# Chapter One
# INVENTORY

# Inventory

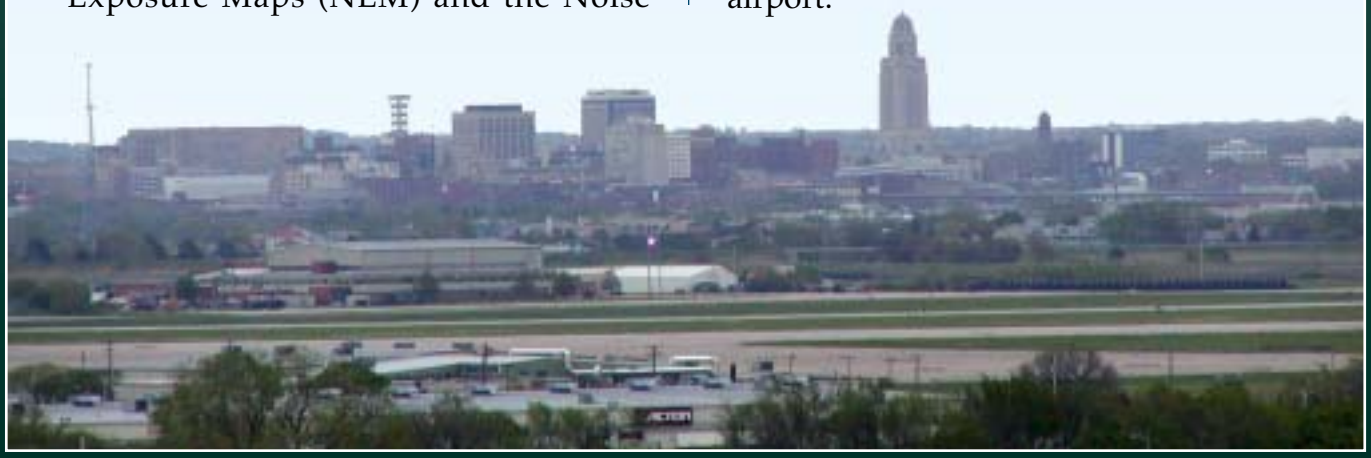
This chapter presents an overview of Lincoln Airport (LNK) and its relationship to the surrounding community. The background information provided in this chapter will be used in later stages of the noise compatibility planning process and contains the following.

- A description of the setting, local climate, and history of the airport.
- A description of airspace and air traffic control.
- A description of key airport facilities and navigational aids.
- A description of existing land uses within the study area.
- A discussion of the local land use planning and regulatory framework within the study area.

This noise study involves the preparation of two official documents: the Noise Exposure Maps (NEM) and the Noise

Compatibility Program (NCP). The NEM document contains a baseline analysis which shows existing and potential future noise conditions at the airport. The NEM document will include Chapters One, Two, and Three of this study.

The NCP document, which will include Chapters Four, Five, and Six, presents a plan for effectively dealing with adverse noise impacts based on a three-step process. First, it addresses alternatives to abate or reduce aircraft noise. Second, it addresses noise mitigation techniques to reduce the impact of noise on sensitive land uses in the area. Third, it addresses land use planning to encourage future development that is compatible with the airport.



A glossary of airport terms and acronyms is found in the section titled "Technical Information Papers" at the back of this document.

## *JURISDICTIONS AND RESPONSIBILITIES*

Reduction of aircraft noise impacts is a complex issue with several parties sharing in the responsibility: the federal government, state and local governments, planning agencies, the airport proprietor, airport users, and local residents. All interests must be considered in the noise compatibility planning process.

### FEDERAL

Aviation plays a vital role in interstate commerce. Recognizing this, the federal government has assumed the role of coordinator and regulator of the nation's aviation system. Congress has assigned administrative authority to the Federal Aviation Administration (FAA). Specific responsibilities of the FAA include:

- The regulation of air commerce in order to promote its development, safety, and to fulfill the requirements of national defense.
- The promotion, encouragement, and development of civil aeronautics.
- The control of the use of navigable airspace and the regulation of civil and military aircraft operations to promote the safety and efficiency of both.
- The development and operation of a common system of air traffic control and navigation for both military and civil aircraft.

The FAA also administers a program of federal grants-in-aid for the development of airport master plans, the acquisition of land, and for planning, design, and construction of eligible airport improvements. In addition, Congress passed legislation and the FAA established regulations governing the preparation of noise compatibility programs. Laws and regulations were also implemented that required the conversion of the commercial aircraft fleet to quieter aircraft.

#### F.A.R. Part 150 Noise Compatibility Studies

The *Aviation Safety and Noise Abatement Act of 1979* (ASNA, P.L. 96-193), signed into law on February 18, 1980, was enacted, ". . . to provide and carry out noise compatibility programs, to provide assistance to assure continued safety in aviation, and for other purposes." The FAA was vested with the authority to implement and administer the Act.

Federal Aviation Regulation (F.A.R.) Part 150, the administrative rule promulgated to implement the Act, sets requirements for airport operators who choose to undertake an airport noise compatibility study with federal funding assistance. As previously discussed, Part 150 provides for the development of two final documents: the

Noise Exposure Maps and the Noise Compatibility Program.

***Noise Exposure Maps.*** The Noise Exposure Maps (NEM) document describes existing and future noise conditions at the airport. It can be thought of as a baseline analysis defining the scope of the noise situation at the airport and including maps of noise exposure for the current year, five-year, and long-range forecasts. The noise contours are depicted on various land use maps to reveal areas of non-compatible land use. Included in the document is detailed supporting information which explains the methods used to develop the maps.

Part 150 requires the use of standard methodologies and metrics for analyzing and describing noise. It also establishes guidelines for the identification of land uses which are incompatible with different noise levels. Airport proprietors are required to update noise exposure maps when changes in the operation of the airport would create any new, substantial non-compatible use. This is defined as an increase in the yearly day-night average sound level (DNL) of 1.5 decibels over noncompatible land uses.

A limited degree of legal protection can be afforded to the airport proprietor through preparation and submission of noise exposure maps. Section 107(a) of the ASNA Act provides that:

> *No person who acquires property or an interest therein . . . in an area surrounding an airport with respect to which a noise exposure map has been submitted . . . shall be entitled to recover damages with respect to the noise attributable to such airport if such person had actual or constructive knowledge of the existence of such noise exposure map unless . . . such person can show –*
>
> *(i) A significant change in the type or frequency of aircraft operations at the airport; or*
>
> *(ii) A significant change in the airport layout; or*
>
> *(iii) A significant change in the flight patterns; or*
>
> *(iv) A significant increase in nighttime operations occurred after the date of acquisition of such property . . .*

The ASNA Act provides that "constructive knowledge" shall be attributed to any person if a copy of the noise exposure map was provided to him at the time of property acquisition, or if notice of the existence of the noise exposure map was published three times in a newspaper of general circulation in the area. In addition, Part 150 defines "significant increase" as an increase of 1.5 DNL. (See F.A.R. Part 150, Section 150.21 (d), (f), and (g); and Airport Environmental Handbook, Order 5050.4A, 47e(1)(a).) For purposes of this provision, FAA officials consider the term "area surrounding an airport" to mean an area within the 65 DNL contour.

Acceptance of the noise exposure maps by the FAA is required before it will approve a noise compatibility program for the airport.

***Noise Compatibility Program.*** A Noise Compatibility Program (NCP) includes provisions for the abatement of aircraft noise through aircraft operating procedures, air traffic control procedures, airport regulations, or airport facility modifications. It also includes provisions for land use compatibility planning and may include actions to mitigate the impact of noise on noncompatible land uses. The program must contain provisions for updates and periodic revisions.

F.A.R. Part 150 establishes procedures and criteria for FAA evaluation of noise compatibility programs. Among these, two criteria are of particular importance: the airport proprietor may take no action that imposes an undue burden on interstate or foreign commerce, nor may the proprietor unjustly discriminate between different categories of airport users.

With an approved noise compatibility program, an airport proprietor becomes eligible for funding through the Federal Airport Improvement Program (AIP) to implement the eligible items of the program.

In 1998, the FAA established a policy for Part 150 approval and funding of noise mitigation measures. The policy states that the FAA will not approve measures in Noise Compatibility Programs that propose corrective noise mitigation actions for new, noncompatible development, which is allowed to occur in the vicinity of airports after October 1, 1998, the effective date of the policy. As of the same effective date, AIP funding under the noise set-aside will be determined using criteria consistent with this policy. Specifically, corrective noise mitigation measures for new noncompatible development that occurs after October 1, 1998 will not be eligible for AIP funding under the noise set-aside regardless of previous FAA approvals under Part 150.

This policy increases the incentives for airport operators to discourage the development of new non-compatible land uses around airports, and to assure the most cost-effective use of federal funds spent on noise mitigation measures.

The new policy does not affect funding under the Airport Improvement Program for noise mitigation projects that do not require Part 150 approval, that can be funded with Passenger Facility Charges (PFCs) revenue, or that are included in FAA-approved environmental documents for airport development.

**F.A.R. Parts 36 And 91**
**Federal Aircraft Noise Regulations**

The FAA has required reduction of aircraft noise at the source through certification, modification of engines, or replacement of aircraft. F.A.R. Part 36 prohibits the further escalation of noise levels of subsonic civil turbojet and transport category aircraft and also requires new airplane types to be markedly quieter than earlier models. Subsequent amendments have extended the noise standards to include small, propeller-driven airplanes and supersonic transport aircraft.

F.A.R. Part 36 has three stages of certification. Stage 3 is the most rigorous and applies to aircraft certificated since November 5, 1975; Stage 2 applies to aircraft certificated between December 1, 1969 and November 5, 1975; and Stage 1 includes all previously certificated aircraft.

F.A.R. Part 91, Subpart I, commonly known as the "Fleet Noise Rule," mandated a compliance schedule under which Stage 1 aircraft were to be retired or refitted with hush kits or quieter engines by January 1, 1988. A very limited number of exemptions have been granted by the U.S. Department of Transportation for foreign aircraft operating into specified international airports.

Pursuant to the Congressional mandate in the *Airport Noise and Capacity Act of 1990*, FAA has established amendments to F.A.R. Part 91 by setting December 31, 1999 as the date for discontinuing use of all Stage 2 aircraft exceeding 75,000 pounds. Stage 2 aircraft operating non-revenue flights can operate beyond the December 31, 1999 deadline for the following purposes:

- To sell, lease, or scrap the aircraft;
- To obtain modifications to meet Stage III standards;
- To obtain scheduled heavy maintenance or significant modifications;
- To deliver the aircraft to a lessee or return it to a lessor;
- To park or store the aircraft;
- To prepare the aircraft for any of these events; or
- To operate under an experimental airworthiness certificate.

Neither F.A.R. Part 36 nor Part 91 apply to military aircraft. Nevertheless, many of the advances in quiet engine technology are being used by the military as they upgrade aircraft to improve performance and fuel efficiency.

### F.A.R. Part 161 Regulation Of Airport Noise And Access Restrictions

F.A.R. Part 161 sets forth requirements for notice and approval of local restrictions on aircraft noise levels and airport access. Part 161, which was developed in response to the *Airport Noise and Capacity Act of 1990* (ANCA), applies to local airport restrictions that would have the effect of limiting operations of Stage 2 or 3 aircraft. Restrictions regulated under Part 161 include direct limits on maximum noise levels, nighttime curfews, and special fees intended to encourage changes in airport operations to lessen noise.

In order to implement noise or access restrictions on Stage 2 aircraft, the airport operator must provide public notice of the proposal and provide at least a 45-day comment period. This includes notification of FAA and publication of the proposed restriction in the *Federal Register*. An analysis must be prepared describing the proposal, alternatives to the proposal, and the costs and benefits of each.

Noise or access restrictions on Stage 3 aircraft can be implemented only after receiving FAA approval. Before granting approval, the FAA must find that the six conditions specified in the statute, and listed below, are met.

(1) The restriction is reasonable, non-arbitrary, and nondiscriminatory.

(2) The restriction does not create an undue burden on interstate or foreign commerce.

(3) The proposed restriction maintains safe and efficient use of the navigable airspace.

(4) The proposed restriction does not conflict with any existing federal statute or regulation.

(5) The applicant has provided adequate opportunity for public comment on the proposed restriction.

(6) The proposed restriction does not create an undue burden on the national aviation system.

In its application for FAA review and approval of the restriction, the airport operator must include an environmental assessment of the proposal and a complete analysis addressing the six conditions. Within 30 days of the receipt of the application, the FAA must determine whether the application is complete. After a complete application has been filed, the FAA publishes a notice of the proposal in the *Federal Register*. FAA must approve or disapprove the restriction within 180 days of receipt of the completed application. Very few Part 161 studies have been undertaken since the enactment of ANCA. **Table 1A** summarizes the studies that have been done to date. Currently, no F.A.R. Part 161 Study has received FAA approval.

Airport operators that implement noise and access restrictions in violation of F.A.R. Part 161 are subject to termination of eligibility for airport grant funds and authority to impose and collect passenger facility charges.

**TABLE 1A**
**Summary of F.A.R. Part 161 Studies**

| Airport | Year | | Cost | Proposal, Status |
|---|---|---|---|---|
| | Started | Ended | | |
| Aspen-Pitkin County Airport, Aspen, Colorado | N.A. | N.A. | N.A. | The study has not yet been submitted to FAA. |
| Kahului Airport, Kahului, Maui, Hawaii | 1991 | 1994 | $50,000 (est.) | Proposed nighttime prohibition of Stage 2 aircraft pursuant to court stipulation. Cost-benefit and statewide impact analysis found to be deficient by FAA. Airport never submitted a complete Part 161 Study. Suspended consideration of restriction. |
| Minneapolis-St. Paul International Airport, Minneapolis, Minnesota | 1992 | 1992 | N.A. | Proposed nighttime prohibition of Stage 2 aircraft. Cost-benefit analysis was deficient. Never submitted complete Part 161 study. Suspended consideration of restriction and entered into negotiations with carriers for voluntary cooperation. |
| Pease International Tradeport, Portsmouth, New Hampshire | 1995 | N.A. | N.A. | Have not yet submitted Part 161 study for FAA review. |
| San Francisco International Airport, San Francisco, California | 1998 | 1999 | $200,000 | Proposing extension of nighttime curfew on Stage 2 aircraft over 75,000 pounds. Started study in May 1998. Submitted to FAA in early 1999 and subsequently withdrawn. |
| San Jose International Airport, San Jose, California | 1994 | 1997 | Phase 1 - $400,000 Phase 2 - $5 to $10 million (est.) | Study undertaken as part of a legal settlement agreement. Studied a Stage 2 restriction. Suspended study after Phase 1 report showed costs to airlines at San Jose greater than benefits in San Jose. Never undertook Phase 2, systemwide analysis. Never submitted study for FAA review. |
| Burbank-Glendale-Pasadena Airport | 2000 | Ongoing | Phase 1 - $1 million (est.) | Proposed curfew restricting all aircraft operations from 10:00 p.m. to 7 a.m. |

**TABLE 1A (Continued)**
**Summary of F.A.R. Part 161 Studies**

| Airport | Year Started | Year Ended | Cost | Proposal, Status |
|---|---|---|---|---|
| Naples Municipal Airport<br>Naples, Florida | 2000 | 2000 | Currently over $730,000<br><br>Expect an additional cost of $1.5 to $3.0 million in legal fees due to litigation. | Enactment of a total ban on Stage 2 general aviation jet aircraft under 75,000 pounds (the airport is currently restricted to aircraft under 75,000 pounds). Airport began enforcing the restriction on March 1, 2002. FAA has deemed the Part 161 Study complete; however, FAA has not ruled on federal grant assurance violations. |

N.A. - Not available.

Sources: Telephone interviews with Federal Aviation Administration officials and staffs of various airports.

### Air Traffic Control

The FAA is responsible for the control of navigable airspace and the operation of air traffic control systems at the nation's airports. Airport proprietors have no direct control over airspace management and air traffic control, although they can propose changes in procedures.

The FAA reviews any proposed changes in flight procedures, such as flight tracks or runway use programs proposed for noise abatement, on the basis of safety of flight operations, safe and efficient use of navigable airspace, management and control of the national airspace and traffic control systems, effect on security and national defense, and compliance with applicable laws and regulations. Typically, FAA implements and regulates flight procedures pertaining to noise abatement through the local air traffic control manager.

## STATE AND LOCAL

Control of land use in noise-impacted areas around airports is a key tool in limiting the number of citizens exposed to noise. The FAA encourages land use compatibility in the vicinity of airports, and F.A.R. Part 150 has guidelines relating to land use compatibility based on varying levels of noise exposure. Nevertheless, the federal government has no direct legal authority to regulate land use. That responsibility rests exclusively with state and local governments.

### State

Although the State of Nebraska does not directly implement and administer

general purpose land use regulations, it has vested counties, cities, and towns with that power through enabling legislation (Chapters 13-301, 13-302, 15-1101, 15-1102, 15-1103, 23-114, and 23-114). Nebraska State Statutes require the establishment of planning commissions, agencies, or departments in municipalities with populations over 100,000. Counties and municipalities are allowed to adopt land use tools to guide the development of the county or city. These tools include comprehensive development plans, zoning and subdivision regulations, and an organized and staffed program to enforce such zoning and subdivision regulations.

### City and County

In the Lincoln Airport study area, land use regulation is controlled by the Lincoln/Lancaster County Planning Department. This joint department is charged with regulating land use within both the city and the county. Staff within the department administers a planning program which includes the comprehensive plan, the capital improvements program, two zoning ordinances, subdivision regulations, historic preservation, and transportation planning.

The City of Lincoln operates under a mayor-council form of government under which each elected member serves a four-year term. The Lincoln City Council consists of seven members, four of which are elected from individual single-member districts with the remaining three being elected on an at-large, nonpartisan basis.

In Lancaster County, the five elected County Commissioners are the overall governing and management body. The County Commissioners are responsible for all budgetary decisions.

In addition to regulating land use, local governments may also acquire property to mitigate or prevent airport noise impacts or may sponsor sound insulation programs for this purpose.

### AIRPORT PROPRIETOR

The Airport Authority of the City of Lincoln was created on February 16, 1959 under the authority of Article 5 of Chapter 3 of the Revised Statutes of Nebraska. Five residents of the city were appointed to the authority by the Mayor and confirmed by the City Council on this date. Under the provisions of the State Airport Authority Act, the governing Board of the Authority is a corporate body and politic constituting a public corporation. The members of the board receive no compensation for their services. Day-to-day operation of the airport is charged to an Airport Director which is hired by the board.

As airport proprietor, the Airport Authority has limited power to control what types of civilian aircraft use its airport or to impose curfews or other use restrictions. This power is limited by the rules of F.A.R. Part 161, described earlier. Airport proprietors may not take actions that (1) impose an undue burden on interstate or foreign commerce, (2) unjustly discriminate between different categories of airport users, or (3) involve unilateral action in

matters preempted by the federal government.

The Airport Authority may take steps to control on-airport noise by installing sound barriers and acoustical shielding or by controlling the times when aircraft engine maintenance run-up operations may take place. Within the limits of the law and financial feasibility, airport proprietors may mitigate noise by acquiring land or partial interests in land, such as air rights, easements, and development rights, to assure the use of property for purposes which are compatible with airport operations.

## *AIRPORT SETTING*

The *National Plan of Integrated Airport Systems* (NPIAS), as established by the FAA, identifies 3,344 airports that are important to national transportation. The NPIAS identifies Lincoln Airport as a primary commercial service airport.

### LOCALE

As depicted on **Exhibit 1A**, Lincoln Airport is located in the northwest corner of the city, approximately five miles from the central business district. To the south, the airport is bordered by Interstate 80. Northeast portions of the airport are bordered by a golf course and commercial uses while northern portions of the airport are bounded by U.S. Route 34 and agricultural uses. West of the airport are a mixture of residential and industrial uses.

### CLIMATE

Weather plays an important role in the operational capabilities of an airport. Temperature is an important factor in determining runway length required for aircraft operations. The percentage of time that visibility is impaired due to cloud coverage is a major factor in determining the use of instrument approach aids. Wind speed and direction determine runway selection and operational flow.

Summers in eastern Nebraska vary from periods of hot dry weather with southerly winds, to periods of higher humidity often associated with severe thunderstorms. Temperatures typically range from 60 to 90 degrees Fahrenheit (F). The mean maximum daily temperature during July, the hottest month, is 89.5 degrees F. Annual precipitation averages 26.9 inches per year, with May and June being the wettest months.

January is the coldest month with an average temperature of 32 degrees F. Cold fronts are typically accompanied by strong northwesterly winds. Snow normally occurs between early November and early April. Average annual snowfall is 29.3 inches, with January and March having the highest average snowfall at 6.5 inches.

Wind speed averages 10.4 miles per hour at Lincoln Airport. April is the windiest month with an average speed of 12.7 miles per hour. The strongest winds typically come out of the north-northwest.

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Lincoln Airport

Exhibit 1A
LOCATION MAP

## *AIRPORT HISTORY*

In 1928, the City of Lincoln approved the issue of a bond to acquire 160 acres of land for airport development. Within the next two years, runways, access roads, and lighting systems were developed and a house was remodeled to serve as an office and waiting room. The airport was officially dedicated on June 12, 1930.

In February 1941, the city requested the inclusion of the airport in the national defense program. Seven months later, the federal government requested permission to utilize the airport. Within the next year, the U.S. Army initiated the construction of facilities on the airport. Approximately $20 million was spent preparing the airport for military use. In return for the facilities, the Army requested that the city provide an additional 2,750 acres of land and the needed electrical and water services. On October 4, 1942, the Lincoln Air Base was formally dedicated.

The Lincoln Air Base became inactive in December 1945 and was declared surplus seven months later. The federal government surrendered its lease in December 1948 which provided for the transfer of the rights, title, and interest in the facilities constructed on airport land to the City of Lincoln.

In 1952, the airport was reactivated by the U.S. Air Force. Separate military facilities were constructed and the airport operated as a joint-use facility until 1964 when the Lincoln Air Base was deactivated. The City of Lincoln renamed the area occupied by the U.S. Air Force to Lincoln Air Park West and proceeded to develop the area into an airport industrial park.

In February 1959 the Lincoln Airport Authority was created. The Authority was, and is, charged with overseeing airport operations.

The City of Lincoln Fire Department assumed the responsibility of providing crash and structural fire protection at the airport in September 1966. A fire station was established in Air Park West to house the required firefighting equipment.

The current airline terminal facilities were opened for operation on December 4, 1974. Facilities included a terminal building, aircraft parking apron, taxiways, access roads, and vehicle parking areas. The FAA airport traffic control tower (ATCT), located in the terminal complex, was dedicated on August 22, 1975. In December 1987, a 549-vehicle parking garage was constructed. Improvements completed in the past ten years include the construction of apron facilities for the Nebraska Air National Guard (NANG), expansion of general aviation facilities, rental car parking lot expansion, and runway improvements.

## *AIRPORT FACILITIES*

Airfield facilities influence the utilization of airspace and are important to the noise compatibility planning process. These facilities can be divided into two distinct categories: airside facilities and landside facilities. Airside facilities include those directly

associated with aircraft operation. Landside facilities include those necessary to provide a safe transition from surface to air transportation and support aircraft servicing, storage, maintenance, and operational safety. Current airfield facilities at Lincoln Airport are depicted on **Exhibit 1B.**

## AIRSIDE FACILITIES

Airside facilities include the runway and taxiway systems, and aircraft and terminal activity areas.

### Runways

The existing airfield configuration at Lincoln Airport includes three runways, two of which are aligned in a parallel configuration. Runway information is summarized in **Table 1B**.

Primary Runway 17R-35L is 12,901 feet long by 200 feet wide. This runway was designed to support military and commercial air carrier aircraft and is strength-rated to 100,000 pounds single-wheel loading (SWL), 200,000 pounds dual-wheel loading (DWL), and 400,000 pounds dual tandem wheel loading (DTWL). SWL refers to the design of the aircraft landing gear that has a single wheel on each main landing gear strut; DWL refers to landing gear that has dual wheels on each main landing gear strut; and DTWL refers to dual landing gear with two wheels on each landing gear strut.

Parallel Runway 17L-35R is used primarily by general aviation aircraft. The runway is 5,400 feet long by 100 feet wide and has been strength-rated to 49,000 pounds SWL and 60,000 pounds DWL.

Crosswind Runway 14-32 is 8,649 feet long by 150 feet wide and has been strength-rated at 80,000 pounds SWL, 170,000 pounds DWL, and 280,000 DTWL. This runway is utilized by all aircraft when wind conditions are not favorable for use of the primary or general aviation runways. Runway 32 has been displaced 470 feet due to an obstruction within the approach, and Runway 14 has been displaced 363 feet to meet safety area requirements.

### Taxiways

The taxiway system at Lincoln Airport consists of parallel, entrance/exit, connecting, and access taxiways. Each runway is served by at least one full length parallel taxiway as depicted on **Exhibit 1B**.

Taxiway A is the full length parallel taxiway which serves general aviation Runway 17L-35R. This taxiway provides access to the general aviation services located within the eastern portions of airport property.

Taxiway D is the full length parallel taxiway for primary Runway 17R-35L. This taxiway, located east of the runway, provides a number of access points to the runway as well as access to the NANG apron.

Taxiway G serves as the second full length parallel taxiway for Runway 17R-35L. This taxiway, located west of the runway, provides access to the primary runway as well as the west

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Highlands Golf Course
North Park Rd.
Capitol Beach Lake
Hangar Facilities
Adams St.
Interstate 80
Union Pacific/Burlington Northern Railroad
General Aviation Apron
Heli Pad
A
PAPI
PAPI
RUNWAY 17L-35R 5,400' x 100'
Nebraska Air National Guard
Air Carrier Apron
N
K
Airline Terminal
VASI
E
Army National Guard Apron
J
Air Traffic Control Tower
Nebraska Air National Guard Apron
D
D
D
H
Localizer
VASI
Localizer
MALSR
RUNWAY 17R-35L 12,901' x 200'
MALSR
VASI
Run-Up Mat
S
E
G
G
RUNWAY 14-32 8,521' x 150'
J
Oak Creek
Existing West Apron
AIRPORT PROPERTY LINE
W. Vine St.
W. Holdrege St.
NORTH
Airpark West
0
1,200
2,400
SCALE IN FEET

KEY

**PAPI** - Precision Approach Path Indicator

**VASI** - Visual Approach Slope Indicator

**MALSR** - Medium intensity approach lighting system with runway alignment indicator lights

Lincoln Airport

Exhibit 1B
AIRFIELD FACILITIES

**TABLE 1B**
**Runway Information**

| | Runways | | | | | |
|---|---|---|---|---|---|---|
| | **17R** | **35L** | **17L** | **35R** | **14** | **32** |
| Runway Length (feet) | 12,901 | | 5,400 | | 8,649 | |
| Runway Width (feet) | 200 | | 100 | | 150 | |
| Runway Surface Material | grooved asphalt/concrete | | asphalt/concrete | | grooved asphalt/concrete | |
| Displaced Threshold | none | | none | | 363 feet | 470 feet |
| Runway Load Bearing Strength | | | | | | |
| SWL | 100,000 | | 49,000 | | 80,000 | |
| DWL | 200,000 | | 60.000 | | 170,000 | |
| DTWL | 400,000 | | N.A. | | 280,000 | |
| Approach Aids | | | | | | |
| PAPI | no | no | yes | yes | no | no |
| VASI | yes | yes | no | no | yes | yes |
| REIL | no | no | yes | yes | yes | no |
| MALSR | yes | yes | no | no | no | no |
| Markings Lighting | precision instrument HIRL | | non-precision instrument HIRL | | non-precision instrument MIRL | |
| Instrument Approach Procedures | ILS, VOR, GPS | ILS, NDB, GPS | VOR, GPS | None | GPS | None |
| Traffic Pattern | right | left | left | right | left | left |

Source: Airport Facility Directory, North Central United States, April 8, 2002

Notes:
SWL - Single wheel loading
DWL - Dual wheel loading
DTWL - Dual tandem wheel loading
REIL - Runway End Identifier Lights
VASI - Visual Approach Slope Indicator
PAPI - Precision Approach Path Indicator
MIRL - Medium intensity runway lighting
HIRL - High intensity runway lighting
MALSR - Medium intensity approach lighting system with runway alignment indicator lights
ILS - Instrument landing system
VOR - Very high frequency omnidirectional range
GPS - Global positioning satellite
NDB - Non-directional beacon

apron area and crosswind Runway 14-32. Crosswind Runway 14-32 is served by Taxiway J. This full length parallel taxiway provides access to the runway as well as the air carrier apron area and the west apron area.

The locations of connecting taxiways are important as they provide complete airfield access to all aircraft. Taxiway E, located within the northern portions of the airport, provides an east-west connection from the general aviation apron to the west apron. Taxiway H, located on the southern portion of Runway 17R-35L, provides access from the ARNG apron to Taxiway D and Runway 17R-35L. Taxiway K, located midfield, serves both as an entrance/exit taxiway for Runway 14-32 and a connecting taxiway for all three runways. This taxiway also provides direct access to the air carrier apron. Taxiway N runs from the southern portion of the general aviation ramp, through parallel Runway 17L-35R, to the displaced threshold on crosswind Runway 14-32. Taxiway S, located approximately midfield, provides access from the midpoint of primary Runway 17R-35L to the west apron area.

## Airfield Lighting

Airfield lighting systems extend an airport's usefulness into periods of darkness and/or poor visibility. A variety of lighting systems are installed at Lincoln Airport for this purpose. These lighting systems, categorized by function, are summarized as follows.

**Identification Lighting:** The location of an airport at night is universally indicated by a rotating beacon which projects two beams of light, one white and one green, 180 degrees apart. The rotating beacon at Lincoln Airport is located on the west side of the airport.

**Runway and Taxiway Lighting**: Runway and taxiway lighting utilizes light fixtures placed near the pavement edge to define the lateral limits of the pavement. This lighting is essential for maintaining safe operations at night and/or during times of poor visibility in order to maintain safe and efficient access from the runway and aircraft parking areas. Medium intensity runway and taxiway lighting (MIRL and MITL) are provided along Runway 14-32 and all of the taxiways. High intensity runway lighting (HIRL) is provided on Runways 17L-35R and 17R-35L.

Runway end identification lighting (REIL) provides rapid and positive identification of the approach end of a runway. Runways 14, 17L, and 35R have been equipped with REILs at Lincoln Airport.

**Approach Lighting**: Visual glide slope indicators (VGSIs) provide visual descent guidance to pilots during an approach to a runway. When intercepted by the pilot, VGSIs give an indication of whether the aircraft is above, below, or within the designed descent path to the runway.

At Lincoln Airport, two types of VGSIs have been installed. A four-box visual approach slope indicator (VASI-4L) is installed on the left side near each end of Runways 17R-35L and 14-32, and a four-box precision approach path indicator (PAPI-4L) is installed on the left side near each end of Runway 17L-

35R. These systems are identical in their purpose of providing visual approach slope guidance to pilots, but vary in their configuration.

## LANDSIDE FACILITIES

Landside facilities are the ground-based facilities that support the aircraft and pilot/passenger handling functions. These facilities typically include the passenger terminal complex, aircraft storage/maintenance hangars, aircraft parking apron and support facilities, such as fuel storage, automobile parking, and roadway access. Landside facilities at Lincoln Airport are identified on **Exhibit 1B**.

### Passenger Terminal Complex

The Lincoln Airport passenger terminal complex is located on the southeast side of the airport near the southeast end of Runway 14-32. The terminal building consists of three levels. The lower level contains parking areas and airport security offices. Level one contains passenger ticketing areas, rental car booths, baggage claim, and other miscellaneous offices. The second level contains dining and lounge areas, Lincoln Airport Authority's offices, and two gate areas. A skywalk on this level connects the terminal building to the parking garage.

### General Aviation Complex

General aviation services are provided exclusively by private businesses at Lincoln Airport. Two major fixed base operators (FBOs), Duncan Aviation and Silverhawk Aviation, provide services at the airport. Facilities utilized by these FBOs are located on the eastern side of the airfield. Services provided by the FBOs include flight training, aircraft maintenance, hangar rental, and fuel sales.

Duncan Aviation is one of Lincoln's largest employers and provides complete services for the sale, operation, and maintenance of all types of general aviation and corporate aircraft. Available services include aircraft sales, major and minor aircraft maintenance, fuel sales, aircraft charter and rental, aircraft parts sales, avionics sales and service, interior and exterior aircraft customizing, as well as a pilot's lounge.

Silverhawk Aviation also provides a variety of services including flight training, aircraft rental, aircraft fueling, aircraft maintenance, hangar rental, charter operations, and a pilot's and passenger lounge.

## OTHER FACILITIES

Other facilities operated at Lincoln Airport include a number of businesses located west of the west apron area and the Nebraska Air National Guard (NANG) and Nebraska Army National Guard (ARNG) which occupy facilities in the southeastern portions of airport property.

## *AIRSPACE AND AIR TRAFFIC CONTROL*

The Federal Aviation Administration (FAA) Act of 1958 established the FAA as the responsible agency for the control and use of navigable airspace within the United States. The FAA Central Region, with offices in Kansas City, Missouri, controls the airspace in eastern Nebraska.

The FAA has established the National Airspace System (NAS) to protect persons and property on the ground and to establish a safe and efficient airspace environment for civil, commercial, and military aviation. The NAS covers the common network of U.S. airspace, including: air navigation facilities; airports and landing areas; aeronautical charts; associated rules, regulations, and procedures; technical information; and personnel and material. The system also includes components shared jointly with the military.

### AIRSPACE STRUCTURE

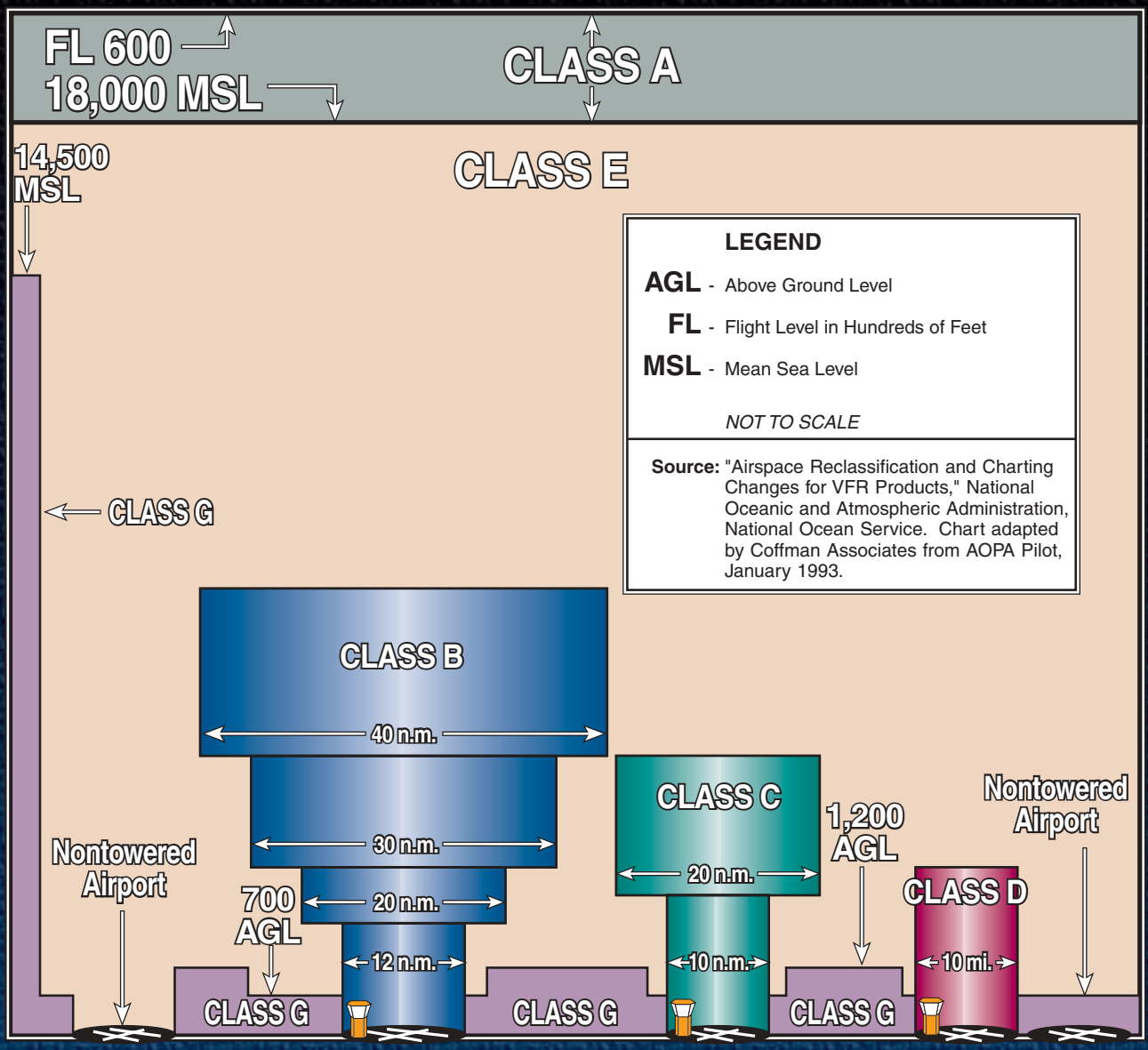
Since the inception of aviation, nations have set up procedures within their territorial boundaries to regulate the use of airspace. Airspace is still broadly classified as either "controlled" or "uncontrolled" in the United States. The difference between controlled and uncontrolled airspace relates primarily to requirements for pilot qualifications, ground-to-air communications, navigation and air traffic services, and weather conditions. Six classes of airspace have been designated in the United States. **Exhibit 1C** shows the airspace classifications and terminology. Airspace designated as Class A, B, C, D, or E is considered controlled airspace. Aircraft operating within controlled airspace are subject to varying requirements for positive air traffic control. Several types of controlled airspace exist in the Lincoln area:

- Class A airspace governs operations above 18,000 feet mean sea level (MSL).
- Class C airspace surrounds towered airports served by radar approach control such as Lincoln Airport.
- Class D airspace encompasses traffic areas for airports with ATCTs.
- Class E airspace encompasses airports without ATCTs.
- Class G airspace covers uncontrolled airspace.

Class B airspace is not present in the Lincoln area. This airspace classification is reserved for airports with the greatest traffic volume in terms of instrument flight rule (IFR) operations and enplaned passengers, such as Kansas City International Airport. Airspace within the study area is depicted on **Exhibit 1D**.

#### Class A Airspace

Class A airspace includes all airspace from 18,000 feet MSL to flight level (FL) 600 (approximately 60,000 feet MSL). This airspace is designated in F.A.R. Part 71.193 for positive control of aircraft. The Positive Control Area

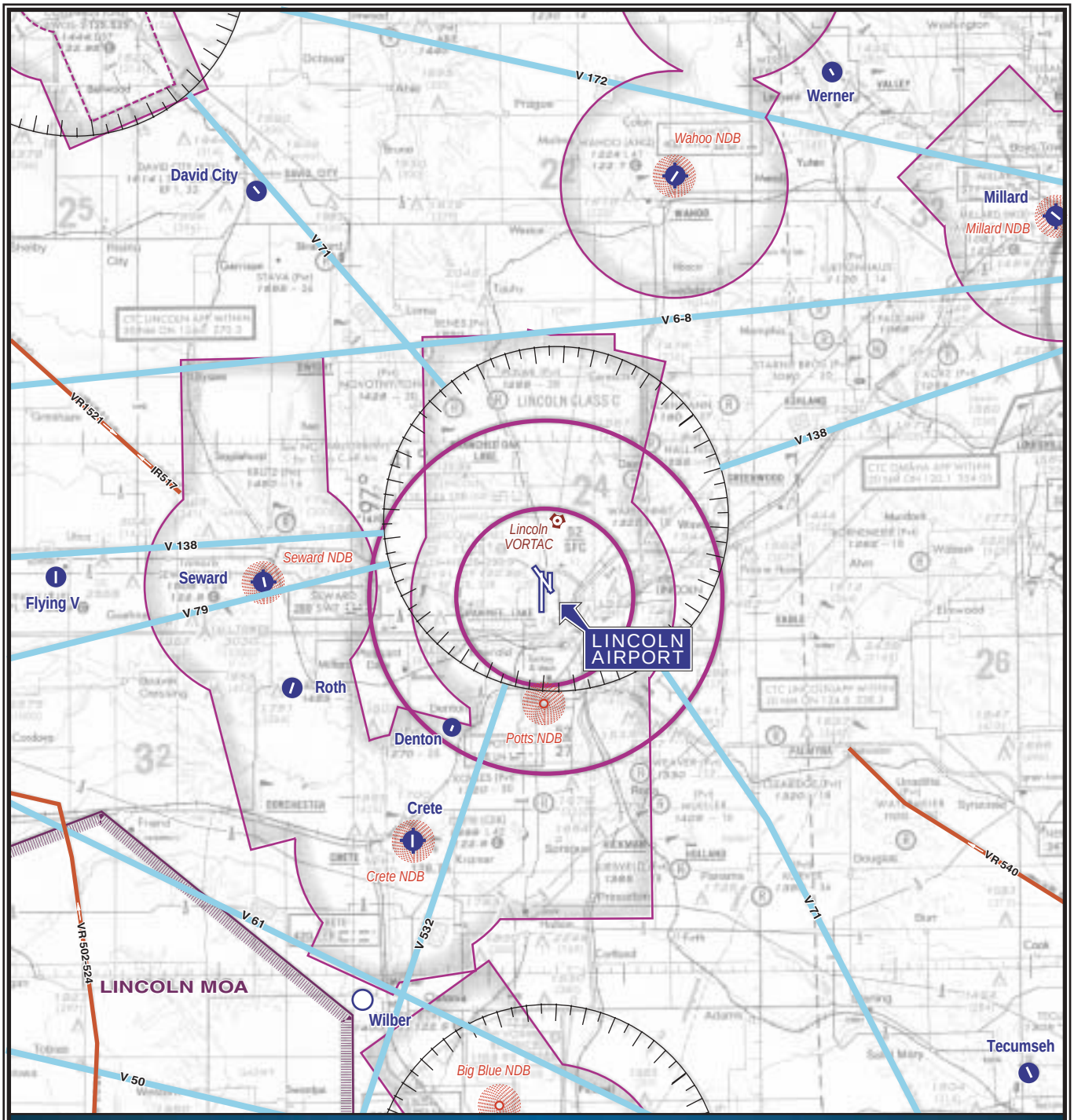



| CLASSIFICATION | DEFINITION |
|---|---|
| CLASS A | Generally airspace above 18,000 feet MSL up to and including FL 600 . |
| CLASS B | Generally multi-layered airspace from the surface up to 10,000 feet MSL surrounding the nation's busiest airports. |
| CLASS C | Generally airspace from the surface to 4,000 feet AGL surrounding towered airports with service by radar approach control. |
| CLASS D | Generally airspace from the surface to 2,500 feet AGL surrounding towered airports. |
| CLASS E | Generally controlled airspace that is not Class A, Class B, Class C, or Class D. |
| CLASS G | Generally uncontrolled airspace that is not Class A, Class B, Class C, Class D, or Class E. |

Lincoln Airport

Exhibit 1C
AIRSPACE CLASSIFICATION

01SP21-1D-6/11/02




## LEGEND

- Airport with other than hard-surfaced runways
- Airport with hard-surfaced runways 1,500' to 8,069' in length
- Airports with hard-surfaced runways greater than 8,069' or some multiple runways less than 8,069'
- VORTAC
- Non-Directional Radiobeacon (NDB)
- Compass Rose
- Class C Airspace
- Class E Airspace with Floor 700 ft. or greater above surface
- Military Training Routes
- Victor Airways
- MOA - Military Operations Area

Source: Omaha Sectional Chart, US Department of Commerce, National Oceanic and Atmospheric Administration

Lincoln Airport

Exhibit 1D
AREA AIRSPACE

(PCA) allows flights governed only under IFR operations. The aircraft must have special radio and navigation equipment, and the pilot must obtain clearance from an air traffic control (ATC) facility to enter Class A airspace. In addition, the pilot must possess an instrument rating.

**Class C Airspace**

Class C airspace is the primary airspace encompassing Lincoln Airport. The core of the Class C airspace is circular and extends from the ground up to 5,200 feet MSL. This area has a radius of five nautical miles from the center of the airport. The outer zone extends from 2,700 feet MSL to 5,200 feet MSL and extends an additional five nautical miles beyond the core on the southern side of the airport.

In order to fly inside Class C airspace, aircraft must have two-way radio communications, an encoding transponder, and must have obtained ATC clearance. Pilots must have at least a student pilot certificate to fly in Class C airspace.

**Class D Airspace**

Class D airspace is controlled airspace surrounding airports with an ATCT. The Class D airspace typically constitutes a cylinder with a horizontal radius of four or five nautical miles from the airport, extending from the surface up to a designated vertical limit, typically set at approximately 2,500 feet above the airport elevation. If an airport has an instrument approach or departure, the Class D airspace extends along the approach or departure path. The airport in the vicinity of Lincoln Airport, which possesses Class D airspace, is the Central Nebraska Regional Airport in Grand Island.

**Class E Airspace**

Class E airspace consists of controlled airspace designed to contain IFR operations, commonly flown routes, and those areas between busy airports. The airspace extends upward from 700 feet above the surface, when established in conjunction with an airport which has an instrument approach procedure, or from 1,200 feet above the surface when established in conjunction with airway route structures or segments. Unless otherwise specified, Class E airspace terminates at the base of the overlying airspace. Only aircraft operating under IFR are required to be in contact with air traffic control when operating in Class E airspace.

Lincoln Airport has airport-specific Class E airspace to the south and north. In addition, Class E transition surfaces cover a large area to the west and southwest of Lincoln and are associated with Seward and Crete airports. These areas are controlled airspace having a floor of 700 feet above the surface. When the tower at Lincoln Airport is closed, airspace above the airport converts to Class E airspace.

### Class G Airspace

Airspace not designated as Class A, B, C, D, or E is considered uncontrolled, or Class G, airspace. Air traffic control does not have the authority or responsibility to exercise control over air traffic within this airspace. Class G airspace lies between the surface and the overlaying Class E airspace (700 to 1,200 feet above ground level [AGL]).

Additional FAA rules regulate flight altitudes over congested residential areas, national parks, and outdoor recreational areas, which are often located under Class G airspace. The overall amount of Class G airspace is continuing to decline due to the need for more coordinated air traffic activity.

### Special Use Airspace

Special use airspace is defined as airspace where activities must be confined because of their nature, or where limitations are imposed on aircraft not taking part in those activities. There is one area of special use airspace within 30 nautical miles of Lincoln Airport. The Lincoln Military Operations Area (MOA) is located approximately 25 miles southwest of the airport. This area is reserved for military use and is designed to separate nonparticipating aircraft from military training operations.

## ENROUTE NAVIGATIONAL AIDS

Enroute navigational aids (NAVAIDS) are established for the purposes of accurate enroute air navigation. Various devices use ground-based transmission facilities and on-board receiving instruments. Enroute NAVAIDS often provide navigation to more than one airport as well as to aircraft traversing the area. Enroute NAVAIDS that operate in the study area are discussed below.

The VOR (very high frequency omnidirectional range) provides course guidance to aircraft by means of a VHF radio frequency. TACAN (tactical air navigation), primarily a military-oriented facility, is often collected with a VOR station. This combined facility is called a VORTAC. TACAN provides both course guidance and line-of-sight distance measurement from a UHF transmitter. A properly equipped aircraft translates the VORTAC signals into a visual display of both azimuth and distance. Distance measuring equipment (DME) is also sometimes collocated with VOR facilities. DME emits signals enabling pilots of properly equipped aircraft to determine their line-of-sight distance from the facility.

There are four VORTAC facilities offering navigational assistance within the study area. These include Lincoln, Grand Island, Pawnee City, and Omaha. In addition, there are two VOR-DME facilities and one VOR facility in the area. These include Columbus, Hastings, and Beatrice.

VORs define low-altitude (Victor) and high altitude airways (Jet Routes) through the area. Most aircraft enter the Lincoln area via one of these federal airways. Aircraft assigned to altitudes above 18,000 feet MSL use the Jet Route system. Other aircraft use the low altitude airways. Radials off VORs

define the centerline of these flight corridors.

There are five Victor Airways in the immediate vicinity of the airport: V-138, V-79, V-532, V-71, and V-138. All of these airways originate from the Lincoln VORTAC.

## AREA AIRPORTS

There are six public-use airports, 25 private airports, and one private heliport within 40 nautical miles of Lincoln Airport. The following six airports are open to the public.

**Crete Municipal Airport** (CEK), located 15.9 nautical miles south-southwest, is served by two runways. Runway 17-35, which is a paved runway, 4,202 feet long by 75 feet wide, and Runway 13-31, which consists of a 3,370-foot long by 150 feet wide turf surface. There are 49 aircraft based at the airport and a limited range of available general aviation services including AvGas, Jet-A, and aircraft maintenance.

**Seward Municipal Airport** (SWT), located 15.9 nautical miles west, is served by two runways. Runway 16-34 is a 3,601-foot long by 60-foot wide paved surface. Runway 4-22 is a turf runway measuring 3,400 feet long by 150 feet wide. There are 26 aircraft based at the airport, and a wide range of services including flight training, AvGas, and aircraft maintenance are available.

**Wahoo Municipal Airport** (AHQ), located 24.6 nautical miles north-northeast, is served by two runways. Runway 2-20 is a 4,101-foot long by 75-foot wide paved runway. Runway 13-31 is a 3,290-foot long by 150-foot wide turf runway. There are 41 based aircraft and a number of services available at the airport including flight training, AvGas, pilot supplies, and aircraft maintenance.

**Wilber Municipal Airport** (0D6), located 24.8 nautical miles south-southwest, is served by two turf runways. Runway 14-32 is 2,150 feet long and 300 feet wide, and Runway 18-36 is 2,345 feet long and 300 feet wide. No based aircraft and no services are available at Wilber Municipal Airport.

**Flying V Airport (Utica)** (09J), located 26.9 nautical miles east, with a 3,000-foot long by 50-foot wide paved runway. There are three aircraft based at 09J, however, no services are available.

**David City Municipal Airport** (93Y) is located 28.1 nautical miles northwest of Lincoln. The primary runway is 3,100 feet long and 50 feet wide with a paved surface. An additional runway, measuring 2,100 feet long and 120 feet wide, is turf. There are seven based aircraft at David City. No aircraft services are available.

**Exhibit 1D** illustrates the location of several area airports.

## INSTRUMENT APPROACHES

Instrument approaches are defined with the use of electronic and visual navigational aids in order to assist pilots in landing when visibility is reduced below specified minimums. While these are