



# **Denver International Airport**

## **Noise Release Study**

**February 28, 2006**



## INTRODUCTION

This Noise Release Study was prepared pursuant to Section 4.5.3 "Noise Studies" of the Intergovernmental Agreement dated April 21, 1988 between Adams County and the City & County of Denver related to the Denver International Airport ("airport"). Section 4.5.3 provides that the airport shall conduct a noise study complying in form with 14 CFR 150, subparts A and B, for the purpose of determining whether Noise Release Conditions have occurred with respect to land use in Adams County adjacent to the boundaries of the airport. The first study of this type by the airport under the terms of the Intergovernmental Agreement ("IGA") was completed and transmitted to Adams County on February 28, 2000. Subsequent studies, per IGA requirements, were completed in 2002 and 2004. This current study (2006) thus continues the mandated every-two-year schedule.

Part 150 is a regulation developed under the Aviation Safety and Noise Abatement Act of 1979 (49 USC 2101 et seq) and addresses noise compatibility planning activities of operators of all public use airports. The Denver International Airport is a public use airport. Subpart A covers the general scope of Part 150 and its purpose and Subpart B covers the development of noise exposure maps and noise compatibility programs. The purposes and process of both subparts have been modified to comply with the objectives of the IGA as it relates to Noise Release Conditions as that term is defined within the IGA.

## DENVER INTERNATIONAL AIRPORT STATISTICS

Denver International Airport is located approximately 17 miles northeast of downtown Denver. The airport and its access corridor occupy 53 square miles of land which had previously been used primarily for agricultural purposes.

DIA currently has six operating runways, five of which are 12,000' long, with the sixth at 16,000' in length. The airport also currently has a 1.5 million square foot main terminal building, with three remote concourses of varying sizes. Both the airfield and the terminal/concourse complex can be expanded to accommodate future growth. DIA has been designed to ultimately support as many as 12 runways, as well as a doubling of the current size of the main terminal, and the construction of two additional concourses.

DIA opened on February 28, 1995, replacing Stapleton International Airport as Denver's primary commercial airport. DIA is served by a variety of domestic and international air carriers, and is the second largest hub for United Airlines. DIA is also the home and hub for Frontier Airlines. Passenger traffic at DIA has continued to grow since recovering from the effects of September 11, with 43,387,513 passengers using the airport in 2005, a record number, and a 2.6% increase over 2004. This made DIA the 6<sup>th</sup> busiest airport in the United States. The number of aircraft operations has also increased slightly to 567,610.

## LAND USES

The current land uses within the Adams County Noise Overlay Zone are agricultural and rural residential. Three residential subdivisions, Stonehouse Farms, Van Aire, and Green Estates, lie within the Noise Overlay Zone (2000 Study - Figure 1). The outside boundary of the Noise Overlay Zone was based on the projected 60  $L_{dn}$  contour for the airport. All three subdivisions continue to remain outside of the airport's operating 60  $L_{dn}$  contour.

The Adams County 2004 Comprehensive Plan states as a matter of policy that agricultural uses will be encouraged within the 60  $L_{dn}$  contour. See enclosed Noise Exposure Maps (Figures 1 & 2) for depictions of existing and future land uses as approved by FAA per FAR Part 150 process.

## NOISE MEASUREMENT METHODOLOGY

For the purposes of this study, the City and County of Denver contracted with HNTB Corporation to prepare a set of Noise Exposure Maps. These maps illustrate the location of the 55, 60, and 65  $L_{dn}$  contour lines for the years 2005 and 2010.

HNTB prepared the contour maps using the FAA's Integrated Noise Model (INM) Version 6.1. INM is a computer model which uses aircraft operations data, correlated with known acoustical information for each type of aircraft, to calculate noise contours. Contours for the 2005 base case were generated based upon actual 2005 DIA operations data. For the 2010 projection, HNTB used the 2005 data as well as forecasts of aircraft operations levels and fleet mix for the year 2010.

## NOISE CONTOURS

Figures 1 and 2 in this 2006 Study Report illustrate the location of the 55, 60, and 65  $L_{dn}$  noise contours for the years 2005 and 2010.

Each of the contour lines encloses a geographic region within which the same average annual sound level (due to aircraft) exists. These levels are expressed in terms of a measurement unit called  $L_{dn}$  (also sometimes referred to as DNL). These  $L_{dn}$  levels represent the average annual aircraft-produced sound exposure within each contour line. Additionally, the  $L_{dn}$  metric includes a 10 decibel weighting factor which is applied to any events which occur during the nighttime hours, defined for this purpose as 10:00 pm to 7:00 am.

It should be noted that the 2005  $L_{dn}$  contours depicted in Figure 1 may not be identical to the contours contained in the DIA Noise Abatement Office's 2005 annual noise report. The Integrated Noise Model (INM) was used to calculate the contours for the Noise Release Study,

while the contours in the 2005 Annual Report were calculated by a program called ARTSMAP. INM is limited in the number of individual aircraft flight paths it can use in the calculation process and is designed primarily to predict future aircraft noise. ARTSMAP calculates noise based upon thousands of actual radar flight tracks and, as such, is not very useful for predicting future noise.

## **LAND USE IMPACTS 2010**

The projections for 2010 indicate that the contours will expand to varying degrees in all directions as compared to 2005. The greatest projected changes appear to be to the east and south of the airport, with smaller increases projected to the north and west. It should also be noted that compared to the 2004 Noise Release Study results, the contours contained in the 2006 report are generally larger, indicating a trend toward increased noise and expansion of the contour. It should also be noted that the FEIS projections were based on the airport operating at full capacity with 12 runways, therefore the current contour of the Noise Overlay Zone should be maintained until full build-out of the airport.

















It should also be noted that on both the 2005 and 2010 contour maps, numerous areas to the east and north of the airport are colored yellow, indicating residential land use. Most of the areas so designated are not residentially zoned, but are rather agricultural zones within which Adams County permits one home to be built on a parcel of land having a minimum size of 35 acres. The source of all Adams County land use data used on these maps is Adams County.



**Figure 1**  
**2005 DNL Contours**



**Legend**

-  2005 DNL Contours
-  Residential
-  Agricultural
-  Exempt / Parks / Open Space
-  Commercial
-  Industrial
-  Public / Institutional
-  Vacant Residential
-  Vacant
-  DIA Property Boundary
-  County Boundary
-  Aurora Jurisdiction
-  Commerce City Jurisdiction
-  Brighton Jurisdiction
-  Thornton Jurisdiction
-  School

February 2006

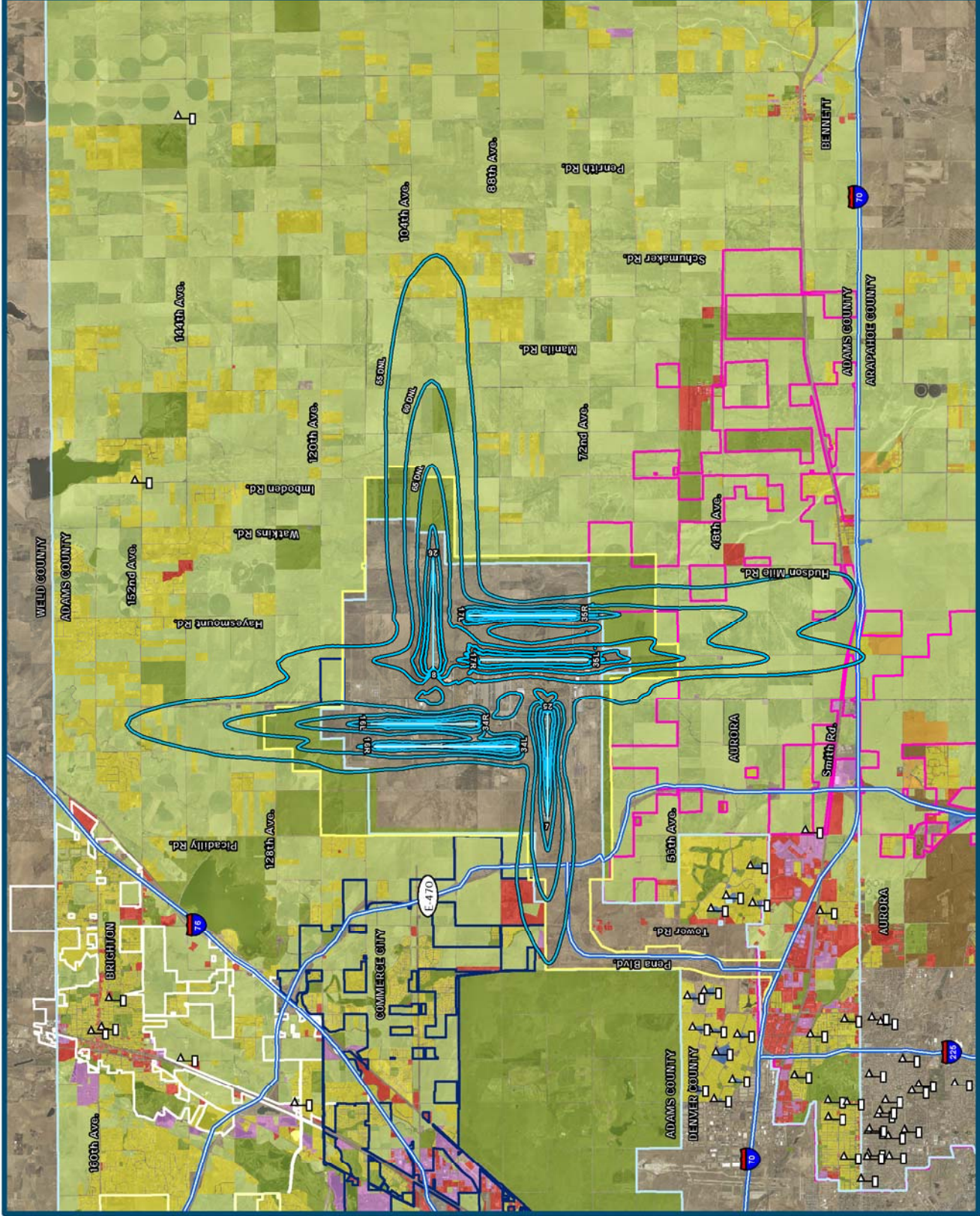


Figure 1

**Denver International Airport  
2006 ICA Noise Release Study**

**2005 DNL Contours**

Source:  
Aerial photography from DIA, May 2004.  
Land use from the City and County of Denver  
developed from its latest aerial  
photography by HNTB Corporation.  
Existing land use data provided by  
Adams County and Arapahoe County.





**Figure 2**  
**2010 DNL Contours**



**Legend**

- 2010 DNL Contours
- Residential
- Agricultural
- Exempt / Parks / Open Space
- Commercial
- Industrial
- Public / Institutional
- Vacant Residential
- Vacant
- DIA Property Boundary
- County Boundary
- Aurora Jurisdiction
- Commerce City Jurisdiction
- Brighton Jurisdiction
- Thornton Jurisdiction
- School

February 2006



**Figure 2**  
**Denver International Airport**  
**2006 ICA Noise Release Study**  
**2010 DNL Contours**

Source:  
 Aerial photography from DIA, May 2004.  
 Land use from the City and County of Denver  
 developed from its latest aerial  
 photography by HNTB Corporation.  
 Existing land use data provided by  
 Adams County and Arapahoe County.

