

# AIRPORT LAYOUT PLAN UPDATE NARRATIVE REPORT



## LINCOLN REGIONAL AIRPORT KARL HARDER FIELD

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Prepared for



JUNE 1, 2020

**LINCOLN REGIONAL AIRPORT  
KARL HARDER FIELD  
LINCOLN, PLACER COUNTY  
AIRPORT LAYOUT PLAN UPDATE NARRATIVE**

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*Prepared for  
City of Lincoln, California*

*Prepared by:  
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Consulting Airport Engineer*

*June 1, 2020*

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**LINCOLN REGIONAL AIRPORT - KARL HARDER FIELD  
LINCOLN, PLACER COUNTY, CALIFORNIA  
AIRPORT LAYOUT PLAN UPDATE NARRATIVE**

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## EXECUTIVE SUMMARY

Lincoln Regional Airport – Karl Harder Field (LHM) is owned and operated by the City of Lincoln, California. This airport serves the general aviation requirements of the air trade area, which generally consists of the City of Lincoln, the southwestern portion of Placer County, and a significant portion of the northern part of Sacramento County.

Lincoln Regional Airport is located on the west side of the City of Lincoln in Placer County, California. The 725-acre site is located in the Sacramento Valley in California at an elevation of 121.4 feet above mean sea level.

An Airport Layout Plan for Lincoln Regional Airport (LHM) dated November 2007, was approved by the Federal Aviation Administration (FAA) in 2008. A new updated Airport Layout Plan has been prepared and submitted to the FAA dated February 2020.

Since the submittal of the last approved Airport Layout Plan, the following changes have been made to the detailed layout:

1. Constructed two 16-unit hangar buildings on the south side of the apron.
2. Construct Taxiway B.
3. Runway 15 and Runway 33 VASI replaced with PAPI.
4. AWOS upgrade.
5. Security fence upgrade.

The airport consists of one runway, Runway 15-33, which is 100 feet wide by 6,001 feet long. There is a parallel taxiway to Runway 15-33 and five cross taxiways. In the long-term development of the airport, it is proposed to extend this runway by 1,000 feet to the north, providing a total length of 7,001 feet to provide adequate length for takeoff of the larger business jets operating at the airport.

A parallel runway is proposed in the future if required for expanded capacity of the airport. This parallel runway can be designed as a reliever runway in which the small airplanes are diverted from the long runway to the new parallel runway, thus providing the additional required capacity on the long runway. It will be necessary that the centerline spacing between the two runways be established at 700 feet. This spacing was anticipated in the original 1976 Master Plan and there will be no need to adjust any of the taxiways to accommodate this runway.

Large aircraft holding aprons exist on the south cross taxiway and the north cross taxiway. The existing aircraft parking apron at the airport is approximately 321,000

square feet and has 165 aircraft parking positions. The sizes of the parking positions vary to accommodate single- and twin-engine aircraft and business jets.

Development at other airports indicates that with the introduction of business jets to the airport there is a significant need for box hangars and large corporate hangars. The corporate hangars are generally 100 foot by 100 foot or larger. It is considered appropriate to maintain the smaller aircraft, including the propeller-driven single engine and twin engine aircraft, and some of the jets on the east side of the airport and to place the large corporate jet facilities on the west side of the airport as the need arises. The east side of the airport can accommodate a future Jet Center and Corporate hangars, with additional room to expand on the west side of the airport as the need arises.

There are currently a total of 220 individual tee hangar spaces on the airport, of which 98 are privately owned on airport-leased property. There are 4 FBO buildings providing various services located on the east side of the apron on Flightline Drive. The Airport offices and pilots' lounge are located in a separate modular building near the center of the east side apron and hangar development and adjacent to Flightline Drive.

There is a tie down apron located on the east side of the runway. There are 165 tie down spaces at the airport, 4 of which are for large aircraft.

There are currently 291 aircraft and 4 helicopters based at the airport. There are currently approximately 75,000 aircraft operations per year at this airport.

In order to maintain the existing facilities at Lincoln Regional Airport and to provide for the forecast growth, a series of development projects have been proposed and are shown on the Airport Layout Plan. These include the following:

**Short-Term – 0 to 5 Years:**

- Pavement Evaluation Studies conducted in 2008 and updated in 2015 indicate that from a subgrade strength standpoint, the pavements on Runway 15-33 have a remaining life of 15 to 20 years with forecast traffic. The bituminous surface course pavement is weathering and many cracks have developed. It is considered that from a pavement surface standpoint these pavements have a remaining life of 1 to 4 years. It will be necessary to reconstruct this runway, replace the runway lighting system, and to regrade the shoulders since the grade of the runway will be raised. FAA inspections have pointed out deficiencies in the grades of the safety areas. These deficiencies include roughness and erosion. Regrading will consist of disking the soil, compacting it, grading to proper grades and slopes, and harrowing the top inch to allow regrowth of existing vegetation. It is proposed to regrade the runway safety areas at the same time the runway is rehabilitated. An Environmental Assessment project is proposed for this project in 2020. The engineering design is scheduled for 2021 and construction is scheduled for 2022.

- Pavement Evaluation Studies conducted in 2008 and updated in 2015 indicated that from a subgrade strength standpoint, the pavements on Taxiways A, D, E, G, J, and K have a remaining life of 8 to 20 years. The bituminous surface course pavement is weathering and many longitudinal and transverse cracks and block cracking have developed. It is considered that from a pavement surface standpoint these pavements have a remaining life of 3 to 6 years. It will be necessary to reconstruct these taxiways and replace the taxiway lighting system. The engineering design of the reconstruction of these taxiways is scheduled for 2023 and the construction is scheduled for 2024.
- There is a 1.6-acre parcel of land located immediately east of Taxiway A that the Airport plans to acquire to provide improved access to the development area from Taxiway A. It is proposed to acquire this land in 2026.

### **Mid-Term – 6 to 10 Years:**

- Flightline Drive is in a condition of incipient failure at this time. There is extensive alligator cracking and some minor rutting. Much of this road has curb and gutter development on both sides and the grade cannot be raised enough to strengthen the pavement section without reconstructing curbs, gutters, and sidewalks and modifying drainage. It is, therefore, proposed to reconstruct Flightline Drive. The first phase rehabilitation was accomplished in 2013. It is proposed to reconstruct the second phase rehabilitation in 2026.
- Pavement evaluation studies conducted in 2008 and updated in 2015 indicate that from a subgrade strength standpoint, aircraft parking apron Units A1, A2, A3, and A4 will have a remaining pavement life so far as deep-seated distress is concerned in excess of 20 years. The existing pavements throughout the apron areas are showing signs of surface distress caused by traffic and environmental conditions. This distress shows up in the form of cracking and raveling of the pavement. It is proposed to rehabilitate these pavements in the mid-term. Engineering design of this project is scheduled for 2027 and construction is scheduled for 2028.
- To meet the demand for hangars at the airport, it is considered that in the mid-term it will be necessary to construct a series of new hangars. These hangars will be located in the central portion of the of the airport immediately south of the existing northern hangar development. The majority of this development will occur on existing tie-down apron. The development of the site for these hangars will include grading and drainage of the complete site and paving of a 35-foot wide collector taxiway and 25-foot wide taxilanes between the hangar sites. This development will ultimately consist of two hangar buildings with nested T-hangars and one building of executive box hangar type development, including all site work and



hangar construction. Engineering design of this project is scheduled for 2028 and construction is scheduled for 2029.

**Long-Term:**

- To meet the demand for hangars at the airport, it is considered that in the mid-term it will be necessary to construct a series of new hangars. These hangars will be located in the southeast portion of the airport immediately south of the existing south hangars. An Environmental Assessment project is proposed for this project in 2028. The engineering design is scheduled for 2030 and construction is scheduled for 2031.
- Runway 15R and associated taxiways are proposed to be extended 1,000 feet to the north to provide adequate length for takeoff of the larger business jets operating at the airport. An Environmental Assessment project is proposed for this development in 2033. The engineering design of this project is scheduled for 2034 and construction is scheduled for 2035.
- A parallel runway may be required in the future to increase the capacity of the airport. This parallel runway can be designed as a reliever runway in which the small airplanes are diverted from the long runway to the new parallel runway, thus providing the additional required capacity on the long runway. A 3,350-foot long by 60-foot wide runway is proposed. An Environmental Assessment project is proposed for this project in 2033. The engineering design is scheduled for 2037 and construction is scheduled for 2038.
- It is estimated that the aircraft traffic may increase at the Lincoln Regional Airport to a point where an air traffic control will be required. The location for a new Air Traffic Control Tower is reserved on the Airport Layout Plan.
- The Airport Layout Plan identifies an area on the west side of the runway that needs to be reserved for additional hangar facility development, Jet Center development, commercial development, and corporate hangars if the east side becomes fully developed and runs out of space. It is proposed to construct a service road to this area, which will access onto the airport off Nicolas Road and loop around and depart on Airport Road. The development on the west side of the airport is anticipated to be beyond the 20-year development plan laid out in this ALP, but can be moved up if the need for this additional development develops earlier than anticipated.

**Funding Plan:**

Total short-term development project costs total \$16,660,000, mid-term development project costs total \$17,415,000, and long-term development project costs total \$11,819,000. A full implementation plan for development of short-term, mid-term, and long-term projects has been presented in this Airport Layout Plan Narrative. It is anticipated that all development projects will be funded under the Federal Aviation Administration Airport Improvement Program (AIP) at 90 percent, the State of California Division of Aeronautics matching grant program at 5 percent of the AIP funding, and local monies will fund the remainder of the projects. All costs are based on 2019 prices and have not been adjusted for inflation.

Lincoln Regional Airport is eligible for \$150,000 in annual entitlement funds from Federal Aviation Administration AIP funding and can compete for additional airport discretionary funds. The Airport will have adequate funding to meet their local match for these projects.

## CHAPTER 1. INTRODUCTION

Lincoln Regional Airport – Karl Harder Field (LHM) is located on the west side of the City of Lincoln in Placer County, California. The 725-acre site is located in the Sacramento Valley in California at an elevation of 121.4 feet above mean sea level. The airport serves the general aviation requirements of the air trade area, which generally consists of the City of Lincoln, the southwestern portion of Placer County, and a significant portion of the northern part of Sacramento County. The Airport is owned and operated by the City of Lincoln.

Airport Sponsors are required by the Federal Aviation Administration (FAA) to keep their Airport Layout Plan (ALP) current, reflecting current conditions, and growth and expandability of the facility. An Airport Layout Plan drawing set provides the Airport Sponsor with recommended airport development in the short term (0 to 5 years), mid-term (6 to 10 years), and long term (11 to 20 years). The ALP update for Lincoln Regional Airport (LHM) will guide the City of Lincoln in the development of this airport.

The Airport Layout Plan was last updated in 2008. The Airport Layout Plan has been further updated in 2020, and a summary of changes made and recommendations for development are presented in this Airport Layout Plan Update Narrative.

This narrative report provides an outline of the research and analysis that makes up the framework for the ALP document and its related changes. In accordance with FAA Standard Operating Procedure 2.0, Standard Procedure for FAA Review and Approval Airport Layout Plans (ALPs), this report contains the following elements:

- Inventory
- Basic Aeronautical Forecasts
- Alternatives/Proposed Development
- Obstruction Surfaces
- Runway Protection Zone
- Development Summary
- Wildlife Hazard Management Issues Review
- Preliminary Identification of Environmental Features
- The Airport Layout Plan Sheets No. 1 through 12 are submitted separately and included in this narrative by reference.

Airport standards, aviation forecasts, and airport development requirements to accommodate the standards and forecasts are expected to change over time with changes in economic conditions, environmental requirements, and political environment. This Airport Layout Plan and Narrative Report has been prepared to accommodate existing and forecast growth conditions and provide guidance for development of the airport to accommodate existing and forecast growth. It is important that the Airport Layout Plan be reviewed and updated at least once every five years to plan for and accommodate any changes that develop. Flexibility has been incorporated into the Airport Layout Plan to allow changes if and when required.

## CHAPTER 2. INVENTORY

This chapter describes existing facilities on the Lincoln Regional Airport. This information is to be used as a baseline for the development of the updated Airport Layout Plan.

### 2-1 Location and Setting

This airport serves the general aviation requirements of the air trade area, which generally consists of the City of Lincoln, the southwestern portion of Placer County, and a significant portion of the northern part of Sacramento County. A map of a portion of Placer County, including the City of Lincoln is included as Exhibit 2-1, which shows the location of the airport, roads and other land features in the area.

### 2-2 Airfield Facilities

The airfield consists of features and facilities required to accommodate safe and efficient current and future aircraft operations. The airfield includes one runway, taxiways, aircraft parking aprons, hangar facilities, and fixed base operator buildings. The major airfield facilities at this airport consist of the following items:

- Runway 15-33 is 6,001 feet long by 100 feet wide with no shoulders. The runway has full-length runway sighting distance. Runway 15 is a Precision Instrument Runway with less than 3/4-mile visibility minimums. Runway 33 is a Non-Precision runway with less than 1-mile visibility minimums. The Runway Design Code (RDC) for Runway 15 is B/I/2400 and for Runway 33 is B/I/4000.
- The taxiway system consists of one parallel taxiway (Taxiway A) and five cross taxiways, which are 40 feet wide. The centerline of the parallel taxiway is located 900 feet from the centerline of the runway to provide room for a parallel runway located 700 feet from the existing runway. Taxiway A runs the full length of the runway. There are holding aprons at the ends of the runway. There are no shoulders on the taxiway. Taxiway A is classified as a Taxiway Design Group (TDG) 2.
- The following 40-foot wide collector taxiways exist on the airport:
  - Taxiway B connects Taxiway A to Apron A1.
  - Taxiway F connects Taxiway A to Apron A2 and A1.
  - Taxiway H connects Taxiway A to Tee Hangar Taxilanes T1 and T2.
- Large aircraft holding aprons exist on the south cross taxiway and the north cross taxiway. The existing aircraft parking apron at the airport is approximately 321,000 square feet and has 165 aircraft parking positions. The sizes of the parking positions vary to accommodate single- and twin-engine aircraft and business jets.

- There is a series of hangars at the north end of the airport and one row of hangars at the south end of the airport. There are currently a total of 220 hangar spaces located at the Lincoln Regional Airport.
- A helicopter landing and parking area with three separate parking positions is also located between the apron and the parallel taxiway.

A Google Earth photo depicting the airfield facilities is presented in Exhibit 2-2.

### 2-3 Airfield Pavements/Geotechnical

The existing airfield pavement sections at this airport are summarized in Table No. 2-1.

<b>TABLE NO. 2-1 LINCOLN REGIONAL AIRPORT LINCOLN, PLACER COUNTY, CALIFORNIA PAVEMENT SECTIONS</b>					
Item	Unit	Station <sup>1</sup>	Pavement Section - inches		
			AC	AB	ASB
Runway 15-33	R1	0+00 to 24+00	3	10	-
Runway 15-33	R2 & R3	24+00 to 43+50	5	7	-
Runway 15-33	R4	43+50 to 60+00	5	7	-
Taxiway A	TA 1	0+00 to 39+00	3	10	-
Taxiway A	TA 2	39+00 to 49+00	3	10	-
Taxiway A	TA 3	49+00 to 60+00	3	10	-
Taxiway D	TD 1	0+00 to 8+50	3	10	-
Taxiway E	TE 1	0+00 to 8+00	5	7	-
Taxiway E	TE 2	8+00 to 12+00	3	10	-
Taxiway G	TG 1	0+00 to 8+50	3	10	-
Taxiway J	TJ 1	0+00 to 8+50	3	10	-
Taxiway K	TK 1	0+00 to 6+00	3	10	-
Taxiway K	TK 2	6+00 to 8+50	3	10	-
Tee Hangar T/W	TH 1	--	2	7	-
Tee Hangar T/W	TH 2	--	2	7	-
Taxiway B	TB 1	--	3	5	4
South Apron	A1	--	2	7	-
Central Apron	A2-1	--	3	10	-
Central Apron	A2-2	--	3	10	-
North Apron	A3	--	3	4	12
West Apron	A4	--	3	5	5
Flightline Drive	FL 1	0+00 to 8+50	4	-	12
Flightline Drive	FL 2	8+50 to 20+00	2	7	-
Flightline Drive	FL 3	20+00 to 33+00	2	7	-
Flightline Drive	FL 4	33+00 to 40+00	4.5	14	-
Flightline Drive	FL 5	40+00 to 55+00	4.5	14	-
Heliport		PCC	-	-	-
		AC	-	-	-

Geotechnical studies were undertaken at Lincoln Regional Airport between 1973 and 1985. A series of test holes were excavated at representative areas on the airport. Soil samples were taken from the test holes and tested in the Geotechnical Laboratory to provide data for classification and strength characteristics of the foundation soils. The results of these studies are presented in the January 2008 (Updated October 2015), *Lincoln Regional Airport/Pavement Management Plan*. These studies showed that throughout most of the site the subgrade soils consist of sandy silts, clayey silts or clayey sands. There are a few thin layers of silty clays and sandy clays and some medium plastic clays.

Materials obtained from these test pits were sampled and tested in the laboratory. These tests indicate that the California Bearing Ratio (CBR) of the subgrade soils compacted in place under existing pavements is 9 minimum and of the subsoils is 6 minimum.

Based on the existing pavement sections and using a subgrade CBR of 9 and a subsoil CBR of 7 the aircraft bearing capacity of the various pavements are as shown in Table No. 2-2. The bearing values given are based on 1,200 annual aircraft departures.

<b>TABLE NO. 2-2 LINCOLN REGIONAL AIRPORT PAVEMENT BEARING CAPACITY</b>		
Airfield Segment	Aircraft Bearing Capacity - Pounds	
	Single Gear Aircraft	Dual Gear Aircraft
Runway 15-33	36,000	50,000
All Taxiways	36,000	50,000
Aircraft Parking Apron	20,000/40,000	50,000

The Pavement Condition Number (PCN) for Runway 15-33 is 11/F/B/X/T. These soils are classified as CL-ML based on the US Soil Classification System.

#### **2-4 Building Facilities**

There is significant general aviation development on the east side of the airport, which includes four fixed base operator hangars, a nested tee hangar row at the south end of the airport, and a series of hangars to the north of the apron. The hangars range from rows of nested tee hangars to box hangars to larger corporate hangars. There are currently 220 hangar spaces at the airport.

#### **2-5 Airport Offices**

The airport offices and pilots' lounge are presently located in a separate temporary modular building near the center of the east side apron and hangar development and adjacent to Flightline Drive.

## **2-6 Airfield Lighting/Navigational Aids**

The lighting of the Runway 15-33 Complex is complete and generally meets all F.A.A. minimums. Specifically, the existing lighting consists of the following:

- *Runway 15-33* – Medium intensity runway edge lights on the runway. There are lighted airfield guidance signs on this runway.
- *Taxiway A and Collector Taxiways* – Medium intensity taxiway edge lights and lighted airfield guidance signs on the taxiways.

Navigational aids (NAVAIDs) at Lincoln Regional Airport consist of airport owned 4-box PAPIs on Runways 15 and 33. FAA owned NAVAIDs consist of a Localizer, Glideslope, and MALSR for Runway 15. There is an ILS/DME instrument approach procedure published for Runway 15 and GPS approaches to Runway 15 and Runway 33.

## **2-7 Fuel Facilities**

The airport has self-serve and truck fueling facilities, which provide 100 low-lead gasoline and Jet-A fuel. The fuel system and delivery services are owned and operated by the City of Lincoln. In 2019-2020, a new fueling system with above-ground storage tanks was installed at the Lincoln Regional Airport that includes two 12,000-gallon fuel tanks, which provide Avgas and Jet-A fuel. The two underground storage tanks will be decommissioned and removed from the airport in the next 2-3 years.

## **2-8 Wash Rack**

An aircraft wash rack is located at the northeast end of the aircraft parking apron.

## **2-9 Weather Facilities**

An Automatic Weather Observation System (AWOS III) is located between the runway and Taxiway A at the north end at Lincoln Regional Airport and is owned by the Airport.

## **2-10 Airport Access Road and Parking**

Ground access to the Lincoln Regional Airport from Central Lincoln, Southwestern Placer County, and Northern Sacramento County is by way of State Highway 65 to Nelson Lane to Flightline Drive.

Airport parking is provided along Flightline Drive and in a small parking lot located on the east side of this street, which will accommodate approximately 36 vehicles. Hangar tenants normally park their vehicles in their hangars.

## 2-11 Utilities

Utilities are available at the airport to serve the FBO buildings, airport administration building, hangars, and other structures and include sewer, water, electrical, and telephone. Sewer and domestic water is provided by the City of Lincoln. Electrical and natural gas service is provided by P.G.&E. Telephone service is provided by AT&T.

The airport lies in an area that gradually slopes from east to west, with occasional drainage swales carrying drainage water in a westerly direction. Drainage of all paved areas is by sheet flow to a series of inlet structures, which are interconnected by means of underground pipes. These pipes carry the drainage water to two peripheral drainage ditches, which connect approximately 1,500 feet west of airport property and extend from that point into Markham Ravine, six miles west of the airport. The northern portion of the airport drains to the west into a ditch, which ultimately drains into Coon Creek. Grades of the paved areas are such that for heavy storms surface flow carries the excess water to the infield areas, where there is a series of ditches and inlet structures.

## 2-12 Perimeter Fencing

The Lincoln Regional Airport has a 6-foot chain link fence and a barbed wire fence around the perimeter of the improved airfield area with controlled entry on the east side of the airport.

## 2-13 Airport Maintenance Equipment

Airport maintenance activities are performed by the City of Lincoln. The City is responsible for monitoring the condition of the airport and performing maintenance activities including grass mowing and overall maintenance of the airfield.

The City of Lincoln owns the following maintenance equipment:

Year	Make	Model
1985	GMC	7000 GMC Jet Refueler
2001	John Deere	4300 Series Tractor
2001	John Deere	1600 Turbo Series Mower

This equipment is stored in a locked gated area adjacent to the airport office on the airport.

## 2-14 Fixed Base Operators (FBOs)

There are currently seven Fixed Base Operators (FBOs) operating out of Lincoln Regional Airport. These FBOs and their services are as follows:



- *Norcal Flight Center* - Pilot school, flight training, aircraft rental, aircraft sales, aircraft parts and supplies.
- *Kracon Aircraft Refinishing* – Aircraft refinishing including paint, aircraft mechanic, aviation and upholstery services.
- *Lincoln Skyways* – Aircraft maintenance, flight training, aircraft sales.
- *Avionics Specialists* – Avionics sales and service.
- *Helifly Flight School* – Helicopter flight training
- *Vertical Solutions Unlimited* – Helicopter maintenance and parts.
- *Skydive Sacramento* – Skydiving Operation

### **2-15 Airport Property Ownership**

The Property Map, Exhibit “A” of the Airport Layout Plan set of drawings, Sheet No. 11, shows the property that is owned in fee simple. The City of Lincoln owns all of the property on which Lincoln Regional Airport is located.

### **2-16 Land Use Controls – Zoning**

The City of Lincoln has zoned property around the airport to be generally compatible with airport operations. The Placer County Airport Land Use Commission has adopted Placer County Land Use Compatibility Plans to ensure that the land surrounding the Lincoln Regional Airport is zoned for airport-compatible uses. The Placer County ALUC has found the City of Lincoln 2050 General Plan to be consistent with the ALUC for the Lincoln Regional Airport. The off-Airport Land Use Plan is shown on Sheet No. 11 of the Airport Layout Plan set of drawings.

### **2-17 Existing Critical Aircraft**

Aircraft based at the airport consist of 267 light single-engine aircraft, 24 multi-engine aircraft, and 4 helicopters. 244 are hangered aircraft and 47 are tied down. The critical aircraft, which is defined as that class aircraft that has at least 500 operations per year at the airport, is the Cessna Citation I. This aircraft has a maximum takeoff weight of 11,850 lbs.

The Runway Design Code (RDC) for Runway 15-33 is B I.

Lincoln Regional Airport

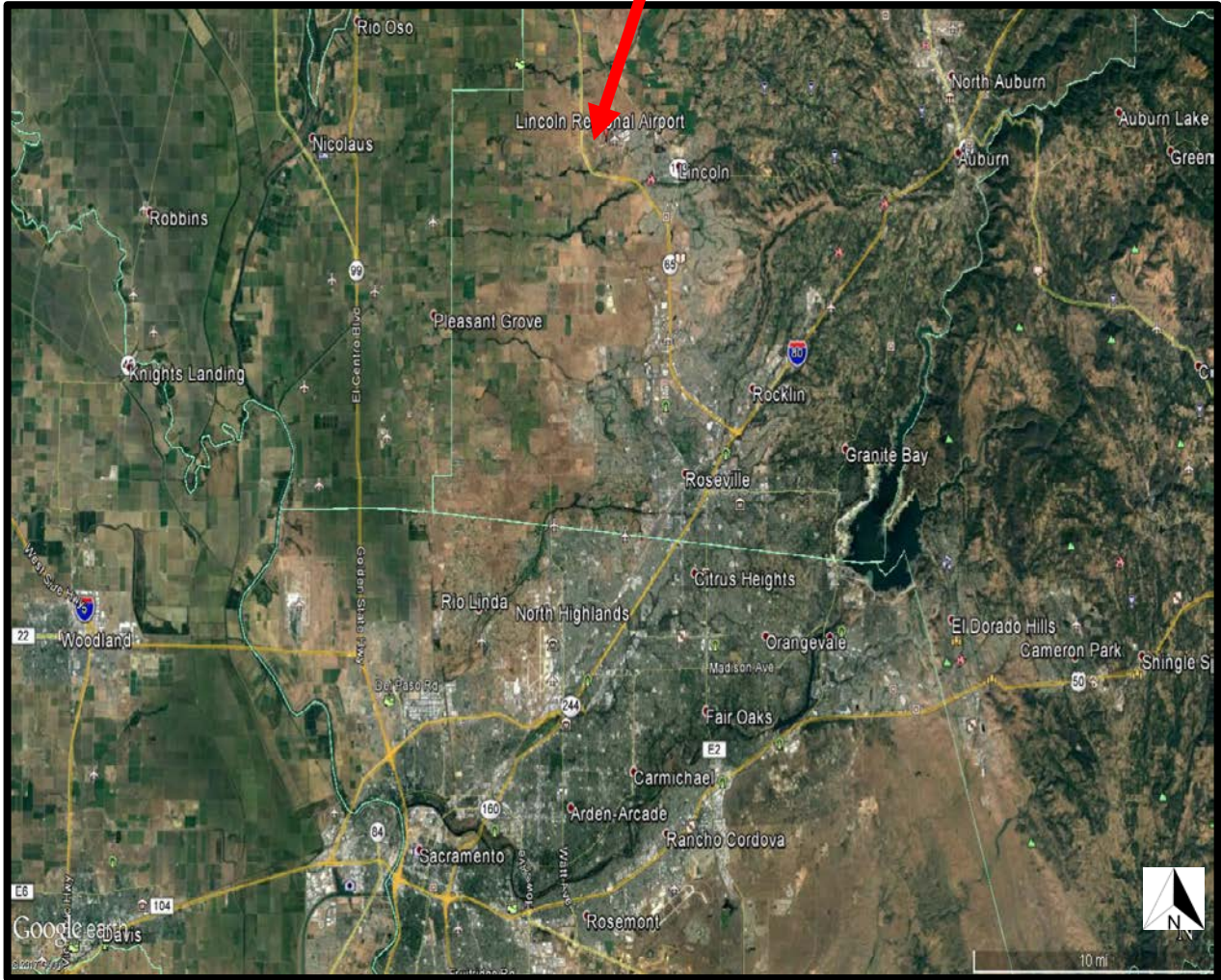


Exhibit 2-1  
Location Map  
Lincoln Regional Airport



Exhibit 2-2  
Airport Facilities  
Lincoln Regional Airport

## CHAPTER 3. AVIATION FORECASTS

### 3-1 Introduction

Detailed forecasts of aircraft activity are beyond the scope of a Program Narrative. Forecasts have been limited to determine reasonable forecasts of aircraft activity at Lincoln Regional Airport. Trend analyses have been conducted to determine the relationship between aircraft activity and population and employment of the County and City. Share analyses have been conducted to determine relationship of aircraft activity with the aircraft activity in the Western Pacific Region and the entire United States. In addition, the forecasts prepared by F.A.A. and included in F.A.A. Form 5010 and in the Terminal Area Forecasts (TAF) have also been collected. An inventory has been made of existing based aircraft at the airport in 2019 and the past five years, and a reasonable estimate of operations has been prepared.

The existing count of based aircraft and estimated operations, as well as the forecasts presented in F.A.A. Form 5010 and the TAF for the Base Year 2019, have been prepared and are included in Table No. 3-1.

Source	Based Aircraft	Annual Operations
Airport Count	291	75,000
FAA Form 5010	76	74,400
TAF Forecasts	127	75,387

For all forecast studies for the Base Year 2019 the based aircraft used is 291 and the annual operations used is 75,000

### 3-2 **Aviation Activity Parameters and Measures to be Forecast**

The major activities and measures to be forecast include:

- Annual Operations – Itinerant, Local, and Total
- Number of Based Aircraft
- Critical Aircraft
- Runway Design Code (RDC)
- Runway Reference Code (RRC)
- Fleet Mix – Number and Type of Operations
- Peak Operations
- Comparison of Airport Planning to TAF Forecasts

### 3-3 Data Collection

Pertinent data available for all demographics and airport activity used in these forecasts were collected and are included in this narrative. The most recent FAA Terminal Area Forecasts (TAF) were obtained for the historical and forecast aviation activity for the entire Western United States, the FAA Western Region and Lincoln Regional Airport. These data are summarized in Table No. 3-2.

The historical and forecast population trends for Placer County are shown on Plate No. 3-1. The historical and forecast employment trends for Placer County are shown on Plate No. 3-2.

The fleet mix data were acquired from the airport records. The general aviation fleet mix includes single engine and twin engine general aviation aircraft and business jets.

### 3-4 Forecast Methods

Forecasts have been prepared using trend analysis procedures with City and County populations and employment data as the basis of analysis and share analysis using FAA Terminal Area Forecasts for the Western Pacific Region and the total United States based aircraft and operations data. The Airport Forecast and TAF Forecast activity showing based aircraft, itinerant operations, local operations, and total operations have been calculated for the period 2019 to 2040 and are summarized in Table No. 3-2. These forecasts are presented on Plate No. 3-3 for total annual operations and Plate No. 3-4 for total based aircraft.

A comparison of Airport Forecasts to TAF Forecasts has been made and the results are included in Table No. 3-3. It will be noted that the Airport Forecasts are very similar to the TAF forecasts.

### 3-5 Evaluation of Forecasts

The forecasts prepared have been evaluated to indicate the forecast growth, the reason for the growth, and the effect on future development of the airport.

#### 3-5.1 Airport Operations

The total current operations at Lincoln Regional Airport in 2019 based on TAF data are 75,387, which includes:

- 3,200 air taxi and commuter operations
- 34,563 itinerant general aviation operations
- 37,624 local operations

It is anticipated that by 2039 (20 years) the total number of operations will increase to 87,000.

### 3-5.2 Based Aircraft

Based on Airport forecasts, it is anticipated that by 2039 (20 years) the number of based aircraft will have increased from 291 to 340.

Lincoln just completed an on-airfield count of based aircraft and found the total was 291. This is significantly larger than the 74 based aircraft that is currently listed on the FAA Form 5010-1 Airport Master Record. The airport is working to update the database on basedaircraft.com so that the proper number of based aircraft are listed for Lincoln on the 5010.

Based aircraft are either stored in hangars or tied down in the aircraft parking apron. Transient aircraft are generally tied down on the apron, but some aircraft owners staying overnight request hangar facilities. With the increased cost and sophistication of the general aviation aircraft, most pilots will store their aircraft in hangars if available rather than tie them down on the aircraft parking apron. Of the 291 aircraft currently based at Lincoln Regional Airport, 244 are stored in hangars and the rest are tied down on the apron. There is a waiting list for new hangar storage, some of which are pilots who currently store their aircraft off site and others are pilots who have aircraft tied down on the apron. If hangars are available, it is estimated that 80 to 85 percent of the fleet will be stored in hangars and the remaining on the aircraft tie down apron. Hangar storage facilities constructed should include tee hangars for light twin engine and single engine aircraft, box hangars for larger aircraft, and corporate hangars for the larger business jets.

### 3-5.3 Instrument Approaches

Instrument approaches available at Lincoln Regional Airport are:

- Electrical Approach NAVAIDs – Lincoln Regional Airport is currently equipped with a Category 1 instrument landing system on Runway 15 with current minimums for this approach at ½ mile visibility and 200-foot ceiling. The airport also has a non-precision VOR GPS approach to Runway 15 and a GPS approach to Runway 33.

- Visual NAVAIDs – Visual NAVAIDs available at the Lincoln Regional Airport include:
  - Precision Approach Path Indicator (PAPI) – 4-box – Runway 15 and Runway 33
  - Medium intensity approach lighting system and runway alignment indicator lights (MALSR) – Runway 15
  - Wind cones and segmented circle and rotating beacon

These visual NAVAIDs meet all F.A.A. requirements.

### 3-5.4 Critical Aircraft

F.A.A. defines the critical aircraft for planning purposes to be the largest aircraft group that has more than 500 annual operations. The current critical aircraft on Runway 15-33 at Lincoln Regional Airport is the Cessna Citation I. The maximum takeoff weight of the Cessna Citation I is 11,850 pounds. The Cessna Citation I aircraft is categorized by aircraft approach category B and aircraft design group I.

To determine the critical aircraft at Lincoln Regional Airport, the Traffic Flow Management System Counts (TFMSC) for 2014 through 2018 were analyzed in detail. These data showed that the Aircraft Approach Category for Category B at Lincoln was as follows:

- 2014 – 619 operations
- 2015 – 580 operations
- 2016 – 474 operations
- 2017 – 497 operations
- 2018 – 533 operations

The TFMSC data also showed that the Airplane Design Group for Group I or larger was as follows:

- 2014 – 1,433 operations
- 2015 – 1,298 operations
- 2016 – 1,070 operations
- 2017 – 1,199 operations
- 2018 – 1,486 operations

During the analysis of the data that was procured from the TFMSC database, it was found that there were some inconsistencies in the data. These inconsistencies were analyzed in detail and some minor

corrections were made to aircraft counts “>small”. These corrections were based on the following:

- 1) Some aircraft were classified by the TFMSC as “Small Equipment”, yet the Maximum Takeoff Weight of these aircraft are actually >”small equipment”. This correction resulted in 55 to 126 additional operations of aircraft >”small” per year.
- 2) Some aircraft indicated an arrival at Lincoln, yet no departure operation ever occurred for these aircraft. Some “potentially missed” operations were found and added to the operation counts. These corrections varied between 27 and 31 additional operations of aircraft >”small” per year.
- 3) It is known that several jet operations occur that are not IFR or file flight plans, thus the TFMSC has the potential to miss these operations. Lincoln’s operations personnel have kept ‘Jet Logs’ that record the N-number, aircraft type, date, and time of each jet that they observe on the airfield. A comparison of the “jet log” data and the TFMSC data found that between 9 and 29 operations of aircraft >”small” were not counted in the TFMSC data.

All data for the determination of the critical aircraft is summarized in Table 3-4, Critical Aircraft Determination Summary. Any “corrections” made to the TFMSC data are also identified in this table.

These data indicate that the current critical aircraft grouping of aircraft that exceeds 500 annual operations has an Airport Reference Code (ARC) of B-I.

At this time, it is anticipated the forecast future critical aircraft for Runway 15-33 will be the Cessna Citation V if the runway is extended to 7,001 feet. The Cessna Citation V has a maximum takeoff weight of 16,300 pounds and is categorized by aircraft approach category B and aircraft design group II, a future ARC of B-II.

If the new Runway 15L-33R is developed (60’ x 3,350’), it is anticipated that the critical aircraft for this runway will be the Cessna Centurion. This aircraft has a maximum takeoff weight of 4,000 pounds and is categorized by aircraft approach category A and aircraft design group I-Small. Runway 15L-33R will have an ARC of A-I(small).

The Airport Sponsor should continue to monitor airport operations and evaluate the needs of current and future airport users.



### 3-5.5 Runway Design Code (RDC)

The current Runway Design Code (RDC) for Runway 15-33 is B/I/2400. The future forecast RDC for Runway 15R-33L is B/II/2400.

The RDC for future Runway 15L-33R is forecast to be A/I Small/VIS.

### 3-5.6 Approach Reference Code (APRC)

The current Approach Reference Code (APRC) for Runway 15 is D/VI/2400 and for Runway 33 is D/VI/4000. The future forecast APRC does not change.

The APRC for future Runway 15L-33R is forecast to be B/I(Small)/Visual.

### 3-5.7 Departure Reference Code (DPRC)

The current Approach Reference Code (APRC) for Runway 15-33 is D/VI. The future forecast DPRC does not change.

The DPRC for future Runway 15L-33R is forecast to be B/I(Small).

### 3-5.8 Fleet Mix

The fleet mix ranges from small single-engine aircraft to the business jets. The critical aircraft for Runway 15-33 in the base year is the Cessna Citation I and in the future is the Cessna Citation V. The critical aircraft for future Runway 15L-33R is the Cessna Centurion.

### 3-5.9 Peaking Characteristics

Peak hour operations indicate that the existing runway system will adequately serve the forecast aircraft traffic during the forecast period without any significant delays.

TABLE NO. 3-2  
FORECAST AIRCRAFT ACTIVITY - LINCOLN REGIONAL AIRPORT (LHM)

Year	Itinerant Operations										Local			Total			Based Aircraft	
	TAF					Airport					TAF	Airport	TAF	Airport	TAF	Airport		
	Air Taxi & Commuter	General Aviation	Total	Air Taxi & Commuter	General Aviation	Total	TAF	Airport	Total	TAF							Airport	Total
2010	3,200	34,100	37,300	3,200			37,100				37,100			74,400		200		
2011	3,200	34,100	37,300	3,200			37,100				37,100			74,400		188		
2012	3,200	34,100	37,300	3,200			37,100				37,100			74,400		188		
2013	3,200	34,100	37,300	3,200			37,100				37,100			74,400		196		
2014	3,200	34,100	37,300	3,200			37,100				37,100			74,400		196		
2015	3,200	34,100	37,300	3,200			37,100				37,100			74,400		180		
2016	3,200	34,100	37,300	3,200			37,100				37,100			74,400		174		
2017	3,200	34,100	37,300	3,200			37,100				37,100			74,400		125		
2018	3,200	34,100	37,300	3,200		34,000	37,100		34,000	37,200	37,100	37,800	75,000	74,400	85	291		
2019	3,200	34,330	37,530	3,264	34,231	37,495	37,361		34,231	37,495	38,050	75,545	74,891	75,545	86	291		
2020	3,200	34,562	37,762	3,329	34,464	37,793	37,624		34,464	37,793	38,298	76,091	75,386	76,091	87	293		
2021	3,200	34,796	37,996	3,396	34,698	38,094	37,890		34,698	38,094	38,542	76,636	75,886	76,636	88	296		
2022	3,200	35,032	38,232	3,464	34,934	38,398	38,157		34,934	38,398	38,784	77,182	76,389	77,182	89	298		
2023	3,200	35,269	38,469	3,533	35,172	38,705	38,426		35,172	38,705	39,022	77,727	76,895	77,727	90	300		
2024	3,200	35,509	38,709	3,604	35,411	39,015	38,697		35,411	39,015	39,258	78,273	77,406	78,273	91	303		
2025	3,200	35,751	38,951	3,676	35,652	39,328	38,970		35,652	39,328	39,491	78,818	77,921	78,818	92	305		
2026	3,200	35,995	39,195	3,749	35,894	39,644	39,246		35,894	39,644	39,720	79,364	78,441	79,364	93	307		
2027	3,200	36,240	39,440	3,824	36,138	39,963	39,524		36,138	39,963	39,946	79,909	78,964	79,909	94	310		
2028	3,200	36,487	39,687	3,901	36,384	40,285	39,804		36,384	40,285	40,170	80,455	79,491	80,455	95	312		
2029	3,200	36,736	39,936	3,979	36,631	40,610	40,086		36,631	40,610	40,390	81,000	80,022	81,000	96	314		
2030	3,200	36,987	40,187	4,058	36,881	40,939	40,370		36,881	40,939	40,607	81,545	80,557	81,545	97	317		
2031	3,200	37,240	40,440	4,140	37,131	41,271	40,656		37,131	41,271	40,820	82,091	81,096	82,091	98	319		
2032	3,200	37,495	40,695	4,222	37,384	41,606	40,944		37,384	41,606	41,030	82,636	81,639	82,636	99	321		
2033	3,200	37,752	40,952	4,307	37,638	41,945	41,234		37,638	41,945	41,237	83,182	82,186	83,182	100	324		
2034	3,200	38,010	41,210	4,393	37,894	42,287	41,527		37,894	42,287	41,440	83,727	82,737	83,727	101	326		
2035	3,200	38,270	41,470	4,481	38,152	42,632	41,822		38,152	42,632	41,640	84,273	83,292	84,273	102	328		
2036	3,200	38,532	41,732	4,570	38,411	42,981	42,119		38,411	42,981	41,837	84,818	83,851	84,818	103	331		
2037	3,200	38,796	41,996	4,662	38,672	43,334	42,418		38,672	43,334	42,030	85,364	84,414	85,364	104	333		
2038	3,200	39,062	42,262	4,755	38,935	43,690	42,719		38,935	43,690	42,219	85,909	84,981	85,909	105	335		
2039	3,200	39,330	42,530	4,850	39,200	44,050	43,023		39,200	44,050	42,404	86,455	85,553	86,455	106	338		
2040	3,200	39,600	42,800	4,947	39,467	44,414	43,329		39,467	44,414	42,586	87,000	86,129	87,000	107	340		

**TABLE NO. 3-3  
COMPARISON - AIRPORT FORECASTS VS. TAF FORECASTS  
LINCOLN REGIONAL AIRPORT (LHM)**

Year	Ratio - Airport/TAF			
	Itinerant Operations	Local Operations	Total Operations	Based Aircraft
2019	1.00	1.02	1.01	3.38
2024	1.01	1.01	1.01	3.33
2029	1.02	1.01	1.01	3.27
2034	1.03	1.00	1.01	3.23
2039	1.04	0.99	1.01	3.19

Table No. 3-4

Lincoln Regional Airport - Critical Aircraft Determination Summary (Annual Operations)

FAA TFMSC - Airplane Approach Category	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
A	1661	1376	1191	1702	1612	1204	737	646	698	814	718	596	702	953
B	1037	947	1016	1015	821	784	898	467	465	526	497	366	388	440
C	144	97	97	83	46	68	66	90	88	60	72	69	88	87
D	45	42	38	45	51	37	37	44	57	33	11	39	21	6
No Data	212	136	92	450	399	241	86	96	88	93	130	60	76	129
Total Operations of Category A (or larger)	2887	2462	2342	2845	2530	2093	1738	1247	1308	1433	1298	1070	1199	1486
Total Operations of Category B (or larger)	1226	1086	1151	1143	918	889	1001	601	610	619	580	474	497	533
Total Operations of Category C (or larger)	189	139	135	128	97	105	103	134	145	93	83	108	109	93
Total Operations of Category D (or larger)	45	42	38	45	51	37	37	44	57	33	11	39	21	6
<b>FAA TFMSC - Airplane Design Group</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>
I	1639	1354	1286	1817	1896	1374	973	843	947	987	918	758	907	1164
II	1242	1098	1042	1009	622	711	753	395	352	438	380	295	283	318
III	6	8	14	19	14	8	12	9	9	8	0	17	9	4
IV	0	2	0	0	0	0	0	0	0	0	0	0	0	0
No Data	212	136	92	450	399	241	86	96	88	93	130	60	76	129
Total Operations of Group I (or larger)	2887	2462	2342	2845	2532	2093	1738	1247	1308	1433	1298	1070	1199	1486
Total Operations of Group II (or larger)	1248	1108	1056	1028	636	719	765	404	361	446	380	312	292	322
Total Operations of Group III (or larger)	6	10	14	19	14	8	12	9	9	8	0	17	9	4
Total Operations of Group IV (or larger)	0	2	0	0	0	0	0	0	0	0	0	0	0	0
<b>FAA TFMSC - Type of Equipment (Weight)</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>
>Small	1174	1092	1007	961	582	615	719	456	430	376	325	294	339	300
Correction for ops >12,500 listed as Small										91	87	71	55	126
Correction for Arrivals/Departure Balance										31	27	29	27	27
Correction for Ops in "Jet Logs"										0	0	0	9	29
Total Corrected Operations > "Small"	1174	1092	1007	961	582	615	719	456	430	498	439	394	430	482

Plate No. 3-1  
Lincoln Regional Airport  
Historical & Forecast Population Trends - Placer and Sacramento Counties

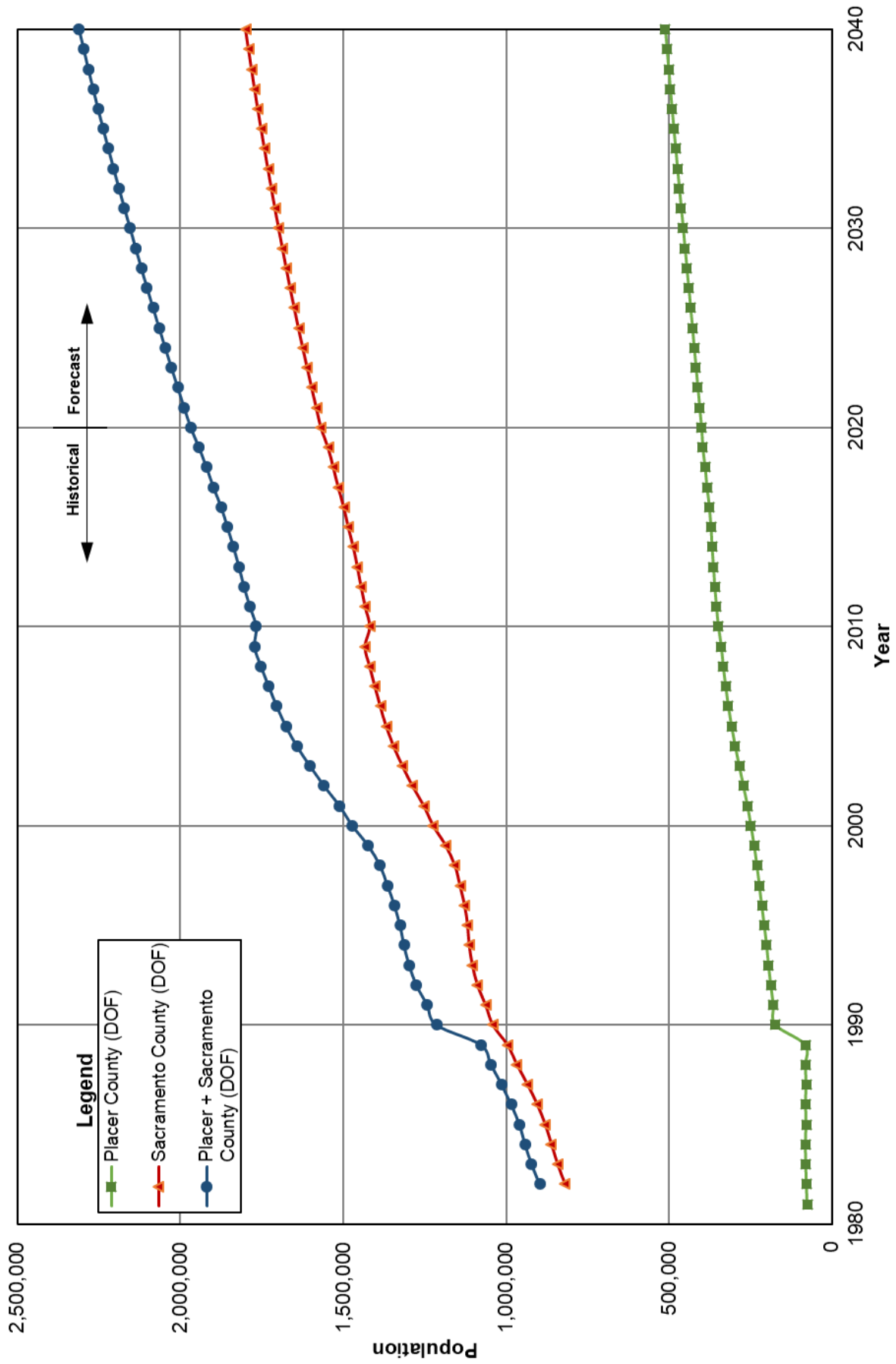


Plate No. 3-2  
 Lincoln Regional Airport  
 Historical & Forecast Employment Trends - Placer and Sacramento Counties

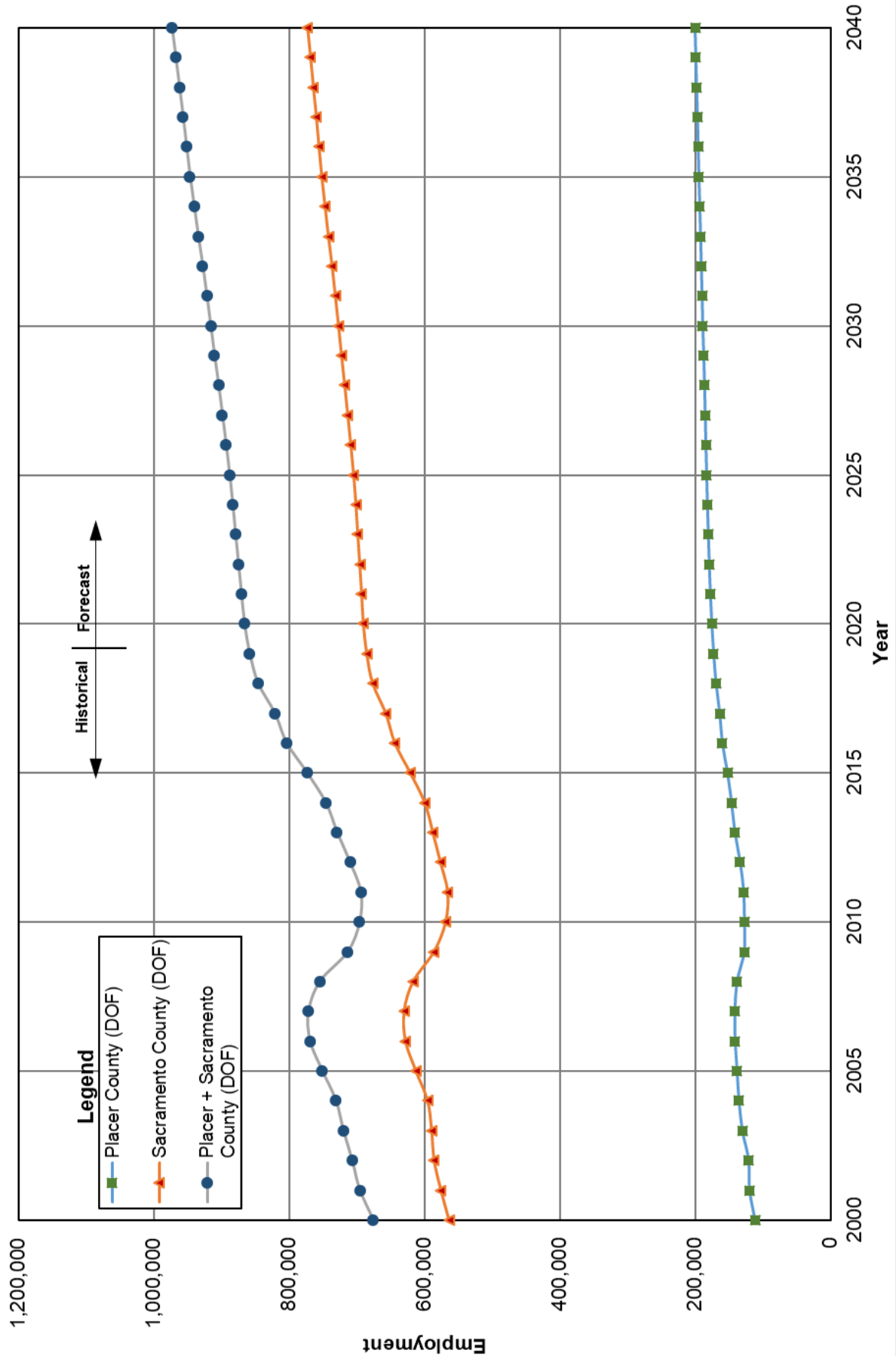


Plate No. 3-3  
Lincoln Regional Airport  
Historical & Forecast Total Annual Operations

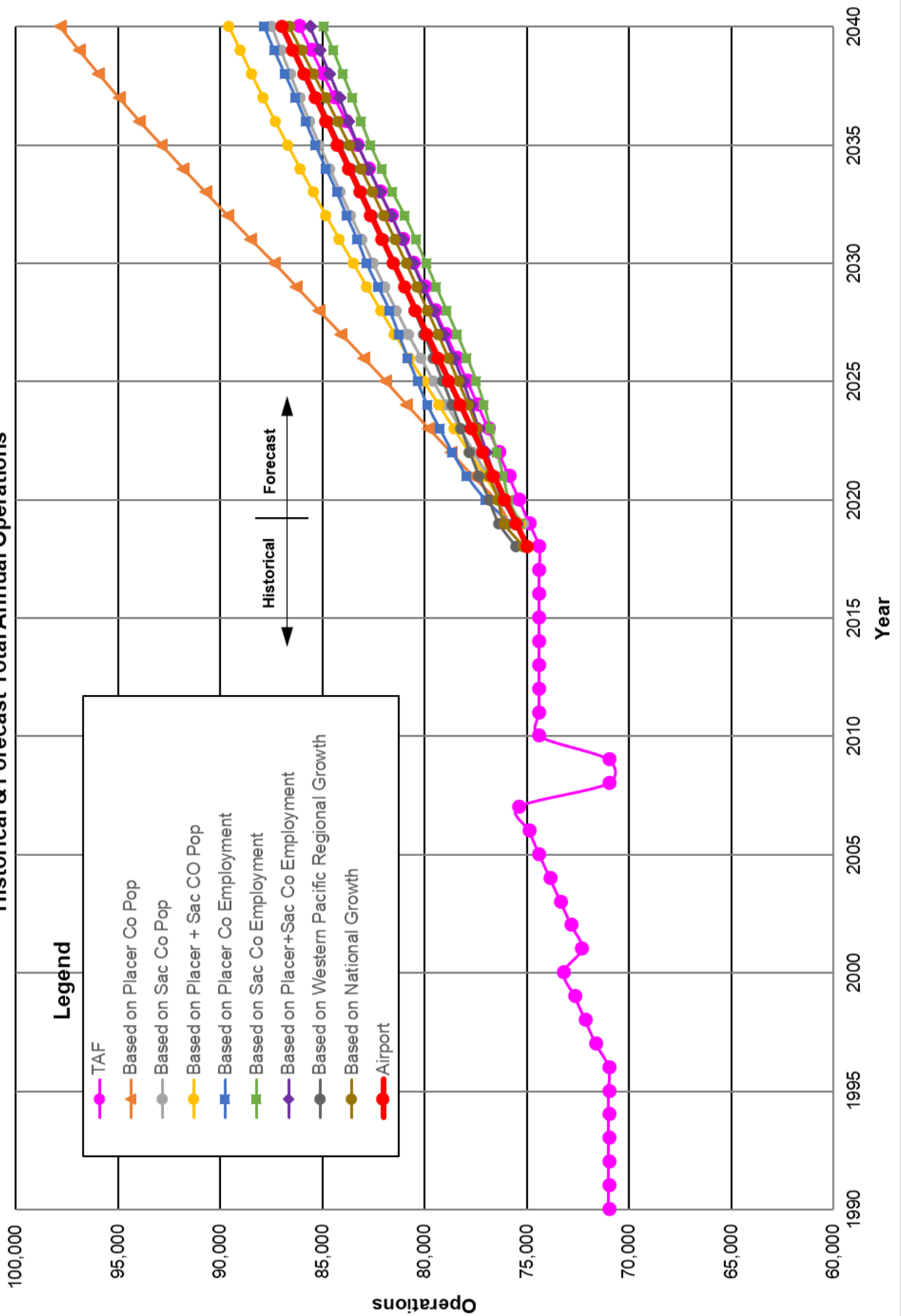
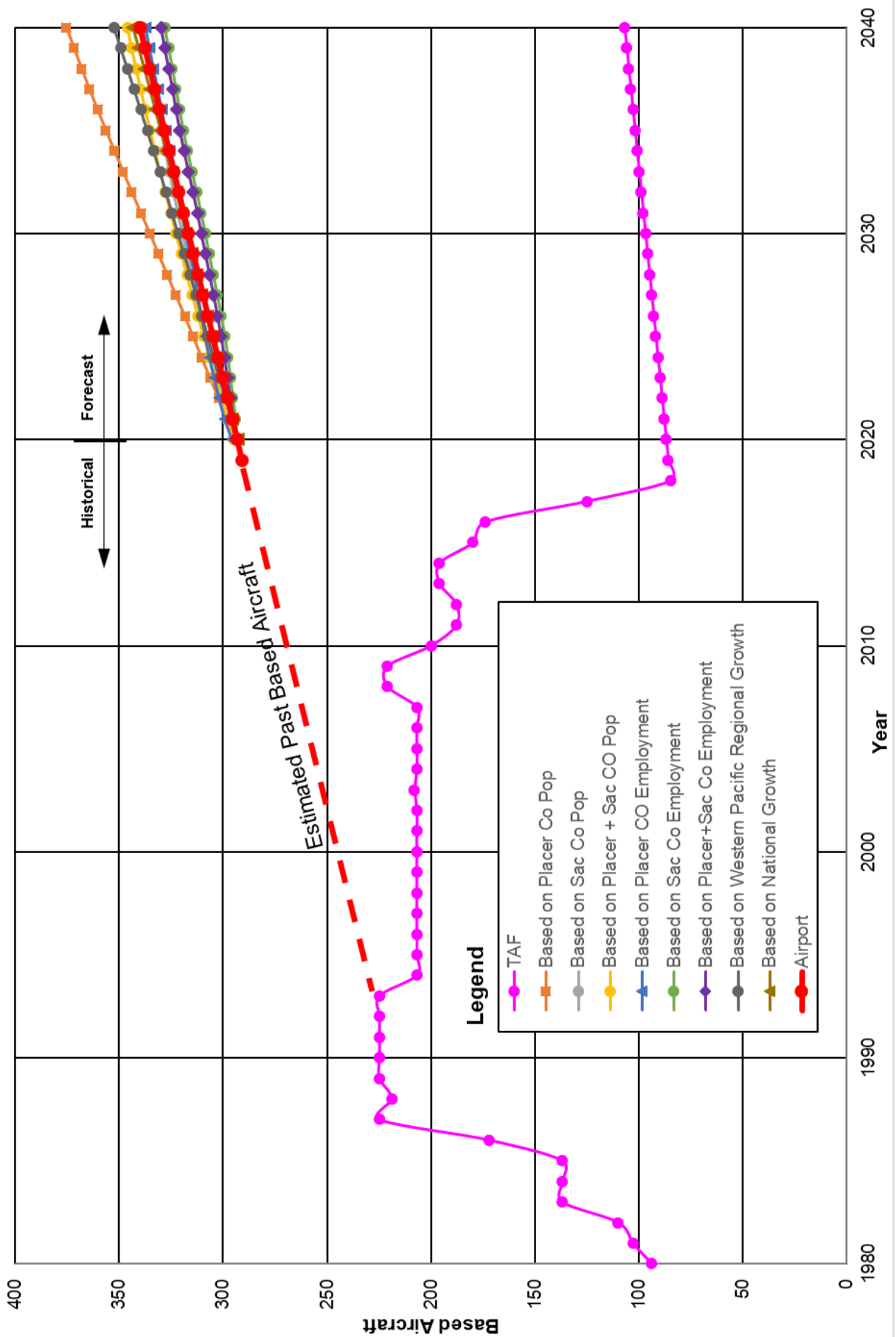


Plate No. 3-4  
Lincoln Regional Airport  
Historical & Forecast Based Aircraft





## CHAPTER 4. ALTERNATIVES/PROPOSED DEVELOPMENT

This chapter of the narrative evaluates feasible airport development alternatives that would enable the Airport to meet its current needs and long-term needs. Proposed development items are presented in Items 4-1 through 4-3 for Short-, Mid-, and Long-Term. A summary of proposed development items is presented in Table No. 4-1.

The pavements on the existing runways, taxiways, aprons, and taxilanes range in age from the rehabilitation of the Runway 15-33 Complex in 1983 (37 years) to the rehabilitation of tie down apron in 2015. The runway, taxiway, and apron pavements are flexible pavements using asphaltic concrete surfacing and were designed to accommodate single-gear aircraft weighing up to 30,000 pounds and dual-gear aircraft weighing up to 100,000 pounds. A Pavement Management Plan was performed for Lincoln Regional Airport in 2008 and updated in 2015. Recommendations for maintenance or rehabilitation of all pavements were included in this report and added to the development program for this airport.

In 2019 the Airport recorded 300 operations of business jets at the Lincoln Regional Airport. This number did not include any nighttime operations. Due to the proximity of Lincoln Regional Airport to the Sacramento area and the current jet operations that occur, it is anticipated that business jet activity will increase significantly if adequate facilities are available such as a jet center, hangars, etc.

In order to provide room for business jet facilities and operation of the business jet at the Lincoln Regional Airport, provision has been made in the Airport Layout Plan for a 1,000-foot extension to the instrument runway, providing a 7,001 foot total length, and providing facilities such as Jet Centers to service the business jet on both the east side and the west side of the airport. The development of a Jet Center would occur on the east side of the airport prior to any development on the west side due to the existing developments and the estimated timing of the west sided development not anticipated to occur within the next 20 years. The west side development has the advantage of close proximity to the long runway, but there are no developments in this area at this time. The proposed east side development is near the center of the existing east side developments and hangar development with good access to the runway.

It is recommended that these areas be saved for business jet aircraft operations until it is necessary to finalize the site selection, at which time the most suitable site can be determined. These projects are incorporated into the proposed Medium- and Long-Term developments.

### 4-1 Short Term Development – 0 to 5 Years

#### 4-1.1 Reconstruct Runway 15-33, Regrade Shoulders and Runway Safety Areas

Pavement Evaluation Studies conducted in 2008 and updated in 2015 indicate that from a subgrade strength standpoint, the pavements on Runway 15-33 have a

remaining life of 15 to 20 years with forecast traffic. The bituminous surface course pavement is weathering and many cracks have developed. It is considered that from a pavement surface standpoint these pavements have a remaining life of 1 to 4 years. It is important that this runway is reconstructed within the next 1 to 4 years. It will be necessary to regrade the shoulders of the runway since the grade of the runway will be raised in this project. It is currently proposed to reconstruct the runway in 2022.

FAA inspections have pointed out deficiencies in the compaction of the safety areas. These deficiencies include roughness and erosion. Rehabilitation of the RSA will consist of disking the soil, compacting it, grading to proper grades and slopes, and harrowing the top inch to allow regrowth of existing vegetation. It is proposed to rehabilitate the safety areas at the same time the runway is rehabilitated.

The extended RSA off the south end of the runway is particularly rough and out of standards. Lincoln has some vernal pools and wetlands adjacent to the RSA and in the extended RSA. Detailed alternative analyses have been conducted to determine how to possibly minimize or eliminate disturbing these environmentally sensitive areas including shortening the runway, moving the thresholds, and over-excavating the pavement section to install a new pavement section without raising the grades. Shortening the runway or moving thresholds was not a viable option as it would cause all the ILS equipment to be relocated, it would make the runway unusable for some of the existing and future jet traffic, and shifting the runway to the north would impact other vernal pools and wetlands. Over-excavating the existing pavement section to install a new pavement section at the same grades would eliminate some fills in the RSA, but it would cause the cost of the project to double or triple, which is not a viable alternative due to limited funding constraints. An Environmental Assessment will be conducted to satisfy all NEPA requirements prior to the design and reconstruction of the runway and RSA grading.

The runway lights were installed in 1983. These lights are old, the cable serving the lights has low-resistance to ground, and it is difficult to maintain the system. It is proposed to reconstruct the entire runway lighting system at the airport. The existing underground electrical duct appears to be in good condition. The regulators serving the runway are operating satisfactorily, but will need to be replaced as major changes in the load and operation of the lighting system have shown to cause old regulators to prematurely fail. This project will include removing and replacing all of the existing medium intensity runway edge lights, airfield guidance signs and transformers and removing and replacing all of the electrical cable associated with the runway lighting system.

#### 4-1.2 Reconstruct Taxiways A, D, E, G, J, and K and Taxiway Lighting

Pavement Evaluation Studies conducted in 2008 and updated in 2015 indicated that from a subgrade strength standpoint, the pavements on Taxiways A, D, E, G,

J, and K have a remaining life of 8 to 20 years. The bituminous surface course pavement is weathering and many longitudinal and transverse cracks and block cracking have developed. It is considered that from a pavement surface standpoint these pavements have a remaining life of 3 to 6 years. It is proposed to reconstruct these taxiways in the short-term, in 2024.

The existing taxiway lights were installed in 1984. These lights are old, the cable serving the lights has low-resistance to ground, and it is difficult to maintain the system. It is proposed to reconstruct the entire taxiway lighting system at the airport. The existing underground electrical duct appears to be in good condition. The regulators serving the taxiways are operating satisfactorily, but will need to be replaced as major changes in the load and operation of the lighting system have shown to cause old regulators to prematurely fail. This project will include removing and replacing all of the existing medium intensity taxiway edge lights, taxiway signs and transformers and removing and replacing all of the electrical cable associated with the taxiway lighting system.

#### 4-1.3 Land Acquisition – 1.6 Acre

There is a 1.6-acre parcel of land located immediately east of Taxiway A that the Airport plans to acquire to provide improve access to the development area from Taxiway A. It is anticipated to complete this land acquisition in 2025-2026.

## 4-2 **Mid Term Development – 6 to 10 Years**

### 4-2.1 Flightline Drive Rehabilitation Phase 2

Flightline Drive is in a condition of incipient failure at this time. There is extensive alligator cracking and some minor rutting. Much of this road has curb and gutter development on both sides and the grade cannot be raised enough to strengthen the pavement section without reconstructing curbs, gutters, and sidewalks and modifying drainage. It is, therefore, proposed to reconstruct Flightline Drive. The first phase rehabilitation was accomplished in 2013. At this time it is proposed to complete this project in 2026.

### 4-2.2 Apron Rehabilitation

Pavement evaluation studies conducted in 2008 and updated in 2015 indicate that from a subgrade strength standpoint Units A1, A2, A3, and A4 will have a remaining pavement life so far as deep-seated distress is concerned in excess of 20 years. The existing pavements throughout the apron areas are showing signs of surface distress caused by traffic and environmental conditions. This distress shows up in the form of cracking and raveling of the pavement. It is proposed to rehabilitate these pavements in the mid-term development in 2028.

### 4-2.3 New Tee Hangar and Box Hangar Development – East Side

To meet the demand for hangars at the airport, it is considered that in the mid-term it will be necessary to construct a series of new hangars. These hangars will be located in the central portion of the of the airport immediately south of the existing northern hangar development. The majority of this development will occur on existing tie-down apron. The development of the site for these hangars will include grading and drainage of the complete site and the installation of new pavement sections for collector taxiways and taxilanes between the hangar sites. This development will ultimately consist of three new hangar buildings with nested T-hangars and one new building of executive box hangar type development, including all site work and hangar construction.

## 4-3 Long Term Development – 11 to 20 Years

### 4-3.1 Southeast Hangar Site Development

To meet the demand for hangars at the airport, it is considered that in the mid-term it will be necessary to construct a series of new hangars. These hangars will be located in the southeast portion of the airport immediately south of the existing south hangars. The development of the site for these hangars will include grading and drainage of the complete site and paving of a 35-foot wide collector taxiway and five 25-foot wide taxilanes between the hangar sites.

### 4-3.2 Runway 15R Extension and Associated Taxiways

Lincoln Regional Airport has one runway, 100 feet by 6,001 feet. It is proposed to extend this runway by 1,000 feet, providing a total length of 7,001 feet. For the Lincoln Regional Airport – with an airport elevation of 118 feet MSL, average maximum average temperature of hottest month of 97 degrees, 0 wind, and 0 runway gradient – the runway length requirement for large airplanes of 60,000 pounds or less is 7,300 feet for 75 percent of the fleet at 90 percent useful load and 9,200 feet for 100 percent of the fleet at 90 percent useful load. The design aircraft for future use at this airport are the business jets such as Citation X and Gulfstream V. All these aircraft require runway lengths in excess of 6,000 feet, and only the Gulfstream V requires runway lengths greater than 7,000 feet. If the existing runway at Lincoln Regional Airport is extended to 7,001 feet it would adequately serve all of the expected fleet. It is impractical to extend the runway to the south because of the location of Nicolaus Road and housing developments to the south of the airport. It is, therefore, proposed to extend the runway to the north to avoid conflicts with roads and development.

### 4-3.3 Construction of Runway 15L-33R

A parallel runway will be required in the future to increase the capacity of the airport. This parallel runway can be designed as a reliever runway in which the small airplanes are diverted from the long runway to the new parallel runway, thus providing the additional required capacity on the long runway. A 3,350-foot long by 60-foot wide runway is proposed. To keep this runway centered as much as possible on the existing and future development areas and to allow sufficient distance off the end of the runway so that aircraft can taxi on the cross taxiways without interfering with approaches to the short runway, it is recommended that the runway extend from Taxiway E to Taxiway J. To provide simultaneous VFR operations on the two runways, and thus realize the increased capacity, it will be necessary that the centerline spacing between the two runways be established at 700 feet. This spacing was anticipated in the original 1976 Master Plan and there will be no need to adjust any of the taxiways to accommodate this runway. The parallel runway will have an ARC A-I Small classification.

### 4-3.4 Air Traffic Control Tower

An Air Traffic Control Tower's primary purpose is to ensure a safe airport environment by providing sufficient separation between aircraft landing and departing. As aircraft operations increase and the mix of aircraft types varies, the need for a control tower increases. Provision has been made in the Airport Layout Plan for the installation of an Air Traffic Control Tower as the need arises.

### 4-3.5 West Side Development

Development at other airports indicates that with the introduction of business jets to the airport that there is a significant need for box hangars and large corporate hangars. The corporate hangars are generally 100 foot by 100 foot or larger. It is considered appropriate to maintain the smaller aircraft, including the propeller-driven single engine and twin engine aircraft and some of the jets, on the east side of the airport and to place the large corporate jet facilities at a separate location. These facilities could be located on the west side of the airport and would need to be serviced by a new taxiway on the west side of Runway 15-33. A second jet center and fueling facilities may ultimately be necessary on this side of the airport. The Airport Layout Plan identifies the area on the west side of the runway that needs to be reserved for this future development if/when the east side becomes fully developed and runs out of space. It is proposed to construct a service road to this area, which will allow access onto the airport off Nicolas Road and loop around and depart on Airport Road.

The development on the west side of the airport is anticipated to be beyond the 20-year development plan laid out in this ALP, but can be moved up if the need for this additional development develops earlier than anticipated

A summary of all proposed development items is presented in Table No. 4-1.

#### 4-4 Approach Procedure Requirements

Lincoln Regional Airport has the following published instrument approach procedures:

- ILS or Localizer Runway 15
- Satellite-based GPS instrument approach procedure – Runway 15 and Runway 33.

The published visibility minimums for Runway 15 is less than 3/4-mile and Runway 33 is less than 1-mile. The airport also has the VOR circling procedure for Runway 15 utilizing ground-based navigation.

#### 4-5 Navigational Aids and Other Equipment Needs

NAVAIDs at the airport provide visual and instrument approaches to the runway. The instrument landing system (ILS) provides precision approach to Runway 15 with minimums of ½-mile visibility and 200-foot ceiling. Non-precision approaches to Runway 15 include a very high frequency omni-directional range (VOR) and global positioning system (GPS). Runway 33 has a non-precision GPS approach.

There is a segmented circle and lighted wind cone located adjacent to Runway 33. There is no plan to relocate or replace these facilities.

There is an airport beacon located on the airport. There are no planned changes to this beacon.

#### 4-6 Wind Coverage

Wind data indicate that Runway 15-33 has a wind coverage of 96.8 percent at 10.5 knots, 98.86 percent at 13 knots, 99.72 percent at 16 knots, and 99.96 percent at 20 knots. It is, therefore, concluded that the runway configuration at Lincoln Regional Airport will provide adequate wind coverage and there is no need for a crosswind runway.

<b>TABLE 4-1 LINCOLN REGIONAL AIRPORT - PROPOSED DEVELOPMENT SCHEDULE</b>		
Description	Triggering Events	Action Items
<b>Short-Term Development - 0 to 5 Years</b>		
Reconstruct Runway 15-33, Regrade Shoulders and Runway Safety Areas (Environmental, Design, and Construction)	The bituminous surface course pavement is weathering and many cracks have developed. It is considered that from a pavement surface standpoint these pavements have a remaining life of 1 to 4 years. There are deficiencies in the compaction of the safety areas.	Reconstruct Runway 15-33 pavements and regrade shoulders. Disk the soil, compact it, grade to proper grades and slopes, and harrow top 1" in the safety areas.
Reconstruct Taxiways A, D, E, G, J, and K (Environmental, Design, and Construction)	The bituminous surface course pavement is weathering and many longitudinal and transverse cracks and block cracking have developed. It is considered that from a pavement surface standpoint these pavements have a remaining life of 3 to 6 years.	Reconstruct Taxiways A, D, E, G, J, and K
Land Acquisition - 1.6 Acres	Access to the development area from Taxiway A is difficult.	Acquire a 1.6-acre parcel of land immediately east of Taxiway A to improve access.
<b>Mid-Term Development - 6 to 10 Years</b>		
Flightline Drive Rehabilitation Phase 2 (Environmental, Design, and Construction)	Flightline Drive is in a condition of incipient failure with extensive alligator cracking and some minor rutting. Phase 1 reconstruction was completed in 2013.	Reconstruct Flightline Drive.
Apron Rehabilitation (Environmental, Design, and Construction)	The existing pavements throughout the apron areas are showing signs of surface distress caused by traffic and environmental conditions in the form of cracking and raveling of the pavement.	Rehabilitate the apron pavements.
East Side Hangar Development - 3 - Tee Hangar Buildings and 1 - Executive Box Hangar Building (Environmental, Design, and Construction)	There is a demand for hangars at the airport and a need for larger box hangars for the small business jets.	Construct a new hangar development in the central portion of the existing tie-down apron just south of the existing hangars. Site work AND buildings included.
<b>Long-Term Development - 11 to 20 Years</b>		
Southeast Hangar <b>Site</b> Development (4 Hangar Rows) - 35' x 560' & 25' x 2,850' - Grade, Drain, & Pave Taxilanes (Environmental, Design, and Construction)	There is a demand for hangars at the airport. Site work for future ground leased hangars.	Construct a new hangar development in the southeast portion of the airport immediately south of the existing south hangars. Site work ONLY.
Runway 15R Extension and Associated Taxiways (Environmental, Design, and Construction)	The current runway length is 6,001 feet, which is not adequate for the business jets forecast to utilize the runway in the future. These aircraft require lengths in excess of 6,000 feet.	Extend Runway 15R and associated taxiways 1,000 feet to the north.
Runway 15L-33R Construction - 60' x 3,350' (Environmental, Design, and Construction)	Additional capacity is required on the runway. Second runway will allow smaller GA operations to be separated from the larger jet operations.	Construct a 60-foot wide by 3,350-foot long parallel runway designed as a reliever runway to provide the additional required capacity on the long runway.
Air Traffic Control Tower	It is estimated that by 2039 traffic will have increased at the Lincoln Regional Airport to a point where air traffic control will be required.	Construct a new Air Traffic Control Tower
West Side Development - Aircraft Parking Apron, West Side Service Road, and West Side Taxiway System	With the introduction of business jets to the airport that there is a significant need for box hangars and large corporate hangars.	Develop a corporate jet facility on the west side of the airport that includes corporate hangars, an aircraft parking apron, a service road, and a taxiway system.

## CHAPTER 5. OBSTRUCTION SURFACES

Airfield safety area requirements are set forth in F.A.A. Advisory Circular 150/5300-13A and FAR Part 77. The Airport Design Manual defines the requirements for threshold siting surfaces, runway protection zones (RPZ), runway safety areas (RSA), and runway object free areas (ROFA). Part 77 defines the surfaces surrounding the airport above which objects penetrating those surfaces will affect navigable airspace. These surfaces include primary surface, approach surface, transitional surface, horizontal surface, and conical surface.

There are several objects located around the airport that are considered obstructions the Part 77 primary surfaces, approach surfaces, transitional surfaces, threshold siting surfaces, and OCS departure surfaces at this time or in the future. These obstructions include the trees, poles, terrain, and fences. Each obstruction is identified in an obstruction data table located in the Airport Layout Plan sheet set on Sheet 7 of 12. This table also includes the mitigation recommended for each obstruction.



## **CHAPTER 6. RUNWAY PROTECTION ZONE**

The Runway Protection Zones (RPZ) for Runway 15 and Runway 33 are shown on the Airport Layout Plan, Sheet No. 2.

There are no incompatible land uses inside the Runway Protection Zone (RPZ) to Runway 15 or Runway 33. There is no planned future development at Lincoln Regional Airport in the RPZ.

The Runway Protection Zones for future Runway 15L and Runway 33R are also shown on the Airport Layout Plan. There are no incompatible land uses inside the RPZ to future Runway 15L or future Runway 33R.

## CHAPTER 7. DEVELOPMENT SUMMARY

### 7-1 Development Projects Completed Since Last ALP

The last Airport Layout Plan Update for Lincoln Regional Airport was prepared in 2007. Since 2007 the following development projects have been completed:

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<b>Project:</b>	Environmental Assessment – West Side Development Installation of AWOS III - 2008
<b>AIP No.</b>	3-06-0120-15
<b>Cost:</b>	Total Project Cost – EA \$144,540; FAA Funding \$137,523 Total Project Cost – AWOS \$130,029; FAA Funding \$123,717

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<b>Project:</b>	Flightline Drive Rehabilitation – 2012-2013
<b>AIP No.</b>	3-06-0120-16 and 17
<b>Cost:</b>	AIP 16 – Design - Total Project Cost \$166,667; FAA Funding \$150,000 AIP 17 – Construction – Total Project Cost \$666,667; FAA Funding \$600,000

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<b>Project:</b>	Pavement Management Plan - 2014
<b>AIP No.</b>	3-06-0120-18
<b>Cost:</b>	Total Project Cost \$60,000; FAA Funding \$54,000

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<b>Project:</b>	Crack Seal and Remark Airfield Pavements – 2015-2016
<b>AIP No.</b>	3-06-0120-18 and 19
<b>Cost:</b>	AIP 18 – Design - Total Project Cost \$35,000; FAA Funding \$31,500 AIP 19 – Construction – Total Project Cost \$115,285; FAA Funding \$103,757

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<b>Project:</b>	Upgrade Perimeter Fence Security Gates – 2016-2017
<b>AIP No.</b>	3-06-0120-20 and 22
<b>Cost:</b>	AIP 20 – Design - Total Project Cost \$27,000; FAA Funding \$24,300 AIP 22 – Construction – Total Project Cost 338,519; FAA Funding \$304,667

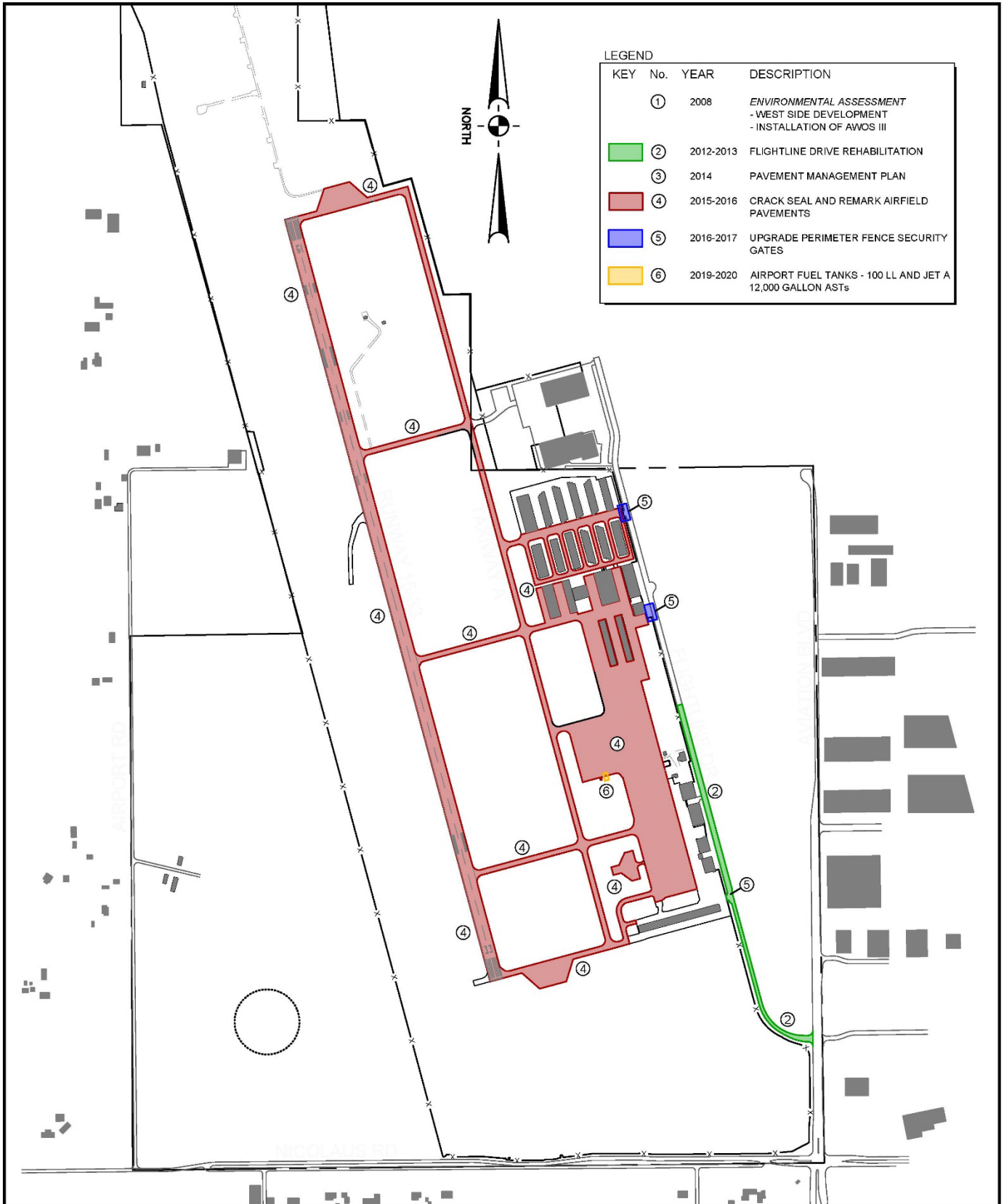
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<b>Project:</b>	Airport Fuel Tanks Project – 2019-2020
<b>AIP No.</b>	City Funded
<b>Cost:</b>	\$1,125,338

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This Airport Layout Plan Narrative and Updated ALP Drawings are currently being funded under AIP No. 3-06-0120-21.

A sketch showing all projects completed since the last Airport Layout Plan is included as Plate No. 7-1.



KEY	No.	YEAR	DESCRIPTION
①		2008	ENVIRONMENTAL ASSESSMENT - WEST SIDE DEVELOPMENT - INSTALLATION OF AWOS III
②		2012-2013	FLIGHTLINE DRIVE REHABILITATION
③		2014	PAVEMENT MANAGEMENT PLAN
④		2015-2016	CRACK SEAL AND REMARK AIRFIELD PAVEMENTS
⑤		2016-2017	UPGRADE PERIMETER FENCE SECURITY GATES
⑥		2019-2020	AIRPORT FUEL TANKS - 100 LL AND JET A 12,000 GALLON ASTs

**LINCOLN REGIONAL AIRPORT**  
LINCOLN, CALIFORNIA

**SKETCH MAP**  
**PROJECTS COMPLETED**  
**SINCE LAST ALP**

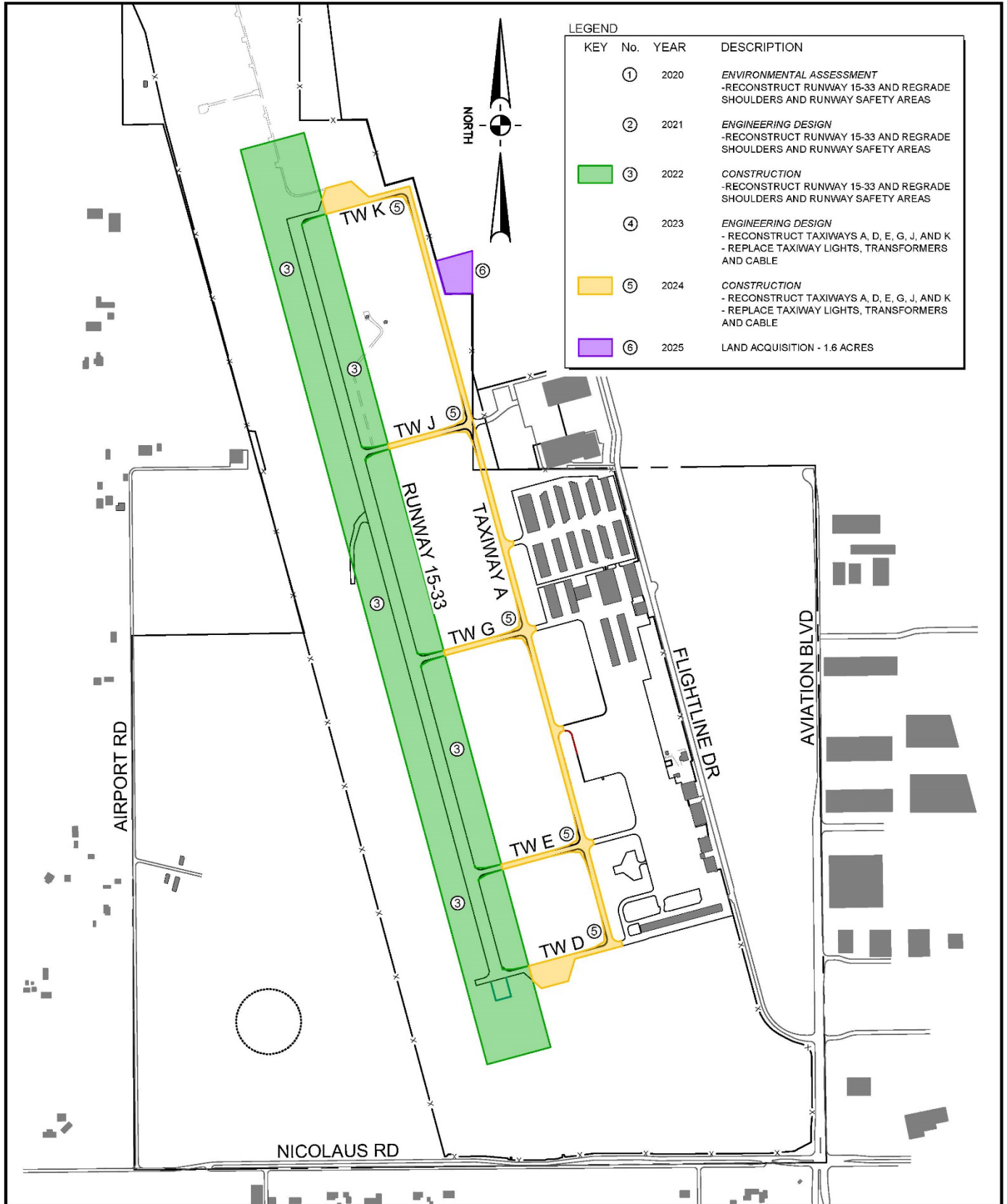
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## 7-2 Development Projects in the Next 0 to 5 Years (2020-2025)

It is proposed to develop the following projects at Lincoln Regional Airport with FAA entitlement/discretionary funds and/or State of California Aeronautics funds in the next 0 to 5 years. All costs are based on 2019 prices and have not been adjusted for inflation.

<b>TABLE NO. 7-1 - SHORT TERM DEVELOPMENT PROJECTS</b>				
Description	Total Cost	F.A.A. Participation	State Participation	Local Participation
<b>Fiscal Year 2020</b>				
<b>Environmental Assessment - Reconstruct Runway 15-33 and Regrade Shoulders and Runway Safety Areas</b>	<b>\$ 285,000</b>	<b>\$ 256,500</b>	<b>\$ 12,825</b>	<b>\$ 15,675</b>
<b>TOTAL FY 2020</b>	<b>\$ 285,000</b>	<b>\$ 256,500</b>	<b>\$ 12,825</b>	<b>\$ 15,675</b>
<b>Fiscal Year 2021</b>				
<b>Engineering Design - Reconstruct Runway 15-33 and Regrade Shoulders and Runway Safety Areas</b>	<b>\$ 840,000</b>	<b>\$ 756,000</b>	<b>\$ 37,800</b>	<b>\$ 46,200</b>
<b>TOTAL FY 2021</b>	<b>\$ 840,000</b>	<b>\$ 756,000</b>	<b>\$ 37,800</b>	<b>\$ 46,200</b>
<b>Fiscal Year 2022</b>				
Construction - Reconstruct Runway 15-33 and Regrade Shoulders and Runway Safety Areas	\$ 8,500,000	\$ 7,650,000	\$ 382,500	\$ 467,500
<b>TOTAL FY 2022</b>	<b>\$ 8,500,000</b>	<b>\$ 7,650,000</b>	<b>\$ 382,500</b>	<b>\$ 467,500</b>
<b>Fiscal Year 2023</b>				
<b>Engineering Design - Reconstruct Taxiways A, D, E, G, J, and K; Replace Taxiway Lights, Transformers and Cable</b>	<b>\$ 665,000</b>	<b>\$ 598,500</b>	<b>\$ 29,925</b>	<b>\$ 36,575</b>
<b>TOTAL FY 2023</b>	<b>\$ 665,000</b>	<b>\$ 598,500</b>	<b>\$ 29,925</b>	<b>\$ 36,575</b>
<b>Fiscal Year 2024</b>				
Construction - Reconstruct Taxiways A, D, E, G, J, and K; Replace Taxiway Lights, Transformers and Cable	\$ 6,320,000	\$ 5,688,000	\$ 284,400	\$ 347,600
<b>TOTAL FY 2024</b>	<b>\$ 6,320,000</b>	<b>\$ 5,688,000</b>	<b>\$ 284,400</b>	<b>\$ 347,600</b>
<b>Fiscal Year 2025</b>				
Land Acquisition - 1.6 Acre	\$ 50,000	\$ 45,000	\$ 2,250	\$ 2,750
<b>TOTAL FY 2025</b>	<b>\$ 50,000</b>	<b>\$ 45,000</b>	<b>\$ 2,250</b>	<b>\$ 2,750</b>
<b>TOTAL SHORT TERM DEVELOPMENT</b>	<b>\$ 16,660,000</b>	<b>\$ 14,994,000</b>	<b>\$ 749,700</b>	<b>\$ 916,300</b>

A sketch showing all projects proposed for development in the 0 to 5-year period is included as Plate No. 7-2.



**LEGEND**

KEY	No.	YEAR	DESCRIPTION
①	2020	ENVIRONMENTAL ASSESSMENT -RECONSTRUCT RUNWAY 15-33 AND REGRADE SHOULDERS AND RUNWAY SAFETY AREAS	
②	2021	ENGINEERING DESIGN -RECONSTRUCT RUNWAY 15-33 AND REGRADE SHOULDERS AND RUNWAY SAFETY AREAS	
③	2022	CONSTRUCTION -RECONSTRUCT RUNWAY 15-33 AND REGRADE SHOULDERS AND RUNWAY SAFETY AREAS	
④	2023	ENGINEERING DESIGN - RECONSTRUCT TAXIWAYS A, D, E, G, J, AND K - REPLACE TAXIWAY LIGHTS, TRANSFORMERS AND CABLE	
⑤	2024	CONSTRUCTION - RECONSTRUCT TAXIWAYS A, D, E, G, J, AND K - REPLACE TAXIWAY LIGHTS, TRANSFORMERS AND CABLE	
⑥	2025	LAND ACQUISITION - 1.6 ACRES	

**LINCOLN REGIONAL AIRPORT**  
LINCOLN, CALIFORNIA

**SKETCH MAP**  
**SHORT TERM**  
**0 TO 5 YEARS**

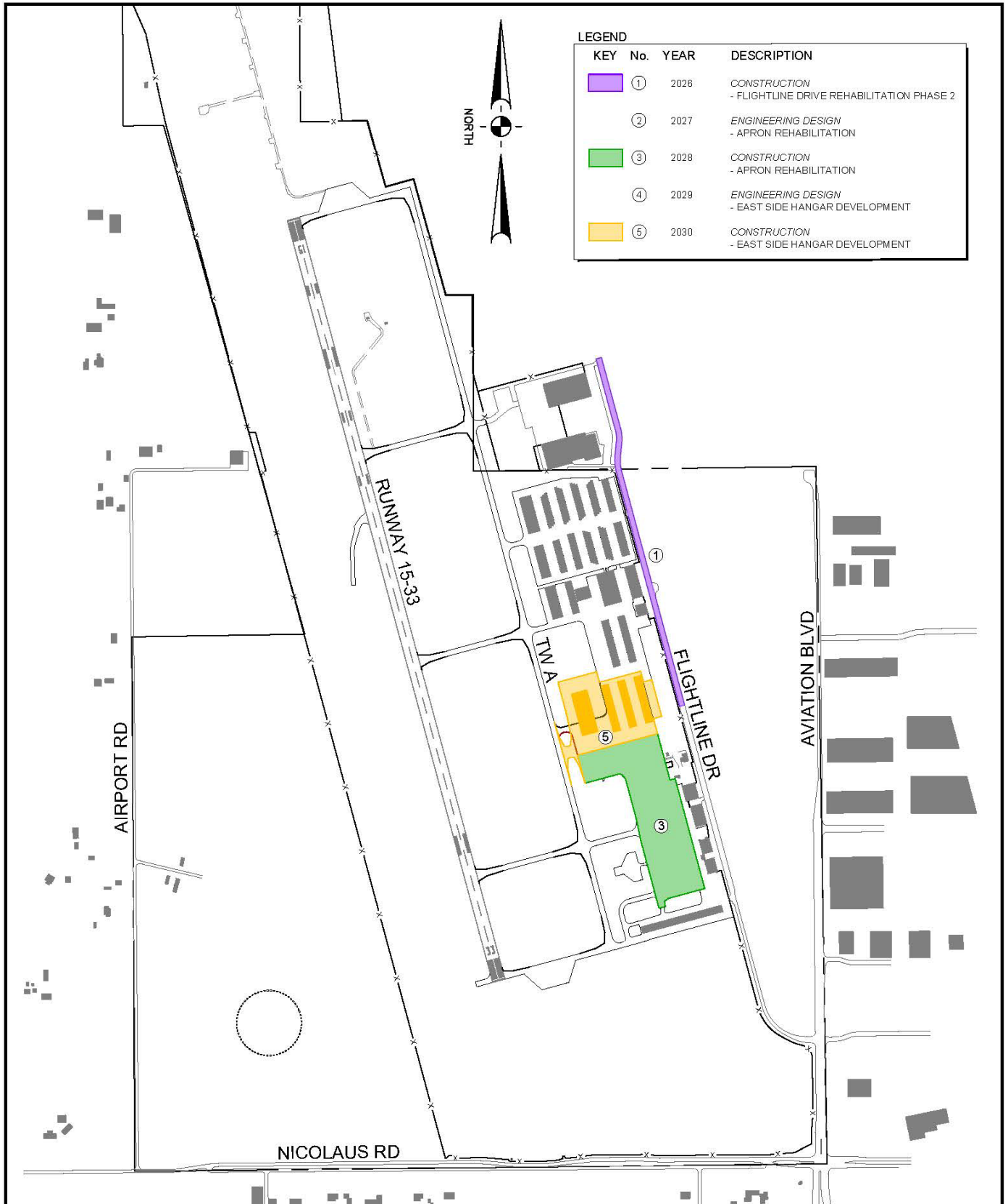
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### 7-3 Development Projects in the 6 to 10 Year Period (2026-2030)

It is proposed to develop the following projects at the Lincoln Regional Airport with FAA entitlement/discretionary funds and/or State of California Aeronautics funding in the 6 to 10-year period. All costs are based on 2019 prices and have not been adjusted for inflation.

<b>TABLE NO. 7-2 - MID TERM DEVELOPMENT PROJECTS</b>				
Description	Total Cost	F.A.A. Participation	State Participation	Local Participation
<b>Fiscal Year 2026</b>				
Construction - Flightline Drive Rehabilitation Phase 2	\$ 670,000	\$ 603,000	\$ 30,150	\$ 36,850
<b>TOTAL FY 2026</b>	<b>\$ 670,000</b>	<b>\$ 603,000</b>	<b>\$ 30,150</b>	<b>\$ 36,850</b>
<b>Fiscal Year 2027</b>				
<b>Engineering Design - Apron Rehabilitation</b>	<b>250,000</b>	<b>225,000</b>	<b>11,250</b>	<b>13,750</b>
<b>TOTAL FY 2027</b>	<b>\$ 250,000</b>	<b>\$ 225,000</b>	<b>\$ 11,250</b>	<b>\$ 13,750</b>
<b>Fiscal Year 2028</b>				
Construction - Apron Rehabilitation	\$ 2,775,000	\$ 2,497,500	\$ 124,875	\$ 152,625
<b>TOTAL FY 2028</b>	<b>\$ 2,775,000</b>	<b>\$ 2,497,500</b>	<b>\$ 124,875</b>	<b>\$ 152,625</b>
<b>Fiscal Year 2029</b>				
<b>Engineering Design - East Side Hangar Development</b>	<b>760,000</b>	<b>684,000</b>	<b>34,200</b>	<b>41,800</b>
<b>TOTAL FY 2029</b>	<b>\$ 760,000</b>	<b>\$ 684,000</b>	<b>\$ 34,200</b>	<b>\$ 41,800</b>
<b>Fiscal Year 2030</b>				
New Tee Hangar and Box Hangar Development - East Side	\$ 12,960,000	\$ 11,664,000	\$ 583,200	\$ 712,800
<b>TOTAL FY 2030</b>	<b>\$ 12,960,000</b>	<b>\$ 11,664,000</b>	<b>\$ 583,200</b>	<b>\$ 712,800</b>
<b>TOTAL PROJECT COSTS</b>	<b>\$ 17,415,000</b>	<b>\$ 15,673,500</b>	<b>\$ 783,675</b>	<b>\$ 957,825</b>

A sketch showing all projects proposed for development in the 6 to 10-year period is included as Plate No. 7-3.



<p><b>LINCOLN REGIONAL AIRPORT</b> LINCOLN, CALIFORNIA</p>	<p><b>SKETCH MAP</b> <b>MID TERM</b> <b>6 TO 10 YEARS</b></p>	<p><b>Reinard W. Brandley</b> CONSULTING AIRPORT ENGINEER</p> <p style="font-size: small;">6125 King Road, Suite 201 • Loomis, California 95650 • (916) 652-4725</p>
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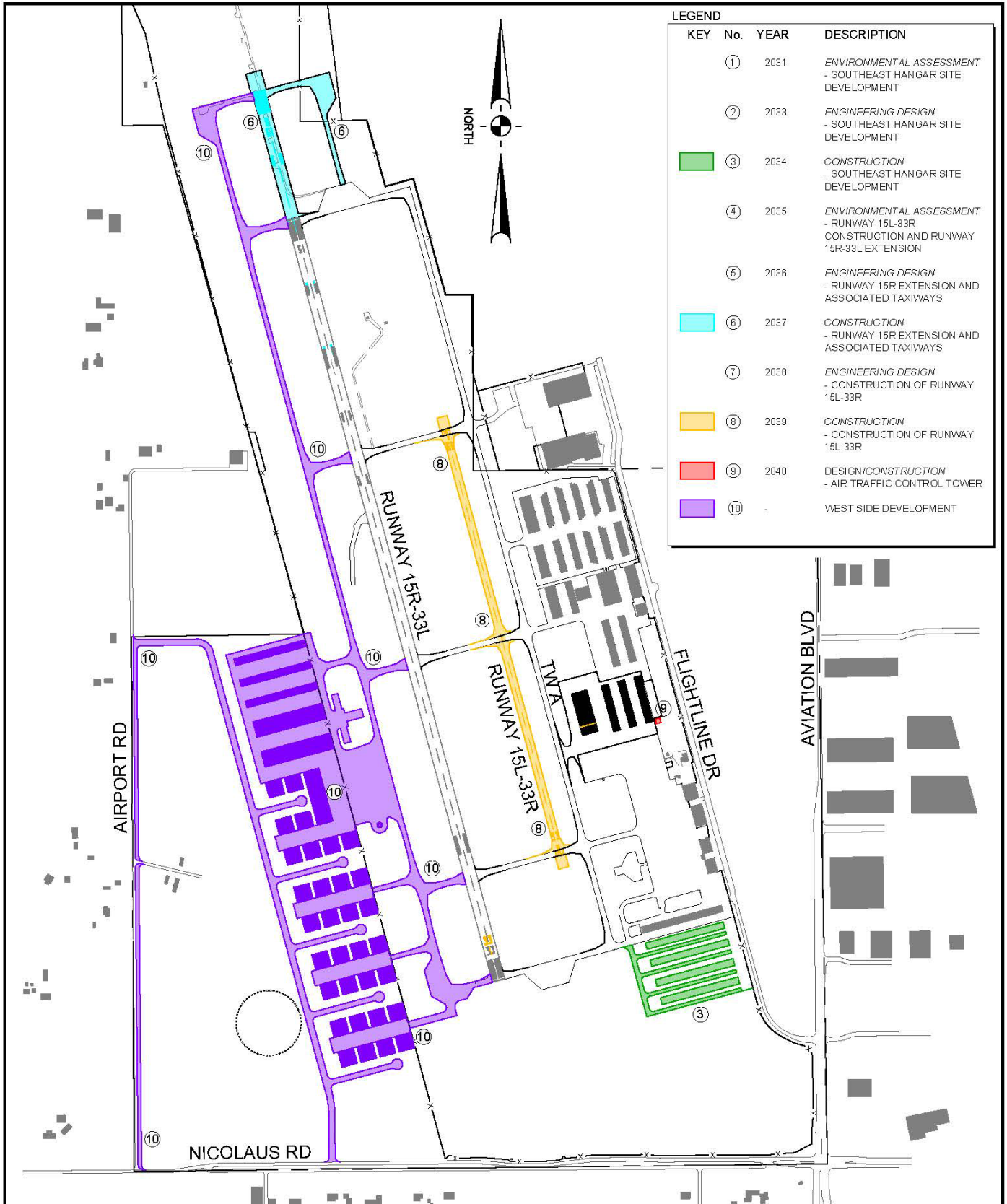


## 7-4 Development Projects in the 11 to 20 Year Period (2031-2040)

It is proposed to develop the following project at the Lincoln Regional Airport with FAA entitlement/discretionary funds and/or State of California Aeronautics funding in the 11 to 20-year period. All costs are based on 2019 prices and have not been adjusted for inflation.

TABLE NO. 7-3 - LONG TERM DEVELOPMENT PROJECTS				
Description	Total Cost	F.A.A. Participation	State Participation	Local Participation
<b>Environmental Assessment - Southeast Hangar Site Development</b>	<b>110,000</b>	<b>99,000</b>	<b>4,950</b>	<b>6,050</b>
<b>Engineering Design - Southeast Hangar Site Development</b>	<b>\$ 140,000</b>	<b>\$ 126,000</b>	<b>\$ 6,300</b>	<b>\$ 7,700</b>
Construction - Southeast Hangar Site Development	\$ 1,470,000	\$ 1,323,000	\$ 66,150	\$ 80,850
<b>Environmental Assessment - Runway 15L-33R Construction and Runway 15R-33L Extension</b>	<b>410,000</b>	<b>369,000</b>	<b>18,450</b>	<b>22,550</b>
<b>Engineering Design - Runway 15R Extension and Associated Taxiways</b>	<b>\$ 408,000</b>	<b>\$ 367,200</b>	<b>\$ 18,360</b>	<b>\$ 22,440</b>
Construction - Runway 15R Extension and Associated Taxiways	\$ 5,050,000	\$ 4,545,000	\$ 227,250	\$ 277,750
<b>Engineering Design - Construction of Runway 15L-33R</b>	<b>\$ 206,000</b>	<b>\$ 185,400</b>	<b>\$ 9,270</b>	<b>\$ 11,330</b>
Construct: Construction of Runway 15L-33R	\$ 2,025,000	\$ 1,822,500	\$ 91,125	\$ 111,375
Design/Construct - Air Traffic Control Tower	\$ 2,000,000	\$ 1,800,000	\$ 90,000	\$ 110,000
West Side Development	To Be Determined			
<b>TOTAL PROJECT COSTS</b>	<b>\$ 11,819,000</b>	<b>\$ 10,637,100</b>	<b>\$ 531,855</b>	<b>\$ 650,045</b>

A sketch showing this project proposed for development in the 11 to 20-year period is included as Plate No. 7-4.



LEGEND			
KEY	No.	YEAR	DESCRIPTION
①	2031		ENVIRONMENTAL ASSESSMENT - SOUTHEAST HANGAR SITE DEVELOPMENT
②	2033		ENGINEERING DESIGN - SOUTHEAST HANGAR SITE DEVELOPMENT
③	2034		CONSTRUCTION - SOUTHEAST HANGAR SITE DEVELOPMENT
④	2035		ENVIRONMENTAL ASSESSMENT - RUNWAY 15L-33R CONSTRUCTION AND RUNWAY 15R-33L EXTENSION
⑤	2036		ENGINEERING DESIGN - RUNWAY 15R EXTENSION AND ASSOCIATED TAXIWAYS
⑥	2037		CONSTRUCTION - RUNWAY 15R EXTENSION AND ASSOCIATED TAXIWAYS
⑦	2038		ENGINEERING DESIGN - CONSTRUCTION OF RUNWAY 15L-33R
⑧	2039		CONSTRUCTION - CONSTRUCTION OF RUNWAY 15L-33R
⑨	2040		DESIGN/CONSTRUCTION - AIR TRAFFIC CONTROL TOWER
⑩	-		WEST SIDE DEVELOPMENT

<p><b>LINCOLN REGIONAL AIRPORT</b> LINCOLN, CALIFORNIA</p>	<p><b>SKETCH MAP</b> <b>LONG TERM</b> <b>11 TO 20 YEARS</b></p>	<p><b>Reinard W. Brandley</b> CONSULTING AIRPORT ENGINEER</p> <p><small>6125 King Road, Suite 201 • Loomis, California 95650 • (916) 652-4725</small></p>
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## CHAPTER 8. ENVIRONMENTAL AND WILDLIFE HAZARD MANAGEMENT CONSIDERATIONS

Wallace Environmental Consulting, Inc. has studied the environs of the Lincoln Regional Airport and has identified environmental settings and conditions which may affect Airport development. These environmental considerations are summarized in this chapter of the ALP narrative.

Lincoln Regional Airport is located in the Great Valley geomorphic province, 25 miles north of Sacramento on the eastern edge of the flat Sacramento Valley floor at the base of the Sierra Nevada foothills. Most of the area is underlain by volcanic flows, which have been covered by sedimentary deposits. These deposits in turn have been cut by seasonal streams.

Lands in the area not developed or not in commercial agricultural use are grassland with oak savannah. Because of clay deposits, some areas don't drain well and water collects in shallow depressions during the rainy season to form temporary vernal pools that often last into early spring. There are approximately 28.5-acres of waters of the U.S. within the Airport boundaries. The Lincoln area is traversed by a number of waterways, including: Markham Ravine and Auburn Ravine near the city, and Ingram Slough and Orchard Creek south of the airport.

### 8-1 Environmental Considerations

#### National Historic Preservation Act (NHPA) Resources

In 2007, for an updated airport master plan, an airport wide cultural resources survey was conducted. The cultural report recorded two historical sites; neither site was considered eligible for inclusion on the NRHP. The 2007 cultural resources report was submitted to the FAA who consulted with California SHPO; it was determined that no cultural resources within the airport were subject to the NHPA.

#### Department of Transportation Act Section 4(f) and 6(f) Resources

The closest public parks to the Airport are: Markham Ravine Park, 1.3 miles southeast of the airport and Foskett Regional Park, 1.5 miles east of the airport. The City of Lincoln is not aware of any land within the vicinity of airport purchased with Section 6(f) Land and Water Conservation Funds.

### Coastal Zone

The Lincoln Regional Airport is located in the Sacramento Valley, California approximately 100 miles east of the Pacific Ocean and therefore, is not within the California Coastal Zone Management Zone.

### Federal or State Listed Endangered, Threatened, or Candidate Species

Based on biological surveys conducted in 2006 and 2007, and a Biological Assessment submitted to the FAA in April 2008, Lincoln Regional Airport is known to have vernal pool habitat which may support vernal pool fairy shrimp vernal pool tadpole shrimp and conservancy fairy shrimp, all federally listed species. The airport supports habitat for foraging raptors and may provide habitat for burrowing owls. No areas on or near the airport are designated as critical habitat. Birds protected by the Migratory Bird Treaty Act may forage on the airport.

### Farmland

According to State of California, Department of Conservation, Farmland Mapping and Monitoring Program, 2017, there is a small farmland parcel (80 acres) of statewide importance approximately 0.30 miles west of the airport.

### Floodplains

Lincoln Regional Airport is not located within either a 100-year or 500-year flood plain. The closest designated 100-year flood plain is along Markham Ravine south and east of the airport.

### Wetlands and Other Waters of the U.S.

In 2008, a wetland delineation map was prepared for the Lincoln Regional Airport. The mapping indicates that there are 28.5 acres of jurisdictional wetlands on the airport. The wetland delineation was submitted to the USACE who conducted five field verification visits; the USACE never issued a final verification.

### Wild and Scenic Rivers

Lincoln Regional Airport is located within the Sacramento River watershed, but is not within any designated wild and scenic river corridor. No segment of the Sacramento River is included in the Wild and Scenic Rivers Act.

### Environmental Justice

There are no minority and/or low-income populations within vicinity of the Airport.

### Noise

The City of Lincoln sets noise standards for land uses in the vicinity of the Airport. According to noise modeling conducted in 2007, aircraft noise does not significantly affect off-site land uses.

### Air Quality

Lincoln Regional Airport is located within the boundaries of the Placer County Air Pollution Control District (APCD), and is within the Sacramento Valley Air Basin (SVAB). Placer County, where the Airport is located, is in an air quality nonattainment area for ozone (8-hour).

### Water Quality

The City of Lincoln operates a municipal drinking water well on the airport along the southern airport boundary. The well is approximately 280 feet south of the Runway 33 RSA. The well is designed and constructed to meet well-head safety standards for a public water source.

## **8-2 Wildlife Hazard Management Considerations**

Lincoln Regional Airport is surrounded by rural and sub-urban development which limits large mammal wildlife habitat. However, coyotes and domestic dogs may cross the Airport. The Airport is within the Pacific Flyway and because of standing water during the winter and spring; migrating birds are attracted to portions of the Airport. There are also resident bird populations in the agricultural fields and in sub-urban neighborhoods near the Airport which forage and cross the Airport.

## CHAPTER 9. AIRPORT LAYOUT PLAN UPDATE

The Airport Layout Plan set of drawings has been prepared and is included with this report. Twelve drawings are included in this set. A table of contents of the drawings is indicated below, along with a general description of information provided on the drawings.

### ***Sheet No. 1 – Title and Index***

***Sheet No. 2 – Airport Layout Plan*** – The Airport Layout Plan shows existing facilities, short-term proposed development, and ultimate development for the airport. This plan also shows recommended areas to be reserved for unanticipated growth.

***Sheet No. 3 – Airport Layout Plan Data Tables*** – The wind rose, runway data tables, runway end data tables, and airport data tables are included on this sheet. This information provides the dimensional details of items shown on the Airport Layout Plan.

There are no items on the airport that are modifications to F.A.A. Advisory Circular 150/5300-13A requirements.

***Sheet No. 4 – East Terminal Area Plan*** – A large scale plan of the East Terminal Area, tee hangar development, helicopter parking area, and FBO building development areas is shown on this drawing.

***Sheet No. 5 – West Terminal Area Plan*** – A large scale plan of the proposed future West Terminal Area, tee hangar development, helicopter parking, and jet center development areas is shown on this drawing.

***Sheet No. 6 – Part 77 Airport Airspace Plan*** - This Airport Airspace Plan is a drawing that depicts the existing critical surfaces for this airport as defined by FAR Part 77 and as they relate to existing and future layout and topography.

***Sheet No. 7 – Obstruction Table*** - This plan contains an obstruction table that summarizes which objects surrounding the airport penetrating FAR Part 77 surfaces, including primary surface, approach surface, transitional surface, horizontal surface, and conical surface.

***Sheet No. 8 – Approach and Departure Profile Runway 15-33*** – This drawing shows the approach (Threshold Siting Surface – TSS) and departure (Obstacle Clearance Surface - OCS) surfaces of the existing and future Runway 15-33 and future Runway 15L-33R.

**Sheet No. 9 – Inner Portion of Approach Surface Plan – Runway 15** - This drawing shows the plan/profile of the approaches to Runway 15. The drawing shows that there are trees that will penetrate the critical surfaces when Runway 15 is extended.

**Sheet No. 10 – Inner Portion of Approach Surface Plan – Runway 33** - This drawing shows the plan/profile of the approaches to Runway 33.

**Sheet No. 11 - Off-Airport Land Use Plan** – This drawing represents the land use recommendations as developed by the State of California Department of Transportation, Aeronautics Division, and provides zoning recommendations to be considered by Cities and Counties.

**Sheet No. 12 – Airport Property Map – Exhibit ‘A’** – The Airport Property Map includes property boundary descriptions for all land owned by the Airport. This is a map showing the major airport features with relation to the property boundaries. The property boundaries are identified by metes and bounds.



Prepared by:

A handwritten signature in black ink, appearing to read "R. Damon Brandley", written over a horizontal line.

R. Damon Brandley, P.E.