Chapter Five
LAND USE ALTERNATIVES

Land Use Alternatives

The evaluation of noise abatement alternatives in Chapter Four resulted in tentative proposals to promote aircraft noise abatement measures in the vicinity of Lincoln Airport. Nevertheless, even if such measures are implemented, land around the airport will continue to be impacted by aircraft noise.

The purpose of this chapter is to present various land use management alternatives that prevent or reduce these future noise impacts. The chapter begins by formulating various land use planning boundaries followed by the identification of broad planning issues that will be addressed in the land use management plan. Alternative land use management techniques are then evaluated to determine their effectiveness in the Lincoln Airport study area. Finally, preliminary recommendations are presented. These recommendations are to be reviewed by the Planning Advisory Committee (PAC) and local citizens. The final land use management and noise abatement recommendations will be presented in Chapter Six, Noise Compatibility Plan.

LAND USE ISSUES

Before presenting various land use management techniques that could be used to minimize or mitigate the impact of noise created by the airport on residents, the land use issues surrounding the airport must be identified. Three broad noise compatibility planning issues and their mitigation objectives for the Lincoln Airport study area have been identified. These issues are described below and have also been generally located on **Exhibit 5A**.

1. Aircraft noise impacts on noise-sensitive development within the 2002 65 DNL noise contour.

As described in Chapter Three of the Noise Exposure Map (NEM) document, approximately 11 dwelling units are contained within the 2002 65 DNL noise contour. These dwellings are primarily located north and south of the airport.

2. Noise impacts from overflights resulting from training activities at the airport.

Aircraft overflights typically cause low cumulative noise levels; however, overflights can also cause loud, annoying single events. The impacts of overflights on existing residential areas cannot necessarily be mitigated; however, through proper planning, impacts on potential future residents can be minimized.

3. Noise-sensitive development pressure within the current airport influence area under the primary aircraft arrival, departure, and training corridors.

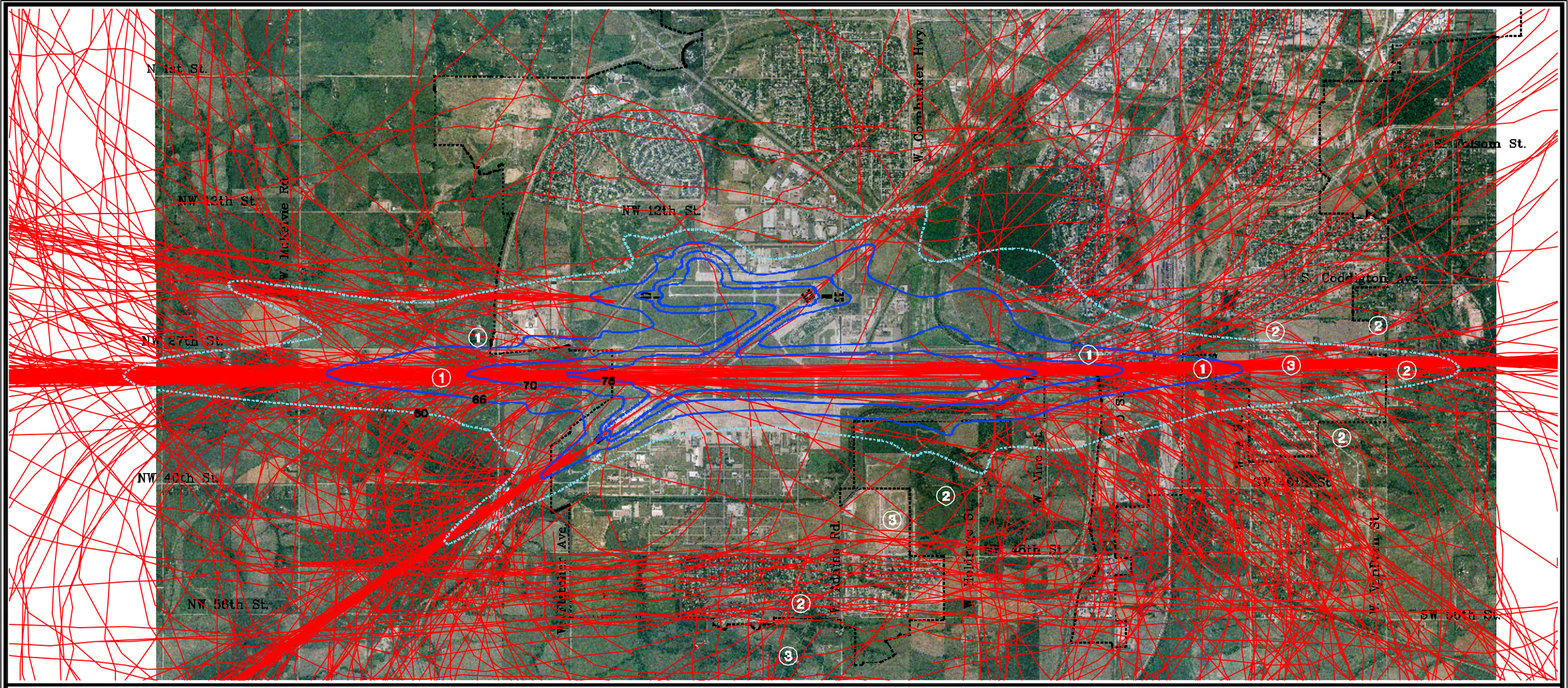
The heaviest concentration of aircraft activity occurs off the extended Runway 17L/R-35L/R centerlines to the north and south, and immediately west of the Airport under the aircraft training pattern. The City of Lincoln has made every effort to plan for compatible land uses within these areas. To ensure compatible development under the primary aircraft arrival, departure, and training corridors, the existing planning tools may need to be modified.

LAND USE COMPATIBILITY BOUNDARY ESTABLISHMENT

In considering potential land use compatibility measures, it is necessary to define the areas within which those policies should apply. The challenge is to define the areas within which the airport now exerts, and in the future may exert, a significant influence on local residents and potentially noise-sensitive land uses. The following sections discuss two methods which have been used by various jurisdictions to establishing boundaries for land use planning purposes.

BOUNDARIES ESTABLISHED UTILIZING AIRCRAFT OPERATIONS

Aircraft operations have been used by jurisdictions to establish large-scale land use planning boundaries. The establishment of such a boundary is beneficial as it allows a jurisdiction to "educate" existing and future landowners of the presence of the airport. In many areas, this boundary is referred to as an Airport Influence Area (AIA). An AIA is typically large enough to contain locations of the primary flight routes in the vicinity of the airport. The airport's Part 77



LEGEND

- Airport Property
- Municipal Boundaries
- 2002 Noise Exposure Contour, Marginal Effect
- 2002 Noise Exposure Contour, Significant Effect
- Radar Flight Track Data (Does not include General Aviation or Overflights)

① Noise Sensitive Land Use Inside the 65 DNL Noise Contour

② Overflight Impact Area

③ Development Pressure Under the Primary Aircraft Arrival, Departure and Training Corridors

Source: Base Information and Map: City of Lincoln Geographic Information System, May 2002. Aerial Photography, June 2002. Coffman Associates Analysis.

NORTH

0 4000

SCALE IN FEET

Lincoln Airport

Exhibit 5A

LAND USE PLANNING ISSUES

horizontal and instrument approach surfaces can be used in defining an AIA as they are good indicators of areas that are impacted by aircraft overflights around the airport. The utilization of flight tracks, such as those depicted on **Exhibit 5A**, can also be beneficial as they provide a visual depiction of exactly where aircraft activity occurs around an airport.

BOUNDARIES ESTABLISHED BY NOISE EXPOSURE CONTOURS

Many jurisdictions have determined a need for land use planning boundaries on a smaller scale. The use of noise contours has successfully met this need as they are widely accepted by a multitude of federal and state agencies as a measurement of the impact of noise. The challenge which has been faced by jurisdictions, when the decision to utilize noise contours as a land use planning tool has been made, is which noise contours are most appropriate for land use planning in their county, city, or town. Cities with airports located in a highly developed urban area may choose to utilize the 65, 70, and 75 DNL noise contours. Other cities with airports located on the urban fringe may choose to utilize the 55, 60, and 65 DNL noise contours. In many cases, the decision on which contours to use appears to be based on the ambient noise level of the airport environs.

Noise analysts have speculated that the overall ambient noise level in a given environment determines to what degree people will be annoyed by aircraft noise of a given level. That is, in a louder environment it takes a louder level of aircraft noise to generate complaints than it does in a quieter environment. The Federal Aviation Administration (FAA), the U.S. Department of Housing and Urban Development (HUD), and the U.S. Environmental Protection Agency (EPA) have all completed studies regarding the impact of various levels of noise on individuals under different ambient noise conditions. These studies are discussed in greater detail within the *Technical Information Paper*, "Noise and Land Use Compatibility Guidelines" located in the back of this document. Results of the studies indicate that noise-sensitive land uses, with no form of noise attenuation, may not be suitable within even the 55 DNL noise contour.

A number of states have made recommendations regarding the use of noise contours for land use planning around airports. The states of Oregon, California, and Florida, to name a few, have all recognized that the contour of significance used in various regions should be based on the ambient noise levels of the area. For example, if an airport is surrounded by primarily low to medium density residential uses, a suitable contour of significance could be the 55 or 60 DNL noise contour. Airports which are surrounded by more urban uses, (i.e. medium to high density commercial and/or residential uses, industrial uses, etc.), may find that the 65 DNL noise contour is appropriate for land use planning purposes.

Sampling of Jurisdictions That Utilize Noise Contours as Land Use Compatibility Boundaries

The following sections contain descriptions of land use planning tools which have been implemented in various jurisdictions utilizing noise contours as a boundary for land use planning purposes.

- FLAGSTAFF, ARIZONA

The City of Flagstaff is located in north-central Arizona and is home to Northern Arizona University. Flagstaff Pulliam Airport is owned and operated by the City of Flagstaff and is identified as a primary commercial service airport within the *National Plan of Integrated Airport Systems* (NPIAS).

Flagstaff Pulliam Airport is located in the southernmost portions of the city and is immediately surrounded by a mixture of open space, commercial, and light industrial development. Residential development pressures are primarily located to the north, south, and southwest of the airport. Ambient noise levels within the airport environs are similar to those experienced in Lincoln as the area surrounding the airport is distanced from the urban core of the city.

The City of Flagstaff has adopted an Airport Influence Area within which avigation easements are required as a condition of development. Additionally, the City also uses various noise contours to guide the types of development allowed within the airport environs. Uses allowed within the various contours are as follows.

60 to 65 DNL Noise Contour. Within this noise contour, manufactured housing, hospitals, and educational facilities are not allowed. Residential development is allowed as long as sound attenuation measures are incorporated into the design and construction of the structure.

65 to 70 DNL Noise Contour. Manufactured housing, hospitals, educational facilities, and outdoor amphitheaters are not allowed within this noise contour. Residential land uses and other noise-sensitive developments, which have incorporated noise attenuation features, are allowed; however, it is recognized that measures to achieve overall noise reduction do not necessarily solve noise difficulties and additional evaluation is required prior to development approval.

70 to 75 DNL Noise Contour. Residential and other noise-sensitive development are not allowed within this noise contour regardless of the incorporation of sound attenuation. Industrial and commercial land uses must incorporate sound attenuation in order to achieve a set noise reduction of either 25 or 30 decibels, depending on the type of use.

In addition, it must be noted that the comprehensive plan for the City of Flagstaff recommends that residential development not be allowed to occur at all within the 60 DNL noise contour. The purpose of this recommendation is to protect the airport from

encroachment as well as to protect the public from locating in an area subject to noise impacts from the airport.

- BOISE, IDAHO

Boise is located in the southwestern portions of the State of Idaho. The City owns and operates Boise Airport which is classified as a commercial service airport within the NPIAS.

Boise Airport is located in the southeastern corner of the City. To the north and west, the airport is developed for urban uses while most of the land to the south and east remains undeveloped.

The City of Boise has adopted an Airport Influence Area within which avigation easements are required for all permitted uses. The City has also adopted detailed land use compatibility policies for several zones around the airport. The zones are as follows.

Area A, squared-off 60 to 65 DNL noise contour. All new residential development and schools within this squared-off noise contour shall be required to provide sound attenuation to reduce interior noise impacts by 25 decibels.

Area B, squared-off 65 to 70 DNL noise contour. Residential development is not allowed and all compatible development will be required to provide sound attenuation. (A portion of the area contained within the squared-off 65 to 70 DNL noise contour is contained within Area B-1. This area was planned for residential land uses prior to the implementation of these regulations. Sound attenuation is required prior to development within Area B-1.)

Area C, squared-off 70 DNL noise contour. Existing residential uses in this area shall be considered non-conforming and no new residential development is allowed. Non-noise-sensitive manufacturing, industrial, and commercial uses are allowed. All compatible uses shall be required to provide sound insulation in noise-sensitive areas of a facility.

EXISTING LAND USE PLANNING BOUNDARIES WITHIN LINCOLN AIRPORT ENVIRONS

From a noise and annoyance perspective, of greatest concern within the Lincoln Airport environs are the primary aircraft arrival and departure training corridors. Aircraft arriving, departing, or implementing a series of arrivals and departures (training) typically are concentrated along the runway centerline or within the traffic pattern.

These concerns are not new to the airport environs as they were previously addressed within the *1980 Airport Noise Control and Land Use Compatibility Study* (ANCLUC). One of the major results of this study was the formation of a series of boundaries for land use planning purposes. These boundaries, and potential modifications to these boundaries, are described in the following sections.

Airport Environs Noise District Boundary

After completion of the ANCLUC study, the City of Lincoln established an AIA which is referred to as the Airport Environs Noise District and is depicted on **Exhibit 5B**. The boundaries of this district were based on flight track data as well as the noise contours which were prepared as part of the study. The purpose of this district was to ensure compatible development within the areas which were affected by airport operations.

The current Airport Environs Noise District boundaries extend approximately four miles off the primary Runway 17R-35L. When this boundary was developed, the western-most areas contained within the boundary were primarily undeveloped and outside the city limits. These areas were primarily agricultural in nature and urban development pressures were not being felt in the area.

As the City of Lincoln has grown, these areas west of the existing boundary have begun to experience development pressures. In order to accommodate the growth of the city, future land use plans for the area depict residential development in the areas bordering the existing noise district. A review of the flight track data for the airport indicates these areas planned for development experience a great deal of touch-and-go aircraft activity. This activity is primarily a result of local and transient military training activity.

Consideration could be given to expanding the existing boundaries of the Airport Environs Noise District to the west to capture the areas planned for residential development that are impacted by touch-and-go activity at the airport. The new proposed boundaries are depicted on **Exhibit 5B.**

Noise Contour Planning Boundaries

Another result of the ANCLUC study was the establishment of the 65 DNL noise contour as the "contour of significance" which sets the standard for unrestricted development within the Lincoln Airport environs. The selection of this contour was most likely due to a number of factors including the size and magnitude of lesser noise contours, such as the 55 and 60 DNL contours as well as what was being utilized for land use planning purposes on a national level.

When the 1980 ANCLUC was prepared, the 65 DNL noise contour was widely applied in the United States as an upper limit to unrestricted development on noise-sensitive land uses. In regards to the use of the 65 DNL noise contour in Lincoln, the ANCLUC states that "This level, while not considered ideal for noise-sensitive uses, is widely considered acceptable. However, when site development proposals are initiated or comprehensive planning polices are developed for the Ldn 55-65 areas, serious consideration should be given to sitting noise-sensitive uses in areas exposed to lesser noise levels wherever