4.0 EXISTING NOISE EXPOSURE MAP

The existing noise abatement procedure at the Airport is wrapped in the "Fly Neighborly" Program. It includes a progression of noise mitigation efforts address to address community concerns. The FAR Part 150 process requires a thorough examination of current airport activity and depiction of aircraft noise levels on a map that represents the area exposed to aircraft noise. This chapter examines those characteristics of airfield use that are reflected in the 2002 noise contours. This analysis establishes a base case which means that the noise contours reflect existing patterns of aircraft activity without noise abatement measures beyond those currently in place. The existing Noise Exposure Map (NEM) is provided at the end of this chapter and graphically depicts the results of the evaluation.

The noise impacts are measured through the use of the FAA's Integrated Noise Model (INM) Version 6.1. The INM, which is described in Chapter 2.0, contains an extensive database on the noise and operational characteristics of various aircraft types currently in use. When input with airport-specific data such as runway layout, runway utilization, flight tracks, flight track utilization, fleet mix, and aircraft activity levels, the model calculates noise levels and produces contours illustrating average daily noise impacts to areas around an airport.

Input factors used in evaluating aircraft noise impacts and developing the 2002 DNL noise contours for the Airport included: aircraft activity levels and specific operational characteristics. Noise abatement procedures currently in use at the Airport are also reflected in the input files developed for the INM.

4.1 EXISTING NOISE ABATEMENT PROCEDURES

The Airport has a number of existing procedures designed to reduce aircraft noise levels in the noise-sensitive areas. These procedures generally pertain to the path taken by aircraft on arrival or departure from the Airport, irrespective of the time of day. Additional measures are

employed during quiet night time hours. The Airport's existing noise abatement procedures are listed below (Recoil Productions):

4.1.1 Arrivals

- **From the northeast**

Landing south, follow Little Miami River to 21L, 21R or 25. Landing aircraft maintain 1,500 MSL or above until 2-mile final.

Landing north, follow interstate beltway and river to runways. Maintain 1,500 or above MSL to 2-mile final or maintain 2,500 MSL while overflying sensitive areas.

- **From the south and the east**

Landing south, maintain 2,500 MSL or above while overflying sensitive areas. Maintain 1,500 MSL or above until 2-mile final.

Landing north, follow Ohio River northwest bound. Maintain 1,500 above MSL or above until 2-mile final.

- **From the southwest**

Landing south, maintain 2,500 MSL or above while overflying sensitive areas. Maintain 1,500 MSL or above until 2-mile final.

Landing north, follow Interstate 275 northwest bound. Maintain 1,500 or above MSL or above until 2-mile final.

- **From the northwest**

All Runways – Maintain 2,500 MSL or above while overflying sensitive areas. Maintain 1,500 MSL or above until 2-mile final. See **Exhibits 4.1-1** and **4.1-2** for a graphic view of the Airport arrival procedures.

Pilots are not prohibited from flying other than recommended altitudes and/or headings if operational requirement dictate. These procedures do not relieve the pilot of the responsibility to maintain appropriate terrain and obstruction.

4.1.2 Departures

- Runways 3R, 3L, 7:

Fly runway heading to 2,000 MSL; avoid depicted sensitive areas.

- Runways 21L, 21R, 25:

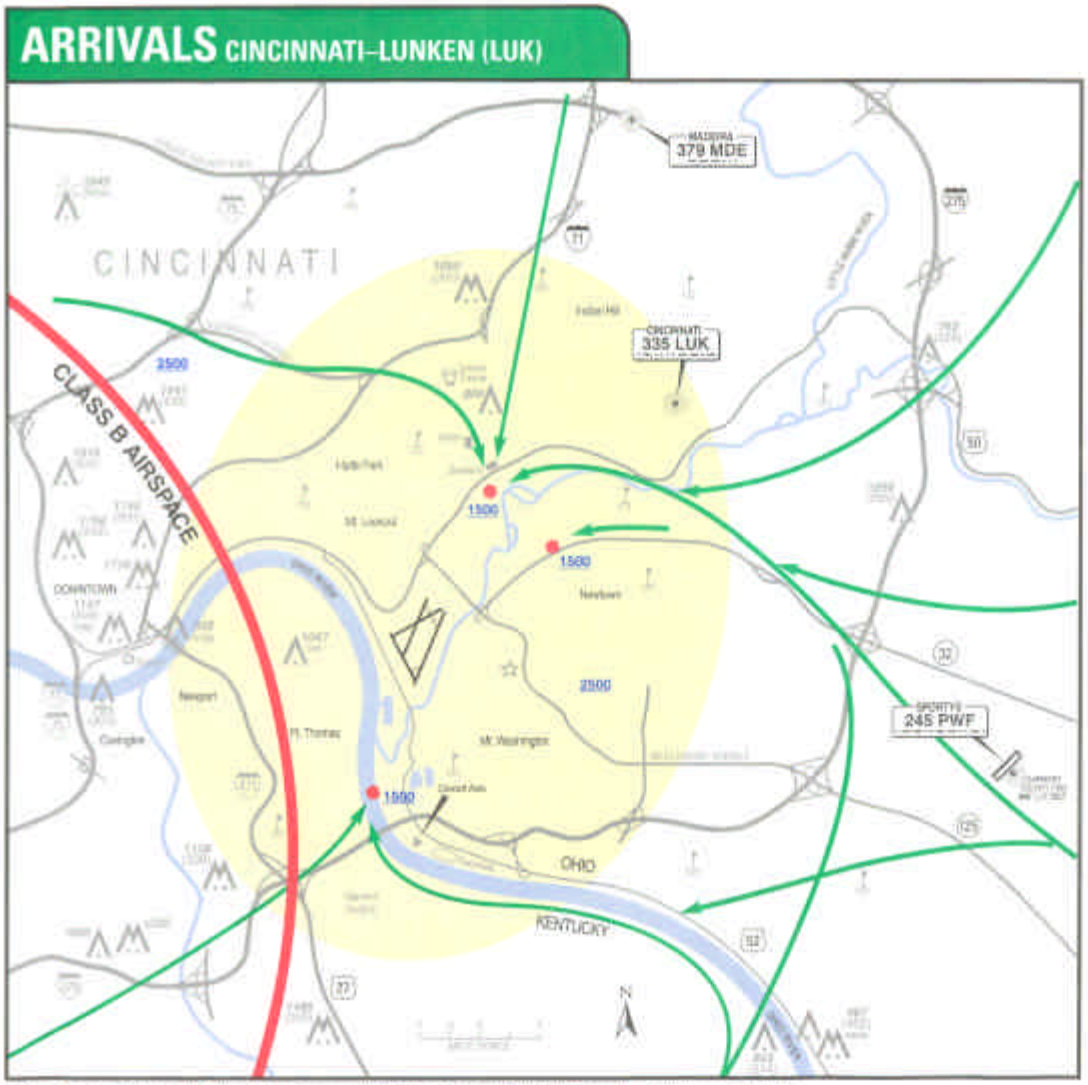
Follow river southeast bound to 2,000 MSL before turning on course.

See **Exhibits 4.1-3** and **4.1-4** for a graphic view of the Airport arrival procedures.

4.2 AIRCRAFT ACTIVITY

The number and type of aircraft operations and the manner in which aircraft arrive to and depart from an airport are the principal determinants of the size of the aircraft noise contours.

Data for 2002 operational levels, fleet mix, stage length (i.e. distance traveled), and day/night operational split were obtained from a variety of sources including: the Airport traffic records, flight strips from the Airport Air Traffic Control (ATC), CVG's Aircraft Monitoring



RECOMMENDED NOISE ABATEMENT PROCEDURES

TURBINE POWERED AIRCRAFT
NIGHT OPERATIONS–ALL AIRCRAFT
(2300–0700 LT)

ARRIVALS:

FROM NORTHEAST

LANDING SOUTH Follow Little Miami River to 21L/21R or 25. Landing Aircraft maintain 1500 MSL or above until 2 mile final.

LANDING NORTH Follow interstate beltway and river to runways; Maintain 1500 or above MSL to 2 mile final or maintain 2500 MSL while overflying sensitive areas.

FROM SOUTH and EAST:

LANDING SOUTH Maintain 2500 MSL or above while overflying sensitive areas; Maintain 1500 MSL or above until 2 mile final.

LANDING NORTH Follow Ohio River northwest bound; Maintain 1500 MSL or above until 2 mile final.

FROM SOUTHWEST:

LANDING SOUTH Maimain 2500 MSL or above while overflying sensitive areas; Maintain 1500 MSL or above until on 2 mile final.

LANDING NORTH Follow Interstate 275 northwest bound; Maimain 1500 MSL or above until 2 mile final.

FROM NORTHWEST

ALL RUNWAYS Maintain 2500 MSL or above while overflying sensitive areas; Maintain 1500 MSL or above until on 2 mile final.

NOTE: Avoid overflying uptown area 2.5 miles southeast during performances Check ATIS

LEGEND

Source: City of Cincinnati
Recoil Productions 2000

CINCINNATI MUNICIPAL-LUNKEN AIRPORT PART 150 STUDY

LUNKEN EXISTING NOISE ABATEMENT ARRIVALS PROCEDURES

EXHIBIT 4.1-1

RECOMMENDED NOISE ABATEMENT PROCEDURES

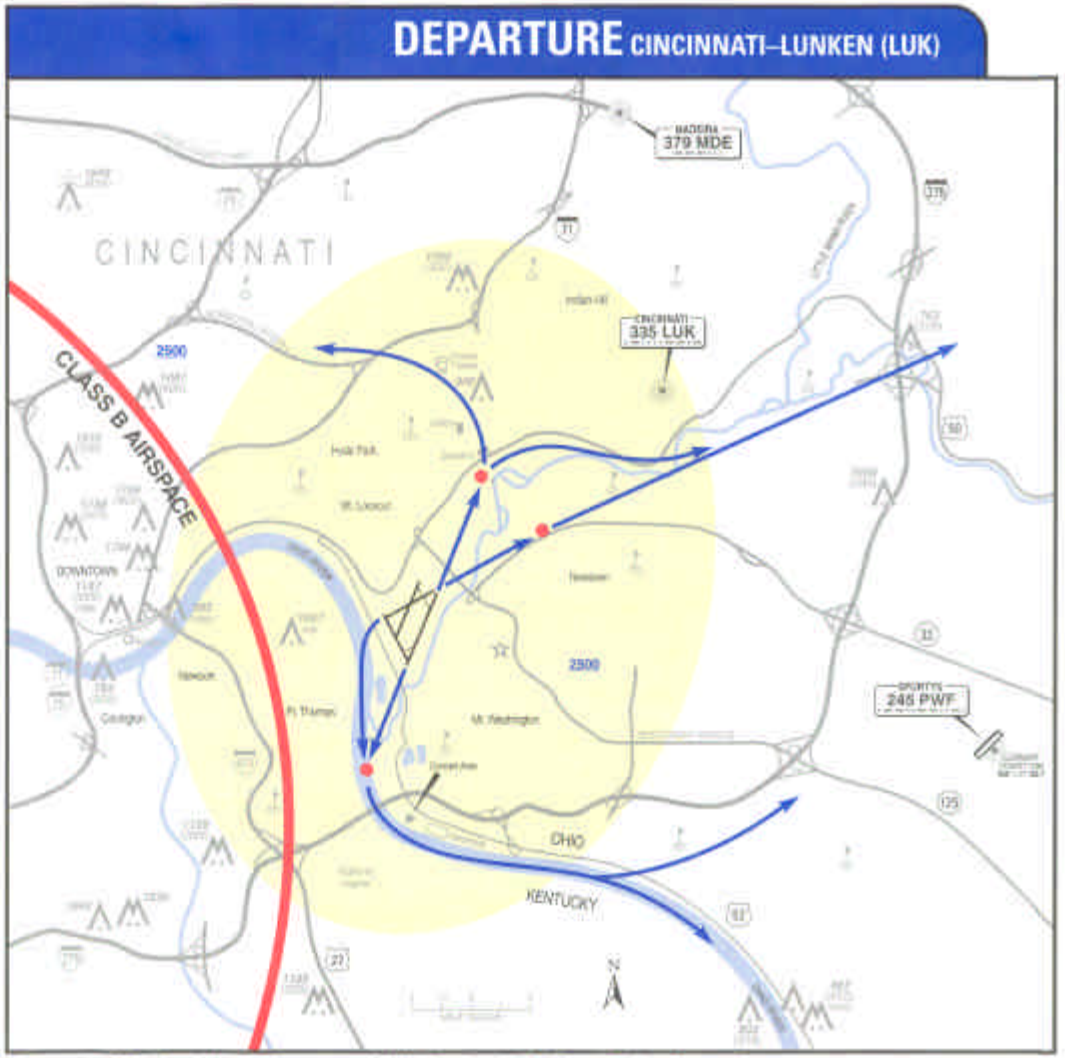
TURBINE POWERED AIRCRAFT
NIGHT OPERATIONS--ALL AIRCRAFT
(2300–0700 LT)

DEPARTURES:

RUNWAYS 3R-3L-7:
Fly runway heading to 2000 MSL; Avoid depicted sensitive areas.

RUNWAYS 21L-21R-25:
Follow river southeast bound to 2000 MSL before turning on course

NOTE: Avoid overflying concert area 2.5 miles southeast during performances (Check ATIS)



Source: City of Cincinnati
Recoil Productions 2000

CINCINNATI MUNICIPAL-LUNKEN AIRPORT PART 150 STUDY

LUNKEN EXISTING NOISE ABATEMENT DEPARTURE PROCEDURES

EXHIBIT 4.1-2

CINCINNATI–LUNKEN (LUK)

RECOMMENDED FLY NEIGHBORLY PROGRAM

– *PLEASE* avoid the noise–sensitive areas of MT. Lookout, Hyde Park, Linwood, Columbia/Tusculum and Ft. Thomas.

– Traffic pattern altitude is 1,500 feet MSL.

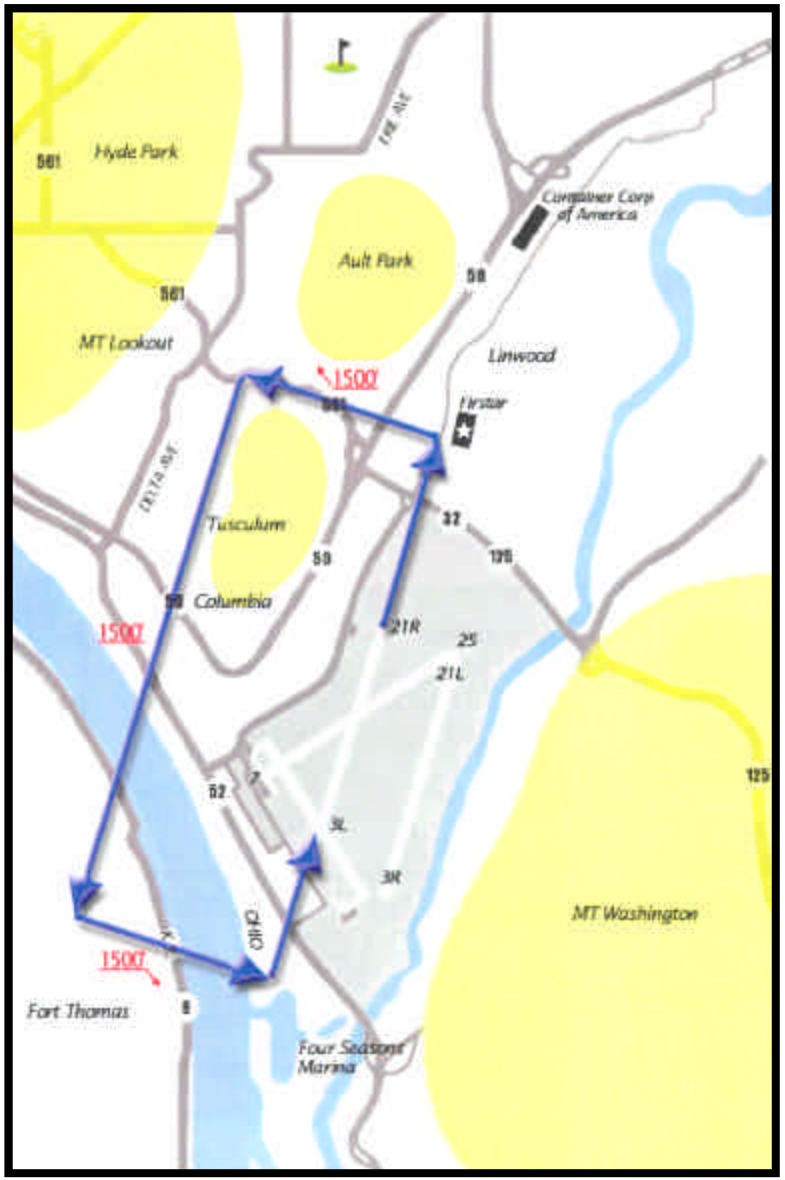
– Avoid flight training touch–and–go operations after 9:00 p.m. and before 10:00 a.m., especially weekends.

Noise Abatement Procedures: Runway 3L
Normal Takeoff and Landing

– Climb to traffic pattern altitude of 1500 feet MSL as quickly as possible. Turn crosswind, downwind and baseleg as shown in the traffic pattern diagram, or as directed by air traffic control . This procedure will avoid all noise–sensitive areas under normal Takeoff and Landing operations.

LEGEND

- Noise Sensitive Area
- 1500' At/or Above
- ↖1500' Ascending to 1500'
- 1500'↘ Descending from 1500'
- Firstar Building
- Four Seasons Marina
- Hyde Park C.C.



Source: City of Cincinnati
Recoil Productions 2000

4-6

CINCINNATI MUNICIPAL-LUNKEN AIRPORT PART 150 STUDY

LUNKEN EXISTING NOISE ABATEMENT TOUCH AND GO OPERATIONS

EXHIBIT 4.1-3

CINCINNATI–LUNKEN (LUK)

RECOMMENDED FLY NEIGHBORLY PROGRAM

– *PLEASE* avoid the noise-sensitive areas of MT. Lookout, Hyde Park, Linwood, Columbia/Tusculum and Ft. Thomas.

– Traffic pattern altitude is 1,500 feet MSL.

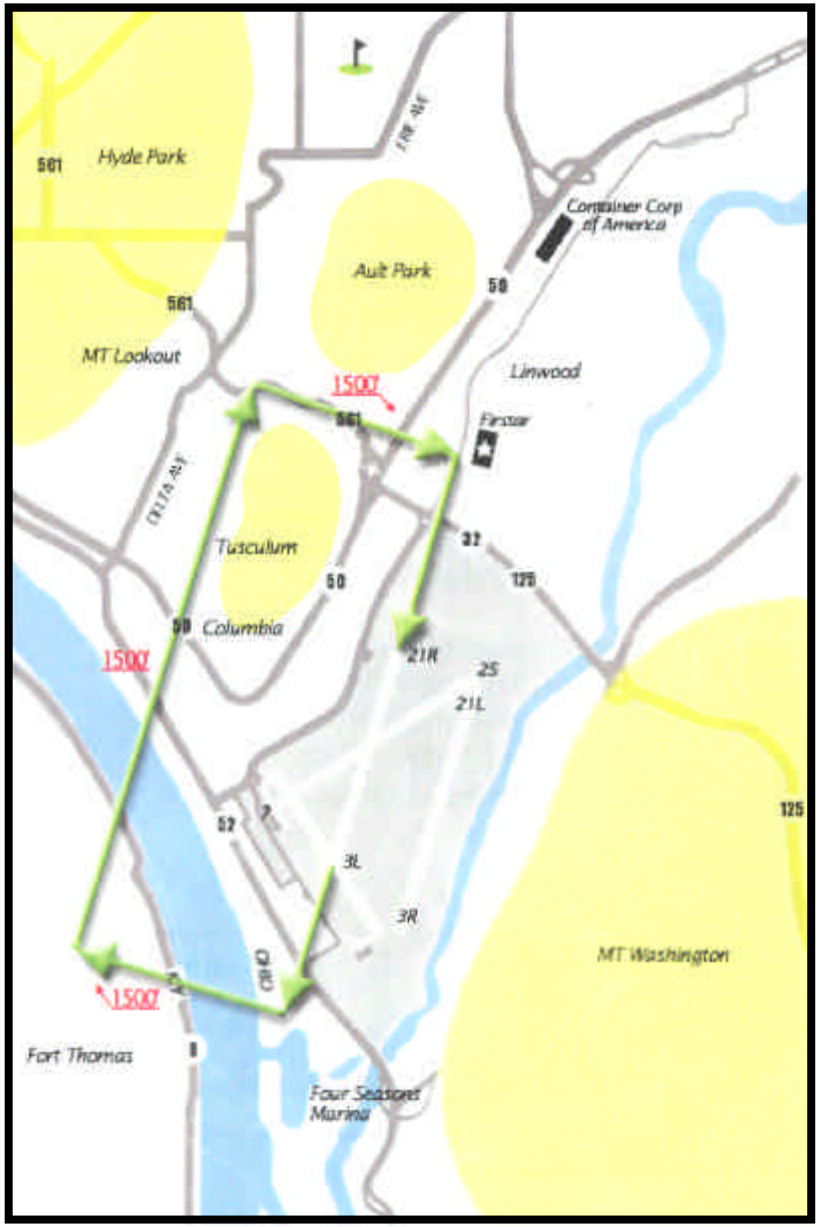
– Avoid flight training touch-and-go operations after 9:00 p.m. and before 10:00 a.m., especially weekends.

Noise Abatement Procedures: Runway 21R
Normal Takeoff and Landing

– Climb to traffic pattern altitude of 1500 feet MSL as quickly as possible. Turn crosswind, downwind and baseleg as shown in the traffic pattern diagram, or as directed by air traffic control. This procedure will avoid all noise-sensitive areas under normal Takeoff and Landing operations.

LEGEND

- Noise Sensitive Area
- 1500' At/or Above
- 1500' Ascending to 1500'
- 1500' Descending from 1500'
- Firstar Building
- Four Seasons Marina
- Hyde Park C.C.



Source: City of Cincinnati
Recoil Productions 2000

4-7

CINCINNATI MUNICIPAL-LUNKEN AIRPORT PART 150 STUDY

LUNKEN EXISTING NOISE ABATEMENT TOUCH AND GO OPERATIONS

EXHIBIT 4.1-4

System (AOMS), interviews with ATC personnel at both the Airport and CVG and on-site observations at the Airport.

4.2.1 Operational Levels

Average daily operations are derived by dividing total annual operations by 365 days. The 2002 base case number of annual aircraft operations at the Airport, is based on the airport operation count report and on-site observation. The aircraft operated at the Airport are divided into six categories including Single-engine piston or turboprop (SEP), Multi-engine piston (MEP), Multi-engine turboprop (METP), Business jet (BJ), Helicopter (HELI), and Military (MIL). These categories are listed in **Table 4.2-1**. Each category has a few representative aircraft. For instance the BJ category has 10 representative aircraft based on the engine type and performance. Many individual aircraft types are not modeled in INM; however, groups of aircraft were combined and modeled using pre-approved FAA aircraft substitutions.

TABLE 4.2-1
Cincinnati Municipal-Lunken Airport
AIRCRAFT CATEGORY AND TYPICAL AIRCRAFT TYPES

Aircraft Category	Representative Aircraft Types
Single-engine Piston/Turboprop	BE23, C150, C172, C182, C206, PA46
Multi-engine Piston	BE55, BE58, C310, C421, PA31
Multi-engine Turboprop	AC90, BE20A , BE300, C441
Business Jet	BE40, C525, C550, C560, C650, C750, F70, FA20, GLF4, LJ35
Helicopter	Bell206, BK117
Military	C130, F15, F16, F18

Source: PB Aviation, On-site observations and interviews with ATC personnel.
Ohio Department of Transportation Office of Aviation, Aircraft Inventory, January 1, 2002.

Annual and daily aircraft operations for 2002 are provided in **Table 4.2-2**. Total average daily operations are 362 in 2002.

TABLE 4.2-2
Cincinnati Municipal-Lunken Airport
ANNUAL AND DAILY AIRCRAFT OPERATIONS

Aircraft Categories	Annual	Average Day
Single-engine Piston/Turboprop	71,802	197
Multi-engine Piston	20,212	55
Multi-engine Turboprop	6,764	19
Business Jet	30,379	83
Helicopter	2,668	7
Military	389	1
Total	132,214	362

Source: PB Aviation, On-site observations.
Lunken Airport, Airport Traffic Record, January to December 2002.
Aviation Planning Associates, Inc., Master Plan Update, Technical Report, March 1989.

4.2.2 Fleet Mix

Fleet mix refers to the various categories and types of aircraft operating at an airport. Information on the Airport's existing fleet mix was obtained from the airport traffic records, an analysis of seven days flight strips, on-site observations, and discussions with Air Traffic Control (ATC) personnel, the Airport manager, and airport staff.

Table 4.2-3 lists the aircraft fleet mix assumed in developing the Airport's Existing Noise Exposure Map.

4.2.3 Stage Length

Stage length refers to the distance an aircraft travels. Each stage is associated with a takeoff weight that includes a typical passenger load and fuel required for each trip. The INM accounts for these various load factors based upon the initial distance traveled.

TABLE 4.2-3

Cincinnati Municipal-Lunken Airport

AIRCRAFT FLEET MIX

Category/ Aircraft Types	Noise Level Designator[1]	INM Designation[2]	Percent of Fleet
Single-engine Piston/Turboprop			
Beechcraft 23	N/A	GASEPF	19.02%
Cessna 172	N/A	CNA172	12.49%
Cessna 206	N/A	CNA206	17.38%
Piper 46	N/A	GASEFV	5.42%
Sub-total			54.31%
Multi-engine Piston			
Piper 31	N/A	BEC58P	15.28%
Sub-total			15.28%
Multi-engine Turboprop			
Beechcraft 2000	3	SD330	2.46%
Beechcraft 300	N/A	DHC6	2.66%
Sub-total			5.12%
Business Jet			
Cessna 525	3	CNA500	0.69%
Cessna 650	3	CIT3	0.69%
Cessna 750	3	CNA750	0.93%
Canadair CL-60	3	CL600	1.36%
Fokker 70	3	F10062	0.92%
Falcon 20	2	FAL20	0.47%
Cessna 560	3	MU3001	8.26%
Gulfstream III	2	GIIB	0.72%
Gulfstream IV	3	GIV	1.38%
LearJet 35	3	LEAR35	7.56%
Sub-total			22.98%
Helicopter			
Bell 206	N/A	B206L	0.60%
BK 117	N/A	BO105	1.42%
Sub-total			2.02%
Military			
C-130	3	C130	0.29%
Sub-total			0.29%

Source: PB Aviation, On-site observations and interviews with LUK ATC personnel.
Lunken Airport Air Traffic Control Tower, Flight Strips.

1. For purposes of showing compliance with federal aircraft noise guidelines, FAR 36 assigns a "noise designator"(Stage 1, Stage 2, and Stage 3) for all transport category large airplanes and turbojet powered aircraft.
2. This column identifies the aircraft noise database identifier for the INM. For aircraft not included in the INM database, an FAA approved substitute aircraft is identified.

Departure stage lengths indicate the range in nautical miles that an aircraft travels (non-stop) to reach its destination. For example, a departure stage length of 1 indicates a

destination range of 0 to 500 nautical miles while a departure stage length of 2 refers to a destination distance of 500 to 1,000 nautical miles. This is an important consideration in the noise analysis because longer stage lengths require more fuel which increases aircraft weight and takeoff roll and decreases climb performance. This in turn affects aircraft noise on the ground.

Stage length for each aircraft type was determined through an analysis of flight strips and discussions with air traffic controllers and airport staff. Stage length percentages are presented in **Table 4.2-4**. All SEP, HELI, and MIL aircraft are assumed to depart to destinations between 0 and 500 miles (departure stage length 1). Departures for the MEP and METP aircraft were split between less than 500 miles and destination between 500 and 1,000 miles (departure stage length 2). Departures for Business Jet destinations include all four stage length categories.

TABLE 4.2-4

Cincinnati Municipal-Lunken Airport

STAGE LENGTH PERCENTAGE

Category	Stage 1	Stage 2	Stage 3	Stage 4	Total
Single-engine Piston/Turboprop	100%	0%	0%	0%	100%
Multi-engine Piston	97%	3%	0%	0%	100%
Multi-engine Turboprop	86%	14%	0%	0%	100%
Business Jet	76%	18%	3%	3%	100%
Helicopter	100%	0%	0%	0%	100%
Military	100%	0%	0%	0%	100%

Source: Lunken Airport Air Traffic Control Tower, Flight Strips.
Aviation Planning Associates, Inc., Master Plan Update, Technical Report, March 1989.

Key: Stage 1 = 0 – 500 nautical miles
Stage 2 = 500 – 1,000 nautical miles
Stage 3 = 1,000 – 1,500 nautical miles
Stage 4 = 1,500 nautical miles or more

4.2.4 Day-Night Operations

Evaluation of nighttime Airport operations is important due to the increased sensitivity to noise occurring during sleeping hours. To account for increased nighttime sensitivity, the INM applies a 10-decibel penalty to nighttime aircraft flight. The Existing 2002 NEM reflects this penalty.

The 2002 day-night split was projected using the RADAR data from CVG's Aircraft Operations Monitoring System (AOMS) on March 21, 2001 and April 12, 2001 and through discussions with air traffic controllers at CVG and the Airport. **Table 4.2-5** provides the percentages of day and night operations for arrivals and departures.

TABLE 4.2-5
Cincinnati Municipal-Lunken Airport
DAY/NIGHT OPERATIONS

	Annual Operations	Average Annual Day				
		Daytime[1]		Nighttime[2]		Total Operations
		Operations	Percentage	Operations	Percentage	
Single-engine Piston/Turboprop	71,802	183	93%	14	7%	197
Multi-engine Piston	20,212	51	93%	4	7%	55
Multi-engine Turboprop	6,764	18	93%	1	7%	19
Business Jet	30,379	77	93%	6	7%	83
Helicopter	2,668	6	93%	1	7%	7
Military	389	1	100%	0	0%	1
Total	132,214	336		26		362

Sources: PB Aviation, Interviews with LUK ATC personnel.
Cincinnati Northern Kentucky International Airport, Aircraft Operation Monitoring System, April 12 and March 21, 2001.
[1]. Daytime = 7:00 a.m. to 9:59 p.m.
[2]. Nighttime = 10:00 p.m. to 6:59 a.m.

4.2.5 Run-Up Operations

INM uses a single directivity pattern to calculate noise around an airplane on a run-up pad. The directivity pattern is symmetric around the longitudinal axis of the airplane. The run-up noise level depends upon aircraft type, run-up pad location, heading of the airplane, average duration of the run-up event, and the number of times the run-up event occurs during the day and night time periods.

There is one run-up pad used at the Airport. The run-up pad is in the holding area near Runway 25. The daily maintenance run-up operations at the Airport are listed in **Table 4.2-6**.

TABLE 4.2-6
Cincinnati Municipal-Lunken Airport
MAINTENANCE/RUN-UP OPERATIONS

Category	Run-Up Operations	Duration Per Operation (second)
Business Jet	6	600

Source: PB Aviation, Interviews with LUK ATC personnel.

4.3 OPERATIONAL PROCEDURES

Operations data, including runway utilization and flight tracks and their utilization, were gathered through the analyses of flight strips, AOMS, and meteorological data, airspace routing procedures, and on-site observation.

4.3.1 Runway Utilization

To estimate annual noise exposure as required by FAR Part 150, annual average runway use must be determined. Existing runway-use patterns were identified through interviews with ATC staff.

The daytime and nighttime annual arrival and departure runway use is shown on **Tables 4.3-1** to **4.3-4**.

TABLE 4.3-1

Cincinnati Municipal-Lunken Airport

ANNUAL AVERAGE ARRIVAL RUNWAY UTILIZATION – DAYTIME

Runway End	SEP	MEP	METP	BJ	HELI	MIL
7	2%	--	--	--	--	--
25	10%	10%	10%	8%	--	--
3L	15%	2%	--	--	--	--
21R	55%	6%	--	--	--	--
3R	8%	22%	25%	25%	--	25%
21L	10%	60%	65%	67%	--	75%
Total	100%	100%	100%	100%	--	100%

Source: Cincinnati Northern Kentucky International Airport, Aircraft Operation Monitoring System, April 12 and March 21, 2001.
Lunken Airport Air Traffic Control Tower, Flight Strips.
Aviation Planning Associates, Inc., Master Plan Update, Technical Report, March 1989.
PB Aviation, On-site observations and interview with LUK ATC personnel.

TABLE 4.3-2

Cincinnati Municipal-Lunken Airport

ANNUAL AVERAGE ARRIVAL RUNWAY UTILIZATION – NIGHTTIME

Runway End	SEP	MEP	METP	BJ	HELI	MIL
7	--	--	--	--	--	--
25	10%	5%	--	--	--	--
3L	--	--	--	--	--	--
21R	--	--	--	--	--	--
3R	25%	25%	25%	25%	--	25%
21L	65%	70%	75%	75%	--	75%
Total	100%	100%	100%	100%	--	100%

Source: Cincinnati Northern Kentucky International Airport, Aircraft Operation Monitoring System, April 12 and March 21, 2001.
Lunken Airport Air Traffic Control Tower, Flight Strips.
Aviation Planning Associates, Inc., Master Plan Update, Technical Report, March 1989.
PB Aviation, On-site observations and interview with LUK ATC personnel.

TABLE 4.3-3

Cincinnati Municipal-Lunken Airport

ANNUAL AVERAGE DEPARTURE RUNWAY UTILIZATION – DAYTIME

Runway End	SEP	MEP	METP	BJ	HELI	MIL
7	5%	2%	--	--	--	--
25	10%	10%	10%	8%	--	--
3L	15%	2%	--	--	--	--
21R	55%	6%	--	--	--	--
3R	5%	20%	25%	25%	--	25%
21L	10%	60%	65%	67%	--	75%
Total	100%	100%	100%	100%	--	100%

Source: Cincinnati Northern Kentucky International Airport, Aircraft Operation Monitoring System, April 12 and March 21, 2001.
Lunken Airport Air Traffic Control Tower, Flight Strips.
Aviation Planning Associates, Inc., Master Plan Update, Technical Report, March 1989.
PB Aviation, On-site observations and interview with LUK ATC personnel.

TABLE 4.3-4

Cincinnati Municipal-Lunken Airport

ANNUAL AVERAGE DEPARTURE RUNWAY UTILIZATION – NIGHTTIME

Runway End	SEP	MEP	METP	BJ	HELI	MIL
7	2%	--	--	--	--	--
25	5%	2%	--	--	--	--
3L	--	--	--	--	--	--
21R	--	--	--	--	--	--
3R	23%	25%	25%	25%	--	25%
21L	70%	73%	75%	75%	--	75%
Total	100%	100%	100%	100%	--	100%

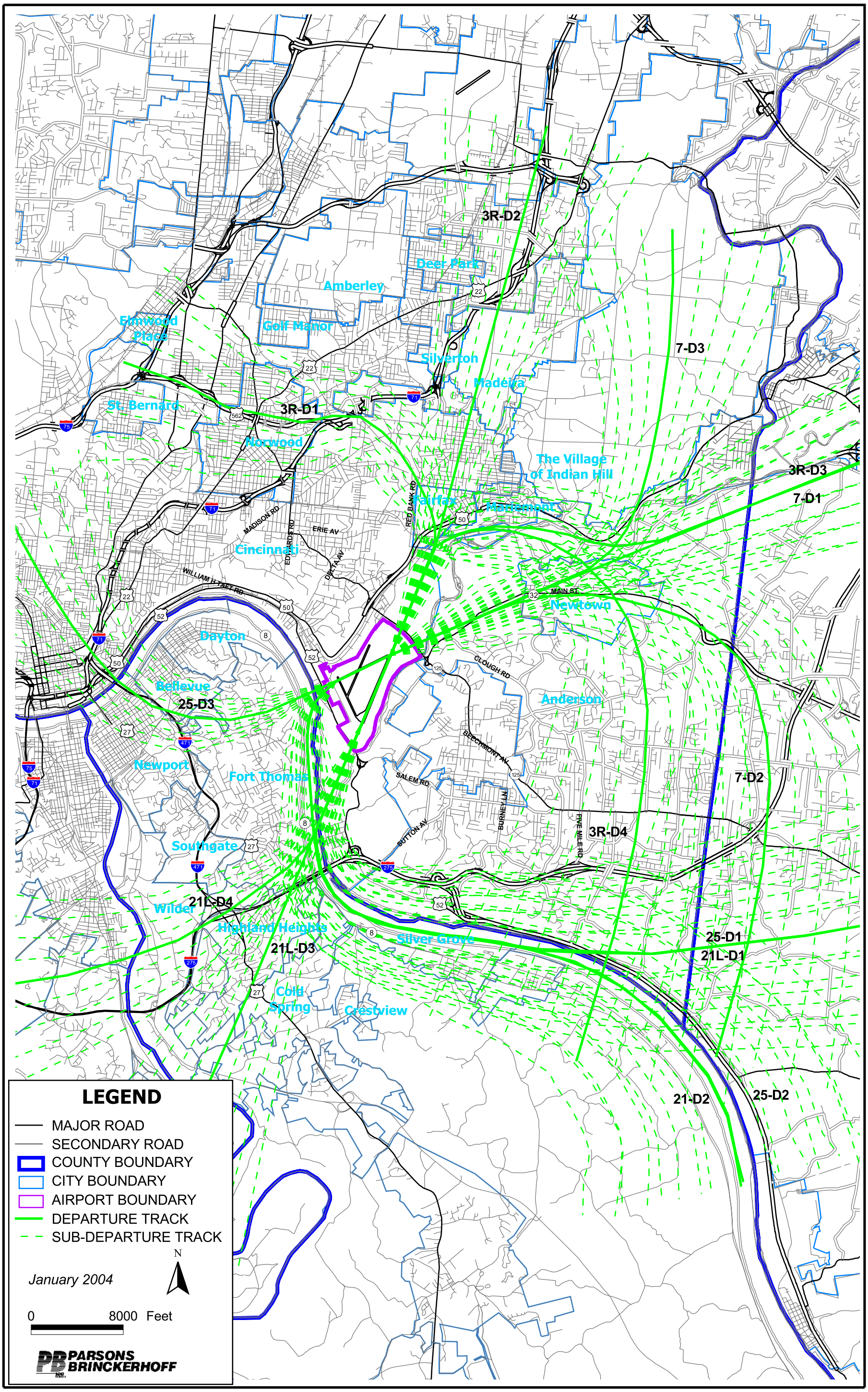
Source: Cincinnati Northern Kentucky International Airport, Aircraft Operation Monitoring System, April 12 and March 21, 2001.
Lunken Airport Air Traffic Control Tower, Flight Strips.
Aviation Planning Associates, Inc., Master Plan Update, Technical Report, March 1989.
PB Aviation, On-site observations and interview with LUK ATC personnel.

4.3.2 Flight Tracks

A flight track is the projection on the ground of an aircraft's path in the sky. Because of meteorological conditions, aircraft types, stage lengths, and pilot judgment, no two flight tracks are exactly the same. To obtain a clear indication of where aircraft are flying, accurately identifying generalized flight tracks is necessary for input into the INM. To quantify flight track usage, the existing departure, arrival, and touch and go flight track maps at the Airport were reviewed and two-day samples of AOMS data were also processed. PB staff also discussed flight tracks and flight track usage with the Airport personnel and ATC Tower staff. **Exhibits 4.3-1**, **4.3-2**, and **4.3-3** illustrate the departure, arrival, and touch and go flight tracks used in this study.

The INM allows the users to select a cross section of AOMS flight tracks to determine the centerline. The INM software also determines the standard deviations from the centerline of the flight track group. The centerline track can be dispersed into multiple sub-tracks that more accurately represent the actual flight tracks than a single generalized flight track.

The allocation of aircraft operations to the generalized flight tracks depicted on Exhibits 4.3-1, 4.3-2, and 4.3-3 is presented on **Tables 4.3-5** to **4.3-8**. The allocation of

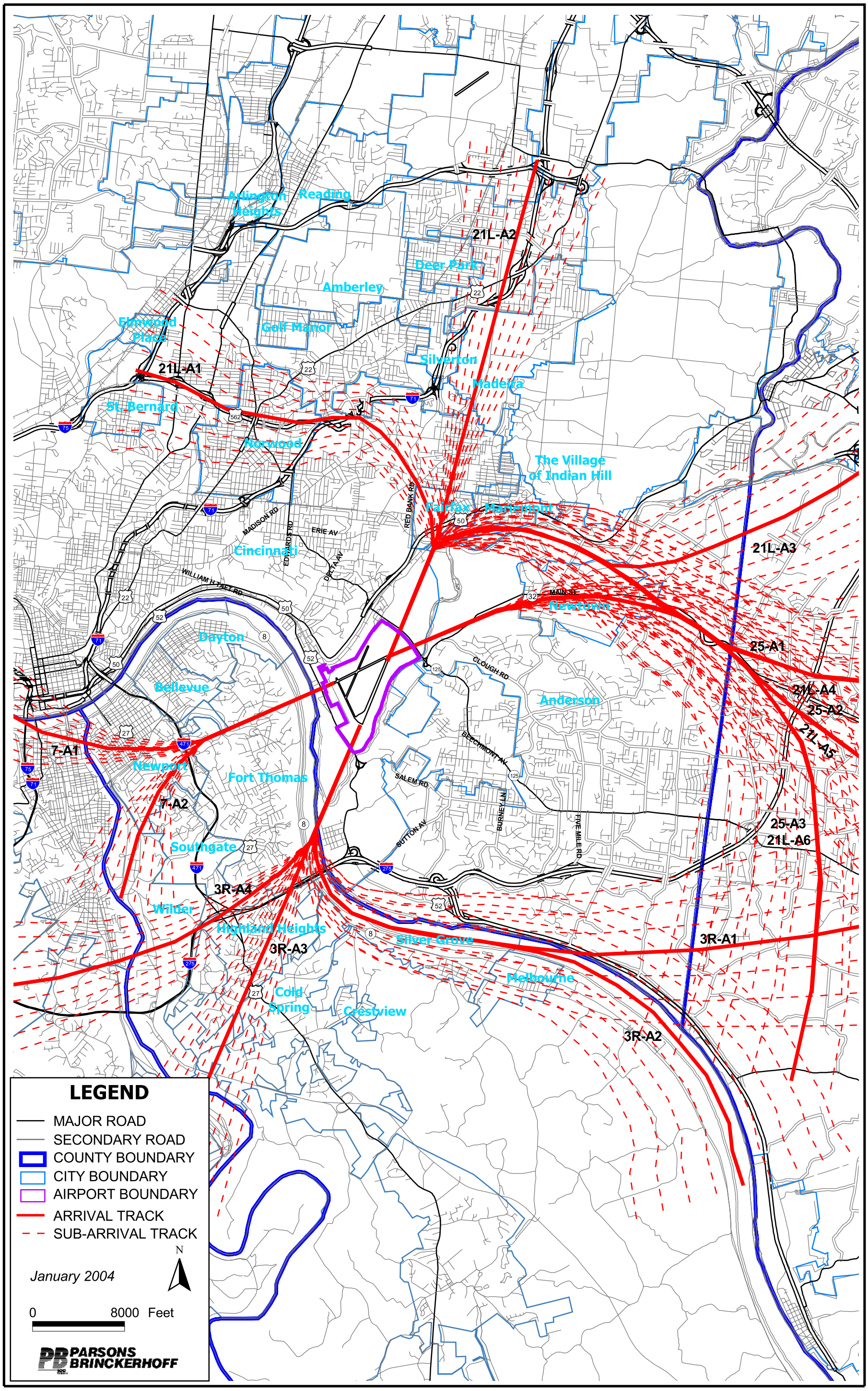


CINCINNATI MUNICIPAL-LUNKEN AIRPORT PART 150 STUDY

DEPARTURE TRACKS

EXHIBIT 4.3-1

PB AVIATION

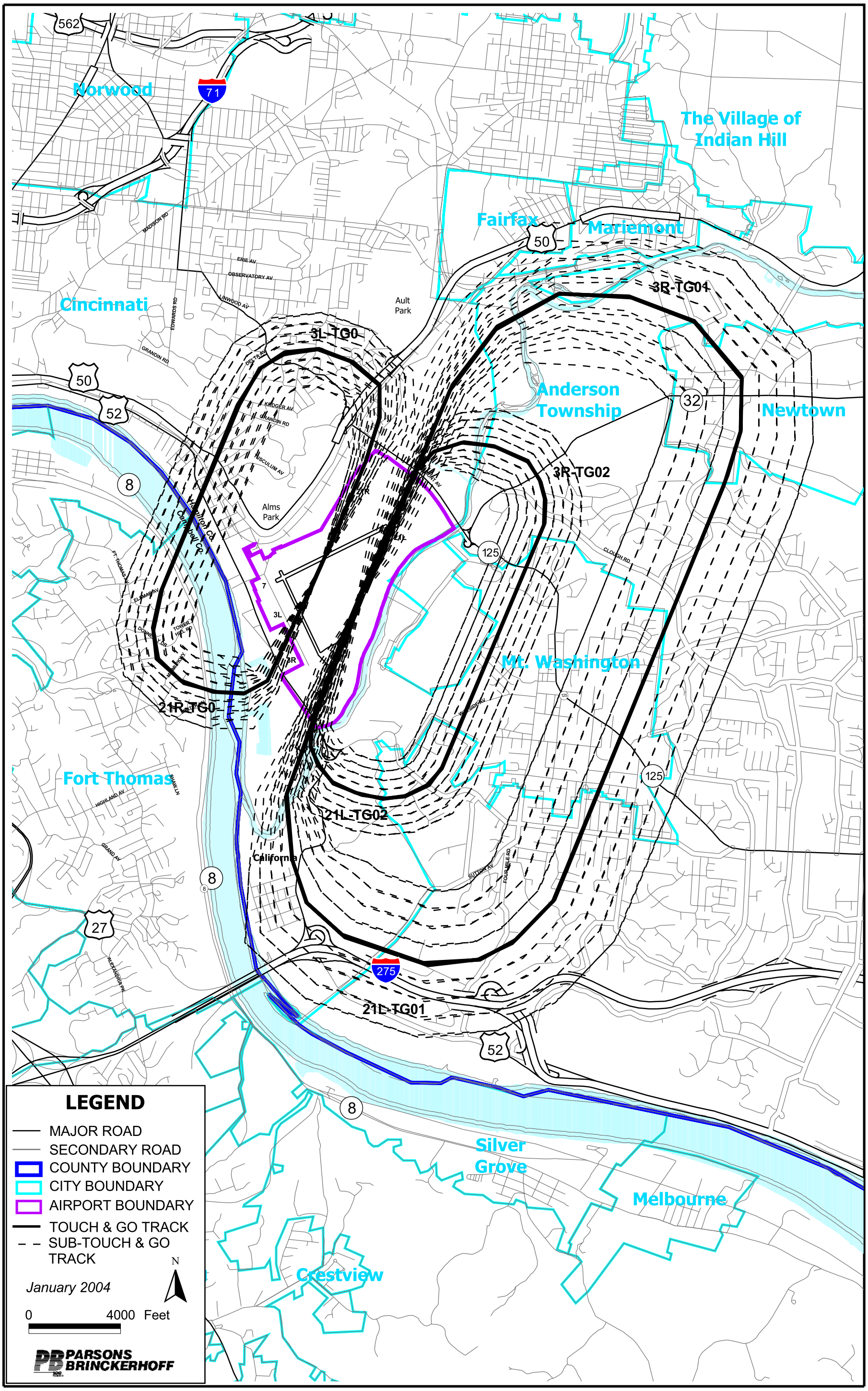


CINCINNATI MUNICIPAL-LUNKEN AIRPORT PART 150 STUDY

ARRIVAL TRACKS

EXHIBIT 4.3-2

PB AVIATION



CINCINNATI MUNICIPAL-LUNKEN AIRPORT PART 150 STUDY

EXISTING TOUCH AND GO TRACKS

EXHIBIT 4.3-3

PB AVIATION

aircraft operations to the generalized flight tracks is derived from analysis of all aircraft operations in the AOMS data sample based.

TABLE 4.3-5

Cincinnati Municipal-Lunken Airport

ANNUAL AVERAGE ARRIVAL FLIGHT TRACK USE – DAYTIME

Runway End	Flight Tracks	SEP	MEP	METP	BJ	HELI	MIL
7	7-A1	50%				--	--
	7-A2	50%				--	--
	Total	100%				--	--
25	25-A1	25%	25%	55%	55%	--	--
	25-A2	50%	50%	20%	20%	--	--
	25-A3	25%	25%	25%	25%	--	--
	Total	100%	100%	100%	100%	--	--
3L	3L-TGO	100%	100%	--	--	--	--
	Total	100%	100%	--	--	--	--
21R	21R-TGO	100%	100%	--	--	--	--
	Total	100%	100%	--	--	--	--
3R	3R-A1	20%	20%	18%	18%	--	--
	3R-A2	20%	20%	20%	20%	--	--
	3R-A3	45%	40%	52%	52%	--	100%
	3R-A4	10%	5%	9%	9%	--	--
	3R-TGO1	--	--	1%	1%	--	--
	3R-TGO2	5%	15%	--	--	--	--
	Total	100%	100%	100%	100%	--	100%
21L	21L-A1	5%	5%	5%	5%	--	--
	21L-A2	40%	35%	38%	38%	--	100%
	21L-A3	10%	10%	20%	20%	--	--
	21L-A4	20%	15%	11%	11%	--	--
	21L-A5	10%	10%	12%	12%	--	--
	21L-A6	10%	10%	13%	13%	--	--
	21L-TGO1	--	--	1%	1%	--	--
	21L-TGO2	5%	15%	--	--	--	--
	Total	100%	100%	100%	100%	--	100%

Source: Cincinnati Northern Kentucky International Airport, Aircraft Operation Monitoring System, April 12 and March 21, 2001.
Lunken Airport Air Traffic Control Tower, Flight Strips.
PB Aviation, On-site observations and interview with LUK ATC personnel.

TABLE 4.3-6

Cincinnati Municipal-Lunken Airport

ANNUAL AVERAGE ARRIVAL FLIGHT TRACK USE – NIGHTTIME

Runway End	Flight Tracks	SEP	MEP	METP	BJ	HELI	MIL
7	7-A1	--	--	--	--	--	--
	7-A2	--	--	--	--	--	--
	Total	--	--	--	--	--	--
25	25-A1	25%	25%	--	--	--	--
	25-A2	50%	50%	--	--	--	--
	25-A3	25%	25%	--	--	--	--
	Total	100%	100%			--	--
3L	3L-TGO	--	--	--	--	--	--
	Total	--	--	--	--	--	--
21R	21R-TGO	--	--	--	--	--	--
	Total	--	--	--	--	--	--
3R	3R-A1	20%	20%	18%	18%	--	--
	3R-A2	20%	20%	20%	20%	--	--
	3R-A3	50%	50%	52%	52%	--	100%
	3R-A4	10%	10%	10%	10%	--	--
	3R-TGO1	--	--	--	--	--	--
	3R-TGO2	--	--	--	--	--	--
	Total	100%	100%	100%	100%	--	100%
21L	21L-A1	10%	20%	5%	5%	--	--
	21L-A2	40%	35%	38%	38%	--	100%
	21L-A3	10%	10%	20%	20%	--	--
	21L-A4	20%	15%	12%	12%	--	--
	21L-A5	10%	10%	12%	12%	--	--
	21L-A6	10%	10%	13%	13%	--	--
	21L-TGO1	--	--	--	--	--	--
	21L-TGO2	--	--	--	--	--	--
	Total	100%	100%	100%	100%	--	100%

Source: Cincinnati Northern Kentucky International Airport, Aircraft Operation Monitoring System, April 12 and March 21, 2001.
Lunken Airport Air Traffic Control Tower, Flight Strips.
PB Aviation, On-site observations and interview with LUK ATC personnel.

TABLE 4.3-7

Cincinnati Municipal-Lunken Airport

ANNUAL AVERAGE DEPARTURE FLIGHT TRACK USE – DAYTIME

Runway End	Flight Tracks	SEP	MEP	METP	BJ	HELI	MIL
7	7-D1	85%	85%				
	7-D2	10%	10%			--	--
	7-D3	5%	5%			--	--
	Total	100%	100%			--	--
25	25-D1	40%	40%	55%	55%	--	--
	25-D2	55%	55%	42%	42%	--	--
	25-D3	5%	5%	3%	3%	--	--
	Total	100%	100%	100%	100%	--	--
3L	3L-TGO	100%	100%	--	--	--	--
	Total	100%	100%	--	--	--	--
21R	21R-TGO	100%	100%	--	--	--	--
	Total	100%	100%	--	--	--	--
3R	3R-D1	5%	5%	5%	5%	--	--
	3R-D2	20%	20%	50%	50%	--	100%
	3R-D3	30%	25%	20%	20%	--	--
	3R-D4	40%	35%	24%	24%	--	--
	3R-TGO1	--	--	1%	1%	--	--
	3R-TGO2	5%	15%	--	--	--	--
	Total	100%	100%	100%	100%	--	100%
21L	21L-D1	45%	40%	35%	35%		
	21L-D2	35%	30%	19%	19%	--	100%
	21L-D3	10%	10%	25%	25%	--	--
	21L-D4	5%	5%	20%	20%	--	--
	21L-TGO1	--	--	1%	1%	--	--
	21L-TGO2	5%	15%	--	--	--	--
	Total	100%	100%	100%	100%	--	100%

Source: Cincinnati Northern Kentucky International Airport, Aircraft Operation Monitoring System, April 12 and March 21, 2001.
Lunken Airport Air Traffic Control Tower, Flight Strips.
PB Aviation, On-site observations and interview with LUK ATC personnel.

TABLE 4.3-8

Cincinnati Municipal-Lunken Airport

ANNUAL AVERAGE DEPARTURE FLIGHT TRACK USE – NIGHTTIME

Runway End	Flight Tracks	SEP	MEP	METP	BJ	HELI	MIL
7	7-D1	85%					
	7-D2	10%				--	--
	7-D3	5%				--	--
	Total	100%				--	--
25	25-D1	40%	40%			--	--
	25-D2	55%	55%			--	--
	25-D3	5%	5%			--	--
	Total	100%	100%			--	--
3L	3L-TGO	--	--	--	--	--	--
	Total	--	--	--	--	--	--
21R	21R-TGO	--	--	--	--	--	--
	Total	--	--	--	--	--	--
3R	3R-D1	10%	15%	5%	5%	--	--
	3R-D2	20%	20%	50%	50%	--	100%
	3R-D3	30%	25%	20%	20%	--	--
	3R-D4	40%	40%	25%	25%	--	--
	3R-TGO1	--	--	--	--	--	--
	3R-TGO2	--	--	--	--	--	--
	Total	100%	100%	100%	100%	--	100%
21L	21L-D1	45%	45%	35%	35%		
	21L-D2	35%	30%	20%	20%	--	100%
	21L-D3	10%	10%	25%	25%	--	--
	21L-D4	10%	15%	20%	20%	--	--
	21L-TGO1	--	--	--	--	--	--
	21L-TGO2	--	--	--	--	--	--
	Total	100%	100%	100%	100%	--	100%

Source: Cincinnati Northern Kentucky International Airport, Aircraft Operation Monitoring System, April 12 and March 21, 2001.
Lunken Airport Air Traffic Control Tower, Flight Strips.
PB Aviation, On-site observations and interview with LUK ATC personnel.

4.4 EXISTING NOISE CONTOURS

The activity and operational data gathered for the Airport were used as input data to the INM. Using the input file and its internal database, the model calculated existing noise exposure levels and produced noise contours reflecting existing noise impacts. Then, the noise contours were overlaid on a base map of the Airport area to identify specific areas exposed to noise level of DNL 55 dBA, 60 dBA, 65 dBA, 70 dBA, and 75 dBA. The 55 DNL and 65 DNL were included to show noise conditions on overlying communities. The DNL contours for an average day activity that

occurred at the Airport in 2002 are depicted on **Exhibit 4.4-1**. The largest section of the noise contour is along Runway 3R/21L, which corresponds with the high utilization of Runway 3R/21L by the larger aircraft at the Airport. The Existing 2002 NEM is provided in large-scale format in the map pocket at the end of this chapter.

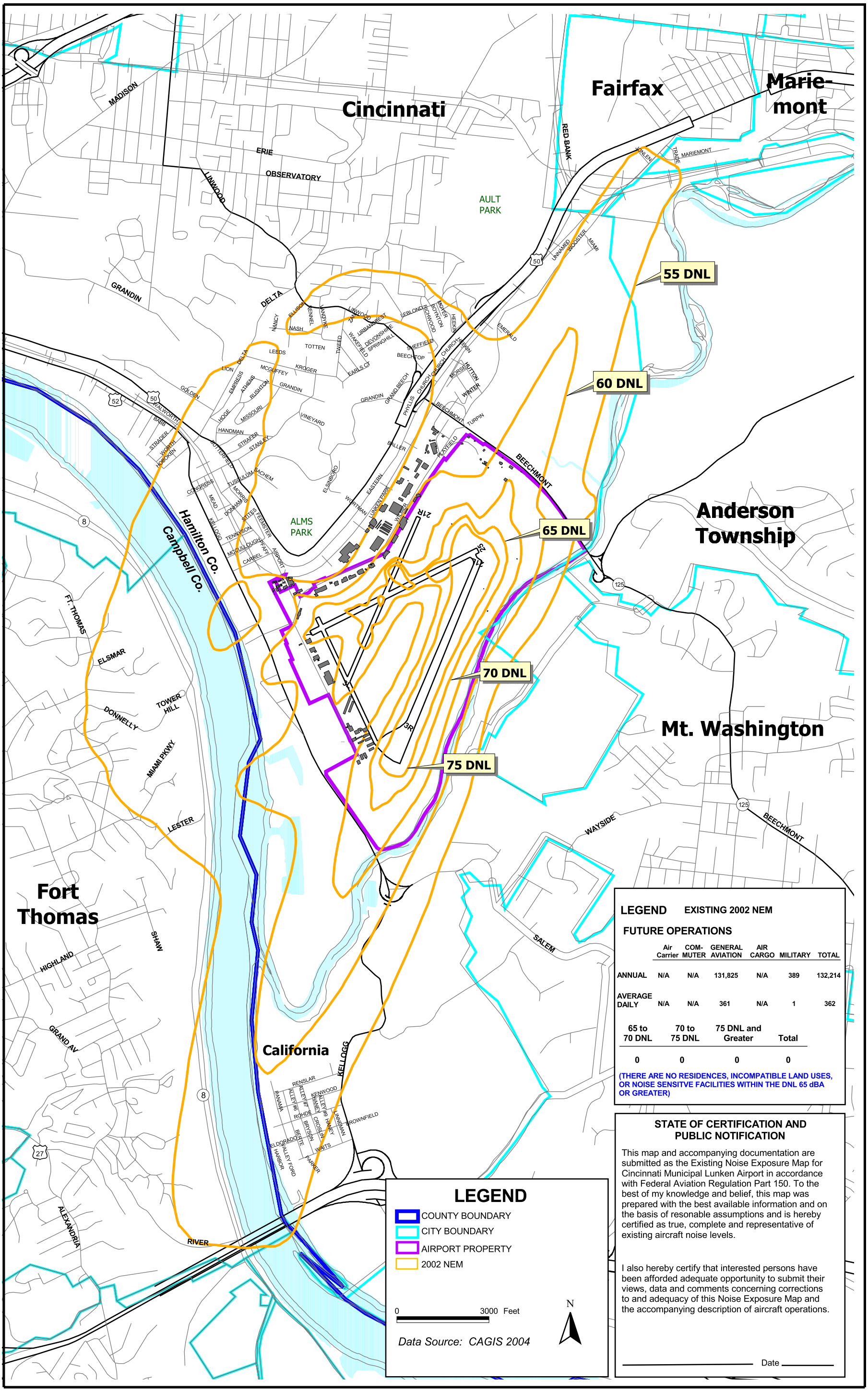
4.4.1 Noise Monitoring Data

To support the initial FAR Part 150 Study for the Airport, a noise-monitoring was conducted at 15 locations in the vicinity of the Airport. A summary of the results of that program is included in this chapter and the complete hourly monitoring data report is contained in **Appendix G** of this report. The noise monitoring was designed to accomplish the following objectives:

- To sample acoustic data in order to compute the background and day-night average sound levels (DNL) using all measurable noise sources at representative locations around the airport.
- To sample and document the typical sound levels of aircraft arrival and departure operations.
- To provide a comparison between the sample acoustic data at several of the noise monitoring sites located close to the airport with those of the INM model predicted values.

Table 4.4-1 "Noise Monitoring Summary" of the Noise Monitoring Report found in Appendix G shows a comparison between community background or ambient noise levels and DNL sound levels. Background noise levels ranged from a low of 35.5 dBA to a high of 51.5 dBA. DNL sound levels ranged from 54.9 dBA to 69.2 dBA at the 15 monitoring stations.

A sample of typical sound levels of aircraft arrival and departure were recorded and presented in Table 1-4 in Appendix G "Observed Aircraft Operations and Noise Levels" of the Noise Monitoring Report. The sound exposure level (SEL) and maximum A-weighted sound level (L_{max}) identified at the monitoring stations ranged from SEL 66.5 dBA and L_{max} 65.0 dBA to SEL 113.8 dBA and L_{max} 109.1 dBA.



LEGEND	EXISTING 2002 NEM					
FUTURE OPERATIONS						
	Air Carrier	COM-MUTER	GENERAL AVIATION	AIR CARGO	MILITARY	TOTAL
ANNUAL	N/A	N/A	131,825	N/A	389	132,214
AVERAGE DAILY	N/A	N/A	361	N/A	1	362

65 to 70 DNL	70 to 75 DNL	75 DNL and Greater	Total
0	0	0	0

(THERE ARE NO RESIDENCES, INCOMPATIBLE LAND USES, OR NOISE SENSITVE FACILITIES WITHIN THE DNL 65 dBA OR GREATER)

LEGEND

- COUNTY BOUNDARY
- CITY BOUNDARY
- AIRPORT PROPERTY
- 2002 NEM

0 3000 Feet

N

Data Source: CAGIS 2004

STATE OF CERTIFICATION AND PUBLIC NOTIFICATION

This map and accompanying documentation are submitted as the Existing Noise Exposure Map for Cincinnati Municipal Lunken Airport in accordance with Federal Aviation Regulation Part 150. To the best of my knowledge and belief, this map was prepared with the best available information and on the basis of resonable assumptions and is hereby certified as true, complete and representative of existing aircraft noise levels.

I also hereby certify that interested persons have been afforded adequate opportunity to submit their views, data and comments concerning corrections to and adequacy of this Noise Exposure Map and the accompanying description of aircraft operations.

_____ Date _____

CINCINNATI MUNICIPAL-
LUNKEN AIRPORT
PART 150 STUDY

EXISTING 2002 NEM

EXHIBIT

4.4-1

PB AVIATION

TABLE 4.4-1

Cincinnati Municipal-Lunken Airport

NOISE MONITORING SUMMARY

Monitoring Site	Total Hours	L90	DNL, dB (17 June through 24 June, 2002) Mon 17-Jun	Tue 18-Jun	Wed 19-Jun	Thu 20-Jun	Fri 21-Jun	Sat 22-Jun	Sun 23-Jun	Mon 24-Jun	Overall DNL
1 - 3755 Earls Court View	146	43.2		60.8	57.7	56.3	55.3	53.4	53.8	53.9	56.7
2 - 5788 Brookstone	143	39.9		54.0	56.2	56.1	56.3	54.7	54.4	54.7	55.3
3 - 64 Henry Avenue	140	44.0	57.1	58.5	57.0	60.5	56.4	57.7	55.2		57.8
4 - 5497 Wasigo Street*	131	47.9	58.7	66.8	58.1	59.2	59.1	59.1	63.3		61.9
5 - 3609 Center Street	146	40.5	54.7	53.7	53.1	53.6	59.4	51.9	52.3		54.9
6 - 3605 Oak Vista	149	36.5	54.8	54.3	53.1	54.0	62.8	56.1	54.1		57.1
7 - Fairfield School	165	40.0	56.0	58.1	57.2	57.6	58.2	54.5	54.2		56.8
8 - 3541 Kentucky View	143	47.0	57.9	58.7	58.4	57.8	58.2	57.5	56.5		57.9
9 - 4716 Wilmer Court	123	46.0	62.3	64.7	61.0	64.3	64.2	61.8	63.0		63.2
10 - 3541 Principio	146	40.6		58.0	59.7	57.1	60.7	56.0	55.2	54.3	57.8
11 - 6920 Ragland Road	115	35.5	56.6	58.1	-	-	58.6	53.1	56.6		57.0
12 - 5701 Kellogg	147	51.5	61.0	63.2	62.8	62.5	62.6	61.5	60.5		62.1
13 - Approach End of Rwy 03R	140	39.5		65.1	68.5	65.6	67.6	60.2	63.6	62.1	65.5
14 - Approach End of Rwy 21L	140	38.0		72.6	70.7	69.4	69.0	63.8	67.6	64.6	69.2
15 - OLD LUNKEN Tower	119	49.0		68.0	67.7	66.9	65.7	65.4	65.2	-	66.6

Note: * Measurements were conducted during 23 July (Monday) through 29 July, 2002 (Sunday) to replace those originally conducted at 2481 Wenatchee (meter failure).

A sample of typical sound levels of aircraft arrival and departure were recorded and presented in **Table 4.4-2** in "Observed Aircraft Operations and Noise Levels" of the Noise Monitoring Report. The sound exposure level (SEL) and maximum A-weighted sound Level (L_{max}) identified at the monitoring stations ranged from SEl 66.5 dBA and L_{max} 65.0 dBA to SEL 113.8 dBA and L_{max} 109.1 dBA.

4.4.2 Area

The acreage encompassed by the existing DNL 55 dBA, 60 dBA, 65 dBA, 70 dBA, and 75 dBA noise contours is listed in **Table 4.4-3**. Overall, the area of the DNL 55 dBA or greater noise contours is 7.1 square miles.

TABLE 4.4-2

Cincinnati Municipal-Lunken Airport

OBSERVED AIRCRAFT OPERATIONS AND NOISE LEVELS

Site	Date	Local Time	Operation	Aircraft Type	Eng. Cfg.	Runway	SEL (dB)	L_{max} (dB)
5	6/18/02	7:28:16	Departure	Cessna 501	Jet	3R	66.5	65.0
5	6/18/02	8:32:33	Departure	Cessna 560	Jet	3R	82.0	73.5
6	6/18/02	7:11:04	Departure	Cessna 550	Jet	3R	77.1	69.2
7	6/18/02	7:10:33	Departure	Cessna 550	Jet	3R	80.0	72.0
7	6/18/02	7:28:02	Departure	Cessna 501	Jet	3R	80.5	71.5
7	6/18/02	8:32:19	Departure	Cessna 560	Jet	3R	79.0	70.5
7	6/18/02	9:42:57	Departure	Learjet 35A	Jet	3R	75.0	67.5
7	6/18/02	10:07:01	Departure	BAe 125 Series 800A	Jet	3R	81.0	72.5
9	6/18/02	7:03:35	Departure	Raytheon B300	Twin	3R	75.0	70.5
9	6/18/02	7:13:57	Departure	Dassault Falcon 50	Jet	3R	73.5	71.0
9	6/18/02	8:44:34	Departure	Canadair CL-600-2B16	Jet	3R	77.5	70.0
9	6/18/02	10:06:39	Departure	BAe 125 Series 800A	Jet	3R	77.5	72.0
9	6/18/02	10:33:11	Departure	Beech E-55	Twin	3R	80.5	74.0
14	6/18/02	15:15:48	Departure	Cessna 182	SE	21L	80.2	77.7
14	6/18/02	15:58:48	Departure	IAI Astra SPX	Jet	21L	71.6	67.2
14	6/18/02	17:13:37	Departure	Piper PA-32RT-300T	SE	21L	77.0	70.7
14	6/18/02	17:31:45	Departure	Cessna 550	Jet	21L	70.4	67.5
14	6/18/02	18:00:25	Departure	Cessna 550	Jet	21L	68.7	66.5
2	6/21/02	19:18:21	Departure	Cessna 560XL	Jet	21L	73.7	66.7
2	6/21/02	17:40:53	Departure	Piper PA-28	SE	21L	69.0	65.5
8	6/21/02	11:28:45	Departure	Piper PA-31-325	Twin	21L	78.0	70.0
8	6/21/02	11:39:08	Departure	Hawker Siddeley 125	Jet	21L	65.0	66.5
8	6/21/02	16:08:24	Departure	Beech E-55	Twin	21L	79.0	69.5
8	6/21/02	16:28:41	Departure	Mitsubishi MU-300	Jet	21L	82.0	73.5
8	6/21/02	17:28:41	Departure	Piper PA-31-350	Twin	21L	82.0	73.5
12	6/21/02	11:39:02	Departure	Hawker Siddeley 125	Jet	21L	77.0	73.5
12	6/21/02	12:17:13	Departure	Cessna 560	Jet	21L	74.5	73.5
12	6/21/02	14:43:56	Departure	Beech C90	Twin	21L	79.5	75.0
12	6/21/02	15:14:25	Departure	Cessna 335	Twin	21L	77.5	74.5

TABLE 4.4-2 (continued)

Cincinnati Municipal-Lunken Airport

OBSERVED AIRCRAFT OPERATIONS AND NOISE LEVELS

Site	Date	Local Time	Operation	Aircraft Type	Eng. Cfg.	Runway	SEL (dB)	L_{max} (dB)
12	6/21/02	16:28:24	Departure	Mitsubishi MU-300	Jet	21L	83.0	78.5
13	6/21/02	11:39:00	Departure	Hawker Siddeley 125	Jet	21L	96.2	90.8
13	6/21/02	12:17:00	Departure	Cessna 560	Jet	21L	93.8	87.0
13	6/21/02	14:50:22	Departure	Grumman G-1195	Jet	21L	113.8	109.1
13	6/21/02	14:53:00	Departure	Lear 55	Jet	21L	98.1	94.2
13	6/21/02	15:14:15	Departure	Cessna 335	Twin	21L	89.8	85.7
13	6/21/02	15:21:10	Departure	Cessna 560XL	Jet	21L	88.3	83.0
13	6/21/02	15:25:55	Departure	Dassault Falcon 900 EX	Jet	21L	98.8	94.1
13	6/21/02	15:50:00	Departure	Beech 200	Twin	21L	82.6	77.3
13	6/21/02	16:06:36	Departure	Cessna 421C	Twin	21L	85.0	80.3
13	6/21/02	16:07:45	Departure	Beech E-55	Twin	21L	90.0	84.0
13	6/21/02	16:28:10	Departure	Mitsubishi MU-300	Jet	21L	96.8	91.7
14	6/21/02	11:56:35	Arrival	CJ	Jet	21R	97.1	94.9
14	6/21/02	14:57:40	Arrival	Unknown	SE	21L	79.8	76.6
14	6/21/02	14:59:00	Arrival	Unknown	SE	21L	79.8	76.8
14	6/21/02	15:39:30	Arrival	BAE 125 Series 1000A	Jet	21L	93.8	91.6
14	6/21/02	16:02:20	Arrival	Cessna 750	Jet	21L	92.2	88.8
14	6/21/02	16:26:05	Arrival	Piper PA-31-350	Twin	21L	91.3	89.6
13	6/21/02	14:19:19	Arrival	Dassault Falcon 10	Jet	21L	81.8	73.7
13	6/21/02	14:41:35	Arrival	Unknown	SE	21R	92.3	87.0
13	6/21/02	15:03:34	Arrival	Unknown	Jet	21L	96.5	90.9

TABLE 4.4-3

Cincinnati Municipal-Lunken Airport

AREA WITHIN THE EXISTING (2002) NEM (SQUARE MILES AND ACREAGE)

Noise Contours	Area in Square Miles	On-Airport Property within Contour (acres)	Off-Airport Property within Contour (acres)	Total Area within Each Contour (acres)
DNL 55 to 60 dB	4.649	87.2	2,888.2	2,975.4
DNL 60 to 65 dB	1.54	357.8	627.7	985.5
DNL 65 to 70 dB	0.496	275.9	41.5	317.4
DNL 70 to 75 dB	0.206	131.9	0.1	132.0
Greater than DNL 75	0.222	141.9	0.0	141.9
Total	7.1	994.8	3,557.4	4,552.2

Source: PB Aviation

4.4.3 Housing and Population Impacts

The existing 2002 NEM was examined to determine the number of residential units and population. 2004 CAGIS data was to determine residential units within the 2002 NEL DNL 55 dBA, 60 dBA, 65 dBA, 70 dBA, and 75 dBA. In conjunction with 2004 CAGIS data, the 2000 U.S. census data was used to determine the population within those residential units.

Impacts to residents of Cincinnati, Ohio, and Dayton and Ft. Thomas, Kentucky, which are generally located west of the Airport, are caused primarily by training flow from Runway 3L/21R. Fairfax, Mariemont, Anderson, Ohio and Ft. Thomas, Heights, and Silver Grove, Kentucky are impacted by traffic flow from Runway 3R/21L.

A summary of the housing units and population numbers affected by noise levels exceeding DNL 55 dBA is provided **Table 4.4-4**.

TABLE 4.4-4

Cincinnati Municipal-Lunken Airport

EXISTING 2002 NOISE IMPACTS TO HOUSING AND POPULATION

Municipality	75 + DNL Contour		70-75 + DNL Contour		65-70 + DNL Contour		55-65 + DNL Contour		Totals	
	Housing Units	Population	Housing Units	Population	Housing Units	Population	Housing Units	Population	Housing Units	Population
Cincinnati, OH Fairfax, OH Mariemont, OH Anderson, OH Dayton, KY Ft. Thomas, KY Heights, KY Silver Grove, KY	0	0	0	0	0	0	2,192	5,366	2,192	5,366

Source: 2004 Cincinnati Area GIS (CAGIS)
2000 U.S. Census Data

4.4.4 Potentially Incompatible Land Uses

The Federal Aviation Administration (FAA) has developed land use compatibility guidelines relating to sound levels generated by airport activity to various types of land use. These guidelines, presented in FAR Part 150 and reproduced in Table 3.1-1 of Chapter 3.0 *Land Uses and Community Characteristics* establish compatibility guidelines for residential, public use, commercial use, manufacturing and production, and recreational land uses. As determined by these guidelines, all land uses are generally compatible with airport operations if they are exposed to noise levels below DNL 65 dBA.

Potentially incompatible land uses surrounding the Airport, including residential uses, hospitals, nursing homes, schools, churches, parks and recreational areas archaeological sites, and historic structures registered with the National Register of Historic Places, were identified in Chapter 3.0, *Land Use and Community Characteristics*.

Existing 2002 NEM was examined to determine whether these specific noise-sensitive land uses were experiencing aircraft noise levels of DNL 65 dBA or greater noise contours. No residences are located within the DNL 65 dBA noise contours. No noise sensitive community facilities such as hospitals, nursing homes, schools, churches, parks and recreational areas archaeological sites, and historic structures registered with the National Register of Historic Places were found to be located within the DNL 65 dBA noise contours. Chapter 5.0 *Future Baseline NEM* details the Airport's future (2007) baseline noise conditions and presents the Future NEM.