scanner
ETD	Explosive Trace Detection
FDRS	Field Data Recording System
WTMD	Walk Through Metal Detector

Figure 5-6 Preferred Terminal Development - 1st Floor



SUMMARY TABLE		
ELEMENT	AREA (SF)	PASSENGERS
SEATING	4185	316
CONCESSIONS	612	27

LEGEND

- CIRCULATION
- CONCESSIONS
- QUEUES
- SEATING

USCBP U.S. Customs and Border Protection

Figure 5-7 Preferred Terminal Development - 2nd Floor

Preferred Terminal Development – 2nd Floor

As shown in **Figure 5-7 Preferred Terminal Development - 2nd Floor**, it is recommended the current gate counters and associated equipment be shifted to the far ends of the concourse. This provides a total capacity of 343 seats that is balanced between the wider spaced gate locations. However, the reconfiguration of the counters and the seats are recommended to take full advantage of the space available. Since the seating capacity is somewhat more than needed to meet requirements, it is suggested that the snack bar be enlarged into a single centralized location with added seating, taking advantage of the airside view.

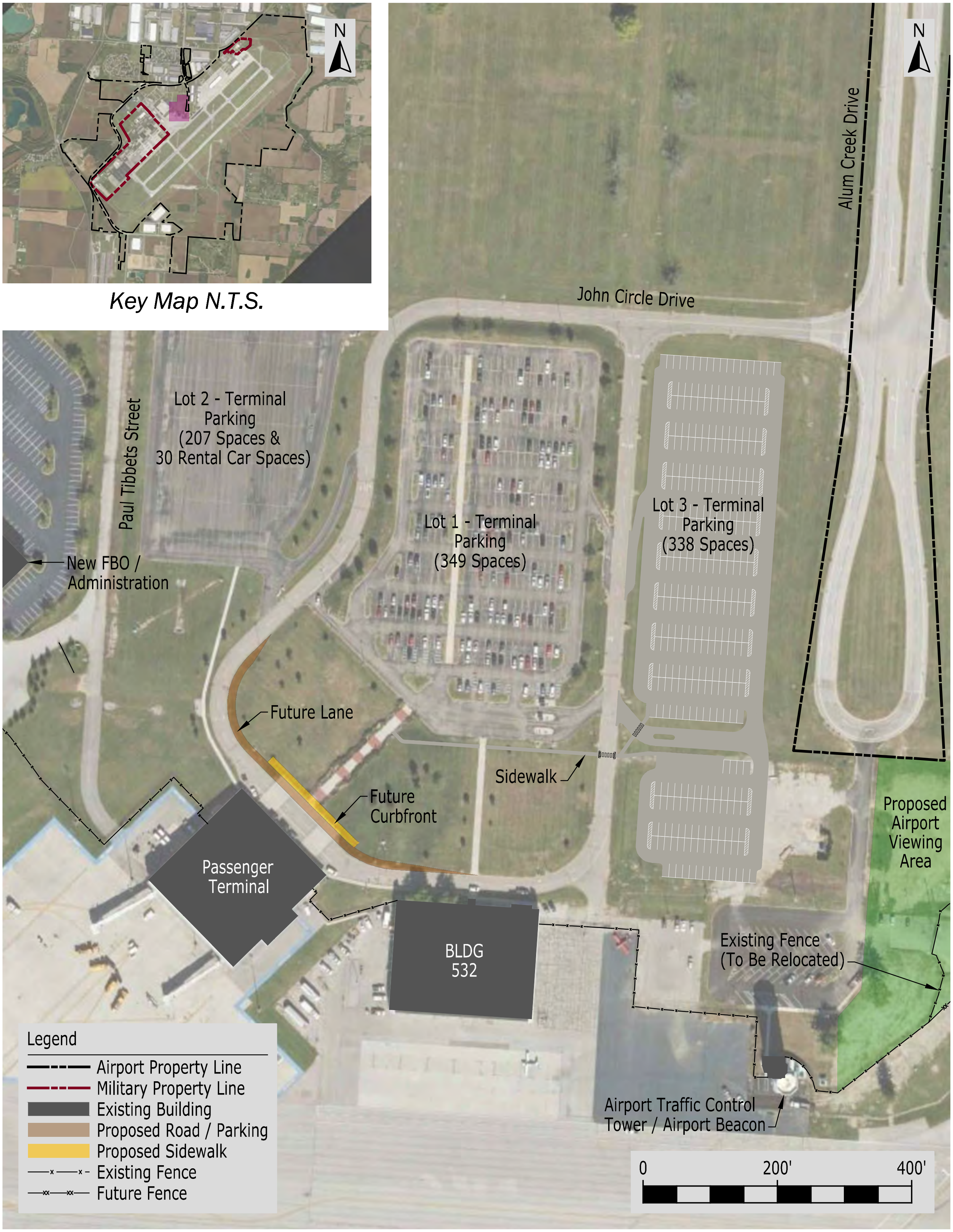
This development option is preferred as it offers a variety of seating options and the highest level of amenities. The proximity and visibility to all passengers as they enter the space should enhance sales. Furthermore, the far northeast and northwest corners of the concourse would be freed up for work stations or small group table seating to offer options beyond the typical rows.

Preferred Terminal Area Improvements

As shown in **Figure 5-8 Terminal Area Improvements**, an additional lane (620 feet long) is recommended to provide an additional 180 feet of curbfront for passenger loading/unloading (total curbfront of 415 feet) and improve the flow of vehicular traffic in front of the terminal. This improvement is designed to provide additional curbfront capacity required during the 20-year planning period. Additional parking lot improvements are incorporated to accommodate future public and rental car parking needs. These improvements include Parking Lot 3 (338 spaces) completed in January 2018 and the 30 rental car spaces incorporated into Parking Lot 2 in November 2018.

The parking lot portion of the proposed development was previously environmentally cleared with a CATEX. The following impacts, actions, and permit requirements are anticipated with the remaining portions of this development, including the sidewalks and added lane, airport viewing area, and rental car parking, based on the evaluations described in **Section 5.1 Environmental Requirements Relevant to Proposed Projects**:

- Construction Stormwater – For construction activities that disturb one or more acres, inclusive of the larger common plan of development, coverage under the Ohio NPDES general permit for stormwater discharges associated with construction activities will be required, including preparation of a construction Stormwater Pollution Prevention Plan (SWPPP). The footprints of the added sidewalk and curbfront lane are less than one half-acre in total on their own, and may result in less than one acre of total disturbance. However, the airport viewing area will disturb over three acres and will require permit coverage.


Key Map N.T.S.
N
John Circle Drive
Alum Creek Drive
Lot 2 - Terminal Parking (207 Spaces & 30 Rental Car Spaces)
Paul Tibbets Street
Lot 1 - Terminal Parking (349 Spaces)
Lot 3 - Terminal Parking (338 Spaces)
New FBO / Administration
Future Lane
Sidewalk
Future Curbfront
Proposed Airport Viewing Area
Passenger Terminal
BLDG 532
Existing Fence (To Be Relocated)
Airport Traffic Control Tower / Airport Beacon
Legend
Airport Property Line
Military Property Line
Existing Building
Proposed Road / Parking
Proposed Sidewalk
Existing Fence
Future Fence
0
200'
400'

- Hazardous Materials - Construction activities will disturb the following sites illustrated on **Figure 4-1 Development Constraints**:

  - USACE remediation site AOC 17 is located south of the terminal parking lot and north of Building 532. This site may be impacted by proposed sidewalks and lane improvements. Site investigations have indicated residual fuel and oil impacts to soil. This site has not achieved unrestricted closure.
  - Air Force Areas 2 and 3 are aqueous film-forming foam (AFFF) application areas with a potential for presence of perfluorinated compounds. This is the site of the proposed airport viewing area. These areas are the sites of the former fire station and fire station storage building. Site investigations have indicated both soil and groundwater contamination in this area, and the extent of contamination has not been fully delineated. These sites require further investigation and have not achieved unrestricted regulatory closure.

  Consultation with OEPA is required for any sites that have not achieved unrestricted closure at the time of development. Prior to construction within potentially contaminated sites, including sites with unrestricted closure, it is recommended that a work plan be developed that outlines the approach to follow when contamination is encountered in the field, including the management and disposal of impacted soils and groundwater in accordance with applicable regulations. A health and safety plan is also recommended to minimize exposure of construction personnel to hazardous materials and minimize associated health and safety risks.

- NEPA Documentation – In accordance with Chapter 5-6 of FAA Order 1050.1F, Environmental Impacts: Policies and Procedures, this type of development would be considered construction that is minor in nature and would potentially qualify for a CatEx. Although contaminated site AOC 17 has not achieved unrestricted closure, the remaining residual impacts are not likely to trigger an EA. However, Air Force Areas 2 and 3 may trigger an EA for development of the airport viewing park if remediation has not been completed prior to the time of development.

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5.2.5 General Aviation

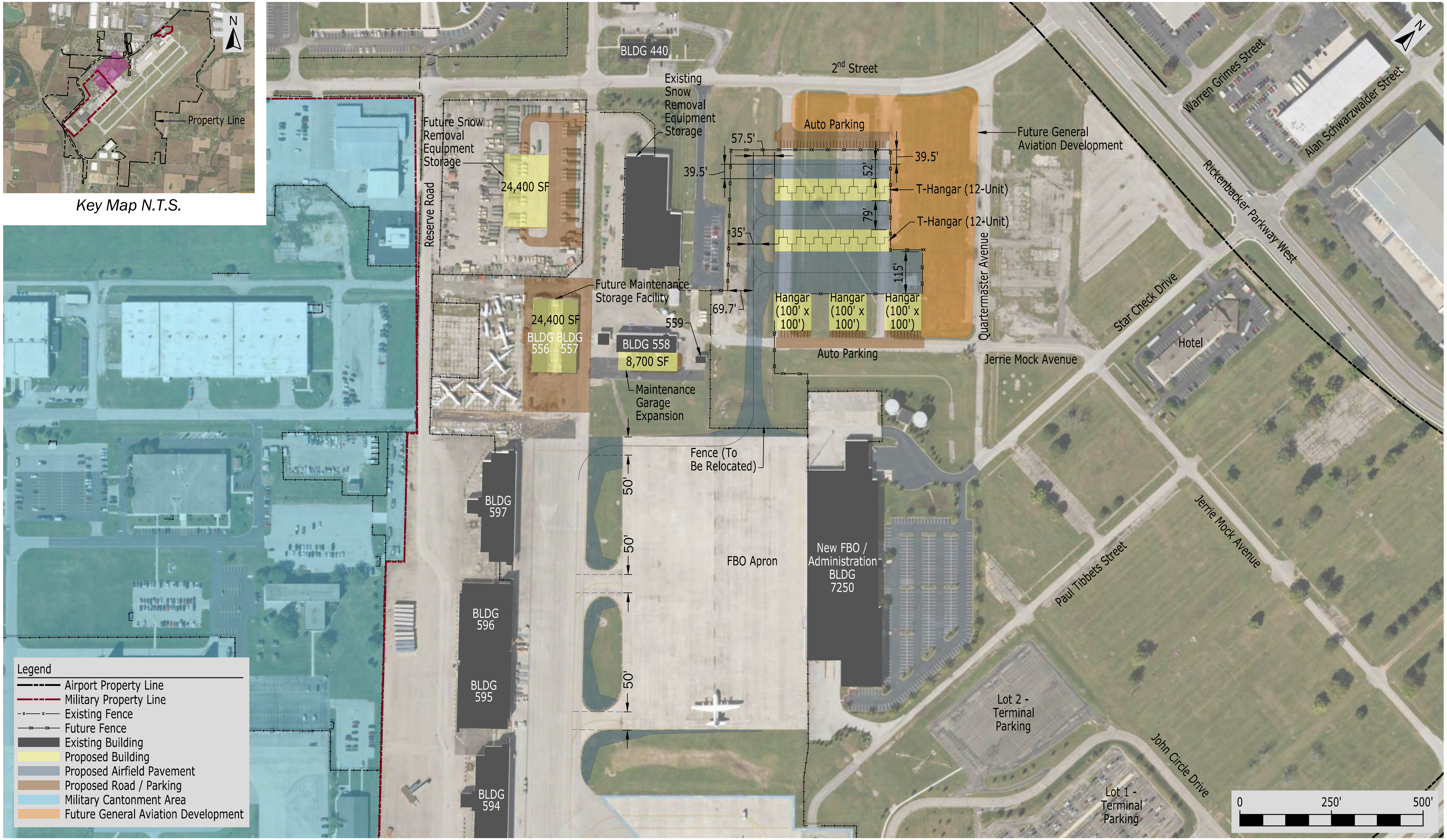
The area northwest of the Fixed Base Operator (FBO) and Administration facilities (Building 7250) is recommended for the future development of general aviation facilities. As noted in **Chapter 4, Airport Alternatives Analysis** (Section 4.9, page 4-39), this location is ideal as the area would provide a buffer between larger commercial and military operations and smaller general aviation aircraft activity. Electric, water, stormwater, and sanitary utilities are available on site. Based upon feedback received from CRAA staff and SAC members, it was determined two T-hangar buildings (12 units each) and three larger conventional hangars (10,000 square feet each) shown in **Figure 5-9 General Aviation/Airport Maintenance Facilities**, were desirable. T-hangars consist of nested t-shaped units designed to efficiently store smaller (ADG I) general aviation aircraft. Conventional hangars are larger box-shaped facilities designed to store larger (ADG II) general aviation aircraft or multiple smaller (ADG I) aircraft. Conventional hangar facilities are often used in support of aviation-related business activities. As an added benefit, this area has good airside and landside accessibility and future expansion potential. In addition, approximately 42,200 square feet of taxilane connector and fillet pavement (asphalt) improvements are proposed to facilitate the movement of TDG 4 charter aircraft (i.e. Boeing 757) into and out of the FBO apron. This proposed development is shown in **Figure 5-9 General Aviation/Airport Maintenance Facilities**.

The following impacts, actions, and permit requirements are anticipated with the proposed general aviation development, based on the evaluations described in **Section 5.1 Environmental Requirements Relevant to Proposed Projects**:

- Hazardous Materials - Construction activities at the FBO apron will disturb the following sites illustrated on **Figure 4-1 Development Constraints**:

    - Air Force Area 4 is an aqueous film-forming foam (AFFF) application area with a potential for presence of perfluorinated compounds. This site is located at the site of former Building 550, which was formerly used for heavy equipment storage, and is currently at the west corner of the FBO ramp southwest of Building 7250. This site requires further investigation and has not achieved unrestricted closure.

  Consultation with OEPA is required for any sites that have not achieved unrestricted closure at the time of development. Prior to construction within potentially contaminated sites, including sites with unrestricted closure, it is recommended that a work plan be developed that outlines the approach to follow when contamination is encountered in the field, including the management and disposal of impacted soils and groundwater in accordance with applicable regulations. A health and safety plan is also recommended to minimize exposure of construction personnel to hazardous materials and minimize associated health and safety risks.



RICKENBACKER INTERNATIONAL AIRPORT Master Plan

Figure 5-9 General Aviation / Airport Maintenance Facilities

- Air Quality – This alternative may require OEPA air emission source permits prior to construction if stationary air pollution sources such as boilers or emergency generators will be installed. This alternative also accommodates increased air traffic. To assess impacts to the counties' air quality resulting from increased air traffic, additional studies such as a detailed inventory of mobile and stationary sources and air quality modeling will be conducted. Consultation with the OEPA will be conducted so that the agency can assess the effects on its State Implementation Plan (SIP).

- Construction Stormwater – As this project will disturb more than one acre, coverage under the Ohio NPDES general permit for stormwater discharges associated with construction activities will be required, including preparation of a construction Stormwater Pollution Prevention Plan (SWPPP).

- NEPA Documentation – In accordance with Chapter 5-6 of FAA Order 1050.1F, Environmental Impacts: Policies and Procedures, this type of development would be considered construction that is minor in nature and would potentially qualify for a CatEx. However, Chapter 5-2 states that projects may require an EA if they disturb an existing hazardous material contamination site, such that new environmental contamination risks are created. Based on this statement, this project may require an EA if contaminated site Air Force Area 4 has not completed remediation or achieved unrestricted closure at the time of development.

5.2.6 Support Facilities

The following support facility improvements presented in **Chapter 4, Airport Alternatives Analysis** (Section 4.10, page 4-43), have been incorporated into the Preferred Alternative as discussed below.

Aircraft Fuel Storage

Aircraft fuel storage facilities capable of providing an average five-day supply of Jet-A fuel are proposed as indicated in Fuel Tank Development Option 3 of **Chapter 4, Airport Alternatives Analysis** (Section 4.10.1, page 4-43). The average five-day supply period was determined to be appropriate following consultation with CRAA operations staff. The proposed development, shown in **Figure 5-10 Aircraft Fuel Storage**, includes removal and replacement of existing Jet-A fuel underground storage tanks (USTs) with room for up to three vertical above-ground storage tanks (AST) (30 feet tall/45-foot diameter each), each capable of storing 356,000 gallons (five-day supply) of Jet-A fuel for a total of 1.06 million gallons of aircraft fuel storage. Separate lanes will be provided to identify fuel off-load lanes from fueling lanes. The site includes room for additional expansion, vehicle circulation and associated fencing improvements. The following impacts, actions, and permit requirements are anticipated with the proposed fuel storage facilities, based on the evaluations described in **Section 5.1 Environmental Requirements Relevant to Proposed Projects**:

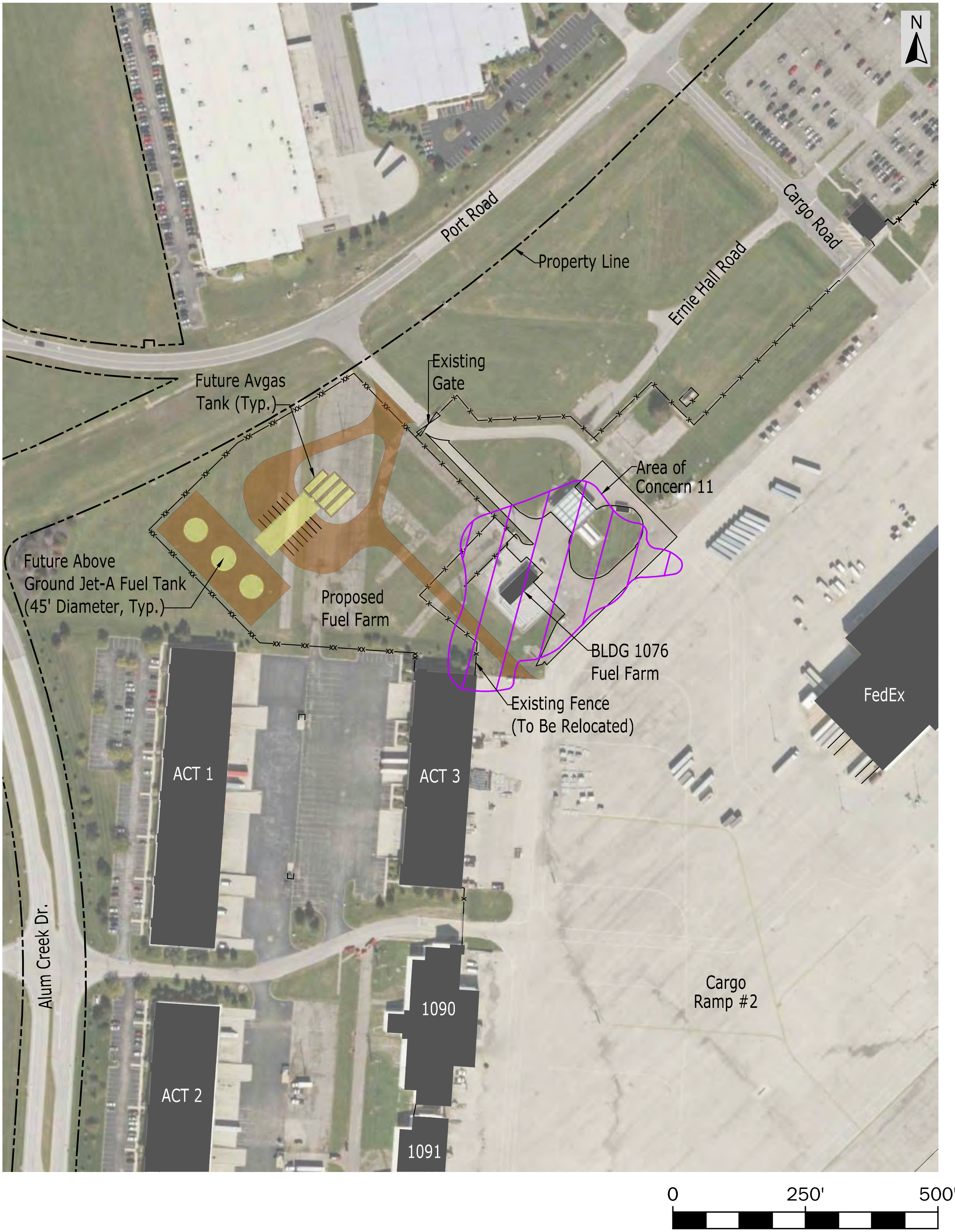


Figure 5-10 Aircraft Fuel Storage

- Hazardous Materials - Construction activities will disturb the following sites illustrated on **Figure 4-1 Development Constraints**:
  - USACE remediation site AOC 11 is a Bureau of Underground Storage Tank Regulations (BUSTR) site that is located in the Building 1076 area and encompasses the project site. Site investigations indicated that this site has petroleum hydrocarbon impacts to soil and groundwater. This site has not achieved unrestricted closure.

  Consultation with OEPA is required for any sites that have not achieved unrestricted closure at the time of development. Prior to construction within potentially contaminated sites, including sites with unrestricted closure, it is recommended that a work plan be developed that outlines the approach to follow when contamination is encountered in the field, including the management and disposal of impacted soils and groundwater in accordance with applicable regulations. A health and safety plan is also recommended to minimize exposure of construction personnel to hazardous materials and minimize associated health and safety risks.

- Air Quality – This alternative will require an OEPA air emission source permit for installation of the proposed ASTs.

- Construction Stormwater – As this project will disturb more than one acre, coverage under the Ohio NPDES general permit for stormwater discharges associated with construction activities will be required, including preparation of a construction Stormwater Pollution Prevention Plan (SWPPP).

- Additional Considerations – This project will require amendment of the existing spill prevention control and countermeasure (SPCC) plan and existing facility stormwater pollution prevention plan (SWPPP). Coordination with the state fire marshal will be required to register flammable, combustible liquid storage.

- NEPA Documentation – In accordance with Chapter 3-1.2 of FAA Order 1050.1F, Environmental Impacts: Policies and Procedures, fuel storage and distribution systems normally require an EA.

In the future, it is contemplated that there will be a desire to establish fuel storage facilities on the south side of the airfield to conveniently serve the proposed cargo and MRO facilities. Therefore, it is recommended that an area be reserved in the preferred development concept to support the future development of fuel storage facilities (See **Figure 5-5 South Airfield Development – Air Cargo and MRO Facilities**, p. 5-25, for location).

Maintenance Storage Facilities

Existing maintenance storage facilities (Buildings 556 and 557) are severely deteriorated, in poor condition and the heating systems are not functional. A larger proposed 24,400 square foot heated facility with associated pavement improvements (approximately 77,769 square feet) is shown in **Figure 5-9 General Aviation and Airport Maintenance Facilities**. As stated previously in **Chapter 3**, Facility Requirements (Section 3.16.5, page 3-52), the space should be heated in accordance with the FAA recommendation of heating sand prior to spreading. This proposed expansion was determined based on discussions on-site with CRAA maintenance and operations staff. This space allocation is designed to replace the site footprint of the existing storage facilities. Electric, water, stormwater, natural gas, and sanitary utilities are available on site.

Maintenance Garage

The expansion to the existing Maintenance Garage (Building 558) to provide an additional larger service bay capable of accommodating current equipment is recommended. As the airport operation continues to grow, an 8,700-square foot proposed expansion with approximately 1,117 square feet of associated pavement improvements to mirror the existing facility is shown in **Figure 5-9 General Aviation and Airport Maintenance Facilities**. This proposed expansion was determined based on discussions on-site with CRAA maintenance and operations staff.

Snow Removal Equipment Building

In the future, additional snow removal equipment storage capacity may be needed in support of future airfield expansion. This would occur if the snow removal priority areas increase in size. Based upon the availability of developable area within the airport maintenance complex, approximately 24,400 square feet of future SRE storage capacity with approximately 21,234 square feet of associated pavement improvements is proposed and shown in **Figure 5-9 General Aviation and Airport Maintenance Facilities**. This proposed expansion is tied to future airfield expansion and was determined based on discussions on-site with CRAA maintenance and operations staff.

The following impacts, actions, and permit requirements are anticipated with the proposed airport maintenance development, based on the evaluations described in **Section 5.1 Environmental Requirements Relevant to Proposed Projects**:

- Air Quality – This alternative may require OEPA air emission source permits prior to building construction if stationary air pollution sources such as boilers, heaters or emergency generators will be installed.

- Construction Stormwater – As this project will disturb more than one acre, coverage under the Ohio NPDES general permit for stormwater discharges associated with construction activities will be required, including preparation of a construction Stormwater Pollution Prevention Plan (SWPPP).

- Building Demolition – This project alternative will require building demolition, which will require submittal of a Notification of Demolition and Renovation form to OEPA, even if no asbestos-containing materials are present in the structures. Submittal of waste shipment records may also be required in the event of asbestos-containing material removal and disposal.

- NEPA Documentation – In accordance with Chapter 5-6 of FAA Order 1050.1F, Environmental Impacts: Policies and Procedures, this type of development is considered construction that is minor in nature and qualifies for a CatEx.

5.3 Rickenbacker Parkway Extension

In 2012-2013, Rickenbacker Parkway was expanded to improve the flow of truck traffic around LCK. Plans are currently being developed to accelerate the growth of the Rickenbacker area by strengthening highway connections and increasing transportation and development capacity. One such effort to achieve this goal is to complete the Rickenbacker Parkway around the southeast to northeast of the airport to improve circulation and land development opportunities in the Rickenbacker area.

As shown in **Figure 5-11 Rickenbacker Parkway Extension**, two alignments of a four-lane divided highway with curb and gutter are considered as part of this Study. This is consistent with the current configuration of the existing Rickenbacker Parkway. Development Option 1 considers a slight modification of the original alignment included in the 2012 LCK Airport Layout Plan Update. The alignment was modified to avoid impacting existing residential development east of London-Lancaster Road. This proposed alignment, located on and off-airport property, provides access through both the Intermodal and Air Cargo Campuses while maximizing the potential development area. Under Option 2, the proposed alignment considers the current alignment plans within the Air Cargo Campus while maximizing the potential development area. The proposed roadway is also maintained on airport property. This is accomplished through a series of gentle curves, which is a traffic calming strategy that offers an added benefit of enhancing overall safety.

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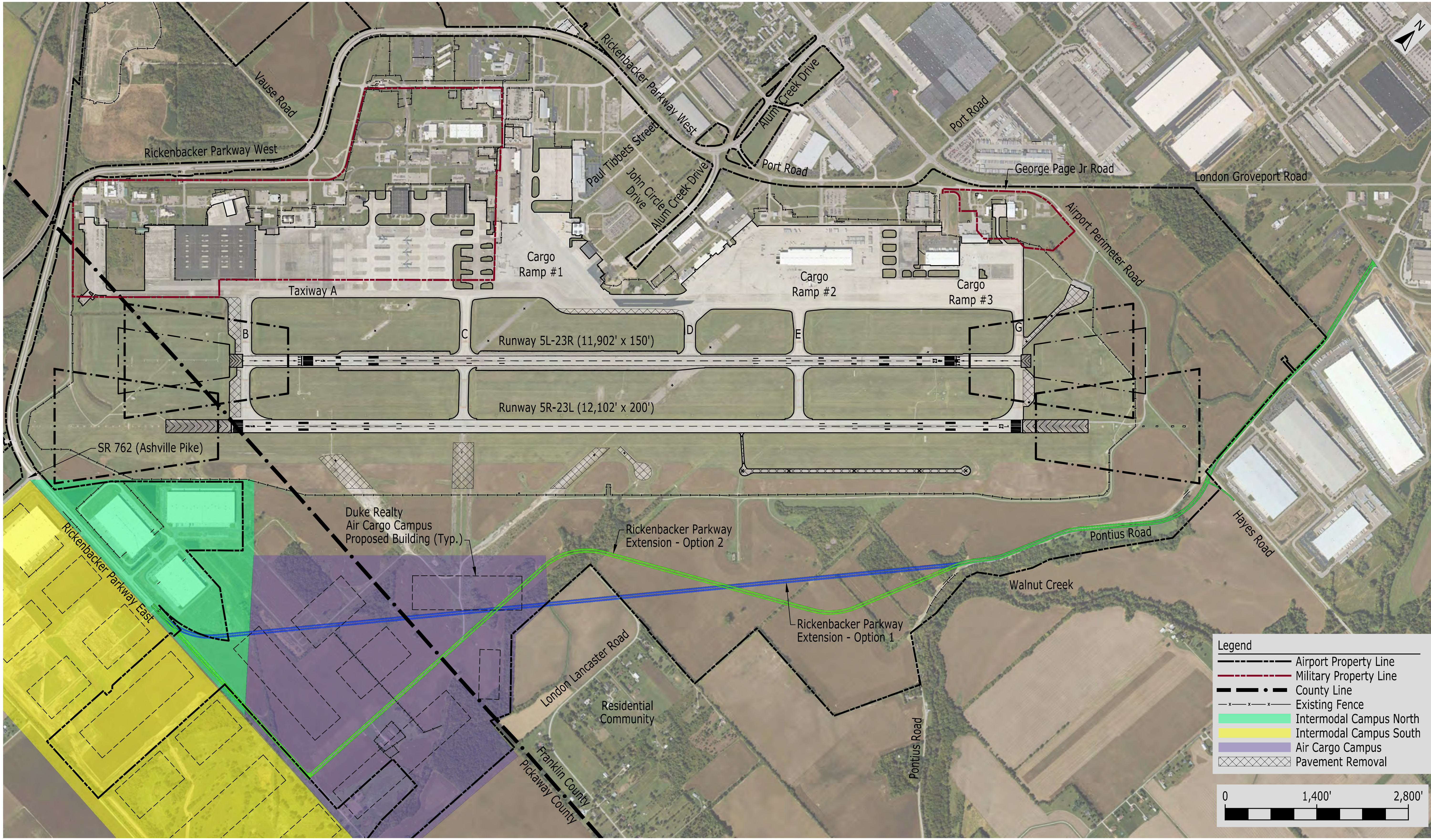

Figure 5-11 Rickenbacker Parkway Extension

The following impacts, actions, and permit requirements are anticipated with the proposed extension of Rickenbacker Parkway, based on the evaluations described in **Section 5.1 Environmental Requirements Relevant to Proposed Projects**:

- Surface Waters and Wetlands – Both identified options for the Rickenbacker Parkway Extension will impact wetlands and streams identified in the document *Unpermitted Areas with Potential Jurisdictional Waters Rickenbacker Airport and Associated Properties Franklin and Pickaway County, Ohio* (TranSystems, March 2013).

  Approximate Option 1 impacts include 0.3 acres of isolated wetlands (Wetlands BM and CR), 2.9 acres of non-isolated wetlands (Wetlands AL, AM, BK, CK, CM, CQ, CS), and 2,100 linear feet of streams (Streams 2, 7, 13, 14, 20, 36, 37, and 39). Approximate Option 2 impacts include 2.1 acres of non-isolated wetlands (Wetlands AL, AM, BK, and CK) and 1,300 linear feet of streams (Streams 2, 7, 13, 14, 20, and 39). Based on these impacts, it is anticipated that both options will require a USACE Section 404 individual permit and an OEPA Section 401 Water Quality Certification for stream and non-isolated wetland impacts. Additionally, Option 1 will require an OEPA Level 1 Isolated Wetland General Permit due to impacts to isolated wetlands.

  A portion of the wetland and stream impacts for both options (northeast of the airport) occur in areas that are classified by OEPA as “ineligible areas requiring an individual 401 Water Quality Certification.” These areas exhibit habitat features indicative of high-quality waters and are depicted on the OEPA “401 Water Quality Certification for the Nationwide Permits Stream Eligibility Web Map (2017 Reissuance).” Potentially eligible areas will require coordination and pre-approval with OEPA.

- Construction Stormwater – As this project will disturb more than one acre, coverage under the Ohio NPDES general permit for stormwater discharges associated with construction activities will be required, including preparation of a construction Stormwater Pollution Prevention Plan (SWPPP).

- Biological Resources – As this project will result in impacts to streams, wetlands and wooded areas, it has the potential to impact endangered species such as the Scioto madtom (fish), five species of mussels, northern long-eared bat, and Indiana bat. As described in **Section 5.1 Environmental Requirements Relevant to Proposed Projects**, coordination and consultation with the Ohio Department of Natural Resources and the U.S. Fish and Wildlife Service will be required to determine impact to these species and mitigation requirements. If the project is found to result in a take of threatened or endangered species, an Incidental Take permit and habitat conservation plan will be required.

- Farmlands – The project crosses into land that is currently used as farmland. Coordination and consultation with NRCS is required to determine if the impacted land includes prime, unique, or statewide and locally important farmland, the significance of the impacts, and potential mitigation requirements.

- Hazardous Materials - Construction activities will disturb the following sites illustrated on **Figure 4-1 Development Constraints**:
  - o Both Options 1 and 2 pass through remediation site SD025 west of Pontius Road. This site is a system of ditches that is still undergoing remediation for sediment contamination associated with polycyclic aromatic hydrocarbons (PAHs), and has not achieved unrestricted closure.
  - o Both Options 1 and 2 pass through Ordnance Area #3, which was the Prime Base Engineer Emergency Force Training Area. Option 2 passes through Ordnance Area #2, the former grenade range. Both sites are located east of Firing Range Road. Visual site investigations identified ordnance fragments. These ordnance sites have not achieved regulatory closure.

  Consultation with OEPA is required for any sites that have not achieved unrestricted closure at the time of development. Prior to construction within potentially contaminated sites, including sites with unrestricted closure, it is recommended that a work plan be developed that outlines the approach to follow when contamination is encountered in the field, including the management and disposal of impacted soils and groundwater in accordance with applicable regulations. A health and safety plan is also recommended to minimize exposure of construction personnel to hazardous materials and minimize associated health and safety risks.

- Noise – With the extension of Rickenbacker Parkway into non-airport properties, this activity is likely to require screening for potential noise impacts, and more detailed noise analysis based on the screening results.

- Additional Considerations – As this project crosses into undeveloped and previously undisturbed areas, SHPO consultation is recommended to identify potential archaeological resources in the project area. In areas where this project crosses into private property not owned by CRAA, socioeconomic impacts need to be assessed.

- NEPA Documentation – According to the “ODOT NEPA Assignment Categorical Exclusion Guidance” last updated in January 2016, roadway projects are eligible for a Categorical Exclusion (CE) if they do not have a significant impact on water quality or natural or other resources, threatened or endangered species, or other significant environmental impacts. While the significance of the impacts has not yet been determined, this project has the potential to require an EA based on the combination of impacts to streams, wetlands, and contaminated sites.

5.4 Noise Contours and Land Use Compatibility

The FAA’s Aviation Environmental Design Tool (AEDT) software is used to generate airport noise contours and to evaluate incompatible noise exposure to sensitive land uses such as residential properties, schools, places of worship, and hospitals. The noise contours illustrate the Day-Night Average Sound Level (DNL) that occurs during an average day and are generated by inputting various airport-specific factors into AEDT (aircraft activity and fleet mix, flight tracks, runway utilization, day and night activity, etc.). According to the FAA's Environmental Desk Reference for Airport Actions, "DNL is the 24-hour average sound level in decibels (dB). This average is derived from all aircraft operations during a 24-hour period that represent an airport's average annual operational day. [...] DNL adds a 10 dB noise penalty to each aircraft operation occurring during nighttime hours (10 p.m. to 7 a.m.). DNL includes that penalty to compensate for people's heightened sensitivity to noise during this period." The FAA identifies DNL levels of 65 dB and higher as incompatible with noise sensitive land uses.

The objectives of compatible land use planning are to encourage land uses that are generally considered to be incompatible with airports (such as residential, schools and churches) to locate away from airports and to encourage land uses that are more compatible (such as industrial and commercial uses) to locate around airports.[1] As noted in the 2006 LCK Part 150 Study, other noise sensitive public facilities to consider include libraries, hospitals and nursing homes. There are currently no hospitals or nursing homes located in the study area.

Using the latest version of AEDT (Version 2d), DNL noise contours were generated for the following two scenarios at LCK: 1) existing 2016 activity levels, fleet mix, and runway configuration, and 2) forecast 2036 activity levels, fleet mix, and runway configuration. The AEDT inputs included in this section were derived from the fleet mix forecasts presented in the **Chapter 2, Forecasts of Aviation Demand** (Section 2.7, page 2-58), and by reviewing historical flight records retrieved from Flightwise and CRAA's Airport Noise Monitoring and Management System (ANOMS) to identify aircraft types that commonly operate at LCK. In addition, the flight tracks extracted from the CRAA ANOMS were analyzed to establish the spine tracks used in the AEDT model. The DNL 65 dB contours for the existing and future conditions are shown in **Figure 5-12 2016 Noise Contours** and **Figure 5-13 2036 Noise Contours.** The 2016 and 2036 DNL 65 dB contours do not encompass sensitive land uses, and therefore, the preferred airfield development does not result in significant noise impacts. The contours presented in this section will be incorporated into the Land Use Plan Drawing of the Airport Layout Plan Set associated with this Study.

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[1] Land Use Compatibility and Airports, Compatible Land Use Planning Task Force, Federal Aviation Administration, 1998.

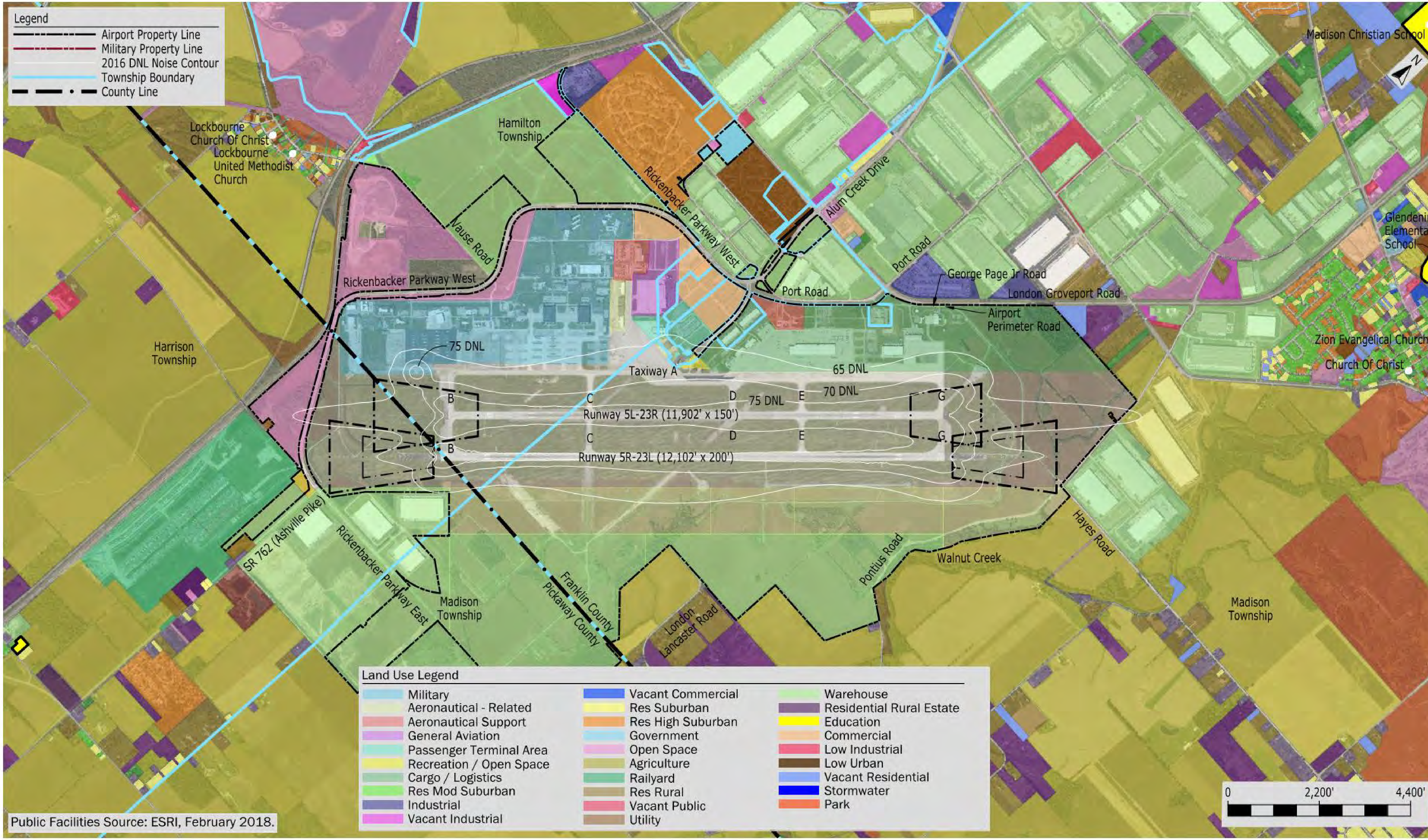


Figure 5-12 2016 Noise Contours

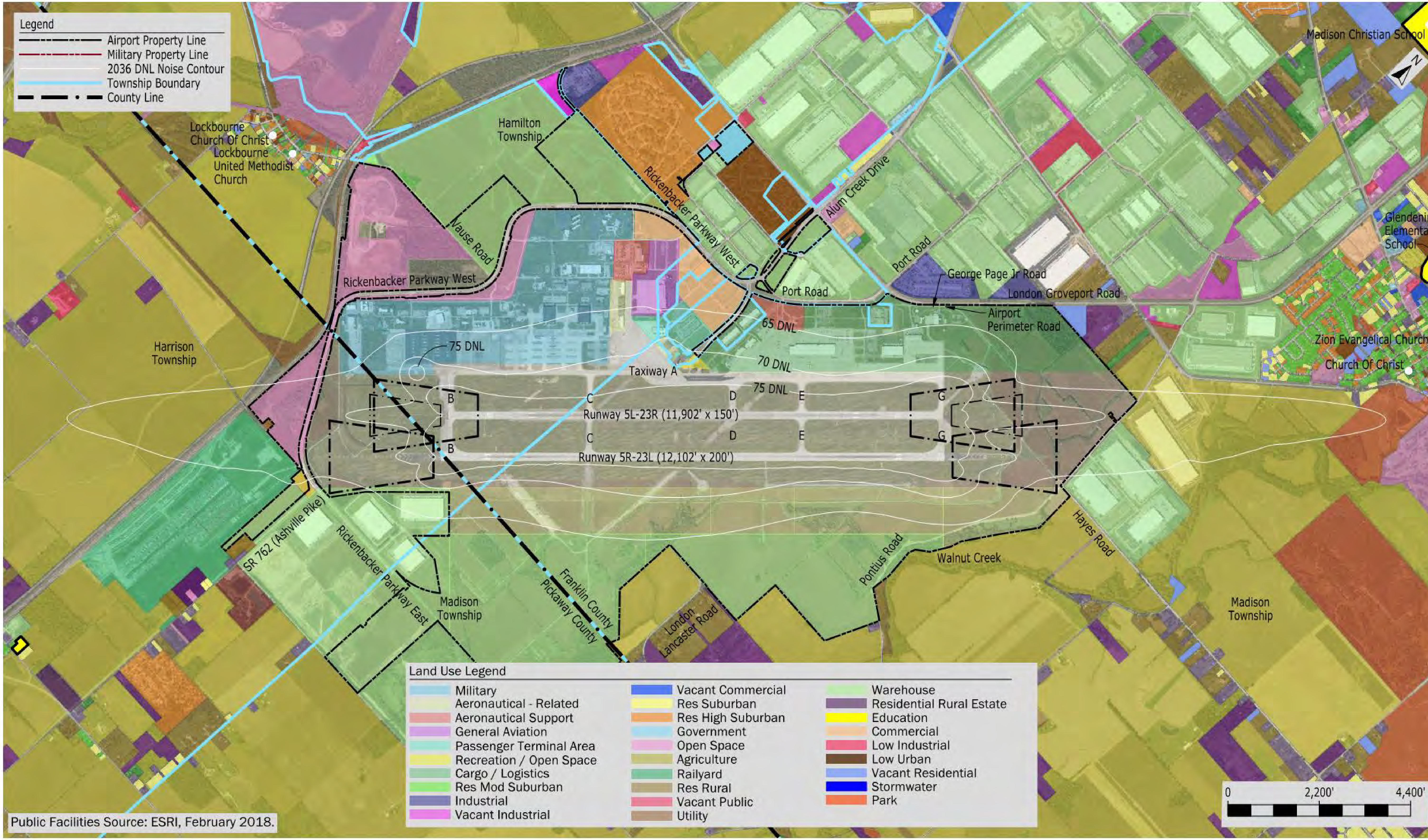


Figure 5-13 2036 Noise Contours

The civil aircraft fleet mix shown in **Table 5-1 Civil Airplane Fleet Mix** and **Table 5-2 Civil Helicopter Fleet Mix** was derived from an analysis of operational data extracted from the CRAA's Airport Noise Monitoring and Management System (ANOMS) and Flightwise for year 2016. It was assumed that the aircraft proportions in the fleet mix remain constant from 2016 to 2036. It is important to note that the assembly of the aircraft operations data was conducted in close coordination with CRAA staff. The number of aircraft operations in the sample were scaled to match the total operations (excluding military operations) for 2016 and 2036 as presented in **Chapter 2, Forecasts of Aviation Demand** (Section 2.10, page 2-65). Air Cargo operators are phasing out older versions of the Boeing 747 aircraft family such as the 747-200 and 747-400. For noise modeling purposes, it was assumed that in year 2036, the Boeing 747-8F would be the only version of the Boeing 747 aircraft family operating at LCK. The day/night and arrival/departure splits were determined based on the analysis of the Flightwise data.

Table 5-1 Civil Airplane Fleet Mix

Aircraft Type Designator	AEDT Aircraft	Make/Model/Engine Type	Engine Type	Operations	
				2016	2036
A124	74720B	Boeing 747-200 / JT9D-7Q	Jet	56	154
A306	A300-622R	Airbus A300-622R / PW4158	Jet	3,152	8,619
A310	A310-304	Airbus A310-304 / GE CF6-80C2A2	Jet	326	892
A319	A319-131	Airbus A319-131 / V2522-A5	Jet	9	24
A320	A320-211	Airbus A320-211 / CFM56-5A1	Jet	1,679	4,591
AC50	BEC58P	Raytheon BARON 58P / TS10-520-L	Piston	253	692
ASTR	IA1125	IAI-1125 ASTRA / TFE731-3A	Jet	4	12
AT43	DHC8	Bombardier de Havilland DASH 8-100 / PW121	Turboprop	7	19
AT72	D0328	Dornier 328-100 / PW119C	Turboprop	742	2,030
B350	DHC6	De Havilland DASH 6 / PT6A-27	Turboprop	16	43
B722	727EM2	FEDX 727-200 / JT8D-15	Jet	88	240
B732	737N17	Boeing 737-200 / JT8D-17 Nordam B737 LGW Hushkit	Jet	9	24
B737	737700	Boeing 737-700 / CFM56-7B24	Jet	7	19
B738	737800	Boeing 737-800 / CFM56-7B26	Jet	163	445
B742	747200	Boeing 747-200 / JT9D-7	Jet	42	0
B744	747400	Boeing 747-400 / PW4056	Jet	189	0
B748	7478	Boeing 747-8F / GEnx-2B67	Jet	1,447	4,590
B752	757PW	Boeing 757-200 / PW2037	Jet	996	2,724
B763	767300	Boeing 767-300 / PW4060	Jet	939	2,568
B772	777200	Boeing 777-200 / GE90-76B	Jet	129	353
B77L	7773ER	Boeing 777-300ER / GE90-115B-EIS	Jet	402	1,099

Table 5-1 Civil Airplane Fleet Mix

Aircraft Type Designator	AEDT Aircraft	Make/Model/Engine Type	Engine Type	Operations	
				2016	2036
BE20	CNA441	Cessna CONQUEST II / TPE331-8	Turboprop	18	49
BE23	GASEPF	1985 1-ENG FP PROP	Piston	4	12
BE30	DO228	Dornier 228-202 / TPE 311-5	Turboprop	7	18
BE33	GASEPV	1985 1-ENG VP PROP	Piston	4	12
BE35	GASEPV	1985 1-ENG VP PROP	Piston	2	6
BE36	GASEPV	1985 1-ENG VP PROP	Piston	14	39
BE40	MU3001	Mitsubishi MU300-10 Diamond II / JT15D-5	Jet	42	116
BE55	BEC58P	Raytheon BARON 58P / TS10-520-L	Piston	41	111
BE58	BEC58P	Raytheon BARON 58P / TS10-520-L	Piston	889	2,430
BE9L	CNA441	Cessna CONQUEST II / TPE331-8	Turboprop	27	73
BL17	GASEPV	1985 1-ENG VP PROP	Piston	13	37
C172	CNA172	Cessna 172R / Lycoming IO-360-L2A	Piston	22	60
C182	CNA182	Cessna 182H / Continental O-470-R	Piston	18	50
C208	CNA208	Cessna 208 / PT6A-114	Turboprop	3,419	9,349
C210	CNA206	Cessna 206H / Lycoming IO-540-AC	Piston	7	19
C25A	CNA500	Cessna Citation II / JT15D-4	Jet	15	42
C310	BEC58P	Raytheon BARON 58P / TS10-520-L	Piston	15	41
C340	BEC58P	Raytheon BARON 58P / TS10-520-L	Piston	4	12
C402	BEC58P	Raytheon BARON 58P / TS10-520-L	Piston	4	12
C421	BEC58P	Raytheon BARON 58P / TS10-520-L	Piston	11	30
C425	CNA441	Cessna CONQUEST II / TPE331-8	Turboprop	4	12
C501	CNA500	Cessna Citation II / JT15D-4	Jet	13	37
C510	ECLIPSE500	Eclipse 500 / PW610F	Jet	11	30
C525	CNA500	Cessna Citation II / JT15D-4	Jet	11	30
C550	CNA500	Cessna Citation II / JT15D-4	Jet	20	55
C560	CNA55B	Cessna 550 Citation Bravo / PW530A	Jet	18	49
C56X	CNA55B	Cessna 550 Citation Bravo / PW530A	Jet	24	67
C680	CNA680	Cessna Citation Sovereign 680 / PW306C	Jet	18	49
C750	CNA750	Cessna Citation X / Rolls Royce Allison AE3007C	Jet	11	30

Table 5-1 Civil Airplane Fleet Mix

Aircraft Type Designator	AEDT Aircraft	Make/Model/Engine Type	Engine Type	Operations	
				2016	2036
C77R	CNA172	Cessna 172R / Lycoming IO-360-L2A	Piston	4	12
CL30	CL601	Canadair CL-601 / CF34-3A	Jet	7	18
CL60	CL600	Canadair CL-600 / ALF502L	Jet	22	61
COL3	GASEPF	1985 1-ENG FP PROP	Piston	4	12
COL4	GASEPF	1985 1-ENG FP PROP	Piston	4	12
DA40	GASEPF	1985 1-ENG FP PROP	Piston	7	18
DC10	DC1030	McDonnell Douglas DC10-30 / CF6-50C2	Jet	734	2,008
DC91	DC910	McDonnell Douglas DC-9-10 / JT8D-7	Jet	22	60
DC93	DC93LW	McDonnell Douglas DC-9-30 / JT8D-9 w / ABS Lightweight Hushkit	Jet	36	98
DHC6	DHC6	De Havilland DASH 6 / PT6A-27	Turboprop	2	7
E120	EMB120	Embraer 120 ER / Pratt & Whitney PW118	Turboprop	13	37
E135	EMB145	Embraer 145 ER / Allison AE3007	Jet	4	12
E50P	ECLIPSE500	Eclipse 500 / PW610F	Jet	4	12
E55P	CL600	Canadair CL-600 / ALF502L	Jet	11	30
EA50	ECLIPSE500	Eclipse 500 / PW610F	Jet	4	12
F2TH	CL600	Canadair CL-600 / ALF502L	Jet	2	7
FA20	CL600	Canadair CL-600 / ALF502L	Jet	38	105
GALX	CL600	Canadair CL-600 / ALF502L	Jet	9	24
H25B	LEAR35	Learjet 36 / TFE731-2	Jet	40	110
LJ35	LEAR35	Learjet 36 / TFE731-2	Jet	527	1,442
LJ40	LEAR35	Learjet 36 / TFE731-2	Jet	4	12
LJ45	LEAR35	Learjet 36 / TFE731-2	Jet	9	24
LJ60	CNA55B	Cessna 550 Citation Bravo / PW530A	Jet	4	11
M20P	GASEPV	1985 1-ENG VP PROP	Piston	9	26
M20T	GASEPV	1985 1-ENG VP PROP	Piston	9	24
MD11	MD11PW	McDonnell Douglas MD-11 / PW 4460	Jet	55	150
MD83	MD83	McDonnell Douglas MD-83 / JT8D-219	Jet	900	2,461
MD88	MD83	McDonnell Douglas MD-83 / JT8D-219	Jet	169	461
P28A	PA28	Piper Warrior PA-28-161 / O-320-D3G	Piston	48	133
P28R	PA28	Piper Warrior PA-28-161 / O-320-D3G	Piston	4	12
P28T	PA28	Piper Warrior PA-28-161 / O-320-D3G	Piston	2	6
P32R	GASEPV	1985 1-ENG VP PROP	Piston	2	6
P46T	GASEPV	1985 1-ENG VP PROP	Piston	2	6

Table 5-1 Civil Airplane Fleet Mix

Aircraft Type Designator	AEDT Aircraft	Make/Model/Engine Type	Engine Type	Operations	
				2016	2036
PA27	BEC58P	Raytheon BARON 58P / TS10-520-L	Piston	2	6
PA30	PA30	Piper Twin Comanche PA-30 / IO-320-B1A	Piston	4	12
PA31	PA31	Piper Navajo Chieftain PA-31-350 / TIO-5	Piston	4	12
PA32	GASEPV	1985 1-ENG VP PROP	Piston	19	51
PA34	BEC58P	Raytheon BARON 58P / TS10-520-L	Piston	40	109
PA46	GASEPV	1985 1-ENG VP PROP	Piston	4	12
PAY1	PA31	Piper Navajo Chieftain PA-31-350 / TIO-5	Piston	2	7
PC12	CNA208	Cessna 208 / PT6A-114	Turboprop	394	1,078
RV6	GASEPF	1985 1-ENG FP PROP	Piston	4	12
S22T	GASEPV	1985 1-ENG VP PROP	Piston	4	12
SH33	SD330	Short SD3-30 / PT6A-45AR	Turboprop	49	135
SH36	SD330	Short SD3-30 / PT6A-45AR	Turboprop	31	84
SR20	GASEPV	1985 1-ENG VP PROP	Piston	4	12
SR22	GASEPV	1985 1-ENG VP PROP	Piston	47	128
SW3	DHC6	De Havilland DASH 6 / PT6A-27	Turboprop	9	24
SW4	DHC6	De Havilland DASH 6 / PT6A-27	Turboprop	4	12
TB20	GASEPF	1985 1-ENG FP PROP	Piston	4	12
TBM8	CNA208	Cessna 208 / PT6A-114	Turboprop	2	7
			Total	18,713	51,171

Source: Michael Baker International, Inc., 2018; Flightwise (https://flightwise.com)

Table 5-2 Civil Helicopter Fleet Mix

Aircraft Type Designator	AEDT Aircraft	Description	Engine Type	Operations	
				2016	2036
EC-130	EC130	Eurocopter EC-130 w/Arriel 2B1	Turboshaft	986	2,694
				986	2,694

Source: Michael Baker International, Inc., 2018.

The military fleet mix, shown in **Table 5-3 Military Airplane Fleet Mix and Table 5-4 Military Helicopter Fleet Mix**, was estimated based on an analysis of the FAA Traffic Flow Management System Counts (TFMSC). It was assumed that the aircraft proportions in the fleet mix remain constant from 2016 to 2036. The number of aircraft operations in the selected sample were scaled to match the total military operations for 2016 and 2036 as presented in **Chapter 2, Forecasts of Aviation Demand** (Section 2.10, page 2-65). Based on discussions with the LCK Tower manager and CRAA staff, military helicopter operations were estimated as 50% of the total military operations. Military helicopter operations were modeled according to procedures and flight tracks described in the Letter of Agreement between the LCK Tower, the Army Aviation Support Facility #2 (AASF #2) and the Ohio Army National Guard (OHARNG).

Table 5-3 Military Airplane Fleet Mix

Aircraft Type Designator	AEDT Aircraft	Description	Engine Type	Operations	
				2016	2036
A10	A10A	A10 - Fairchild A10	Jet	31	31
C30J	C130HP	Lockheed EC130	Turboprop	40	40
C135	C135A	Boeing C-135A Stratolifter	Jet	6	6
C17	C17	Boeing C-17A	Jet	47	47
F22	F15E20	Lockheed Martin F-22 Raptor	Jet	53	53
F16	F16A	F16 - Lockheed F-16 Fighting Falcon	Jet	31	31
F18/F18S	F18EF	Boeing F/A-18 Hornet	Jet	9	9
K35R	KC-135	K35R - Boeing KC-135 Stratotanker	Jet	2,969	2,969
T38	T-38A	T38	Jet	114	114
TEX2	T34	T-6 Texan	Turboprop	3	3
			Total	3,304	3,304

Source: Michael Baker International, Inc., 2018.

Table 5-4 Military Helicopter Fleet Mix

Aircraft Type Designator	AEDT Aircraft	Description	Engine Type	Operations	
				2016	2036
SH-60	S70	Sikorsky S-70 Blackhawk (UH-60A)	Turboshaft	3,304	3,304
			Total	3,304	3,304

Source: Michael Baker International, Inc., 2018.

The runway utilization shown in **Table 5-5 Runway Utilization** was estimated based on a sample of radar tracks (one year period) extracted from the WebTrak System and provided by the CRAA. Straight-in and straight-out flight tracks were modeled for all four runways. Departures of aircraft equipped with jet engines from Runways 5L and 5R were modeled with a flight track representing the initial segment of the LOCKBOURNE FOUR departure procedure.

Table 5-5 Runway Utilization

Aircraft Group	Runway 5L-23R		Runway 5R-23L	
	5L	23R	5R	23L
Boeing 747 Series	2%	9%	23%	66%
Antonov 124	13%	18%	30%	39%
All Other	26%	62%	4%	8%

Source: Michael Baker International, Inc., 2018; CRAA WebTrak System

5.5 Summary of Anticipated Environmental Permits

This section summarizes anticipated permitting requirements that would be associated with undertaking the projects proposed within the preferred alternative, based upon current federal, state, and local environmental regulations. The following permits were considered for applicability on each project:

1. National Pollutant Discharge Elimination System (NPDES) Permit for Construction Activity

   An NPDES permit for stormwater discharges associated with construction activities from the Ohio Environmental Protection Agency (OEPA) is required if the project disturbance, inclusive of all phases of development, is greater than 1 acre. All projects are assumed to involve at least 1 acre of disturbance and require permit coverage.

2. Air Emissions Source Permits

   Construction of air emission sources such as boilers, emergency generators and aboveground fuel storage tanks may require permits from the OEPA. The proposed vertical Jet-A aboveground fuel storage tank (AST) will require a permit to install/operate (PTIO). Additional air permits will be required for projects installing equipment that are considered to be air pollutant sources, including boilers, emergency generators, and fuel aboveground storage tanks.

3. Building Demolition Permits

   Some of the project alternatives propose to demolish buildings and structures. A Notification of Demolition and Renovation form is required to be submitted to the OEPA at least 10 working days before beginning demolition activity, even if no asbestos containing materials are present in the structures.

4. Section 404 Permits or United States Army Corps of Engineers (USACE) Dredge and Fill Permits

   Walnut Creek and its tributaries are located on the east side of the airport and may be impacted by stream crossings or nearby construction. There are also numerous streams and creeks and potential wetland areas to the south and southeast that may be filled or dredged by the proposed construction. These activities, if they impact wetlands or waters of the United States, will require a Clean Water Act Section 404 Permit. Nationwide Permits can be used for approved activities that meet required thresholds within select areas (areas designated by Ohio EPA as “potentially eligible for Nationwide permits” on the “401 Water Quality Certification for the Nationwide Permits Stream Eligibility Web Map (2017 Reissuance)”). However, none of the projects met the threshold for a Nationwide Permit based on cumulative impacts. All projects with impacts to non-isolated wetlands or streams were found to require individual Section 404 permits and mitigation activities.

5. Section 401 Water Quality Certifications and Isolated Wetland Permits

   Projects that require a Section 404 permit, also require a Section 401 Water Quality Certification (WQC) from OEPA. If an Individual Section 404 permit is required, the permittee must apply for the WQC. Multiple projects were noted as requiring a Section 401 Water Quality Certification. Multiple projects were found to involve impacts to isolated wetlands, requiring Isolated Wetland Permits from Ohio EPA.

6. U.S. Fish and Wildlife Service Incidental Take Permits

   Incidental take permits are required when non-Federal activities will result in a take (harming, harassing, collecting, or killing) of threatened or endangered species. A habitat conservation plan or "HCP" must accompany an application for an Incidental Take Permit. Multiple projects were noted as impacting wetlands, streams, or wooded areas that might provide habitat for endangered species, potentially requiring an incidental take permit.

7. Modification to the LCK NPDES Permit for Industrial Activity

   Airports are prohibited from discharging pollutants, including deicing chemicals, from a point source into a regulated water of the United States without an NPDES permit. As required by state and federal law, the airport is covered by an individual industrial National Pollutant Discharge Elimination System (NPDES) permit, which includes threshold levels of deicing chemical concentrations. Future increases in airport flights would likely increase the amount of aircraft deicer applied, increasing the frequency and concentration of deicer in stormwater discharges. Should airport discharges have a reasonable potential of exceeding the existing permit thresholds, discharge limits will be developed by Ohio EPA for the LCK NPDES permit, necessitating management of stormwater containing deicing chemicals.

8. Permit for Discharges to Sanitary Sewer

   The discharge of stormwater associated with deicing activities to the sanitary sewer (e.g., runoff collected from deicing pads) requires permit coverage from the local publicly owned treatment works (POTW). CRAA could potentially discharge deicing stormwater to the Canal Winchester wastewater treatment plant east of the airport or the Southerly wastewater treatment plant west of the airport.

Project-specific findings are summarized in **Table 5-6 Preliminary Environmental Review of Preferred Alternative**.

Table 5-6 Preliminary Environmental Review of Preferred Alternative

Project	Air Quality	Surface Waters / Wetland	Protected Species	Contaminated and Ordnance Sites	NEPA	1050.1F Reference	State Permit	Federal Permit	Comments	Land Use Impacted
Runway 5L-23R Widening, Shoulders and Blast Pad Improvements (includes lighting and signage)	Y	N	N	Y	CatEx*	5-6 & 5-2	CNPDES	None		D-OS
Runway 5R-23L Shoulder and Blast Pad Improvements (includes lighting and signage)	Y	N	N	Y	CatEx*	5-6 & 5-2	CNPDES	None		D-OS
Taxiway A Realignment (North)	Y	Y	Y	Y	CatEx*	5-6 & 5-2	CNPDES, OEPA IWP-1	None		D-OS
Parallel Taxiway (South)	Y	Y	Y	Y	CatEx/EA**	5-6 & 5-2	OEPA 401, CNPDES, OEPA IWP-2	FWS		D-OS
Air Cargo Terminal Facility, Roadway/Parking and Air Cargo Apron Improvements (ACT 5 Area)	Y	N	N	Y	CatEx*	5-6 & 5-2	CNPDES, possible air permit	None		D-HI, D-MI
Deicing Pad Improvements (ACT 4/5 Area)	N	N	N	Y	CatEx*	5-6 & 5-2	CNPDES, INPDES	None	OH IWDP	D-HI
Air Cargo Terminal Facility, Roadway/Parking and Air Cargo Apron Improvements (ACT 2 Area)	Y	N	N	Y	CatEx*	5-6 & 5-2	CNPDES, possible air permit, OEPA notification of demolition	None		D-HI, D-OS
Air Cargo Terminal Facility, Roadway/Parking and Air Cargo Apron Improvements (Northeast Area)	Y	Y	Y	Y	EA*	5-6 & 5-2	CNPDES, OEPA 401, OEPA notification of demolition, possible air permit, OEPA IWP-1	404, FWS	SHPO, NRCS	D-LI, D-OS
Air Cargo Terminal Facilities, Parking, Taxiway Connectors and Air Cargo Apron (South Area)	Y	Y	Y	Y	EA*	5-6 & 5-2	CNPDES, OEPA 401, OEPA notification of demolition, possible air permit	404, FWS	Noise, NRCS	D-OS, CC, DF
Removal of Airfield Pavement and Demolition of Sewage Treatment Plant (South Area)	N	Y	Y	Y	EA*	5-6 & 5-2	OEPA 401, OEPA notification of demolition, CNPDES	404, FWS		CC, DF
Maintenance, Repair and Overhaul Facility (South Area)	Y	Y	N	Y	CatEx*	5-6 & 5-2	CNPDES	404, FWS		CC, DF
On-Airport Perimeter Road Improvements (South Airfield)	N	Y	Y	Y	CatEx/EA*	5-6 & 5-2	CNPDES, OEPA 401	404, FWS		D-LI, D-OS, CC, DF
Airport Viewing Area (Northeast of ATCT)	N	N	N	Y	CatEx*	5-6 & 5-2	CNPDES			D-LI
Terminal Loop Road Lane and Sidewalk Improvements	N	N	N	Y	CatEx*	5-6 & 5-2	CNPDES*	None		D-LI, D-OS
FBO Apron and Taxilane Improvements	N	N	N	Y	CatEx*	5-6 & 5-2	CNPDES*	None		D-MI
General Aviation Taxilane, Apron and Parking Improvements	Y	N	N	Y	CatEx*	5-6 & 5-2	CNPDES	None		D-LI, D-OS
T-Hangars - 2 Buildings (12 units each)	Y	N	N	N	CatEx	5-6	CNPDES*	None		D-LI, D-OS
Conventional Hangars – 3 Buildings (10,000 SF each)	Y	N	N	N	CatEx	5-6	CNPDES*, possible air permit	None		D-LI, D-OS
Aircraft Fuel Storage	Y	N	N	Y	EA	3-1.2	CNPDES*, Air Emission Source permit	None	Coordinate with Fire Marshal, Amend SPCC Plan	D-MI
SRE Storage Facility and Pavement Improvements	Y	N	N	N	CatEx	5-6	CNPDES, possible air permit, OEPA notification of demolition	None		D-HI
Maintenance Garage Expansion and Pavement Improvements	Y	N	N	N	CatEx	5-6 & 5-2	CNPDES*, possible air permit	None		D-HI

Table 5-6 Preliminary Environmental Review of Preferred Alternative

Project	Air Quality	Surface Waters / Wetland	Protected Species	Contaminated and Ordnance Sites	NEPA	1050.1F Reference	State Permit	Federal Permit	Comments	Land Use Impacted
Maintenance Storage Facility and Pavement Improvements	Y	N	N	N	CatEx	5-6 & 5-2	CNPDES, possible air permit, OEPA notification of demolition	None		D-HI
Rickenbacker Parkway Extension	N	Y	Y	Y	EA*	ODOT Guidance	CNPDES, OEPA 401, OEPA IWP-1	404, FWS	Noise, NRCS, SHPO	CC, DF

Source: Gresham, Smith and Partners, 2018; Michael Baker International, 2018.

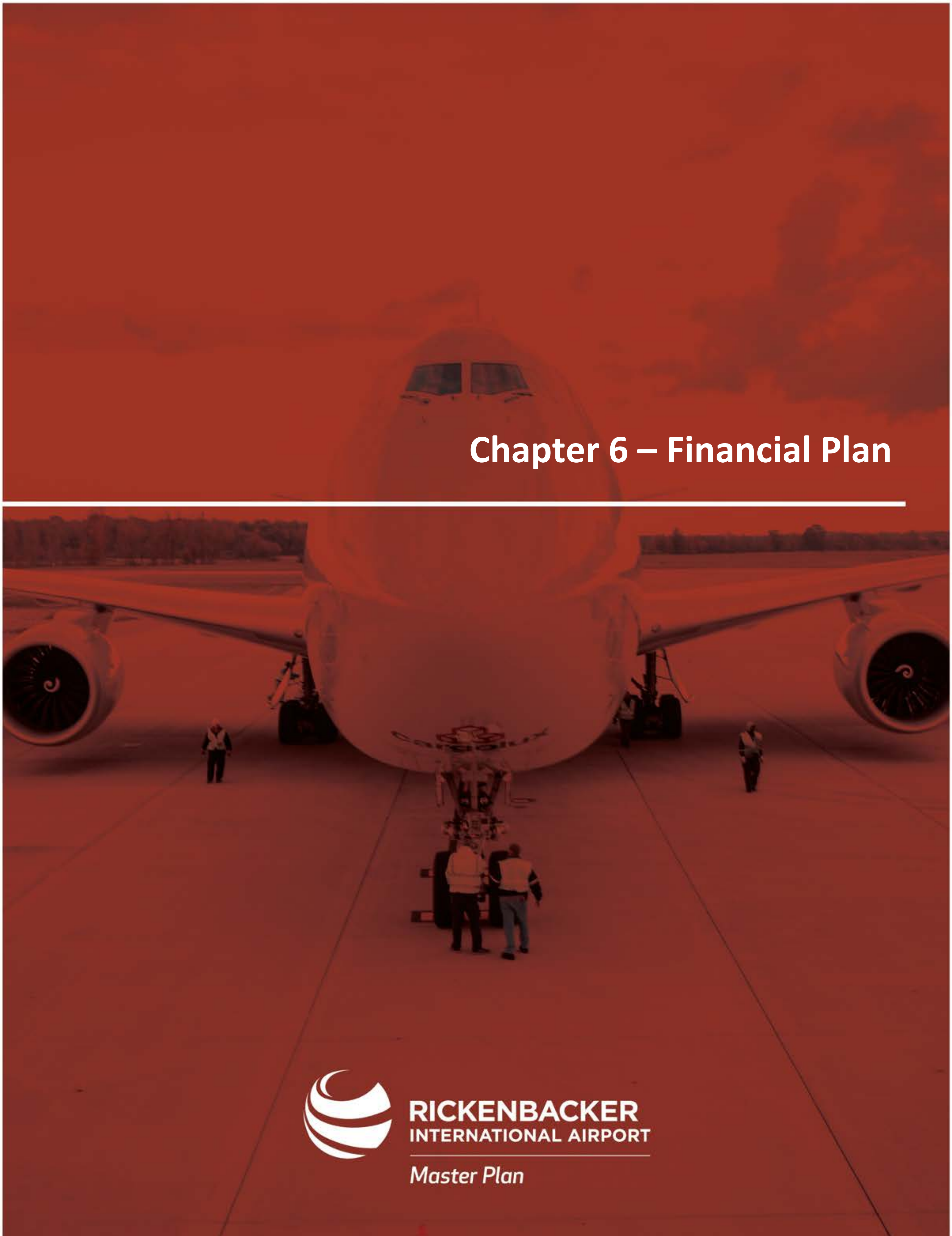
<u>NEPA Documentation Requirements:</u>
CatEx indicates that project is eligible for a CatEx.
CatEx* indicates that project is generally eligible for a CatEx; however, an EA may be required if contaminated sites have not completed remediation prior to the time of development.
CatEx/EA** indicates that project is potentially eligible for a CatEx, but only if contamination has been addressed and impacts to wetlands, streams, and biological resources are not found to be significant.
EA* indicates that project is likely to require an EA due to a combination of impacts to wetlands, streams, biological resources, and contaminated sites, although a CatEx is possible if impacts are not found to be significant and contamination is addressed.
EA indicates that project is likely to require an EA based on the nature of the project, regardless of potential impacts.
NRCS – Natural Resources Conservation Service

<u>State Permit Abbreviations:</u>
CNPDES = National Pollutant Discharge Elimination System Permit for Construction Activity; INPDES = National Pollutant Discharge Elimination System Permit for Industrial Activity. CNPDES* indicates that listed project by itself may disturb less than 1 acre, but permit coverage will still be required if the project is implemented as part of a larger common plan of development with a disturbance area of at least 1 acre.
OH IWDP – Ohio EPA Individual Wastewater Discharge Permit
SHPO – State Historic Preservation Office

<u>Federal Permit Abbreviations:</u>
404 = Corps of Engineers Dredge and Fill Permit; FWS = U.S. Fish and Wildlife Service Incidental Take Permit

<u>Land Use Abbreviations:</u>
D-HI = Developed, high intensity; D-MI = Developed, medium intensity; D-LI = Developed, low intensity; D-OS = Developed, open space; DF = Deciduous forest; CC = Cultivated crops

Chapter 6 – Financial Plan



RICKENBACKER
INTERNATIONAL AIRPORT
Master Plan

6.0 Financial Plan

6.1 Overview

The objective of this chapter is to set forth a strategic financial plan (Financial Plan) which provides for the financial implementation of the recommended improvements identified in this Study over a 20-year planning period.

Included as part of the Financial Plan is an overview of the capital improvements proposed for Rickenbacker International Airport (LCK) over a 20-year planning period (Development Period), with an emphasis on the Short-Term Development Period (Short-Term Development Period) 2018-2021 planning period. Due to the timing of the development of the LCK Capital Program, the original plan included 2017 projects. To maintain consistency with the original planning horizons established for this Study, the short-term projects identified in this section are shown over a period of four years. Analyses assessing the financial implications of the Columbus Regional Airport Authority (CRAA) undertaking the Proposed Projects and CRAA's ability to generate future revenues sufficient to exceed projected operating and capital expenses during the Short-Term Development Period are examined. The following summarizes the components of the Financial Plan:

- A detailed breakdown of each funding type available to Rickenbacker International Airport;
- A detailed funding plan for the Proposed Projects was prepared with an emphasis on the Short-Term Development Period. Recommended projects were evaluated to determine eligibility for funding by the Federal Aviation Administration (FAA) Airport Improvement Program (AIP), Ohio Department of Transportation (ODOT), other funding sources, and Third Party/Tenant Financing. The local funding requirement was identified;
- A compilation and review of CRAA's historical revenues and expenses for the past two years to identify historical trends;
- A detailed description of the Rickenbacker International Airport Financial Structure including an order of magnitude estimate of airport revenues that would be generated by the traffic forecasted in **Chapter 2, Forecasts of Aviation Demand;**
- A historical cash flow analysis detailing both operating income and historical outside funding levels; and
- A section detailing opportunities for Revenue Enhancement.

6.2 Proposed Projects Summary

Based on the projected facility requirements identified in **Chapter 3, Facility Requirements**, a list of preferred airport development alternatives was developed as part of **Chapter 4, Airport Alternatives Analysis**, and **Chapter 5, Alternatives Refinement**. The cost estimates associated with the recommended proposed projects in this Study are intended to be order of magnitude presented in 2018 dollars and include estimated engineering fees and contingencies. Costs shown later in the funding plan section of this chapter are escalated at a 3.0% inflation rate based upon the proposed phasing of the projects. In accordance with the Ohio Department of Transportation (ODOT) construction cost outlook and forecast prepared in January of 2019, the most likely construction cost inflation rate over the next 5 years ranges between 3.0% and 3.4%. Furthermore, ODOT references a 3.0% average rate, based on the Consumer Price Index and GDP, over the past 30 to 60 years, therefore a 3.0% inflation rate was used for all project costs.

In order to provide realistic assumptions regarding the availability of funding for the proposed projects, it is necessary to estimate the phasing requirements of each project based on the need for enhanced safety, security and/or demand for the facilities during the Development Period.

For the purpose of this Financial Plan, each project was placed into one of three general project phasing periods based on an estimate of each project's estimated implementation. Below are the project phasing periods used for this purpose.

- Short-Term Development Period – Projects anticipated to be implemented within 0 to 5 years following the Study. To maintain consistency with the original planning horizons established for this Study, the short-term projects identified in this section are shown over a period of four years.
- Mid-Term Development Period – Projects anticipated to be implemented between 6 to 10 years following the Study.
- Long-Term Development Period – Projects anticipated to be implemented between 11 to 20 years following the Study.

6.3 Capital Improvement Program

The Capital Improvement Program (CIP) includes cost estimates and development phasing for the various projects identified in **Figures 6-1 Capital Improvement Plan (CIP) - Short-Term (2018-2021), 6-2 Capital Improvement Plan (CIP) - Mid-Term (2022-2026) and 6-3 Capital Improvement Plan (CIP) - Long-Term (2027-2036)**. The proposed development is also identified within the Airport Layout Plan (ALP) drawing found in **Chapter 7, Airport Layout Plan.** A subsequent section of this chapter will address the financial feasibility of the Short-Term Development Period. Cost projections are based on 2018 dollars and include estimated engineering fees and contingencies. The projections should be used for planning purposes only and do not imply that funding will be available. Each year indicates the initiation of design and/or environmental efforts and it is assumed that construction would be undertaken either in that same year or the following year.

The CIP projects shown in **Table 6-1 Schedule of Project Costs and Phasing – Capital Improvement Program (CIP)** have been segregated into Short-Term Development Period (2018-2021), Mid-Term Development Period (2022-2026) and Long-Term Development Period (2027-2036).

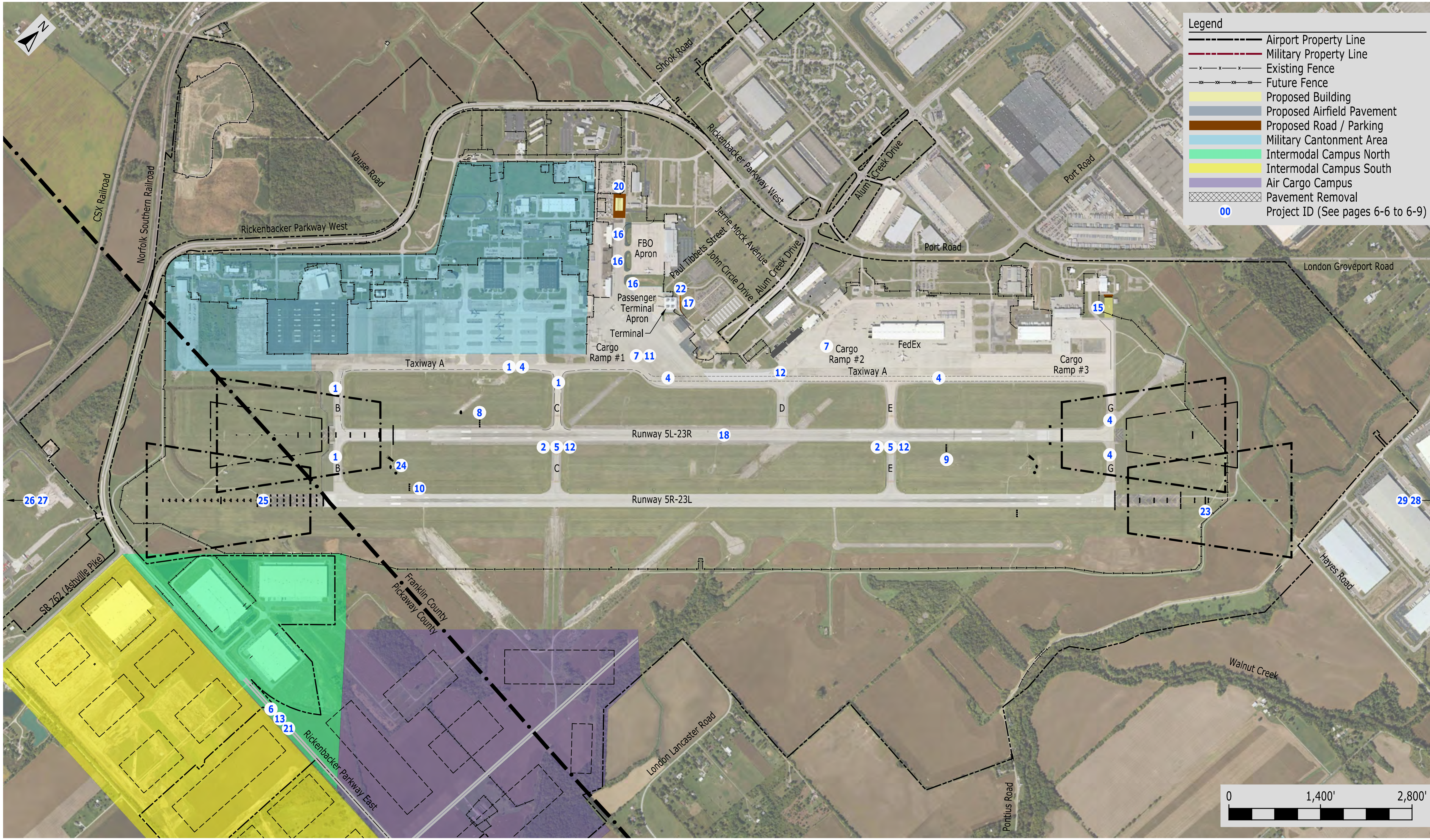


Figure 6-1 Capital Improvement Plan (CIP) - Short-Term (2018-2021)

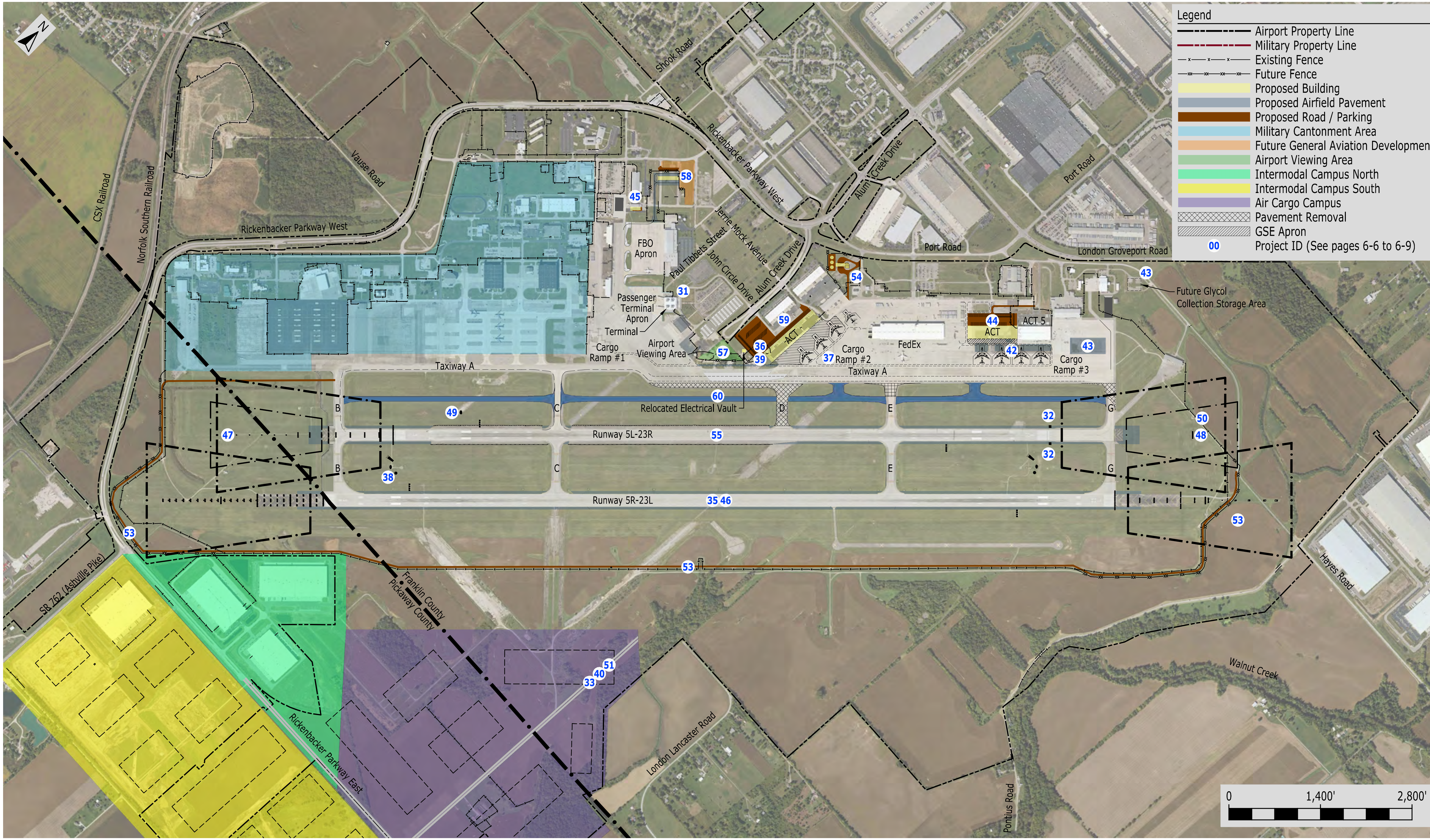


Figure 6-2 Capital Improvement Plan (CIP) - Mid-Term (2022-2026)

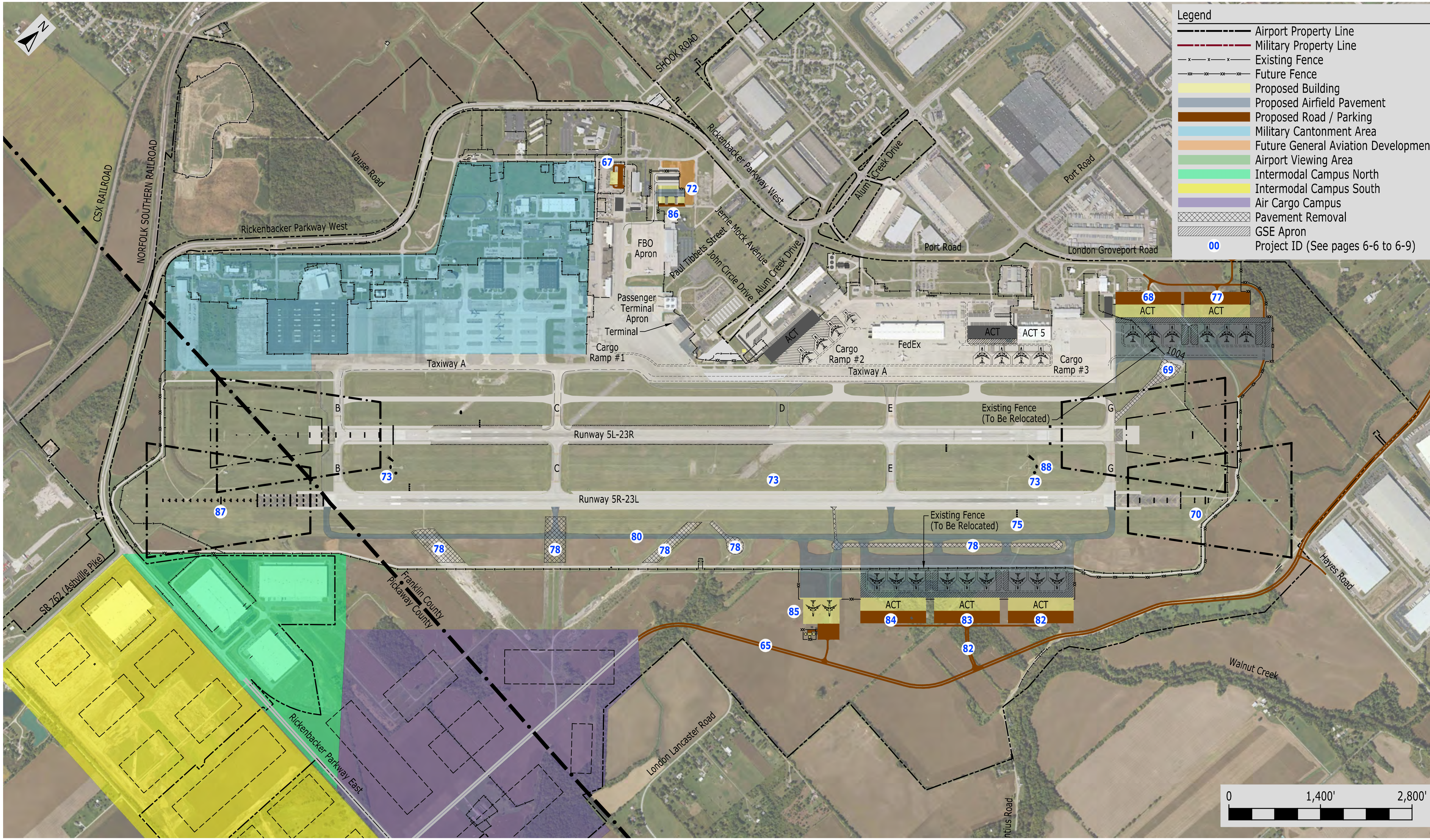


Figure 6-3 Capital Improvement Plan (CIP) - Long-Term (2027-2036)

Table 6-1 Schedule of Project Costs and Phasing – Capital Improvement Program (CIP)

No.	Project	Start Year	Short-Term (0-5 years)	Mid-Term (6-10 years)	Long-Term (11-20 years)	Total
Short-Term Development Period (2018-2021)						
1	Taxiway Rehab & MOS Phase 1A & Phase 1B Improvements 2018 (CRAA #17020)***	2018	$4,811,622			$4,811,622
2	Taxiway Rehabilitation & MOS Improvements Phase 1C 2018 (CRAA #17053)***	2018	$280,153			$280,153
3	Landside Pavement Projects - 2019 (Reserve Road and Parking Rehabilitation)	2019	$1,360,617			$1,360,617
4	Taxiway Rehabilitation & MOS Phase 1A & Phase 1B Improvements 2019 (CRAA #17020)***	2019	$1,546,700			$1,546,700
5	Taxiway Rehabilitation & MOS Improvements Phase 1C 2019 (CRAA #17053)***	2019	$4,782,344			$4,782,344
6	Rickenbacker Parkway East Phase 3A 2019 (CRAA #09020)	2019	$350,000			$350,000
7	Cargo Ramps 1 and 2 Rehabilitation (Partial Reconstruction, Mill and Overlay, and Concrete Restoration)	2020	$5,738,368			$5,738,368
8	Runway 5L PAPI Replacement	2020	$87,451			$87,451
9	Runway 23R PAPI Replacement	2020	$87,451			$87,451
10	Runway 5R PAPI Replacement	2020	$87,451			$87,451
11	Cargo Ramp 1 Rehabilitation (Partial Reconstruction and Mill and Overlay)	2020	$739,157			$739,157
12	Taxiway Rehabilitation & MOS Improvements Phase 1C 2020 (CRAA #17053)***	2020	$183,492			$183,492

* It is assumed that all pavement management program recommendations for all taxiway and runway pavements are included as part of the Modification of Standards (MoS) implementation projects.
** Prioritization and specification of recommended projects to be determined by future PMP.
*** Phase 1B funded through an FAA grant in FY2017 and constructed in FY2018. Phase 1C funded through an FAA grant in FY2018, assumed construction in FY2019.

Sources:

1 - 2015/2016 Airport Pavement Management Program Final Report (PMP) prepared by RDM International, Inc.
2 - Capital Improvement Program (CIP) 2018 & FY2019-FY2028 provided by CRAA on 9/20/18. Inflation was added to all projects provided with "Total to Date" of $0.
3 - Master Plan by Michael Baker International, Inc.
4 - Recommended annual spending amount based on the averages from the 2015/2016 PMP by RDM International, Inc.
5 - Airfield Lighting and Electrical Vault Improvement Study by RS&H in August 2010. Increased to reflect inflation.
6 - This estimate was developed partially based on C&S Companies' estimate from 2014. See project breakout for more information.
7 - Estimated replacement schedule for existing NAVAIDs at LCK based on existing conditions and original install date (provided by CRAA)

Table 6-1 Schedule of Project Costs and Phasing – Capital Improvement Program (CIP)

No.	Project	Start Year	Short-Term (0-5 years)	Mid-Term (6-10 years)	Long-Term (11-20 years)	Total
13	Rickenbacker Parkway East Phase 3A 2020 (CRAA #09020)	2020	$4,150,000			$4,150,000
14	Airfield/Landside Pavement Projects - 2020** (Miscellaneous Rehabilitation)	2020	$3,100,711			$3,100,711
15	Construct New Cargo Equipment Storage Building	2020	$5,637,301			$5,637,301
16	FBO Apron Fillet Improvements	2020	$1,066,673			$1,066,673
17	Construct New Terminal Traffic Lane and Curb Front	2020	$495,971			$495,971
18	Pavement Enabling Rehabilitation - Runway 5L-23R	2021	$12,131,193			$12,131,193
19	Airfield/Landside Pavement Projects - 2021** (Miscellaneous Rehabilitation)	2021	$2,268,084			$2,268,084
20	Construct New Maintenance Storage Facility	2021	$5,265,634			$5,265,634
21	Rickenbacker Parkway East Phase 3A 2021 (CRAA #09020)	2021	$1,000,000			$1,000,000
22	LCK Terminal Improvements - First Floor	2021	$336,566			$336,566
23	Runway 5R Localizer Replacement	2021	$1,720,430			$1,720,430
24	Runway 5R Glide Slope Replacement	2021	$1,179,981			$1,179,981
25	Runway 5R Inner Marker Replacement	2021	$234,195			$234,195
26	Runway 5R Outer Marker Replacement	2021	$272,026			$272,026
27	Runway 5R NDB Replacement	2021	$333,277			$333,277
28	Runway 23L Outer Marker Replacement	2021	$272,026			$272,026
29	Runway 23L NDB Replacement	2021	$333,277			$333,277
	Subtotal of Short-Term Projects		**$59,852,151**			**$59,852,151**

* It is assumed that all pavement management program recommendations for all taxiway and runway pavements are included as part of the Modification of Standards (MoS) implementation projects.
** Prioritization and specification of recommended projects to be determined by future PMP.
*** Phase 1B funded through an FAA grant in FY2017 and constructed in FY2018. Phase 1C funded through an FAA grant in FY2018, assumed construction in FY2019.

Sources:

1 - 2015/2016 Airport Pavement Management Program Final Report (PMP) prepared by RDM International, Inc.
2 - Capital Improvement Program (CIP) 2018 & FY2019-FY2028 provided by CRAA on 9/20/18. Inflation was added to all projects provided with "Total to Date" of $0.
3 - Master Plan by Michael Baker International, Inc.
4 - Recommended annual spending amount based on the averages from the 2015/2016 PMP by RDM International, Inc.
5 - Airfield Lighting and Electrical Vault Improvement Study by RS&H in August 2010. Increased to reflect inflation.
6 - This estimate was developed partially based on C&S Companies' estimate from 2014. See project breakout for more information.
7 - Estimated replacement schedule for existing NAVAIDs at LCK based on existing conditions and original install date (provided by CRAA)

Table 6-1 Schedule of Project Costs and Phasing – Capital Improvement Program (CIP)

No.	Project	Start Year	Short-Term (0-5 years)	Mid-Term (6-10 years)	Long-Term (11-20 years)	Total
	Mid-Term Development Period (2022-2026)					
30	Airfield/Landside Pavement Projects - 2022** (Miscellaneous Rehabilitation)	2022		$2,251,018		$2,251,018
31	LCK Terminal Improvements - Second Floor	2022		$485,217		$485,217
32	Runway 23R REIL Replacement	2022		$46,389		$46,389
33	Rickenbacker Parkway East Phase 3B 2022	2022		$1,508,182		$1,508,182
34	Airfield/Landside Pavement Projects - 2023	2023		$2,318,548		$2,318,548
35	LCK Phase 2A MOS Improvements and Update Pavement Management Program (CRAA #15026)	2023		$22,200,099		$22,200,099
36	Relocate Airfield Electrical Vault	2023		$1,738,911		$1,738,911
37	Reconstruct Ramp 2	2023		$75,200,352		$75,200,352
38	AWOS-III (Precipitation and Thunderstorm Options) Replacement	2023		$334,461		$334,461
39	NAVAID Control Cable Loop Replacement	2023		$2,894,143		$2,894,143
40	Rickenbacker Parkway East Phase 3B 2023	2023		$8,932,207		$8,932,207
41	Airfield/Landside Pavement Projects - 2024	2024		$2,388,105		$2,388,105
42	Construct Airside Operations Area for Expanded ACT 5	2024		$7,553,477		$7,553,477
43	Construct Deicing Pad on Ramp #3	2024		$9,634,738		$9,634,738
44	Expand ACT 5 Building and Associated Landside Infrastructure	2024		$38,400,953		$38,400,953
45	Expand Maintenance Garage Building 558	2024		$2,922,569		$2,922,569

* It is assumed that all pavement management program recommendations for all taxiway and runway pavements are included as part of the Modification of Standards (MoS) implementation projects.
** Prioritization and specification of recommended projects to be determined by future PMP.
*** Phase 1B funded through an FAA grant in FY2017 and constructed in FY2018. Phase 1C funded through an FAA grant in FY2018, assumed construction in FY2019.

Sources:

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6 - This estimate was developed partially based on C&S Companies' estimate from 2014. See project breakout for more information.
7 - Estimated replacement schedule for existing NAVAIDs at LCK based on existing conditions and original install date (provided by CRAA)

Table 6-1 Schedule of Project Costs and Phasing – Capital Improvement Program (CIP)

No.	Project	Start Year	Short-Term (0-5 years)	Mid-Term (6-10 years)	Long-Term (11-20 years)	Total
46	LCK Phase 2B MOS Improvements (CRAA #15026)	2024		$24,199,858		$24,199,858
47	Runway 5L MALSR Replacement	2024		$1,466,566		$1,466,566
48	Runway 5L Localizer Replacement	2024		$1,879,960		$1,879,960
49	Runway 5L Glide Slope Replacement	2024		$1,289,397		$1,289,397
50	Runway 5L DME Replacement	2024		$413,394		$413,394
51	Rickenbacker Parkway East Phase 3B 2024	2024		$9,200,173		$9,200,173
52	Airfield/Landside Pavement Projects - 2025	2025		$2,459,748		$2,459,748
53	Construct Airport Perimeter Road	2025		$28,687,749		$28,687,749
54	Construct New Fuel Farm	2025		$13,367,239		$13,367,239
55	Rehabilitate Runway 5L-23R, Widen to 200' Wide, Construct 40' Wide Shoulders, and Extend Blast Pads at Each End (MOS Improvements, Phase 3)	2025		$58,306,048		$58,306,048
56	Airfield/Landside Pavement Projects - 2026	2026		$2,533,540		$2,533,540
57	Construct Airport Viewing Area	2026		$586,464		$586,464
58	General Aviation Facility Expansion - Phase 1	2026		$4,204,421		$4,204,421
59	Remove Buildings 1090, 1091, 1092 and Replace w/ New ACT	2026		$67,084,421		$67,084,421
60	Construct New Parallel Taxiway A	2026		$54,123,911		$54,123,911
	Subtotal of Mid-Term Projects			**$448,612,258**		**$448,612,258**

* It is assumed that all pavement management program recommendations for all taxiway and runway pavements are included as part of the Modification of Standards (MoS) implementation projects.
** Prioritization and specification of recommended projects to be determined by future PMP.
*** Phase 1B funded through an FAA grant in FY2017 and constructed in FY2018. Phase 1C funded through an FAA grant in FY2018, assumed construction in FY2019.

Sources:

1 - 2015/2016 Airport Pavement Management Program Final Report (PMP) prepared by RDM International, Inc.
2 - Capital Improvement Program (CIP) 2018 & FY2019-FY2028 provided by CRAA on 9/20/18. Inflation was added to all projects provided with "Total to Date" of $0.
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6 - This estimate was developed partially based on C&S Companies' estimate from 2014. See project breakout for more information.
7 - Estimated replacement schedule for existing NAVAIDs at LCK based on existing conditions and original install date (provided by CRAA)

Table 6-1 Schedule of Project Costs and Phasing – Capital Improvement Program (CIP)

No.	Project	Start Year	Short-Term (0-5 years)	Mid-Term (6-10 years)	Long-Term (11-20 years)	Total
	Long-Term Development Period (2027-2036)					
61	Airfield/Landside Pavement Projects - 2027	2027			$2,609,546	$2,609,546
62	Airfield/Landside Pavement Projects - 2028	2028			$2,687,833	$2,687,833
63	Airfield/Landside Pavement Projects - 2029	2029			$2,768,468	$2,768,468
64	Airfield/Landside Pavement Projects - 2030	2030			$2,851,522	$2,851,522
65	Rickenbacker Parkway East Phase 4	2030			$47,938,798	$47,938,798
66	Airfield/Landside Pavement Projects - 2031	2031			$2,937,067	$2,937,067
67	Construct New SRE Building	2031			$7,710,211	$7,710,211
68	Construct Northeast ACT Facilities Phase 1	2031			$97,131,800	$97,131,800
69	Demolish Building 1004 and Associated Pavement	2031			$2,385,540	$2,385,540
70	Runway 5R DME Replacement	2031			$508,423	$508,423
71	Airfield/Landside Pavement Projects - 2032	2032			$3,025,179	$3,025,179
72	General Aviation Facility Expansion - Phase 2	2032			$2,600,890	$2,600,890
73	Runway 5R Personal Computer Based RVR Replacement	2032			$773,045	$773,045
74	Airfield/Landside Pavement Projects - 2033	2033			$3,115,935	$3,115,935
75	Runway 23L PAPI Replacement	2033			$128,425	$128,425
76	Airfield/Landside Pavement Projects - 2034	2034			$3,209,413	$3,209,413
77	Construct Northeast ACT Facilities Phase 2	2034			$105,676,494	$105,676,494
78	South Airfield Developments: Remove Outboard Parallel Runway (a.k.a. Former Assault Strip/Landing Zone) & Other Pavements	2034			$3,118,052	$3,118,052
79	Airfield/Landside Pavement Projects - 2035	2035			$3,305,695	$3,305,695

* It is assumed that all pavement management program recommendations for all taxiway and runway pavements are included as part of the Modification of Standards (MoS) implementation projects.
** Prioritization and specification of recommended projects to be determined by future PMP.
*** Phase 1B funded through an FAA grant in FY2017 and constructed in FY2018. Phase 1C funded through an FAA grant in FY2018, assumed construction in FY2019.

Sources:

1 - 2015/2016 Airport Pavement Management Program Final Report (PMP) prepared by RDM International, Inc.
2 - Capital Improvement Program (CIP) 2018 & FY2019-FY2028 provided by CRAA on 9/20/18. Inflation was added to all projects provided with "Total to Date" of $0.
3 - Master Plan by Michael Baker International, Inc.
4 - Recommended annual spending amount based on the averages from the 2015/2016 PMP by RDM International, Inc.
5 - Airfield Lighting and Electrical Vault Improvement Study by RS&H in August 2010. Increased to reflect inflation.
6 - This estimate was developed partially based on C&S Companies' estimate from 2014. See project breakout for more information.
7 - Estimated replacement schedule for existing NAVAIDs at LCK based on existing conditions and original install date (provided by CRAA)

Table 6-1 Schedule of Project Costs and Phasing – Capital Improvement Program (CIP)

No.	Project	Start Year	Short-Term (0-5 years)	Mid-Term (6-10 years)	Long-Term (11-20 years)	Total
80	South Airfield Developments: Parallel Taxiway (11,860' x 75')	2035			$70,844,222	$70,844,222
81	Airfield/Landside Pavement Projects - 2036	2036			$3,404,866	$3,404,866
82	South Airfield Developments - Phase 1: New ACT and Access Road	2036			$115,183,636	$115,183,636
83	South Airfield Developments - Phase 2: New ACT	2036			$112,464,250	$112,464,250
84	South Airfield Developments - Phase 3: New ACT	2036			$101,295,513	$101,295,513
85	South Airfield Developments - Phase 4: New MRO	2036			$130,857,365	$130,857,365
86	General Aviation Facility Expansion - Phase 3	2036			$9,353,232	$9,353,232
87	Runway 23L Localizer Replacement	2036			$1,838,371	$1,838,371
88	Runway 23L Glide Slope Replacement	2036			$1,838,371	$1,838,371
	Subtotal of Long-Term Projects				**$841,562,162**	**$841,562,162**
	Total of Projects		**$59,852,151**	**$448,612,258**	**$841,562,162**	**$1,350,026,571**

* It is assumed that all pavement management program recommendations for all taxiway and runway pavements are included as part of the Modification of Standards (MoS) implementation projects.
** Prioritization and specification of recommended projects to be determined by future PMP.
*** Phase 1B funded through an FAA grant in FY2017 and constructed in FY2018. Phase 1C funded through an FAA grant in FY2018, assumed construction in FY2019.

Sources:

1 - 2015/2016 Airport Pavement Management Program Final Report (PMP) prepared by RDM International, Inc.
2 - Capital Improvement Program (CIP) 2018 & FY2019-FY2028 provided by CRAA on 9/20/18. Inflation was added to all projects provided with "Total to Date" of $0.
3 - Master Plan by Michael Baker International, Inc.
4 - Recommended annual spending amount based on the averages from the 2015/2016 PMP by RDM International, Inc.
5 - Airfield Lighting and Electrical Vault Improvement Study by RS&H in August 2010. Increased to reflect inflation.
6 - This estimate was developed partially based on C&S Companies' estimate from 2014. See project breakout for more information.
7 - Estimated replacement schedule for existing NAVAIDs at LCK based on existing conditions and original install date (provided by CRAA)

6.4 Sources of Funding

Large-scale development projects at an airport are typically beyond the normal annual budget capacity and cannot be supported solely with self-generated funds. In these situations, it is not uncommon for an airport to seek funding from outside sources. These sources can either provide funding for projects outright or be combined with one another to reach the necessary funding level.

In some cases, funding sources are capped on an annual or lifetime basis, such as with FAA entitlement. On an annual cap basis, it is not uncommon for airports to phase projects on an annual basis and apply for grants to collect the funding necessary. Most sources do not guarantee funding and applicable projects must compete against one another.

Funding sources for this Financial Plan were analyzed and summarized from various governing bodies, including: the Federal Government, State Government, and Columbus Regional Airport Authority, and through activity at LCK. These potential funding sources include:

- Federal Government:
  - FAA Airport Improvement Program
  - Military Airport Program (MAP)
  - Economic Development Assistance Programs
- State Government:
  - Ohio Department of Transportation Office of Aviation
  - Ohio Development Services Agency
  - State Capital Bill
  - Mid-Ohio Regional Planning Commission (MORPC)
- Local Government
  - City of Columbus
  - Franklin County
- CRAA/Rickenbacker International Airport
  - Passenger Facility Charge
  - Customer Facility Charge
  - Bonds
  - CRAA Capital Reserves
  - Public Private Partnerships / Third Party Development
  - Other Funding

As an airport, LCK is in a unique position to take advantage of funding sources from governmental agencies and even negotiating with tenants to fund projects that will directly benefit their operations. The identified possible funding sources listed are not all encompassing, as grants programs tend to open and close due to government funding availability. It is recommended that, when CRAA is prepared to begin the initial planning for any project listed, it should be coordinated with the sponsoring department for any intended grants to discuss the project's justification and benefits.

6.4.1 Federal Funding: FAA Airport Improvement Program (AIP)

Federal funding for airports is coordinated through the FAA. AIP funding is generated through taxes on passenger tickets and aviation fuel and is typically prioritized to enhance safety, security, capacity, and to mitigate noise.

The two major sources of funding managed by the FAA are a part of the Airport Improvement Program which, according to the FAA, "provides grants to public agencies — and, in some cases, to private owners and entities — for the planning and development of public-use airports that are included in the National Plan of Integrated Airport Systems (NPIAS)."[1] The two categories of AIP funding are: entitlements and discretionary funding. It is estimated that about two-thirds of the AIP's annual funds are allocated to airports via entitlement grants based on a formula that takes into account airport activity, passengers, and/or cargo weight, depending on the airport. Discretionary funding is made up of the remaining one-third of the AIP's annual funds and is set aside for specific projects based on their overall importance and priority. AIP Grants are designated to be used for eligible capital projects, equipment, and certain types of planning and environmental studies. The funds are programmed to cover 90% of project costs, depending on statutory requirements, at airports the size of LCK. They cannot be used for airport operating expenses or for debt financing.[2]

Accepting these grants from the FAA includes the acceptance of certain obligations and conditions associated with the FAA's Grant Assurances. According to the FAA, these obligations generally include operating and maintaining the airport in a safe and serviceable condition, not granting exclusive rights, mitigating hazards to airspace, and using airport revenue properly.[1]

As of the 2019-2023 National Plan of Integrated Airport Systems (NPIAS) Report, the FAA classified LCK as a non-hub primary airport, meaning the passenger enplanements at LCK are less than 0.05% of the national total, but greater than 10,000 a year.[3] However, it is also based on a cargo airport and, according to the FAA's ranked list of total landed weight at all qualifying cargo airports in the US for calendar year 2017, LCK is ranked 26 of 137 airports.[4] Both of these qualifiers impact the amount of funding LCK receives from the FAA AIP entitlement fund (passenger and cargo entitlements) on an annual basis, which averages to be approximately $1.5 million.

6.4.2 Federal Funding: FAA Military Airport Program

As a former military use airport, LCK was eligible to receive funding through the FAA's Military Airport Program. Through this program, the FAA is able to award grant funding to "civilian sponsors" who are converting, or have already converted, military airfields to civilian or joint

[1] FAA - Overview: What is AIP?: https://goo.gl/psyFoj (Nov. 15, 2017)

[2] FAA - Evaluating the Formulation of the National Plan of Integrated Airport Systems (NPIAS): https://goo.gl/BkknQS (Nov. 2015)

[3] FAA - National Plan of Integrated Airport Systems (NPIAS) Report: https://goo.gl/xzvrGq (Oct. 21, 2016)

[4] FAA - All-Cargo Data for U.S. Airports: https://goo.gl/oCXpyv (Sep. 27, 2018)

military/civilian use. This funding can be used for projects not typically covered by AIP funding, such as building or rehabilitating surface parking lots, fuel farms, hangars, utility systems, access roads, and cargo buildings.

This program has a maximum term of five (5) fiscal years and in September of 2014, the FAA determined LCK was no longer eligible for funding through MAP. Prior to that date, LCK had received approximately $25 million over the course of 10 years.

6.4.3 Federal Government: Economic Development Assistance Programs

Outside of FAA funding, LCK is eligible to apply for funding from the Economic Development Administration (EDA). This program is tasked with providing strategic investments to promote job creation and attract private investments to economically distressed areas of the US. According to the EDA, the program "solicits applications from applicants in order to provide investments that support construction, non-construction, planning, technical assistance, and revolving loan fund projects under EDA's Public Works and Economic Adjustment Assistance programs."[5]

This funding has a project award ceiling of $3 million and requires a local match. The match is determined based on the level of economic distress a given community has experienced. These levels are gauged depending on the level of unemployment or average income per capita compared to national rates. Applications are reviewed on a revolving basis every month and are coordinated with a regional EDA Office and a local economic development organization.

Successful EDA grant applications are often directly tied to the number of potential jobs created once the project is completed. LCK's future development program has a number of Cargo facility projects and roadways associated with these projects which would compete well for EDA funding.

6.4.4 State Government: Ohio Department of Transportation Office of Aviation

The Ohio Department of Transportation Office of Aviation provides approximately $6 million towards airports project across the State of Ohio. This was the 2018 level of funding and is not guaranteed every year. However, under current eligibility requirements this funding is allocated solely to airports that do not receive FAA passenger or cargo entitlement funding.[6]

Under this stipulation, LCK is not eligible to receive funding from the ODOT Office of Aviation.

[5] EDA - Notice of Funding Availability: Public Works and Economic Adjustment Assistance Programs: https://goo.gl/Bo8L2Q (Jun. 19, 2017)

[6] Ohio DOT - Ohio Airport Grant Program, Fiscal Year 2018: https://goo.gl/pp6nD1

6.4.5 State Government: Ohio Development Services Agency

Aside from ODOT Office of Aviation Funding, the State of Ohio provides potential funding opportunities through other offices, such as the Ohio Development Services Agency (ODSA). The ODSA's mission is to create jobs and build strong communities within Ohio.[7] Through this mission, ODSA's Community Services Division offers a number of programs that could be applicable to the LCK development plan, as new airport tenants bring in long term sustainable employment to the community.

It is recommended that CRAA coordinate with ODSA representatives to identify projects within the study's Capital Improvement Plan to determine which projects would be good candidates for Community Services Division grants.

6.4.6 Ohio State Capital Bill

The Ohio legislature approves a capital budget every two years with the goal of funding needed improvements to public services and facilities across the state, including schools, roads and bridges, waterways and parks. The current bill includes more than $500 million for local infrastructure projects through the Public Works Commission, including local roads, bridges, water-supply systems, storm sewers and wastewater systems.

The current approved budget includes $2 million in funding for Ramp #3, Phase 2 at LCK. CRAA will continue to seek funding for key projects within the study's Capital Improvement Program for inclusion in future Ohio State Capital Bills.

6.4.7 Mid-Ohio Regional Planning Commission (MORPC)

A portion of federal transportation funding is allocated at Mid-Ohio Regional Planning Commission's (MORPC) discretion, following an application and selection process. These funds are identified as MORPC-Attributable Funds. MORPC works closely with local agencies to prioritize the use of these funds to meet local needs and those of the entire Mid-Ohio region. They can be used for roads and bridges, public transit, bikeways, sidewalks, and a variety of other activities. The funds come from three federal programs: the Surface Transportation Block Grant Program (STBG), the Congestion Mitigation & Air Quality Improvement Program (CMAQ) and the Transportation Alternatives Program (TAP).

This program is managed under the oversight of the Attributable Funds Committee (AFC). Applications for funding are solicited from local public agencies every two years. Due the time it takes to plan, study and design these projects, MORPC identifies the next four years' worth of funding for projects already in the pipeline. Currently, this organization is currently evaluating applications for projects that will be ready for construction in 2024 and 2025, and other transportation activities that need funding after 2019.

[7] ODSA - Community Grants, Loans, Bonds, and Tax Credits: https://goo.gl/UkpgWC

MORPC draft funding recommendations were published on December 6, 2018. CRAA was not successful in being selected for $7,202,518 in requested funding for CRAA for Rickenbacker Parkway from Heartland Court to 3000' E for New Roadway. Over the 20-year planning horizon for the LCK Capital Development Program, CRAA can continue to compete for additional funding through the MORPC.

6.4.8 Rickenbacker International Airport: Passenger Facility Charge (PFC) Program

In addition to outside funding sources, airports have a number of programs to generate revenue locally. One tool LCK could take advantage of is the Passenger Facility Charge (PFC) Program, which allows airports, such as LCK, to collect up to $4.50 for every enplaned passenger. These funds are typically used on projects that: enhance safety, security, or capacity; reduce noise; or increase air carrier competition. The charge is capped at $4.50 per enplanement per flight. In order to implement this charge, airports are required to gain approval through a process that requires feedback from the airlines currently serving the airport.[8]

According to an analysis of enplanements at LCK, the airport could anticipate an annual revenue of approximately $612,000, if air carrier enplanements were to remain at the 2018 level of 151,547. A stable figure is typically used for forecasting PFC revenue to remain conservative with financial planning. This is especially recommended when PFC revenue is planned to be tied to future bond payments and financing, which is a common method of PFC program implementation.

Table 6-2 expands on the amounts collected over the span of 5-year, 15-year, and 20-year periods to show an estimated capacity for LCK to dedicate this revenue towards financial bonds. The model makes several assumptions with regard to timeline, collection rate and amounts, and interest on collection amounts. These assumptions are:

- There will be 4 months of PFC collections within 2019 to account for the application time and implementation time;
- 95% of LCK's annual enplanements are eligible for PFC to conservatively account for the potential of excluded carrier operations or chartered enplanements, two categories typically not charged with a PFC;
- An $0.11 "carrier fee" will be assessed by the airlines to account for their PFC processing costs, a common practice with the assessment of a PFC;
- An annual 0.5% interest rate on collections - this assumption may need to be adjusted due to the nature of lending terms with a financial institution.

[8] FAA - Passenger Facility Charge (PFC) Program: https://goo.gl/3bSbkc (Aug. 31, 2017)

Table 6-2 LCK Passenger Facility Charge Forecast

	Annual	Cumulative Totals		
		2021	2031	2036
Annual PFC Enplanements	**154,523**	**154,523**	**154,523**	**154,523**
Passenger Facility Charge (PFC) Revenue	$612,216	$1,429,525	$7,733,087	$11,004,742
Interest Collected	0.5%	$4,087	$35,604	$51,963
Total Revenue Collected		**$1,433,612**	**$7,768,691**	**$11,056,705**

CRAA currently does not pursue the collection of PFCs at LCK due to the relatively low number of annual passengers. This should be reevaluated in the future as additional passengers begin to utilize the facility.

6.4.9 Customer Facility Charge (CFC)

Customer Facility Charges are locally imposed charges in conjunction with the operating car rental companies. The charge is a user-imposed fee typically assessed as either a dollar amount per day or as a percentage of the overall transaction. The fee is not regulated by the FAA and is negotiated with the rental car companies, usually for development projects associated with rental car operations, e.g. a rental car parking lot or consolidated rental car facility.

Forecasting the overall collections of a CFC is dependent upon project needs, airport capacity, and negotiations with the operating rental car companies. Therefore, it is difficult to predict the total collection amount; however, it is recommended that LCK consider this funding source on a per project basis and, in preparation for project implementation, prepare a study to determine a necessary and reasonable rate to meet the project financing requirement.

CRAA currently does not pursue the collection of CFCs at LCK due to the relatively low number of car rentals. This may be reevaluated in the future if car rentals increase in a manner that makes the collection more feasible.

6.4.10 CRAA/Rickenbacker International Airport: Bonds

For specific projects related to economic development or to accommodate an incoming tenant, airports can utilize various bonding options to provide the capital necessary to fund projects. These bonds can take advantage of an airport sponsor's credit rating and strong standing within the bond markets to leverage favorable lending terms and low interest rates. The various types of bonds utilized at airports are listed and defined below:

- *Revenue Bonds:*
  Revenue bonds pledge the revenues of an airport sponsor to the repayment of debt service. These are the most common source of funding at larger commercial service airports. Revenue bonds are popular because they allow for the development of new projects without the need for local financial support or affect the bonding capacity of the municipality. However, their use is limited to airports with a sufficient operating

surplus to cover the debt service. Projected Net Revenues must exceed debt service requirements by at least 1.25 times and up to 2.0 times, depending on the strength of the bond issuer and the underlying assumptions with respect to the market risk for the bonds. Interest rates are dependent on the coverage ratio, but in any case, will be higher than for general obligation bonds.

- *Special Facility Revenue Bonds:*
  Special facility revenue bonds are normally issued by an airport for the construction of a facility for a third-party and backed by the revenues generated from that facility. This method of funding can be used for such facilities as maintenance hangars, airline reservation centers, terminal buildings, and air cargo terminals.

- *Industrial Development Bonds:*
  Industrial development bonds can be issued by states, local government, or an airport authority to fund the construction of an airport industrial park or other facilities that may attract business and increase non-aeronautical leasing revenues.

Currently, LCK does not have any outstanding bonds or debt. It was expressed by CRAA that the airport continues to remain debt free and operate at a financial breakeven point. However, as projects continue to develop and growth rises, long-term agreements with current or new tenants may provide LCK with the backing it needs to utilize bonds to develop revenue generating projects.

6.4.11 Rickenbacker International Airport: CRAA Capital Reserves

In cases where outside funding is not enough to cover the total cost of a project, or if a project is simply not applicable to any funding sources, a local municipality may provide the local share from its annual cash flow or available cash reserves. According to the October 2018 CRAA Financial Statement for LCK, the airport ended 2016 with an operating income of approximately $1.9 million and ended 2017 with an operating income of $2.5 million. This income coupled with the $2,097,785 realized in 2018, could be allocated towards new project development. It is important to note that these totals do not include depreciation/ amortization or any projected grant income.[9] These funds are also utilized for other capital projects throughout the CRAA, and could also be used for bond repayment.

One funding element of the CRAA Capital Reserves is the Rickenbacker Global Logistics Park (GLP). GLP is a public/private partnership comprised of the Columbus Regional Airport Authority (CRAA), Capitol Square, Ltd., and Duke Realty Corporation.

The GLP is ultimately envisioned as:

- A master-planned 1,777-acre logistics park capable of handling 30 million square feet of development.

[9] CRAA - October 2018 Rickenbacker Financial Statement (Oct. 2018)

- An advanced international air cargo airport, rail intermodal facility, U.S. Foreign Trade Zone and distribution hub that ensures efficient movement of goods anywhere in the world.
- Centrally located in Columbus, Ohio, giving companies a competitive advantage by providing access to the global marketplace.

Any revenue generated from the sale of land or buildings as part of the GLP are considered unrestricted capital reserves and are intended to be used for GLP infrastructure investment for the continued development of the GLP. The GLP related infrastructure projects will not likely move forward without first realizing the proceeds from the GLP land or building sales.

6.4.12 Public Private Partnerships / Third Party Development

Public Private Partnerships are "arrangements, typically medium to long term, between the public and private sectors whereby some of the services that fall under the responsibilities of the public sector are provided by the private sector, with clear agreement on shared objectives for delivery of public infrastructure and/or public services."[10] These arrangements provide airports an opportunity to develop projects crucial to growth, without absorbing the financial burden of the construction and operation costs.

However, these arrangements also require airports to work closely with outside operators and could potentially result in less airport involvement during certain capital development projects. Many airports use private or third-party investment when the planned improvements will be primarily used by a private business or other organization. Such projects are not ordinarily eligible for federal funding. Projects of this kind typically include hangars, fixed based operator facilities, fuel storage, exclusive aircraft parking aprons, industrial aviation use facilities, non-aviation office/commercial/industrial developments, and other similar projects. Private development proposals are considered on a case-by-case basis. Often, airport funds for infrastructure, preliminary site work, and site access are required to facilitate privately developed projects on airport property.

6.4.13 Other Funding

As previously mentioned, this list of funding sources is not all-encompassing and there could be several other opportunities, depending on the project type. In addition to the aforementioned sources, certain projects listed within the Study's Capital Improvement Project list could include funding from outside, third-party development and potential ODOT & MORPC road infrastructure grants.

It is recommended that a comprehensive review of funding sources be evaluated for each project as their trigger points are approached.

[10] ACI-NA - Public Private Partnerships at US Airports White Paper: https://goo.gl/VtJkoY (Apr. 2014)

6.5 Financial Feasibility of Master Plan

CRAA's financial operations are accounted for on a calendar year (CY) basis. As the owner and operator of Rickenbacker International Airport, CRAA has the right to enter into agreements, leases, and contracts with tenants and to grant rights, privileges, and services related to the use of the airport. In exchange, tenants compensate the CRAA for use of airport facilities and consumption of services. A review of LCK's finances was conducted to determine the financial feasibility of the projects recommended throughout this Study's Capital Improvement Program.

6.5.1 Capital Improvement Plan Funding Plan

As a part of the master plan process, a comprehensive list of recommended development projects is incorporated into the airport's Capital Improvement Program. These projects are then analyzed from a financial feasibility perspective and a funding strategy is developed. The following tables outline this strategy and break down the projects into three timelines: **Table 6-3 Short-Term Funding (2018-2021)**, **Table 6-4 Mid-Term Funding (2022-2026)**, and **Table 6-5 Long-Term Funding (2027-2036)**. It is important to note this strategy was developed from a limited review of financial documents and assumptions were made based on knowledge of historical funding at LCK, as well as insight into funding practices at airports of similar size and function as LCK.

Within this proposed funding strategy, assumptions for funding of some projects have been made that may contradict the current financial operation of LCK. These assumptions have been made to propose additional funding streams for projects in the event LCK's financial operation is adapted and is conducive to these assumptions (i.e. a PFC is implemented or a P3 partner approaches the Airport for development).

It is recommended that the proposed strategy be utilized as the genesis of a more in-depth planning session when developing the airport's annual Airport Capital Improvement Plan (ACIP) submission to the FAA. This session should consider the proposed funding opportunities mentioned along with any new information that may have developed since the publishing of this strategy, as well as consider any assumptions that may or may not have changed, and/or were not considered.

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Table 6-3 Short Term Funding (2018 – 2021)

Year	Project	2018 Cost	Actual Cost	Entitlement	Discretionary	CRAA	Other Federal Funding	Third Party Funds
2018	Taxiway Rehabilitation & MOS Phase 1A & Phase 1B Improvements 2018 (CRAA #17020) [1]	$4,811,622	$4,811,622	$1,385,020	$2,945,440	$481,162	-	-
2018	Taxiway Rehabilitation & MOS Improvements Phase 1C 2018 (CRAA #17053) [1]	$280,153	$280,153	$252,138	-	$28,015	-	-
2018	New LCK Air Traffic Control Tower (CRAA #08031) - Closeout	$34,223	$34,223	-	-	$34,223	-	-
2018	LCK NAVAIDs: Runway 23L MALSR Retrofit 2018 (CRAA #18006)	$25,440	$25,440	-	-	$25,440	-	-
2018	LCK Master Plan & Airport Layout Plan Updates; Aeronautical Obstruction Survey 2018 (CRAA #12028)	$415,735	$415,735	$374,162	-	$41,574	-	-
2018	LCK Runway 5R ALSF-2 Retrofit (CRAA #15014) - Closeout	$30,116	$30,116	-	-	$30,116	-	-
2018	2018 LCK Vehicle Replacements (2) (CRAA #18012 - 2018)	$225	$225	-	-	$225	-	-
2018	Rickenbacker FBO and Admin Facility (CRAA #17032) - Closeout	$16,492	$16,492	-	-	$16,492	-	-
2018	LCK Terminal Lot #3 (CRAA #17041) – Closeout	$347,842	$347,842	-	-	$347,842	-	-
2018	Purchase of Airnet Building (CRAA #15057) - Closeout	$125,339	$125,339	-	-	$125,339	-	-
2018	Building 596 Equine Facility Upgrade (CRAA #17040)	$85,370	$85,370	-	-	$85,370	-	-
2018	LCK ATC Audio Recorders 2018 (CRAA #14030)	$59,041	$59,041	-	-	$59,041	-	-
2018	LCK Roof Replacements 2018 (CRAA #18042)	$21,749	$21,749	-	-	$21,749	-	-
2018	LCK Golf Course Wetland Mitigation 2018 (CRAA #15054) [3]	$43,619	$43,619	-	-		-	$,619
2018	Rail Campus Road A & Infrastructure 2018 (CRAA #17042) [3]	$167,142	$167,142	-	-		-	$167,142
2018	RGLP Intermodal Pkwy Extension Cul-de-sac 2018 (CRAA #18045) [3]	$899,104	$899,104	-	-		-	$899,104
2018	ACT 5 Ramp Reconstruction Phase 2 2018 (CRAA #10011A)	$20,392	$20,392	-	-	$20,392	-	-
2018	Rickenbacker Parkway East Phase 3A 2018 (CRAA #09020) [3]	$42,787	$42,787	-	-		-	$42,787
2018	PARCS - LCK 2018 (CRAA #16031)	$613,897	$613,897	-	-	$613,897	-	-
2018	Update Pavement Management Program (PMP) 2018/19 2018 (CRAA #18000)	$6,114	$6,114	-	$5,503	$611	-	-
2018	Rickenbacker Parkway Phase 2B (CRAA #09025) [3]	$48,372	$48,372	-	-		-	$48,372
	2018 Total	$8,094,774	$8,094,774	$,011,319	$2,950,943	$1,931,488	-	$1,201,024

Table 6-3 Short Term Funding (2018 – 2021) continued

Year	Project	2018 Cost	Actual Cost	Entitlement	Discretionary	CRAA	Other Federal Funding	Third Party Funds
2019	Tandem Axle Plow/Spreader Truck (CRAA #17012)	$320,649	$320,649	$288,584	-	$32,065	-	-
2019	LCK NAVAIDs: Runway 23L MALSR Retrofit 2019 (CRAA #18006)	$725,000	$725,000	-	-	$725,000	-	-
2019	LCK Master Plan & Airport Layout Plan Updates; Aeronautical Obstruction Survey 2019 (CRAA #12028)	$45,367	$45,367	$40,830	-	$4,537	-	-
2019	Glycol Recovery Vehicle (CRAA #18015)	$396,000	$409,860	-	-	$409,860	-	-
2019	2019 LCK Vehicle Replacement Program (CRAA #19007)	$128,000	$132,480	-	-	$132,480	-	-
2019	Aircraft Deicer Truck Replacement (CRAA #19020)	$300,000	$310,500	-	-	$310,500	-	-
2019	LCK Air Cargo Terminal 2 Roof Replacement (CRAA #15020)	$ 234,325	$242,526	-	-	$242,526	-	-
2019	Taxiway Rehabilitation & MOS Improvements Phase 1C 2019 (CRAA #17053) [1]	$4,782,344	$4,782,344	$934,280	$3,369,829.71	$478,234	-	-
2019	Landside Pavement Projects - 2019 (Reserve Road and Parking Rehabilitation)	$1,245,157	$1,360,617	-	-	$1,360,617	-	-
2019	Runway Deicer Truck (CRAA #17013)	$395,752	$395,752	$356,177	-	$39,575	-	-
2019	Purchase Articulating Wheel Ldr (2) (CRAA #18005)	$365,621	$378,418	$340,576	-	$37,842	-	-
2019	ACT 5 Ramp Reconstruct. Phase 2 2019 (CRAA #10011A)	$4,759,246	$4,759,246	-	-	$2,759,246	-	$2,000,000
2019	LCK Golf Course Wetland Mitigation 2019 (CRAA #15054) [3]	$1,759,072	$1,759,072	-	-		-	$1,759,072
2019	Rail Campus Road A & Infrastructure 2019 (CRAA #17042) [3]	$174,215	$174,215	-	-		-	$174,215
2019	RGLP Intermodal Pkwy Ext Cul-de-sac 2019 (CRAA #18045) [3]	$1,034,192	$1,034,192	-	-		-	$1,034,192
2019	RGLP Rail Court S & Utilities 2019 (CRAA #18036) [3]	$2,852,313	$2,852,313	-	-		-	$2,852,313
2019	Taxiway Rehabilitation & MOS Phase 1A & Phase 1B Improvements 2019 (CRAA #17020) [1]	$1,546,700	$1,546,700	-	$1,392,030	$154,670	-	-
2019	Rickenbacker Parkway East Phase 3A 2019 (CRAA #09020) [3]	$350,000	$350,000	-	-		-	$350,000
2019	Update Pavement Management Program (PMP) 2018/19 2019 (CRAA #18000)	$67,697	$67,697	$60,927	-	$6,770	-	-
2019	PARCS - LCK 2019 (CRAA #16031)	$3,479	$3,479	-	-	$3,479	-	-
2019	GLP Air Cargo Campus Development 2019 (CRAA #19023) [3]	$133,919	$133,919	-	-		-	$133,919
2019	LCK 1001 FPS Modification (CRAA #19025)	$184,271	$190,720	-	-	$190,720	-	-
2019	LCK ATC Audio Recorders 2019 (CRAA #14030)	$11,606	$11,606	-	-	$11,606	-	-
2019	LCK Roof Replacements 2019 (CRAA #18042)	$175,289	$181,424	-	-	$181,424	-	-
2019	Cargo Transporters and Static Racks (CRAA#190022)	$ 915,000	$997,350	-	-	$997,350	-	-
	2019 Total	$22,905,214	$23,165,446	$2,021,375	$4,761,860	$8,078,501	-	$8,303,711

Table 6-3 Short Term Funding (2018 – 2021) continued

Year	Project	2018 Cost	Actual Cost	Entitlement	Discretionary	CRAA	Other Federal Funding	Third Party Funds
2020	Cargo Ramps 1 and 2 Rehabilitation (Partial Reconstruction, Mill and Overlay, and Concrete Restoration)	$5,098,466	$5,738,368	-	-	$5,738,368	-	-
2020	Runway 23R PAPI Replacement	$82,431	$87,451	-	-	$87,451	-	-
2020	Runway 5R PAPI Replacement	$82,431	$87,451	-	-	$87,451	-	-
2020	Runway 5L PAPI Replacement	$82,431	$87,451	-	-	$87,451	-	-
2020	Cargo Ramp 1 Rehabilitation (Partial Reconstruction and Mill and Overlay)	$656,731	$739,157		$665,241	$73,916	-	
2020	Taxiway Rehab & MOS Improvements Ph. 1C 2020 (CRAA #17053)	$183,492	$183,492	$165,143	-	$18,349	-	
2020	ACT 5 Ramp Reconstruction Phase 2 2020 (CRAA #10011A)	$17,819	$17,819	-	-	$17,819	-	-
2020	Tractors w/ Attachments & Batwings (CRAA #18007)	$209,479	$222,236	-	-	$222,236	-	-
2020	Rickenbacker Parkway East Phase 3A 2020 (CRAA #09020) [3]	$4,150,000	$4,150,000					$4,150,000
2020	Airfield/Landside Pavement Projects – 2020 [2] (Miscellaneous Rehabilitation)	$2,869,750	$3,100,711	-	-	$3,100,711	-	-
2020	Construct New Cargo Equipment Storage Building	$ 5,313,697	$5,637,301	-	-	$5,637,301	-	-
2020	Equipment-Runway Vacuum (CRAA #15011)	$200,000	$214,245	$192,821	-	$21,425	-	-
2020	FBO Apron Fillet Improvements	$1,005,442	$1,066,673	$960,006	-	$106,667	-	-
2020	Construct New Terminal Traffic Lane and Curb Front	$483,372	$495,971	-	-	$495,971	-	-
2020	LCK Golf Course Wetland Mitigation 2020 (CRAA #15054) [3]	$63,285	$63,285	-	-		-	$ 63,285
2020	GLP Air Cargo Campus Development 2020 (CRAA #19023) [3]	$4,980,987	$4,980,987	-	-		-	$4,980,987
2020	Cargo Transporters and Static Racks 2 (CRAA#19022)	$915,000	$1,024,800	-	-	$1,024,800	-	-
2020	Street #4 (cul-de-sac) 2020 [3]	$3,000,000	$3,000,000					$ 3,000,000
2020	RGLP Rail Court S & Utilities 2020 (CRAA #18036) [3]	$879,229	$879,229	-	-		-	$879,229
	2020 Total	$30,274,042	$31,776,627	$1,317,969	$665,241	$16,719,916	-	$13,073,501

Table 6-3 Short Term Funding (2018 – 2021) continued

Year	Project	2018 Cost	Actual Cost	Entitlement	Discretionary	CRAA	Other Federal Funding	Third Party Funds
2021	Pavement Enabling Rehabilitation - Runway 5L-23R	$11,101,760	$12,131,193	$2,755,151	$8,142,922	$1,213,119	-	-
2021	Airfield/Landside Pavement Projects - 2021[2] (Miscellaneous Rehabilitation)	$2,071,277	$2,268,084	-	-	$2,268,084	-	-
2021	Construct New Maintenance Storage Facility	$4,818,801	$5,265,634	-	-	$5,265,634	-	-
2021	Street #5 (cul-de-sac) 2021 [3]	$3,000,000	$3,000,000					$3,000,000
2021	LCK Terminal Improvements - First Floor	$308,006	$336,566	-	-	$336,566	-	-
2021	Noise Exposure Map & Compatibility Program Update	$1,500,000	$1,635,000	-	$1,471,500	$163,500	-	-
2021	Rickenbacker Parkway East Phase 3A 2021 (CRAA #09020) [3]	$1,000,000	$1,000,000	-	-			$1,000,000
2021	GLP Air Cargo Campus Development 2021 (CRAA #19023) [3]	$1,915,025	$1,915,025	-	-		-	$1,915,025
2021	Runway 5R Localizer Replacement	$1,574,437	$1,720,430	-	-	$1,720,430	-	-
2021	Runway 5R Glide Slope Replacement	$1,079,849	$1,179,981	-	-	$1,179,981	-	-
2021	Runway 5R Inner Marker Replacement	$214,321	$234,195	-	-	$234,195	-	-
2021	Runway 5R Outer Marker Replacement	$248,942	$272,026	-	-	$272,026	-	-
2021	Runway 5R LOM (NDB) Replacement	$304,996	$333,277	-	-	$333,277	-	-
2021	Runway 23L Outer Marker Replacement	$248,942	$272,026	-	-	$272,026	-	-
2021	Runway 23L LOM (NDB) Replacement	$304,996	$333,277	-	-	$333,277	-	-
	2021 Total	$29,691,352	$31,896,714	$2,755,151	$9,614,422	$13,592,115	-	$5,915,025
			2018 - 2021 Total Funding Required	$8,125,814	$17,992,446	$40,322,020	-	$28,493,261

Source: Michael Baker International, 2018.

Legend:

CIP – Capital Improvement Program
CRAA # – Columbus Regional Airport Authority Project Number
MOS – Modification of Design Standard
PMP – Pavement Management Program

1. Phase 1B funded through an FAA grant in FY2017 and constructed in FY2018. Phase 1C funded through an FAA grant in FY2018 and will be in construction in FY2019.
2. Prioritization and specification of recommended projects to be determined by future PMP.
3. Rickenbacker Global Logistics Park (RGLP) projects are funded from revenue generated by sales of buildings and land within the RGLP, and revenue from the Intermodal Facility.

Table 6-4 Mid Term Funding (2022 – 2026)

Year	Project	2018 Cost	Actual Cost	Entitlement	Discretionary	CRAA	Other Federal Funding	Third Party Funds
2022	Airfield/Landside Pavement Projects – 2022 [2] (Miscellaneous Rehabilitation)	$2,000,000	$2,251,018	-	-	$2,251,018	-	-
2022	LCK Terminal Improvements - Second Floor	$431,109	$485,217	-	-	$485,217	-	-
2022	Rickenbacker Parkway East Phase 3B 2022 [2,3]	$1,340,000	$1,508,182	-	-		$1,206,546	$301,636
2022	Runway 23R REIL Replacement	$41,216	$46,389	-	-	$46,389	-	-
	2022 Total	**$3,812,325**	**$4,290,806**	**-**	**-**	**$2,782,624**	**$1,206,546**	**$301,636**
2023	Airfield/Landside Pavement Projects - 2023	$2,000,000	$2,318,548	-	-	$2,318,548	-	-
2023	LCK Phase 2A MOS Improvements and Update Pavement Management Program (CRAA #15026)	$19,150,000	$22,200,099	$4,113,953	$15,866,136	$2,220,010	-	-
2023	Relocate Airfield Electrical Vault	$1,500,000	$1,738,911	-	$1,565,020	$173,891	-	-
2023	Rickenbacker Parkway East Phase 3B 2023 [2,3]	$7,705,000	$8,932,207	-	-		$7,145,766	$1,786,441
2023	Reconstruct Ramp 2	$64,868,484	$75,200,352	-	$67,680,317	$7,520,035	-	-
2023	AWOS-IIIPT Replacement	$288,509	$334,461	-	-	$334,461	-	-
2023	NAVAID Control Cable Loop Replacement	$2,496,513	$2,894,143	-	-	$2,894,143	-	-
2023	Street #6 (cul-de-sac) 2023 [2]	$320,000	$370,968					$370,968
	2023 Total	**$98,328,506**	**$113,989,689**	**$4,113,953**	**$85,111,473**	**$15,461,088**	**$7,145,766**	**$ 2,157,409**
2024	Airfield/Landside Pavement Projects - 2024	$2,000,000	$2,388,105	-	-	$2,388,105	-	-
2024	Construct Airside Operations Area for Expanded ACT 5	$6,325,918	$7,553,477	-	$6,798,129	$755,348	-	-
2024	Construct Deicing Pad on Ramp #3	$8,068,941	$9,634,738	-	$8,671,264	$963,474	-	-
2024	Expand Building ACT 5 Building and Associated Landside Infrastructure	$32,160,194	$38,400,953	-	-	-	-	$38,400,953
2024	Expand Maintenance Garage Building 558	$2,447,606	$2,922,569	-	-	$2,922,569	-	-
2024	LCK Phase 2B MOS Improvements (CRAA #15026)	$20,267,000	$24,199,858	$2,072,417	$19,707,455	$2,419,986	-	-
2024	Rickenbacker Parkway East Phase 3B 2024 [2,3]	$7,705,000	$9,200,173	-	-		$7,360,138	$1,840,035
2024	Runway 5L MALSR Replacement	$1,228,226	$1,466,566	-	-	$1,466,566	-	-
2024	Runway 5L Localizer Replacement	$1,574,437	$1,879,960	-	-	$1,879,960	-	-
2024	Runway 5L Glide Slope Replacement	$1,079,849	$1,289,397	-	-	$1,289,397	-	-
2024	Runway 5L DME Replacement	$346,211	$413,394	-	-	$413,394	-	-
2024	Development Infrastructure 2024 [2]	$500,000	$597,026					$597,026
2024	Street #6 (cul-de-sac) 2024 [2]	$1,840,000	$ 2,197,056					$2,197,056
	2024 Total	**$85,517,381**	**$102,143,272**	**$2,072,417**	**$35,176,849**	**$14,498,798**	**$7,360,138**	**$43,035,070**

Table 6-4 Mid Term Funding (2022 – 2026) continued

Year	Project	2018 Cost	Actual Cost	Entitlement	Discretionary	CRAA	Other Federal Funding	Third Party Funds
2025	Airfield/Landside Pavement Projects - 2025	$2,000,000	$2,459,748	-	-	$2,459,748	-	-
2025	Construct Airport Perimeter Road	$23,325,765	$28,687,749	-	$25,818,974	$2,868,775	-	-
2025	Construct New Fuel Farm	$10,868,788	$13,367,239	-	-	$13,367,239	-	-
2025	Rehabilitate Runway 5L-23R, Widen to 200' Wide, Construct 40' Wide Shoulders, and Extend Blast Pads at Each End (MOS Improvements, Phase 3)	$47,408,153	$58,306,048	$2,082,779	$50,392,664	$5,830,605	-	-
2025	Development Infrastructure [2]	$500,000	$614,937	-	-	-	-	$614,937
2025	Street #6 (cul-de-sac) 2025 [2]	$1,840,000	$2,262,968					$2,262,968
	2025 Total	**$85,942,706**	**$105,698,689**	**$2,082,779**	**$76,211,638**	**$24,526,367**	**-**	**$2,877,905**
2026	Airfield/Landside Pavement Projects - 2026	$2,000,000	$2,533,540	-	-	$2,533,540	-	-
2026	Construct Airport Viewing Area	$462,960	$586,464	-	-	$586,464	-	-
2026	General Aviation Facility Expansion - Phase 1	$3,319,009	$4,204,421	-	$1,513,592	$2,690,829	-	-
2026	Remove Buildings 1090, 1091, 1092 and Replace with New ACT	$52,957,061	$67,084,421	-	-	-	-	$67,084,421
2026	Construct New Parallel Taxiway A	$42,725,915	$54,123,911	$2,093,192	$46,618,327	$5,412,391	-	-
	2026 Total	**$101,464,946**	**$128,532,757**	**$2,093,193**	**$48,131,919**	**$11,223,225**	**-**	**$67,084,421**
	2022 - 2026 Total Funding Required			**$10,362,342**	**$244,631,879**	**$68,492,101**	**$15,712,450**	**$115,456,442**

Source: Michael Baker International, 2018.

Legend:

CIP – Capital Improvement Program
CRAA # – Columbus Regional Airport Authority Project Number
MOS – Modification of Design Standard
PMP – Pavement Management Program

1. Prioritization and specification of recommended projects to be determined by future PMP.
2. Rickenbacker Global Logistics Park (RGLP) projects are funded from revenue generated by sales of buildings and land within the RGLP, and revenue from the Intermodal Facility.
3. Exact funding associated with the proposed Rickenbacker Parkway Phase 3B development is anticipated to come from an 80%/20% split of "Other Federal" funding (i.e. TIGER/BUILD grant).

Table 6-5 Long Term Funding (2027 – 2036)

Year	Project	2018 Cost	Actual Cost	Entitlement	Discretionary	CRAA	Other Federal Funding	Third Party Funds
2027	Airfield/Landside Pavement Projects - 2027	$2,000,000	$2,609,546	-	-	$2,609,546	-	-
	2027 Total	$2,000,000	$2,609,546	-	-	$2,609,546	-	-
2028	Airfield/Landside Pavement Projects - 2028	$2,000,000	$2,687,833	-	-	$2,687,833	-	-
	2028 Total	$2,000,000	$2,687,833	-	-	$2,687,833	-	-
2029	Airfield/Landside Pavement Projects - 2029	$2,000,000	$2,768,468	-	-	$2,768,468	-	–
	2029 Total	$2,000,000	$2,768,468	-	-	$2,768,468	-	-
2030	Airfield/Landside Preventative Maintenance	$2,000,000	$2,851,522	-	-	$2,851,522	-	-
2030	Rickenbacker Parkway East Phase 4 [3,4]	$33,623,308	$47,938,798	-	-	-	$38,351,038	$9,587,760
	2030 Total	$35,623,308	$50,790,320	-	-	$2,851,522	$38,351,038	$9,587,760
2031	Airfield/Landside Pavement Projects - 2031	$2,000,000	$2,937,067	-	-	$2,937,067	-	-
2031	Construct New SRE Building	$5,250,279	$7,710,211	$6,939,190	-	$771,021	-	-
2031	Construct Northeast ACT Facilities Phase 1	$66,142,029	$97,131,800	-	-	-	-	$97,131,800
2031	Demolish Building 1004 and Associated Pavement [1]	$1,624,437	$2,385,540	$2,146,986	-	$238,554	-	-
2031	Runway 5R DME Replacement	$346,211	$508,423	-	-	$508,423	-	-
	2031 Total	$75,362,956	$110,673,042	$9,086,176	-	$4,455,065	-	$97,131,800
2032	Airfield/Landside Pavement Projects - 2032	$2,000,000	$3,025,179	-	-	$3,025,179	-	-
2032	General Aviation Facility Expansion - Phase 2	$1,719,494	$2,600,890	$2,340,801	-	$260,089	-	-
2032	Runway 5R PC-RVR Replacement	$511,074	$773,045	-	-	$773,045	-	-
	2032 Total	$4,230,568	$6,399,114	$2,340,801	-	$4,058,313	-	-
2033	Airfield/Landside Pavement Projects - 2033	$2,000,000	$3,115,935	-	-	$3,115,935	-	-
2033	Runway 23L PAPI Replacement	$82,431	$128,425	-	-	$128,425	-	-
	2033 Total	$2,082,431	$3,244,360	-	-	$3,244,360	-	-
2034	Airfield/Landside Pavement Projects - 2034	$2,000,000	$3,209,413	-	-	$3,209,413	-	-
2034	Construct Northeast ACT Facilities Phase 2	$65,854,097	$105,676,494	$2,849,884	$44,704,538	-	-	$58,122,071
2034	South Airfield Developments: Remove Old Outboard Parallel Runway (a.k.a. Former Assault Strip/LZ) and Other Pavements [2]	$1,943,067	$3,118,052	$2,806,247	-	$311,805	-	-
	2034 Total	$69,797,164	$112,003,959	$5,656,131	$44,704,538	$3,521,218	-	$58,122,071
2035	Airfield/Landside Pavement Projects - 2035	$ 2,000,000	$3,305,695	-	-	$3,305,695	-	-
2035	South Airfield Developments: Parallel Taxiway (11,860' x 75')	$ 42,861,920	$70,844,222	$2,189,293	$61,570,507	$7,084,422	-	-
	2035 Total	$44,861,920	$74,149,917	$2,189,293	$61,570,507	$10,390,117	-	-

Table 6-5 Long Term Funding (2027 – 2036) continued

Year	Project	2018 Cost	Actual Cost	Entitlement	Discretionary	CRAA	Other Federal Funding	Third Party Funds
2036	Airfield/Landside Pavement Projects - 2036	$2,000,000	$3,404,866	-	-	$3,404,866	-	-
2036	South Airfield Developments - Phase 1: New ACT and Access Road	$67,658,247	$115,183,636	$1,654,623	$24,261,695	-	-	$89,267,318
2036	South Airfield Developments - Phase 2: New ACT	$66,060,894	$112,464,250	-	$40,487,130	-	-	$71,977,120
2036	South Airfield Developments - Phase 3: New ACT	$59,500,438	$101,295,513	-	$27,349,788	-	-	$73,945,724
2036	South Airfield Developments - Phase 4: New MRO	$76,864,911	$130,857,365	-	-	-	-	$130,857,365
2036	General Aviation Facility Expansion - Phase 3	$5,494,038	$9,353,232	$589,254	-	$8,763,978	-	-
2036	Runway 23L Localizer Replacement	$1,079,849	$1,838,371	-	-	$1,838,371	-	-
2036	Runway 23L Glide Slope Replacement	$1,079,849	$1,838,371	-	-	$1,838,371	-	-
	2036 Total	$279,738,226	$476,235,604	$2,243,876	$92,098,614	$15,845,587	-	$366,047,527
	2027 - 2036 Total Funding Required			$21,516,277	$198,373,659	$52,432,030	$38,351,038	$530,889,158

Source: Michael Baker International, 2018.

Legend:

CIP – Capital Improvement Program
CRAA # – Columbus Regional Airport Authority Project Number
MOS – Modification of Design Standard
PMP – Pavement Management Program

1. 2031 Project to Demolish Building 1004 and Associated Pavement is an enabling project in support of the proposed development of the Northeast Cargo Apron.
2. 2034 Project South Airfield Developments: Remove Old Outboard Parallel Runway is in support of the proposed development of the South Parallel Taxiway.
3. Rickenbacker Global Logistics Park (RGLP) projects are funded from revenue generated by sales of buildings and land within the RGLP, and revenue from the Intermodal Facility.
4. Exact funding associated with the proposed Rickenbacker Parkway Phase 4 development is anticipated to come from an 80%/20% split of "Other Federal" funding (i.e. TIGER/BUILD grant).

6.5.2 Rickenbacker International Airport Financial Structure

Currently, LCK is operated as a financial entity within CRAA. The airport has been operating at a break-even point in recent years and CRAA plans to continue to operate it in such a manner. According to the October 2018 CRAA Financial Statement for LCK, the airport is currently operating a net positive operating budget and, excluding depreciation and amortization, is expected to continue to do so throughout 2018.

LCK currently recognizes six (6) revenue generators, which include: Airline Revenue, Auto Parking, Concessionaires & Miscellaneous Lessees, Air Freight, General Aviation, and Other Income. Throughout 2016, the airport generated $12,238,959 in revenue and generated $14,325,582 in 2017. For 2018, LCK realized $17,073,778 in revenue, a 19% increase from the 2017 revenue.[11]

Regarding the airport's expenses, LCK has identified eight (8) cost accounts which are: Salaries & Wages, Benefits, Contract Labor, Services, Supplies & Materials, Other Expenses, Capital Outlays, and Capital Outlay Offset. The airport incurred $10,322,447 in expenses in 2016 and had an expense cost of $11,707,350 in 2017. For 2018, LCK incurred $13,932,681, in expenses.[12]

Throughout CRAA's budgeting process, the airport recognizes its annual net operating income or loss through the simple accounting practice of subtracting net expenses from generated net revenue. Through this process the airport recognized a $1,916,512 net operating income in 2016, approximately $2,500,000 net operating income in 2017, and a net operating income of $2,097,785 for 2018. These net operating incomes are recognized before depreciation and amortization are recognized, as well as prior to any expected grant income is taken into account.[12]

Currently, LCK operates debt free and, while it does generate positive net operating income on an annual basis, CRAA considers the airport to operate within a margin of break-even. Currently, LCK is not reserving funds for capital expenditures.

Among the airport's revenue generators, air freight is the largest contributor, with a 2018 income of $7,768,559. This made up approximately 45% of the airport's total revenue for 2018. The second and third largest generators are classified as "Ground Handling Services" and "concessionaires & miscellaneous lessees," with a 2018 income of $4,161,212 and $2,010,440, respectfully. These revenue generators made up approximately 24% and 12%, respectfully, of the overall revenue for 2018.

Through the analysis of finances, a survey of the airport's leases was conducted to determine the income contributed, as well as the longevity of lease income. Currently, LCK has 18 active leases varying in type from ground leases to space rental. The expected annual income from these leases is $1,367,582. These lease numbers drop to 11 active leases in 2019 and will continue to fall to 5 active leases by 2021. This reduction in lease renewals would decrease

[11] CRAA – December 2018 Rickenbacker Financial Statement Executive Summary (December 2018)

lease revenue from $924,278 in 2019 and down to $764,614 by 2021 assuming no lease renewals or new leases are signed. This assumption, however, is unlikely as CRAA has an active Real Estate department which conducts a market analysis on their property as leases are nearing their expiration. That includes evaluation of fair market value for each lease. Should a lessee choose to not review their lease, all properties are actively marketed to ensure that the property is vacant for as little time as possible.

Based on the lease and budget analysis, LCK is well-positioned to utilize a variety of bond options to generate upfront capital for development projects. There are several potential revenue-developing projects listed throughout this Study's Capital Improvement Plan that would be good candidates for revenue-based bonds.

These projects would require a long-term lease with a tenant to maintain financing payments. In 2016, Moody's Investors Service affirmed CRAA's A1 Credit Rating and forecasted a stable outlook.[12] This credit rating, along with the airport's annual excess net operating income, could provide a lower interest rate so that LCK could lease a facility for revenue despite making financial payments.

Outside funding (e.g. Federal Funding) can be put towards an up-front portion of a development project, while the remainder is covered via a bond. Airports are also able to use FAA entitlement funding towards debt principal payments; however, this funding cannot be used towards any finance interest. FAA discretionary money is not allowed to be used to make debt payments. Generally, discretionary money is dedicated towards projects to pay for a portion of outright costs ahead of construction and cannot be used to pay for cost after a project has been completed.

While this outlook for bond financing appears favorable, CRAA has expressed its desire to continue to operate LCK debt free.

Currently, the only Bond Indenture CRAA has in place excludes all revenue from LCK. The airfield is operated at a financial breakeven point to keep tenant costs low in order to entice additional air service. Non-airside operations, however, are operated as revenue-generating centers to contribute funds towards the entire CRAA airport system. LCK currently is not engaged in any airline use agreements with any of the cargo or passenger service airlines.

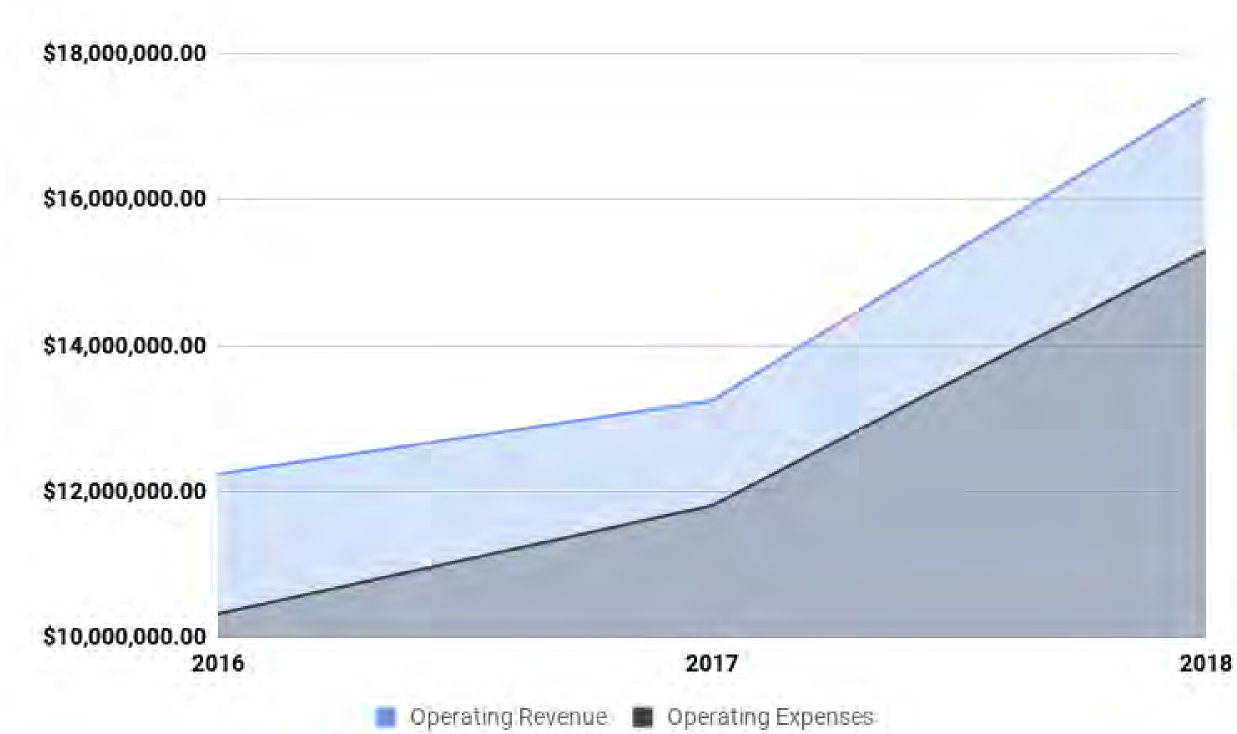
6.5.3 Rickenbacker International Airport Historical Cash Flow

As previously stated, LCK has ended both 2016 and 2017 fiscal years with an average annual net operating income of $1,677,076. In 2018, the airport had a net operating income of $2,097,785. **Figure 6-4, LCK 2016-2018 Operating Revenue and Expenses** depicts LCK's cash flow throughout 2016, 2017, and 2018. This does not include any amortization, depreciation, or any capital from grants.

[12] Moody's Investor Services - Columbus Regional Airport Authority: https://goo.gl/WjDFmx (Jul. 20, 2016)

Currently, LCK does not have any debt obligations and CRAA has expressed an intent to continue to operate the airport without such obligations.

Figure 6-4 LCK 2016-2018 Operating Revenue and Expenses



According to the CRAA financial records, LCK has received approximately $70,000,000 in funding for capital projects since 2006. This funding comes from various sources, including: Local Capital, Bond Capital, Federal Funding, Grants, and Other Funding.[13] According to the FAA's AIP Grant History, LCK has received approximately $39,000,000 since 2006, including approximately $8,250,000 in 2017 for various taxiway reconstruction and VALE infrastructure work, of which approximately $4,504,649 was for taxiway reconstruction and Modification of Standards in 2018. **Figure 6-5 LCK Historical AIP Funding** provides a historical timeline of the FAA AIP funding LCK has received since 2006.[14]

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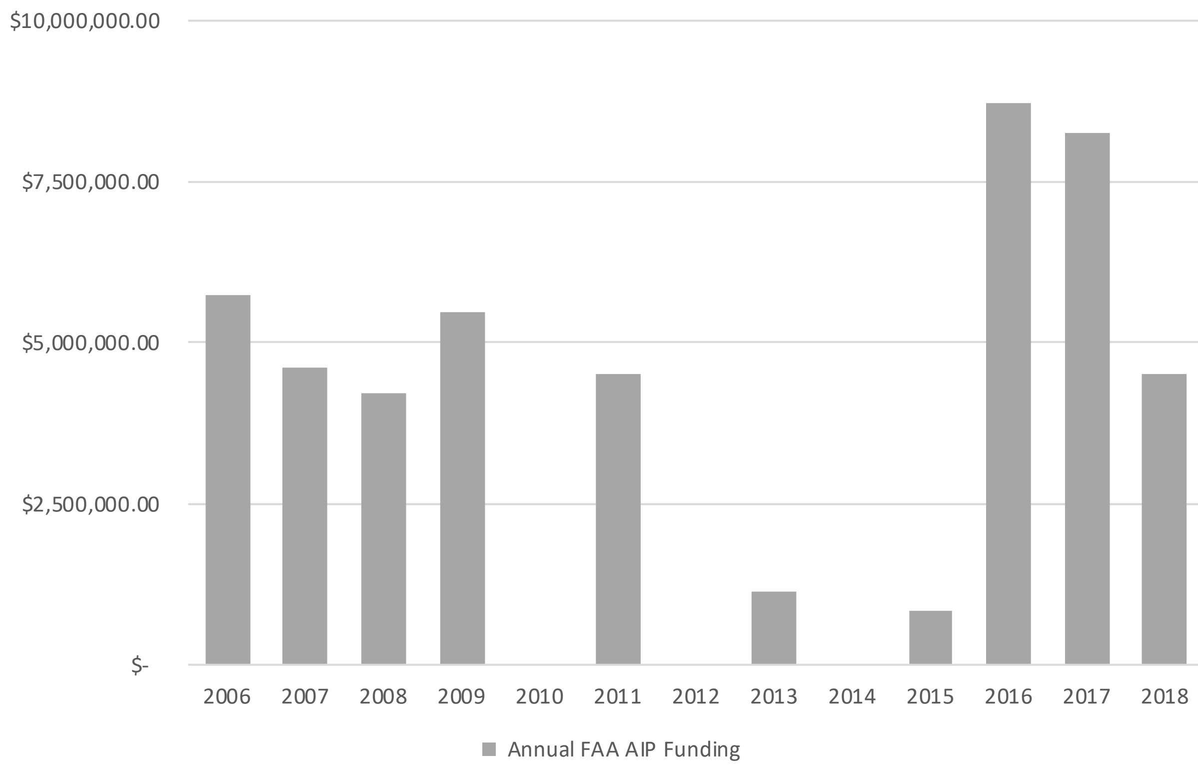
[13] CRAA - LCK Capital Projects with Funding Sources (Feb. 7, 2018)

[14] FAA - AIP Grant History Lookup: https://goo.gl/Bmm6tv (Dec. 15, 2018)

Figure 6-5 LCK Historical AIP Funding



6.6 Revenue Enhancement

As a part of this review of LCK finances, a study was conducted of airports considered by CRAA to be competitive in the air cargo market. This study was designed to identify any potential methods of revenue enhancement opportunities at LCK. These airports were identified as competition because of their on-airfield facilities, location, and ability to serve freight to the Eastern and Midwest areas of the United States. The airports that were reviewed for this study were:

- Chicago O'Hare International Airport
- Cincinnati/Northern Kentucky International Airport
- John F. Kennedy International Airport
- Indianapolis International Airport
- Louisville International Airport
- Pittsburgh International Airport
- St. Louis Lambert International Airport
- Chicago Rockford International Airport
- Huntsville International Airport
- Greenville–Spartanburg International Airport

After an analysis of the various airports' financial reports, it is apparent that, despite years of declining cargo activity across the US, cargo activity has risen at all but one airport, Indianapolis International, from 2015-2016. The 2017 FAA Aerospace Forecast also predicts cargo activity will rise across the country over the next 20 years.[15] This trend is consistent with the expected air freight revenue trends for LCK from 2017-2018.[10]

Taking these considerations into account, along with the existing high amount of freight traffic, air freight is currently the highest revenue generator at LCK, making up almost 44% of total revenue generation. One revenue enhancement strategy that would seamlessly align with the airport's current operations would be to expand efforts to continue to attract cargo airlines.

Currently, the airport does not have any long-term contract or use agreements with any of its regularly-operating airlines. While this may be an attractive opportunity to the Ultra-Low-Cost Passenger Service carriers, such as Allegiant Airlines, cargo airlines may benefit from such agreements as a sustainable method to lower their cost of operation through signatory landing rates. Use agreements also signify to cargo airlines the airport's commitment to support their long-term operations and may encourage capital investment on infrastructure necessary to grow their operations. In addition to sustained operations, use agreements with cargo carriers would also provide the airport with a dependable revenue stream to be able to dedicate towards future projects included in **Table 6-1 Schedule of Project Costs and Phasing – Capital Improvement Program (CIP)**.

Another strategy for revenue enhancement focuses on the anticipated growth in enplanements. Currently only one rental car company services LCK, which presents an opportunity for expansion. LCK served 133,312 enplaned passengers in 2017. In comparison, Toledo Express Airport (TOL), a non-hub airport utilized by Allegiant Airlines to provide flights to the Detroit Metropolitan Area, served approximately 95,000 enplaned passengers.[16] While both LCK and TOL passenger numbers are similar and the metropolitan areas served by both these airports are similar in size, TOL currently has six rental car companies operating.[17] By expanding the marketing efforts to grow rental car operations at LCK, the airport could raise revenue by leasing more concessionaire space and possibly implementing a Customer Facility Charge (CFC).

A more in-depth Revenue Enhancement study is recommended to explore these options, as well as an extensive rates and charges study to determine the potential signatory and non-signatory operating rates.

6.7 Master Plan Implementation

This analysis provides the results of evaluating the financial feasibility of implementing the Master Plan Capital Improvement Program for LCK during the planning period from 2018 through 2036.

[15] FAA - FAA Aerospace Forecast Fiscal Years 2017 - 2037: https://goo.gl/xMnfvM (Aug. 15, 2017)

[16] FAA - 2017 Terminal Area Forecast: https://goo.gl/aaBHKi (Jan. 28, 2018)

[17] Toledo Express Airport - Ground Transportation: https://goo.gl/tjmLDX (Feb. 25, 2017)

6.7.1 Estimated Project Costs and Development Schedule

The Capital Improvement Program (CIP) Estimated Project Costs and Development Schedule is derived from previous results of the Master Plan analysis. The CIP for capital expansion and improvement projects is projected for the Short-Term planning period from 2018 through 2022, for the Mid-Term from 2023 through 2026 and for the Long Term from 2027 through 2036. For each of these planning periods, **Table 6-6 LCK Capital Improvement Program by Planning Period** presents the LCK Capital Improvement Program including estimated costs and anticipated development schedule for the identified projects.

As shown in **Table 6-6**, the total estimated cost of projects of both the existing Capital Improvement Program and the Study's recommended program is $1,391,150,937 including inflation. The estimated costs for projects scheduled during the period 2019 through 2036 are adjusted by an assumed 3% rate of annual inflation.

Short-Term Projects are estimated to cost a total of $94,933,561. These Short-Term Projects are generally well defined and anticipated to fill existing known needs for the airport. Mid- and Long-Term Projects are less defined and will take place when the actual need for the facility arises. A number of the projects included in the overall Study will require Third Party investment and would only be driven by the market need. Those projects would most likely not proceed without outside investment.

Table 6-6 LCK Capital Improvement Program by Planning Period

Planning Period	Cumulative Totals
Short-Term Projects	$94,933,561
Mid-Term Projects	$454,655,214
Long Term Projects	$841,562,163
Total Project Cost	**$1,391,150,937**

6.7.2 Funding Sources and Use of Capital Funds

The CRAA does not anticipate funding any development with future revenue bonds. The CRAA may utilize a short-term credit facility to fund some projects but it is anticipated that most projects will be funded by CRAA reserves/net operating revenue combined with Federal grants or third-party financing.

A summary of the sources of capital funding by type for each planning period for the LCK CIP is presented below in **Figure 6-7 LCK Capital Improvement Plan and Master Plan Summary by Funding Source.**

Table 6-7 LCK Capital Improvement Plan and Master Plan Project Summary by Funding Source

Planning Period	Funding Source				
	Entitlement	Discretionary	CRAA	Other Federal Funding	Third Party Funds
Short-Term Projects	$8,125,814	$17,992,466	$40,322,020	-	$28,493,261
Mid-Term Projects	$10,362,342	$244,631,879	$68,492,101	$15,712,450	$115,456,442
Long-Term Projects	$21,516,277	$198,373,659	$52,432,030	$38,351,038	$530,889,158
Total Project Cost	**$40,004,433**	**$460,998,004**	**$161,246,151**	**$54,063,488**	**$674,838,861**

The overall LCK Capital Improvement Plan is highly dependent on multiple external funding sources, including significant FAA Discretionary funding. Those projects which are identified for Discretionary funding would be considered grant-dependent. Those projects would only move forward if the grant funding is awarded. The projects which require Third Party Funds would also not move forward without the independent funding associated with those projects. Each year, a prioritization of all projects identified within the overall CRAA capital programs will take place which may push some projects into the future based on their priority and funding availability.

6.7.3 Projected Operations and Maintenance Expenses

A fully developed cash flow analysis was developed by Public Financial Management (PFM) for CRAA in their Capital Improvement Program Financial Feasibility Analysis[18]. This document does not contemplate the Airport Master Plan recommended development plan for LCK but does provide a wealth of useful information for evaluating the feasibility of the Study's recommended projects. This document includes estimates for growth of the Operations and Maintenance expenses at LCK.

Operations and maintenance expenses at LCK are anticipated to increase at a growth rate of 1% moving forward and is in line with the growth shown over previous years.

[18] PFM – Capital Improvement Program Financial Feasibility Analysis 2018

6.7.4 Projected Operating Revenues

The PFM Financial Feasibility Analysis includes estimates for growth of the Operating Revenues at LCK. Operating revenues at LCK are anticipated to increase at a growth rate of 1% moving forward and is in line with the growth shown over previous years.

6.7.5 Financial Plan Summary

The financial feasibility for the Study's recommended development relies on achievement of the forecast of aviation activity. Actual aviation traffic may temporarily vary from the projected levels of activity without a significant adverse impact on the capital program. If decreased traffic levels occur and persist, implementation of all the proposed projects may not be financially feasible. It should also be noted, however, that if the forecast activity levels are not met, then a number of the planned capital improvements may not be necessary.

The financial feasibility of future projects will be determined by the provisions of existing and future leases, funding levels and participation rates of federal and state grant programs, the availability of other funding sources, and the ability to generate internal cash flow from operations at LCK.

The financial projections were prepared on the basis of available information and assumptions set forth in this chapter as well as those provided in the Capital Program Financial Feasibility Analysis provided by CRAA. This information was analyzed to ensure that the proposed capital program outlined in the Study was feasible with regard to the financial characteristics of LCK individually as well as when considered with the resources available to CRAA as a whole. It is believed that such information and assumptions provide a reasonable basis for the projections to the level of detail appropriate for an airport master plan. Some of the assumptions used to develop the projections may not be realized, and unanticipated events or circumstances may occur. Therefore, the actual results will vary from those projected, and such variations could be material. Also, a number of the projects included in the Study will require Third Party investment and would only be driven by the market need. Those projects would not proceed without outside investment.

Based on these assumptions, the capital program outlined in the Study for Short-Term projects can reasonably be financed in the future. Due to the nature of the timing of Mid- and Long-Term projected development, the feasibility of the funding of those projects should be analyzed closer to the fruition of those projects.

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Chapter 7 – Airport Layout Plan

RICKENBACKER
INTERNATIONAL AIRPORT

Master Plan

7.0 Airport Layout Plan

7.1 Introduction

The Airport Layout Plan (ALP) serves as the graphical blueprint for the preferred airfield, landside, and support facility development concepts as well as other on-airport land areas reserved for non-aviation uses as recommended in the 20-year short, intermediate, and long-term Airport Master Plan.

The dimensional information and related data serves to identify CRAA's existing and/or planned future compliance with FAA airport design standards. The ALP Drawing Set was developed in accordance with the guidance outlined in Federal Aviation Administration's (FAA) Advisory Circulars (AC) 150/5070-6B, Airport Master Plans (Change 2), 150/5300-13A, Airport Design (Change 1), FAA's Office of Airports (ARP) Standard Operating Procedure (SOP) 2.0, Standard Operating Procedure for FAA Review and Approval of Airport Layout Plans and other supporting FAA-published ACs and Orders. Information and data presented or depicted in the ALP drawing set was not developed or intended for use as design engineering accuracy.

The ALP drawing set includes the following individual drawing sheets:

- Title Sheet (Drawing Number: 1)
- Airport Data Sheet (Drawing Number: 2)
- Airport Layout Plan Drawing (Existing Development) (Drawing Number: 3)
- Airport Layout Plan Drawing (Proposed Development) (Drawing Number: 4)
- Aerial Layout Plan Drawing (Drawing Number: 5)
- Airport Airspace Drawing (Drawing Number(s): 6 through 9)
- Inner Portion of the Approach Surface Drawings (Drawing Number(s): 10 through 13)
- Runway Departure Surface Drawings (Drawing Number(s): 14 through 15)
- Airport Access Plan (Drawing Number: 16)
- Terminal Area Drawing (Drawing Number: 17)
- Existing Land Use Drawing (Drawing Number: 18)
- Future Land Use Drawing (Drawing Number: 19), and
- Future On-Airport Land Use Drawing (Drawing Number: 20)

7.2 Title Sheet

The Title Sheet includes: ALP Drawing Set publication date, airport name, airport owner (Sponsor), geographic location, Vicinity and Location Maps, Drawing Index, FAA Airport Improvement Program Planning Grant Identifier and Airport Sponsor Approval Signature Block.

7.3 Airport Data Sheet

The Airport Data Sheet provides key informational and data elements reflecting current FAA-mandated airport design standards as reflected in the Existing and Future Airport Layout Plan Drawings. Tabular-listed data and information includes: geodetic coordinates and Above Mean Sea Level (MSL) elevations for the Airport Reference Point, each runway end and associated displaced threshold, runway centerline high and low elevations, runway centerline true bearing azimuths, Airport, Runway, Taxiway and Modification to Airport Design Standards Data Tables, Runway Wind Coverage Percentiles and graphical plots of All Weather and Instrument Flight Rule Wind Roses.

7.4 Airport Layout Plan Drawings

The Airport Layout Plan Drawing (ALP), depicts all existing and planned future airport facility developments as proposed within the 20-year Airport Master Plan. To facilitate the review of planned facility improvements, separate ALPs depict existing and future conditions respectively. Only the Future ALP is accepted, conditionally-approved and retained on-file by the FAA for future federal (i.e., FAA) funding authorization and/or participation. The ALP provides informational and dimensional data to demonstrate conformance with current and applicable FAA airport design standards as prescribed in FAA AC 150/5300-13A, Airport Design. Denoted or depicted ALP information includes, but is not limited to: runways, taxiways, airfield lighting, visual and electronic navigational aids, terminal facilities, hangars, other non-aviation or support buildings, aircraft parking areas, automobile and truck parking, and airport access elements, as well as general, aerial photogrammetric mapping and geodetic survey source notes.

7.5 Aerial Layout Plan Drawing

The Aerial Layout Plan Drawing depicts an aerial base map of the airport, associated land use protection areas, surrounding natural and disturbed land area and natural environs. This supplemental drawing is provided for review, inspection, comparison and verification purposes.

7.6 Airport Airspace Drawing

The Airspace Drawings depict applicable Civil Airport Imaginary Surfaces as prescribed by Title 14 of the Code of Federal Regulations (14 CFR) Part 77, Safe, Efficient Use, and Preservation of the Navigable Airspace. The drawing includes and is limited to the plan- and profile-view depiction of the airport's planned future: Primary and Approach Surfaces for each runway, Horizontal Surface, Conical Surface, Inner and Outer Transitional Surfaces. Where natural vegetation, terrain, man-made objects or structures have existing or planned future above ground top elevation heights that penetrate overlying Civil Airport Imaginary Surfaces which represent obstructions to navigable airspace, tabular-listed information and data is provided describing the type of obstruction, surface penetrated, amount of penetration and recommended mitigation. For clarity purposes, the Airport Airspace Drawing was subdivided into four uniquely-numbered sheets depicting each respective runway end. Each Airport Airspace Drawing also includes general, base mapping, and geodetic survey source notes.

7.7 Inner Portion of the Approach Surface Drawing

The Inner Portion of the Approach Surface Drawings depict the plan- and profile-view of the inner-most portion of the 14 CFR Part 77 Approach Surfaces, published Instrument Approach Procedure (Terminal Instrument Procedures or TERPS) surfaces, and Visual Glide Slope Indicator Obstacle Clearance Surfaces. This drawing is truncated to depict a limited height of 100 feet above the threshold elevation. Similar to the Airport Airspace Drawing, penetrations of the various overlying Civil Airport Imaginary and Obstacle Clearance Surfaces are tabular-listed describing the type of obstruction, type of imaginary surface penetrated, amount of penetration and recommended mitigation actions by the Airport Sponsor. The Inner Portion of the Approach Surface Drawing also includes general, base mapping, and geodetic survey source notes. For clarity purposes, the Inner Portion of the Approach Surface Drawings were subdivided into four uniquely-numbered sheets depicting each respective runway end.

7.8 Runway Departure Surface Drawing

The Runway Departure Surface Drawings depict the plan- and profile-view of the TERPS Instrument Departure Surfaces that are located at the end of each runway serving instrument departure operations. This drawing is truncated to depict a limited height of 100 feet above the threshold elevation. Like other Airspace-related drawings, penetrations of the TERPS Departure Surface are tabular-listed describing the type of obstruction, surface penetrated, amount of penetration and recommended mitigation. For clarity purposes, the Runway Departure Surface Drawing was subdivided into two uniquely-numbered sheets depicting the end of each runway. The Departure Surface Drawing includes general, base mapping, and geodetic survey source notes.

7.9 Airport Access Plan Drawing

The Airport Access Plan Drawing shows the existing roadway access system and the major routes of the various modes of transportation that serve the airport. This drawing also shows proposed modifications to the roadway system proposed by the Airport Master Plan, as well as the Mid-Ohio Regional Planning Commission (MORPC) Rickenbacker Area Study. The Airport Access Plan Drawing also includes general, base mapping, and geodetic survey source notes.

7.10 Terminal Area Drawing

The Terminal Area Drawing depicts on-airport non-airfield land areas reserved for existing and planned future terminal facilities, supporting landside developments, and adjacencies. The Terminal Area Drawing also includes general, base mapping, and geodetic survey source notes.

7.11 Existing and Future Land Use Drawings

These Land Use Drawings serve to depict existing and planned future land uses both on and off the airport. On-airport land uses are designated by functional use and their respective relative location, proximity, or direct access to the airfield. For clarity purposes, two separate and uniquely-numbered Land Use Drawings depict the existing and planned future conditions. Each Land Use Drawing includes land uses surrounding the airport as identified and classified by local municipal governments and/or planning agencies. Additionally, each Land Use Drawing also denotes and depicts current and future-computer-modeled day-night average sound level (DNL) noise exposure contours for 2016 and 2036. The Existing and Future Land Use Drawings each also include general, base mapping (provided by the MORPC Rickenbacker Area Plan), and geodetic survey source notes.

7.12 Future On-Airport Land Use Drawing

This Future On-Airport Land Use Drawing provides the same information provided in the Future Land Use Drawing, but at a viewable smaller plotted scale to facilitate review and inspection of planned future on-airport land uses. The Future On-Airport Land Use Drawing includes general, base mapping, and geodetic survey source notes.

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