

The FAA's substitution list recommends the BEC58P, the Beech Baron, to represent the light twin-engine aircraft such as the Piper Navajo, Beech Duke, Cessna 31, and others. The CNA441 effectively represents the light turboprop and twin-engine piston aircraft such as the King Air, Cessna 402, Gulfstream Commander, and others.

The INM provides data for most of the business turbojet aircraft in the national fleet. The MU3001 effectively represents the Cessna Citation I, II and V series aircraft. The CIT3 represents the Cessna Citation III, IV, and VII series aircraft. The GIIB designator represents the Gulfstream II and III series aircraft. The LEAR35 effectively represents the Lear 30 and 50 series, the Sabreliner 65, the Falcon 10, 50, and 200, and the Hawker 700 and 800 series aircraft.

General aviation helicopter operations are modeled using the Jet Ranger and Hughes 500 helicopters. The Jet Ranger and Hughes 500 helicopter data was extracted from the FAA's Heliport Noise Model Version 2.2 (HNM).

All substitutions are commensurate with published Part 150 FAA guidelines.

Single Event Analysis

Measured single event noise levels for individual aircraft, taken during the noise monitoring program, are helpful in validating the noise modeling assumptions for existing and future

conditions at Georgetown Municipal Airport. (Measured single event noise information is for comparative purposes only and cannot be used as input into the INM.) Both the loudest sound levels (Lmax) and the Sound Exposure Levels (SEL) for various aircraft types were recorded during the noise measurement program at each noise monitoring site. A detailed INM grid point analysis can then be prepared that generates Lmax and SEL values for the corresponding aircraft types at each noise monitoring site for comparison. The resulting measured and predicted Lmax and SEL values can then be compared.

Table 3E depicts the range of measured Lmax and SEL values from monitor sites one and three and the predicted Lmax and SEL values from the INM for these sites. (Monitor sites one and three were used because they received the vast majority of aircraft overflights due to weather and wind conditions during the observation period). As previously discussed, Lmax is the peak noise level of the aircraft overflight. SEL is the total noise energy (taking into account the peak and duration) of the aircraft overflight.

In most cases the INM is very close, and in many cases, over-predicts the noise of individual aircraft types in the vicinity of the airport. It should be noted, however, that there may be sizable differences between measured and predicted Lmax and SEL levels in some cases. There are several potential reasons for these differences:

- Small noise measurement sample size;

- Differences in distances from the aircraft to the monitor;
- Differences in aircraft operating procedures and pilot techniques; and
- Differences in specific aircraft configurations within the general aircraft type;
- The effect of weather conditions (temperature, wind direction, and wind velocity) on aircraft performance.

TABLE 3E				
Summary of Measured and Predicted Single Event Noise Levels				
Georgetown Municipal Airport				
	Departures			
Aircraft Type	Measured Lmax, dBA¹ (Monitor Site 1)	Predicted Lmax, dBA²	Measured SEL, dBA¹ (Monitor Site 1)	Predicted SEL, dBA²
Single GA Prop <u>Fixed Pitch Propeller</u>				
Cessna 152	63.5 - 76.1	70.0 - 76.8	69.1 - 86.5	80.0 - 85.0
Cessna 172	62.6 - 78.0	70.0 - 76.8	73.6 - 85.2	80.0 - 85.0
Piper Archer	60.6 - 74.5	70.0 - 76.8	67.8 - 83.9	80.0 - 85.0
<u>Variable Pitch Propeller</u>				
Cessna 182	74.6 - 74.7	69.8 - 81.6	81.3 - 84.0	65.4 - 90.2
Twin GA Prop				
Cessna 310	72.4	65.4 - 86.1	82.0	89.3 - 93.1
Beech Barron	74.3 - 82.4	65.4 - 86.1	83.5 - 89.3	89.3 - 93.1
Piper Seneca	75.4	65.4 - 86.1	84.5	89.3 - 93.1
Business Jet				
Beech Jet	90.0	84.4 - 93.9	94.6	91.5 - 98.2
Cessna Citation	86.3 - 95.0	84.4 - 93.9	94.1 - 102.11	91.5 - 98.2
	Arrivals			
Aircraft Type	Measured Lmax, dBA (Monitor Site 3)	Predicted Lmax, dBA	Measured SEL, dBA (Monitor Site 3)	Predicted SEL, dBA
Single GA Prop <u>Fixed Pitch Propeller</u>				
Cessna 152	63.0 - 65.4	62.0 - 76.8	66.3 - 72.1	62.3 - 82.0
Cessna 172	63.3 - 68.4	62.0 - 76.8	70.6 - 74.8	62.3 - 82.0
Piper Archer	65.3 - 69.2	62.0 - 76.8	73.1 - 77.3	62.3 - 82.0
<u>Variable Pitch Propeller</u>				
Beech Bonanza	74.1 - 74.6	70.7 - 87.4	76.1 - 81.8	60.3 - 89.7
Twin GA Prop				
Beech Barron	74.5 - 79.0	72.5 - 87.2	82.5 - 85.4	60.2 - 89.7
Piper Seneca	75.2	72.5 - 87.2	82.2	60.2 - 89.7
Twin GA Turboprop				
Beech King Air	79.6 - 86.4	83.3 - 86.3	84.9 - 90.9	86.2 - 87.7
Business Jet				
Cessna Citation	82.8 - 88.5	84.4 - 87.4	88.5 - 92.2	87.1 - 88.8

¹ Measurements were taken April 4 and 5, 2001. This information is for comparative purposes only and not for input into the Integrated Noise Model.

² Data from detailed grid analysis for 2003 base conditions.

Source: Coffman Associates Analysis

TIME-OF-DAY

The time-of-day at which operations occur is important as input to the INM due to the 10 decibel weighting of nighttime (10:00 p.m. to 7:00 a.m.) flights. In calculating airport noise exposure, one operation at night has the same noise emission value as 10 operations during the day by the same aircraft. The Georgetown Municipal Airport currently does not have an Airport Traffic Control Tower (ATCT). Consequently, specific counts for nighttime operations are not available. However, discussions with airport staff and experience at similar airports around the country provides a basis for some reasonable assumptions about the nighttime activity at the airport. An estimate of 10 percent of the total annual operations that occur between 10:00 p.m. and 7:00 a.m. was used for modeling the 2003 noise exposure contours. This percentage was applied to the future forecast scenario.

RUNWAY USE

Runway usage data is another essential input to the INM. For modeling purposes, wind data analysis usually determines runway use percentages. Aircraft will normally land and takeoff into the wind. However, wind analysis provides only the directional availability of a runway and does not consider pilot selection, primary runway operations, or local operating conventions. At Georgetown Municipal Airport, the crossing runway configuration offers four directions of choice.

Continuous records of the runway usage at Georgetown Municipal Airport were not available due to the lack of an ATCT. However, airport staff and local aircraft operators provided an estimate of runway use. **Table 3F** summarizes the runway use percentages for the existing and future conditions.

TABLE 3F			
Existing Runway Use			
Runway	Business Jet	Turboprop/ Multi-Engine	Single Engine Piston
Arrivals and Departures			
18	70.0%	70.0%	56.0%
36	30.0%	30.0%	24.0%
11	0.0%	0.0%	10.0%
29	0.0%	0.0%	10.0%
Touch-And-Go's			
18	NA	NA	56.0%
36	NA	NA	24.0%
11	NA	NA	10.0%
29	NA	NA	10.0%

FLIGHT TRACKS

Local and standard air traffic procedures, input from the airport staff, and a review of previous noise studies were used to develop consolidated flight tracks. The result is consolidated flight tracks describing the average corridors that lead to and from the Georgetown Municipal Airport.

At a general aviation airport such as Georgetown, aircraft traffic is expected over most areas around the airport. The density of the air traffic generally increases closer to the airport. The flight tracks were developed to reflect these common patterns and to account for the inevitable flight track dispersions around the airport.

Exhibit 3E illustrates the flight tracks used for the modeling of the departure operations at Georgetown Municipal Airport. The departure traffic tends to follow similar procedures on both the north and south sides of the airport. In order to avoid noise-sensitive residential areas, most of the traffic at Georgetown Municipal Airport departing to the south from Runway 18 turns to the southeast. Departure tracks are also provided for the straight-out and turns to the west.

The consolidated arrival flight tracks for Georgetown Municipal Airport are presented in **Exhibit 3F**. Arrival patterns to all four runway ends are generally straight-in close to the airport. Arrivals from the direction opposite the runway flow typically enter the traffic pattern at about a 45-degree angle and follow it around and into the airport. Aircraft approaching the

airport occasionally cross over the top of the airport to join the traffic pattern.

Exhibit 3G illustrates the touch-and-go pattern tracks and the helicopter flight tracks developed for this analysis. The series of concentric oval-shaped tracks represent the observed variance in the size of the training pattern at Georgetown Municipal Airport. These tracks represent the observed dispersion of the touch-and-go traffic and are adequate for modeling purposes. The helicopter routes represent an average of those observed and represent both arrival and departure traffic.

ASSIGNMENT OF FLIGHT TRACKS

The final step in developing input data for the INM model is the assignment of aircraft to specific flight tracks. Prior to this step, specific flight tracks, runway utilization, and operational statistics for the various aircraft models using Georgetown Municipal Airport were evaluated.

The radar flight track data was used to determine flight track percentages for each aircraft type. The radar flight tracks that formed the consolidated tracks and sub-tracks were first counted. Then each consolidated track was assigned a percentage based on the total number of tracks for each runway.

To determine the specific number of aircraft assigned to any one flight track, a long series of calculations was performed. This included a number of specific aircraft of one group factored by

runway utilization and flight track percentage. A detailed breakdown of the flight track assignments can be found in **Appendix C**.

ysis for current and forecast noise exposure conditions, as developed from the Integrated Noise Model.

INM OUTPUT

Output data selected for calculation by the INM were annual average noise contours in DNL. F.A.R. Part 150 requires that 65, 70, and 75 DNL contours must be mapped in the official Noise Exposure Maps. This section presents the results of the contour anal-

2003 NOISE EXPOSURE CONTOURS

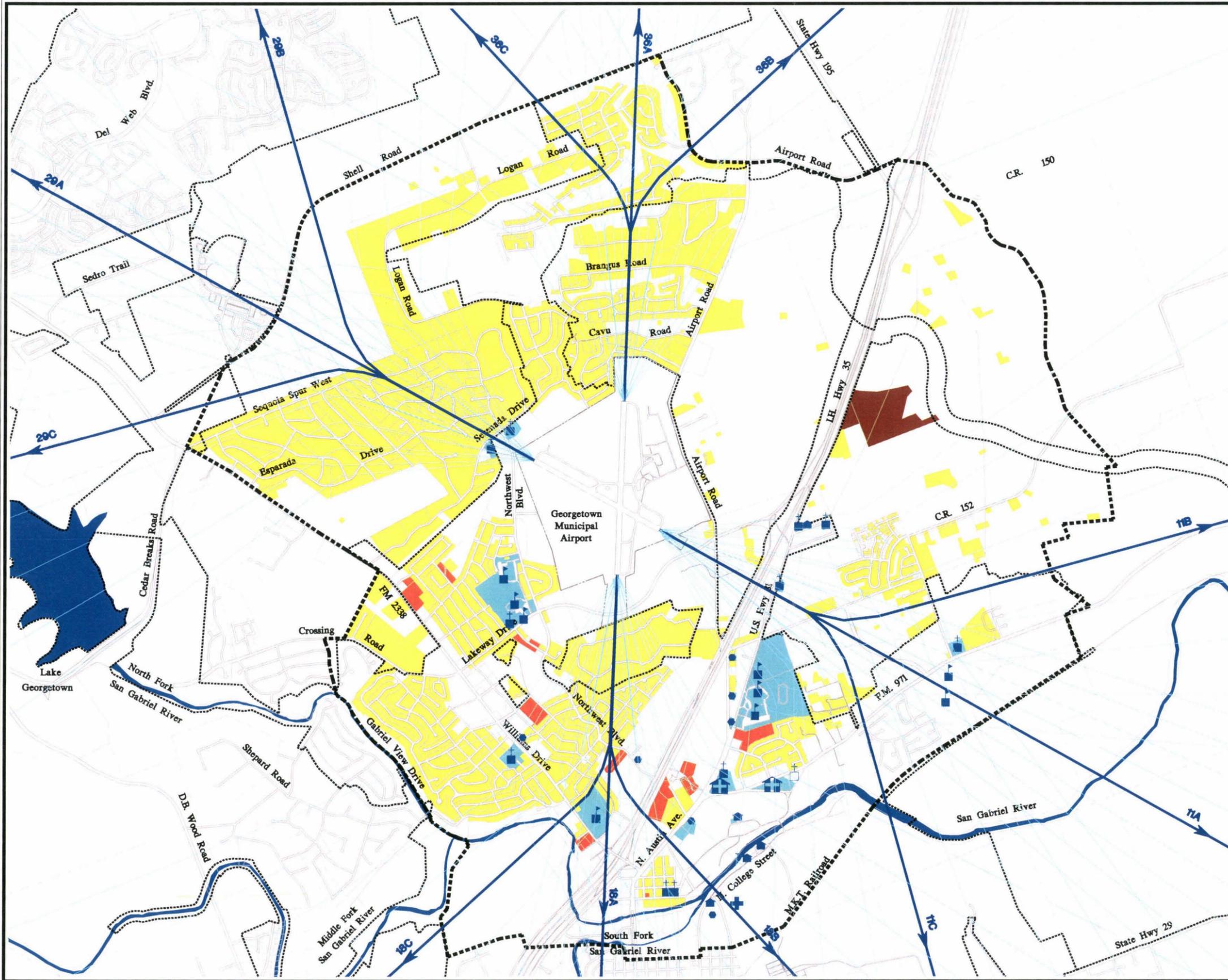
Exhibit 3H presents the plotted results of the INM contour analysis for 2003 conditions using input data described in the preceding pages. The areas within each contour are presented in **Table 3G**.

TABLE 3G Comparative Areas Of Noise Exposure Georgetown Municipal Airport		
DNL Contour	Area In Square Miles	
	2003	2008
65	0.360	0.506
70	0.171	0.241
75	0.071	0.108

The shape and extent of the contours reflect the underlying flight track assumptions. The 65, 70, and 75 DNL noise contours remain close to the runway. The 65 DNL contour has a small bulge northwest of the extended runway centerline off airport property. Small bulges in the 65 DNL contour extend off airport property to the southeast and southwest. The 70 and 75 DNL contours remain on airport property.

COMPARATIVE MEASUREMENT ANALYSIS

A comparison of the measured versus the computer-predicted cumulative DNL noise values for each measurement site has been developed. In this case, it is important to remember what each of the two noise levels indicates. The computer-modeled DNL contours are analogous to the climate of an area and represent the



LEGEND

- Detailed Land Use Study Area
- Municipal Boundary
- Airport Property
- Consolidated Departure Tracks
- Departure Sub Tracks
- Residential Low Density
- Residential Medium Density
- Recreational Vehicle Park
- Noise Sensitive Institutions
- School
- Day Care Facility
- Community Center
- Residential Care Facility
- Place of Worship
- Cemetery

Source: Aerial Photography, dated April 4, 2001
 Corrigan Consulting, Inc.
 Coffman Associates Analysis.

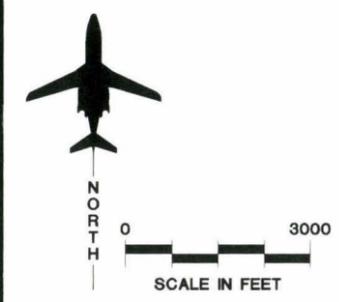
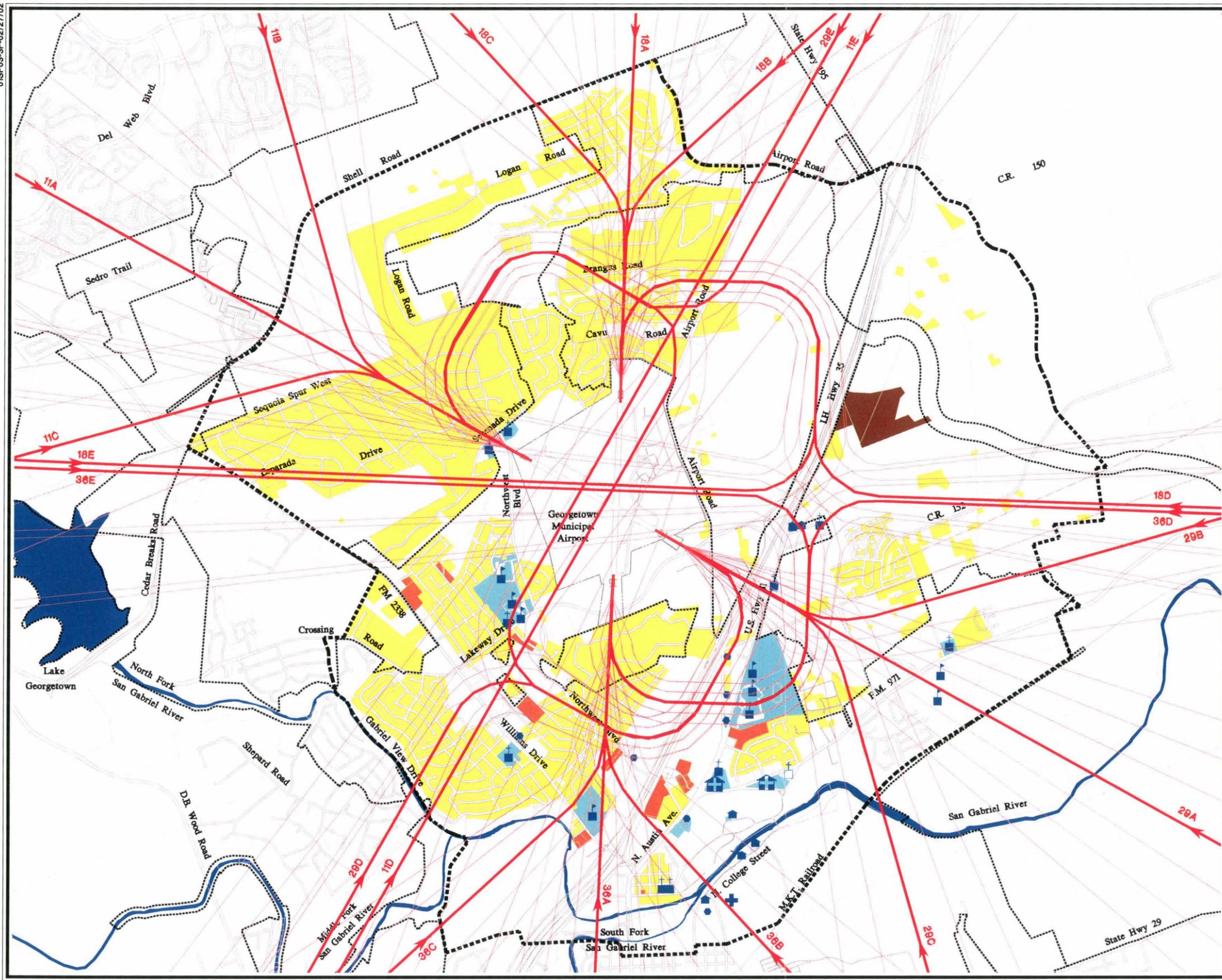


Exhibit 3E
 EXISTING AND FUTURE
 DEPARTURE TRACKS

01SP03-3F-02/27/02



LEGEND

- Detailed Land Use Study Area
- Municipal Boundary
- - - - - Airport Property
- Consolidated Arrival Tracks
- Arrival Sub Tracks
- Residential Low Density
- Residential Medium Density
- Recreational Vehicle Park
- Noise Sensitive Institutions
- School
- Day Care Facility
- Community Center
- Residential Care Facility
- Place of Worship
- Cemetery

Source: Aerial Photography, dated April 4, 2001
 Corrigan Consulting, Inc.
 Coffman Associates Analysis.

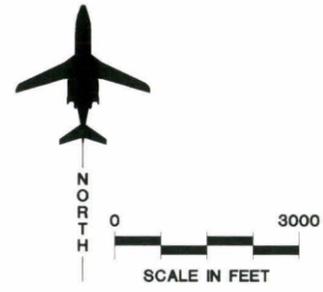
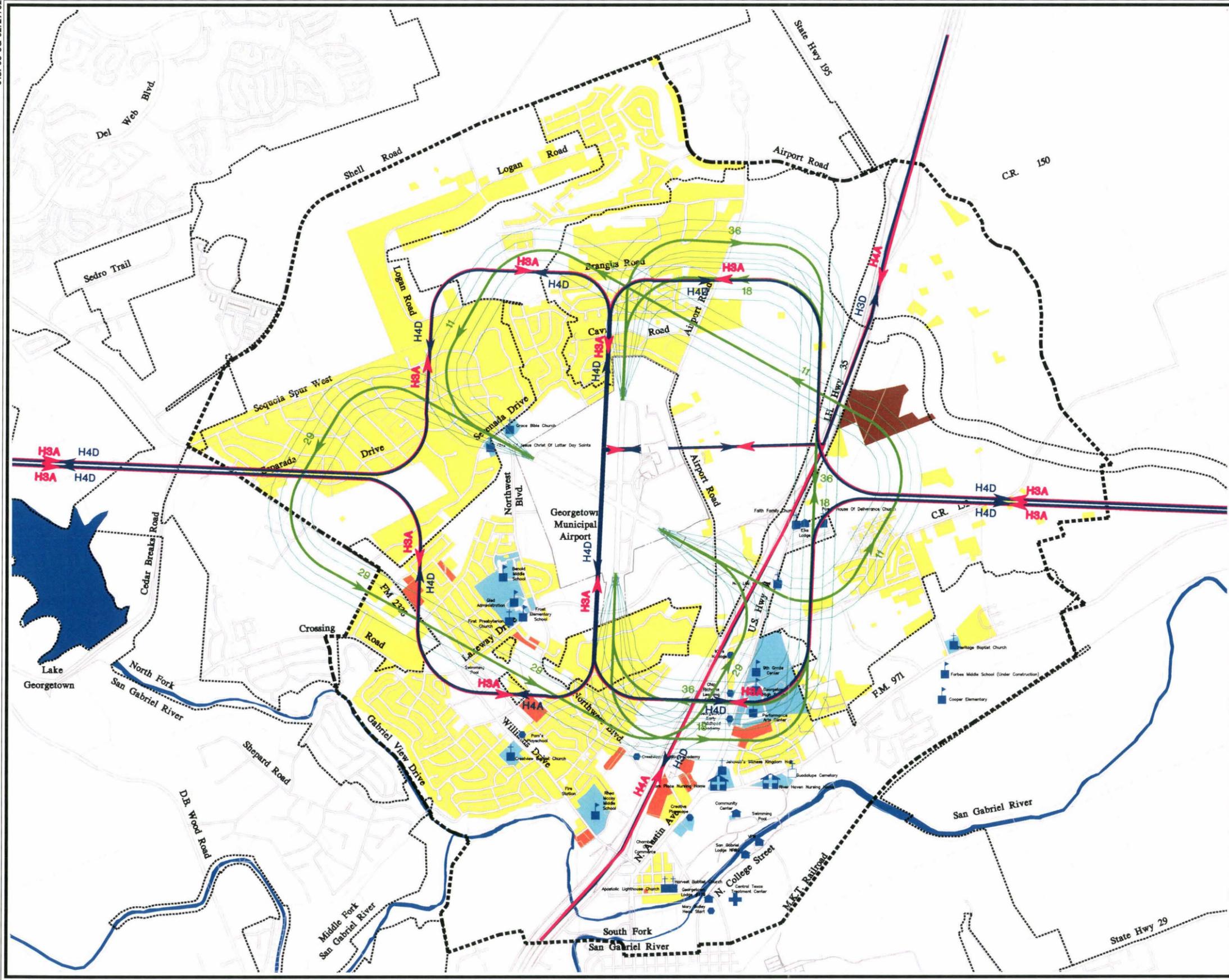


Exhibit 3F
 EXISTING AND FUTURE
 ARRIVAL TRACKS



- LEGEND**
- Detailed Land Use Study Area
 - Municipal Boundary
 - - - - - Airport Property
 - Consolidated Touch & Go Tracks
 - Touch & Go Sub Tracks
 - Consolidated Helicopter Departures
 - Consolidated Helicopter Arrivals
 - Residential Low Density
 - Residential Medium Density
 - Recreational Vehicle Park
 - Noise Sensitive Institutions
 - School
 - Day Care Facility
 - Community Center
 - Residential Care Facility
 - Place of Worship
 - Cemetery

Source: Aerial Photography, dated April 4, 2001
 Corriagan Consulting, Inc.
 Coffman Associates Analysis.

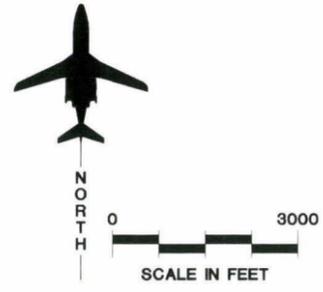
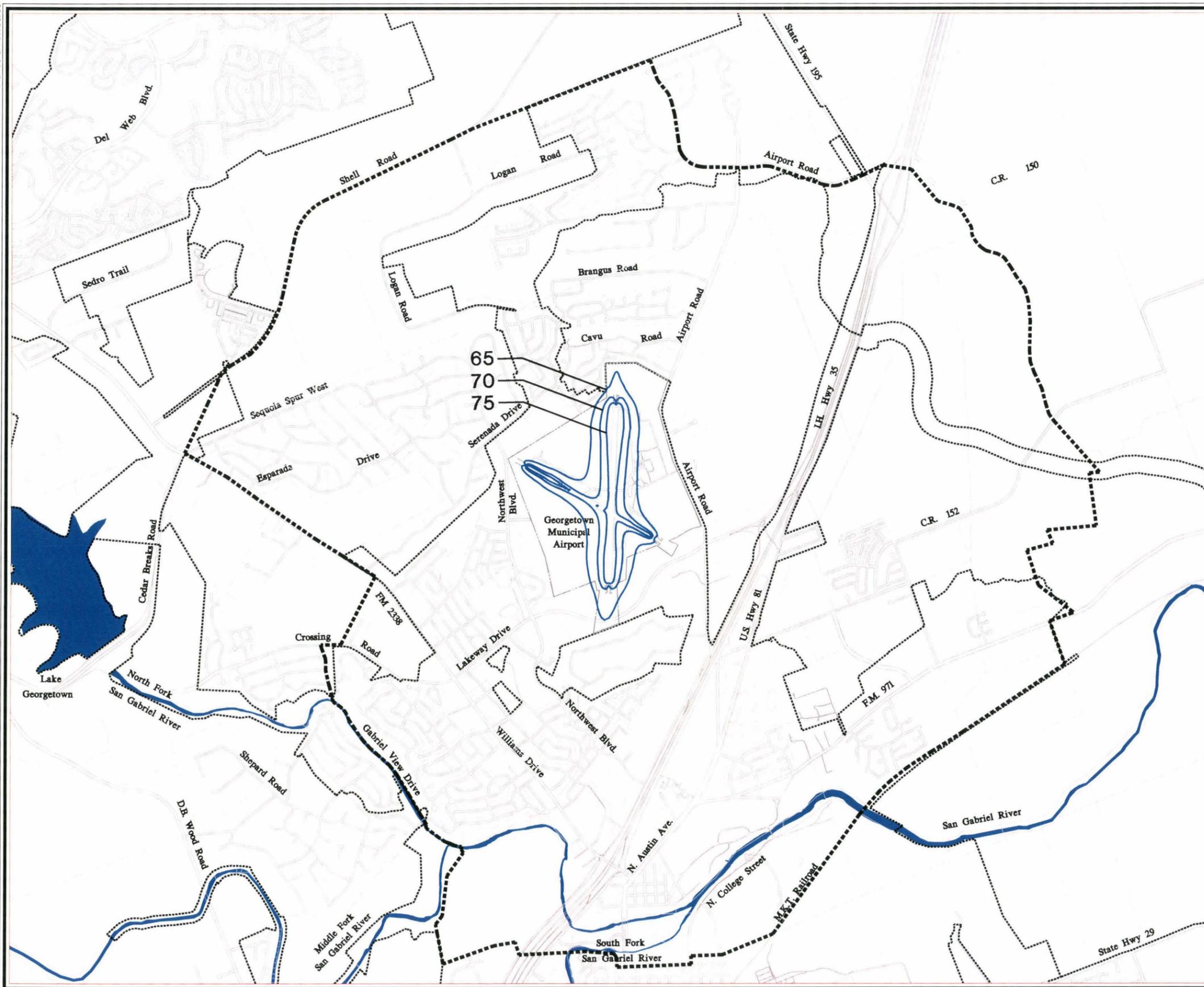


Exhibit 3G
 EXISTING AND FUTURE
 TOUCH AND GO TRACKS



- LEGEND**
- ▬▬▬▬▬▬▬ Detailed Land Use Study Area
 - ⋯⋯⋯⋯⋯ Municipal Boundary
 - - - - - Airport Property
 - 2003 DNL Noise Exposure Contour, Significant Effect

Source: Coffman Associates Analysis.



noise levels on an average day of the period under consideration. In contrast, the field measurements reflect only the noise levels on the specific days of measurement. Additionally, the field measurements consider all of the noise events that exceed a prescribed threshold and duration, while the computer model only calculates the noise due to aircraft events. As previously discussed, the field measurements can easily be contaminated by ambient noise sources other than aircraft around the measurement sites. With this understanding in mind, it is useful to evaluate the comparative aircraft DNL levels of the measurement sites.

DNL Comparison

This analysis provides a direct comparison of the measured DNL(24) and predicted values for each noise measurement site. In order to facilitate such a comparison, it is necessary to ensure that the computer model input is representing the observed reality as accurately as possible within the capabilities of the model.

During the measurements, low cloud ceilings with brief periods of rain occurred during the monitoring period. This may have reduced the number of aircraft operations during the measurement period. The airport also operated primarily in a south flow on Runway 18-36 and very few operations were observed on Runway 11-29.

A difference of three to four DNL is generally not considered a significant deviation between measured and

calculated noise, particularly at levels above 65 DNL. Additional deviation is expected at levels below 65 DNL. In this case, all the noise monitor sites fall outside the 65 DNL noise contour. The measured and predicted 2003 noise exposure contours for the annual average condition are presented for each aircraft noise measurement site on **Exhibit 3J** and **Table 3H**.

As seen in **Table 3H**, in all cases the INM over predicted sound levels at the noise monitor sites. As previously discussed, the reduced operation levels due to the weather may have contributed to the measured noise levels being lower than predicted levels at each measurement site.

A review of annual fuel sales and fuel sales for the five-day measurement period were done to determine the amount operations were reduced during the monitoring period. This assessment indicated that AvGas sales were off 48 percent for the five-day measurement period. Jet fuel sales were off 10 percent during the same five-day period. In addition, the Gulfstream III aircraft also did not operate at Georgetown Municipal Airport during the five day measurement period. For comparative purposes, propeller operations were reduced by 48 percent, jet operations were reduced by 10 percent, and the Gulfstream III aircraft operations were removed from the INM batch file and a grid point analysis was prepared. The results of this analysis are presented for each measurement site in **Table 3H**. As seen in **Table 3H**, the adjusted 2003 predicted levels are well within the INM tolerances (ranging from 0.1 to 3.1 DNL).

TABLE 3H
Noise Measurement DNL(24) vs. Predicted DNL Values
Georgetown Municipal Airport

Monitor Site	Measured ¹ (DNL[24])	Predicted 2003 ²	Difference	Adjusted 2003 ³	Difference
1	58.9	64.5	+5.6	60.4	+2.3
2	51.1	57.1	+6.0	54.2	+3.1
3	58.4	62.0	+3.6	58.5	+0.1
4	50.5	56.2	+5.7	53.1	+2.6

Source: Coffman Associates Analysis

¹ Measurements were taken April 2-7, 2001. This information is for comparative purposes only and not for input into the Integrated Noise Model.

² Annual average 2003 noise exposure contours.

³ Adjusted annual average 2003 with 48 percent few propeller operations, 10 percent fewer jet operations, and no Gulfstream III operations.

2008 NOISE EXPOSURE CONTOURS

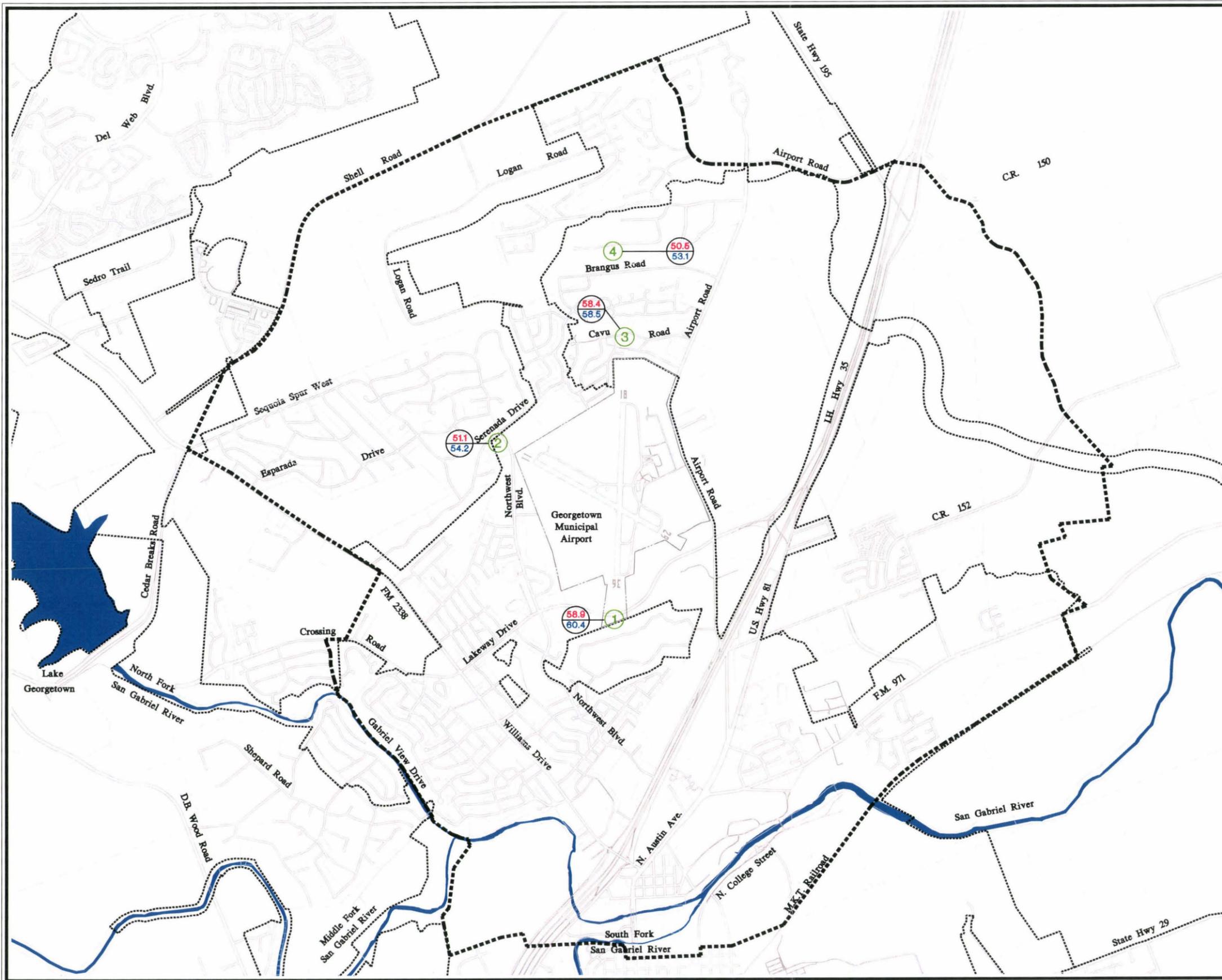
The 2008 noise contours represent the estimated noise conditions based on the forecasts of future operations. This analysis provides a near-future baseline which can subsequently be used to judge the effectiveness of proposed noise abatement procedures. **Exhibit 3K** presents the plotted results of the INM contour analysis for 2008 conditions using input data that has been described in the preceding pages.

Generally, the 2008 noise contours are similar in shape to their 2003 counterparts. This is due to the use of similar modeling input assumptions for the consistency of the baseline case. The contours are slightly wider and more elongated than the 2003 contours due to the forecast increase in operations.

The 2008 65 DNL contour is more elongated than the 2003 65 DNL contour. To the north, the 65 DNL noise contour extends 600 feet off airport property. The 65 DNL contour extends approximately 700 feet off airport property to the south. Small bulges in the 65 DNL contour extend off airport property to the northeast, southeast, and southwest.

Small portions of the 70 DNL contour extend off airport property to the southeast and southwest. The 75 DNL noise contour follows the crossing runway system and remains on airport property.

The surface areas of the 2008 noise exposure are presented for comparison in **Table 3G**.



LEGEND

- Detailed Land Use Study Area
- Municipal Boundary
- _____ Airport Property
- ③ Temporary Noise Monitor Terminal
- ⑤④ Measured DNL(24)¹
- ⑤③ INM-Predicted

¹ Measured DNL(24) is the average DNL for the measurement period at each site. This information is for comparative purposes only and not for input into the intergrated noise model.

Source: Coffman Associates Analysis.



SUMMARY

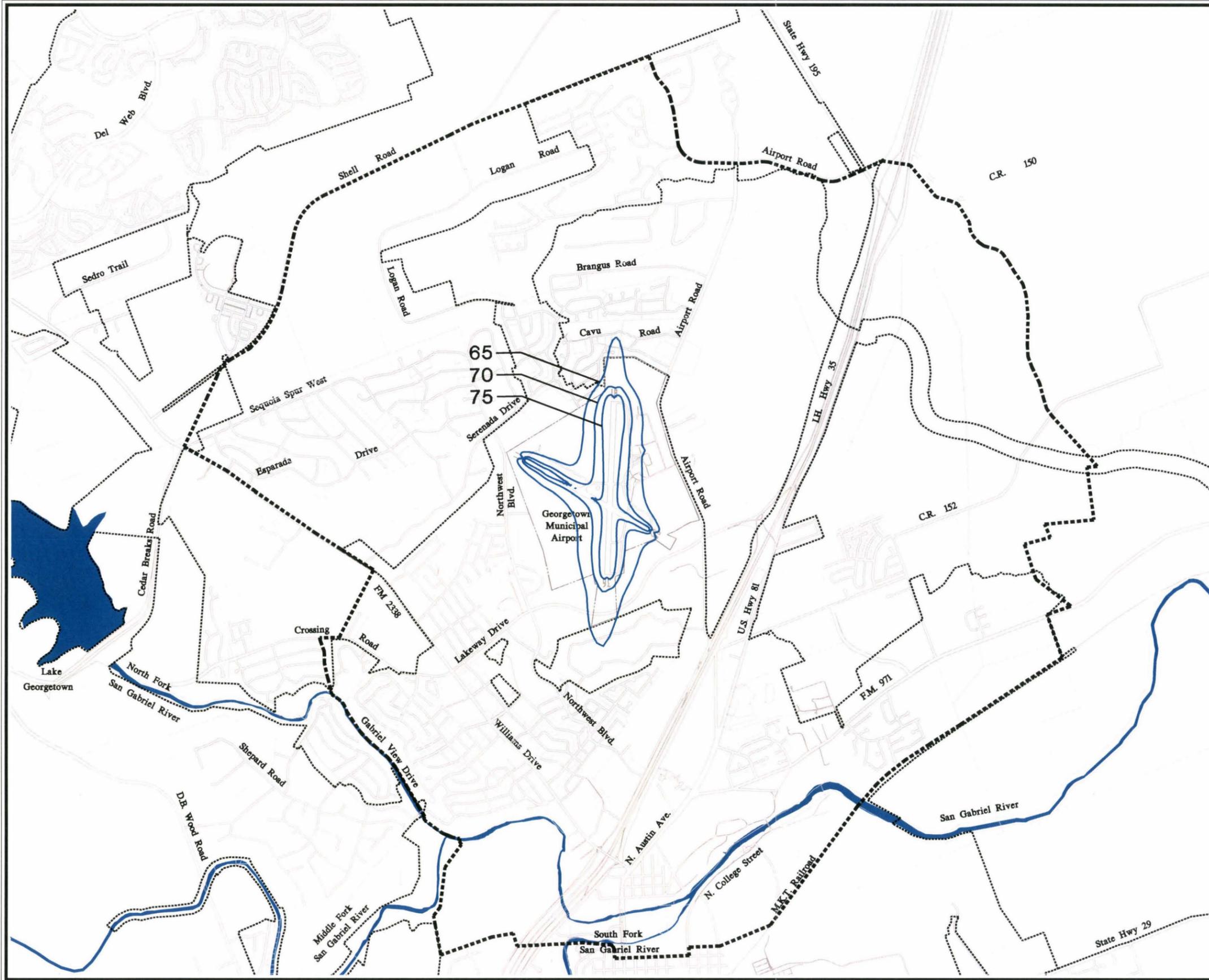
The information presented in this chapter defines the noise patterns for current and future aircraft activity, without additional abatement measures, at Georgetown Municipal Airport. It does not, however, make an attempt to evaluate or otherwise include that activity over which the airport has no control -- such as other aircraft transiting the area and not stopping at the airport.

The current contours are based on a series of operational counts lasting two weeks each quarter during calendar year 2000 and a review of current fuel

sales and based aircraft that indicates no significant change in operations. The current contours are presented as the 2003 noise exposure contours. The 2008 forecasts of noise exposure levels around the airport can be expected to increase slightly as the airport becomes busier in the future.

It is stressed that DNL contour lines drawn on a map do not represent absolute boundaries of acceptability or unacceptability in personal response to noise, nor do they represent the actual noise conditions present on any specific day, but rather the conditions of an average day derived from annual average information.

01SP03-3K-07/08/03



LEGEND

- Detailed Land Use Study Area
- Municipal Boundary
- - - - - Airport Property
- 2008 DNL Noise Exposure Contour, Significant Effect

Source: Coffman Associates Analysis.

