

Existing and Future Baseline Noise Conditions

Introduction

Noise measurements were conducted between June 4, 2003 and July 2, 2003 at various locations within the Milwaukee area. Measurement data were collected at a total of eleven (11) portable noise monitoring locations. These portable measurements were used to supplement the measurement data from the airport's seven (7) permanent noise monitoring locations. Data from January 1, 2002 through December 31, 2002 was obtained from the permanent noise system.

The portable measurements consisted of: (1) single event noise levels from individual aircraft flyovers, (2) cumulative 24-hour continuous measurements, and (3) ambient non-aircraft noise sources. The survey utilized specialized equipment that recorded and displayed the complete time history of sound at the respective sites. The methodology used in the noise measurement program and a description of measurement locations is presented in Section C, Background Information on Noise/Methodology. The results of the measurement survey and noise data from the permanent noise monitoring system are summarized in the following paragraphs. Additional data, with more detailed results for each measurement site, is presented on the General Mitchell International Airport Part 150 project web site. This section is divided into the following sub-sections:

- Noise Measurement Results – Describes the results of the noise measurement survey. The measurement results can be divided into the following subsections:
 - Continuous noise measurement data
 - Ambient levels
 - Single event aircraft noise levels (SEL)
 - DNL noise levels
 - Hourly noise levels
 - Time Above noise levels (TA)
- Noise Contour Modeling Results –Presents the noise contour modeling results.

Noise Measurement Results

Continuous One-Second Noise Data

Noise levels were continuously recorded at each of the portable noise-monitoring sites. Continuous one-second noise data continually records noise data every one second. The results can be shown for a specified period, which in this case is 25 minutes. In addition to recording the noise events from aircraft, monitors also recorded the ambient noise level of the community surrounding the site, since the monitors were continuously monitoring all noise events. An example of this is presented in Figure D1 where 15-minutes of continuous noise data are shown for two sites. The graphic shows the measured A-weighted noise level on the left axis versus time for the sample 15 minute period. The difference between an aircraft event and the ambient noise can be easily distinguished in this plot with each of the peaks caused by an aircraft overflight.

The top portion of the graph plots the data for site M01, a site close to the Airport to the north. The bottom portion of the site plots the same time period for site M03, a slightly more distant site north of the Airport, along the same general flight path. Aircraft departing to the north first pass over site M01, and then about fifteen seconds later pass over site 03. The time sequence of each of the noise events is shown in that noise events occur first at M01 and then at M03.

Ambient Noise Measurement Results

The ambient noise level was identified based on the survey data for each of the measurement sites. In this case, ambient noise refers to the background noise that would occur without influences from aircraft overflight at each site. The quantities measured were the Percent Noise Levels (Ln). Percent Noise Level is the noise level exceeded different percentages (n) of the time. These metrics are described in greater detail in the background section (Section C). The data helps establish the ambient noise environment for all sources of noise and aids in assessing how intrusive aircraft noise is on the ambient environment. These other sources include noise from roadway, railroad, commercial sources, and residual background noise.

The results of the ambient noise measurement survey at each measurement site are described in the following figures and tables. Table D1 presents the statistical summary of the ambient measurements for all of the sites in tabular format. This table presents the Ln noise level for the Lmin, L90, L50, L10 and Lmax. The Lmax is presented for the peak dBA value that was measured while the Lmin is the lowest dBA value that was measured. This table illustrates the range in noise levels that exist at each site. Note that aircraft noise is included in this information and is typically the source of peak or maximum noise levels. Although not technically a component of the ambient noise levels, but because at most noise monitor locations aircraft noise is the loudest event, it is included in the table.

Table D1

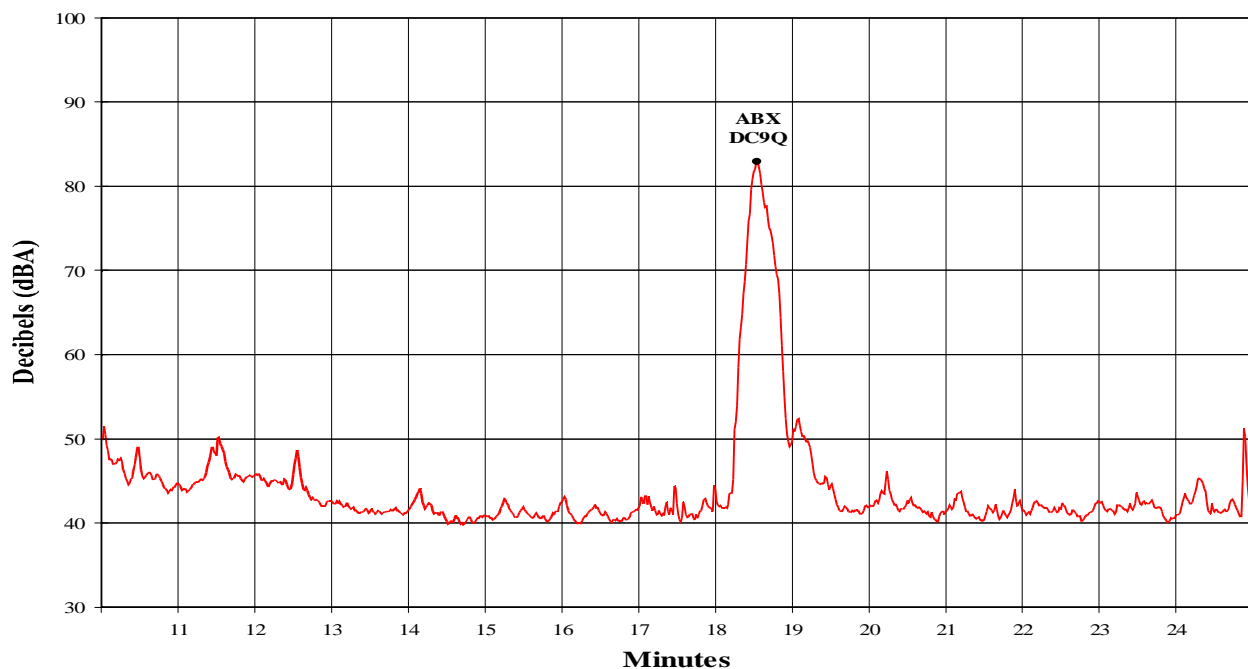
AMBIENT MEASUREMENT RESULTS FOR ALL SITES (Aircraft events included)*General Mitchell International Airport FAR Part 150 Noise Compatibility Study*

NMS	Description	Address	Statistical Noise Levels (dBA)				
			Max	L10	L50	L90	Min
Permanent Sites							
NMS01	Oak Creek	S Clement and Manitowoc	94	59	47	40	38
NMS02	S. Milwaukee	End of Marion St.	89	52	45	39	37
NMS03	Cudahy	Hately Av by Somers Ave	96	61	49	43	41
NMS04	Milwaukee	Vermont and Oklahoma	96	66	56	43	41
NMS05	Milwaukee	Oklahoma Av by Taylor Ave	102	69	62	48	43
NMS06	Milwaukee	23rd St and Kimberley Ave	96	60	51	46	43
NMS07	Oak Creek	20th St and Timber Ridge	99	64	55	50	46
Portable Sites							
M01	Milwaukee	4401 Lenox St.	92	54	47	44	38
M02	Milwaukee	3813 Alabama	97	52	46	42	35
M03	Milwaukee	1702 Eden	95	52	46	43	36
M04	Milwaukee	1901 Kimberly	97	57	52	50	42
M05	Milwaukee	707 W. Maplewood Ct.	92	57	52	49	40
M07	Oak Creek	410 Marquette	93	54	48	45	36
M09	Oak Creek	6775 Juniper	90	55	49	45	39
M10	Cudahy	3225 Mallory	93	54	47	44	37
M11	Cudahy	3713 Holmes	97	55	47	44	39
M12	Cudahy	3025 Holmes	98	57	49	45	38
M13	Milwaukee	6632 S. 19th St.	88	56	52	50	41

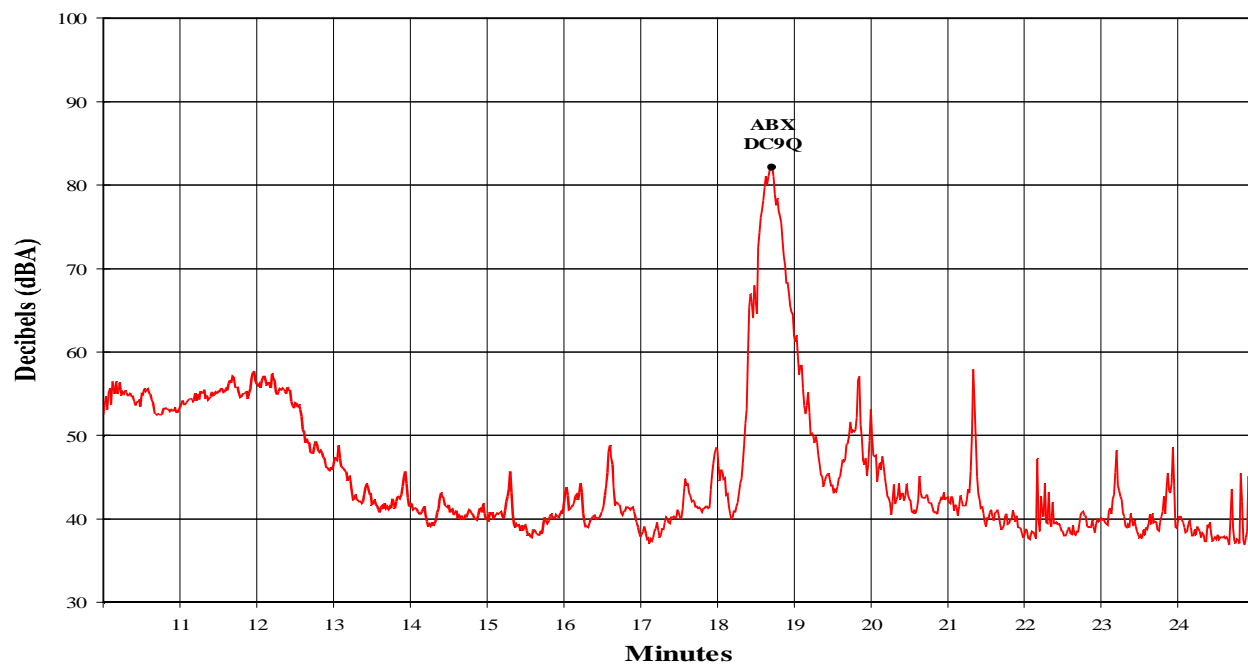
Figure D1
SAMPLE TIME HISTORY NOISE PLOT OF AIRCRAFT AND AMBIENT NOISE
General Mitchell International Airport FAR Part 150 Noise Compatibility Study
Period: Jun 4, 2003 22:10:00 to Jun 4, 2003 22:25:00



Site M101 - Milwaukee - 4401 Lenox St.



Site M103 - Milwaukee - 1702 Eden



This same information is presented graphically in Figure D2. The top portion of the figure presents data for the permanent sites. The bottom portion presents the data for the portable sites. Industry practices indicate that the L90 is a good representation of the background or ambient noise level. It represents the level that is exceeded 90 percent of the time. Therefore it is commonly referred to as the residual noise when other sources of noise are not present and is the level above which noise events occur, such as an aircraft overflight or train pass-by. Aircraft noise would have very little if any contribution to this noise level. The L50 noise level is referred to as the median noise level. Half the time the noise is below this level; half the time it is above this level. During peak hours of aircraft activity, the L50 noise level could be influenced by the aircraft noise, but on a 24-hour basis, this level is generally reflective of ambient noise levels.

The results of the measurements showed that background L90 noise levels ranged from a low of 39 dBA to a high of 50 dBA. Most sites had background L90 noise levels in the mid 40s dBA. The majority of these sites are located in relatively quiet settings that are not exposed to community noise sources, such as highways. The sites with the higher ambient noise levels were typically exposed to roadway noise. These levels are typical of urban residential environments.

Ambient noise levels vary by day and time of day. To illustrate this range in noise, ambient noise data from one of the sites is summarized in Figure D3. The data for all other sites is presented on the General Mitchell International Airport web site, www.mitchellairport.com. The top portion of this figure presents the day-to-day measurement results. The bottom portion of the figure shows each hour of measurement for one typical day. The results show that day-to-day ambient noise levels are approximately the same for each day, except occasional days that are higher. These higher ambient days are generally during bad weather conditions. As is shown, ambient noise levels do vary by time of day, where noise levels are quieter at night and during late evening and early morning hours. The ambient levels increase during daytime hours. Typical daytime ambient noise levels are about 5 to 10 dBA higher than the nighttime hours.

Figure D2

AMBIENT NOISE MEASUREMENT RESULTS (ALL SITES)

General Mitchell International Airport FAR Part 150 Noise Compatibility Study

Period: June 4, 2003 to June 23, 2003

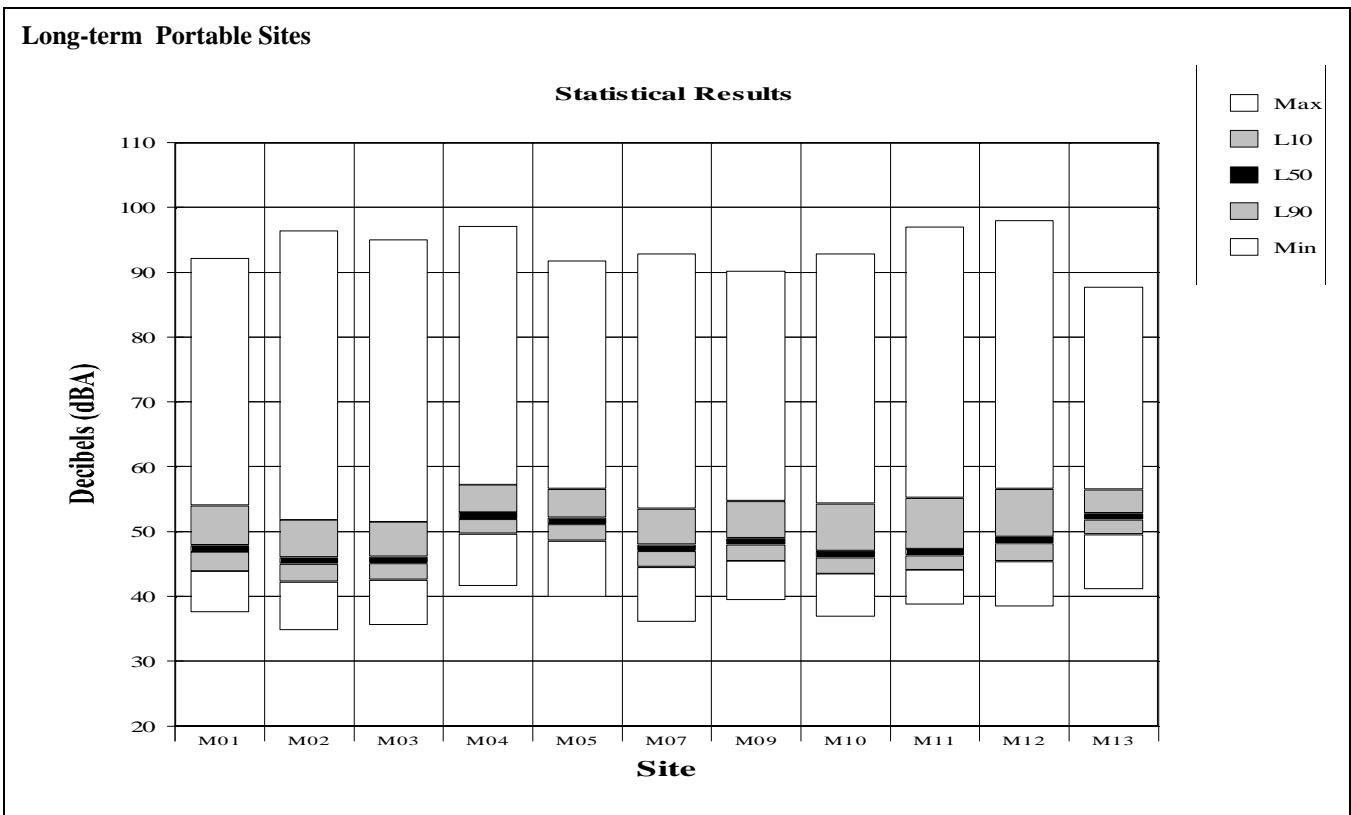
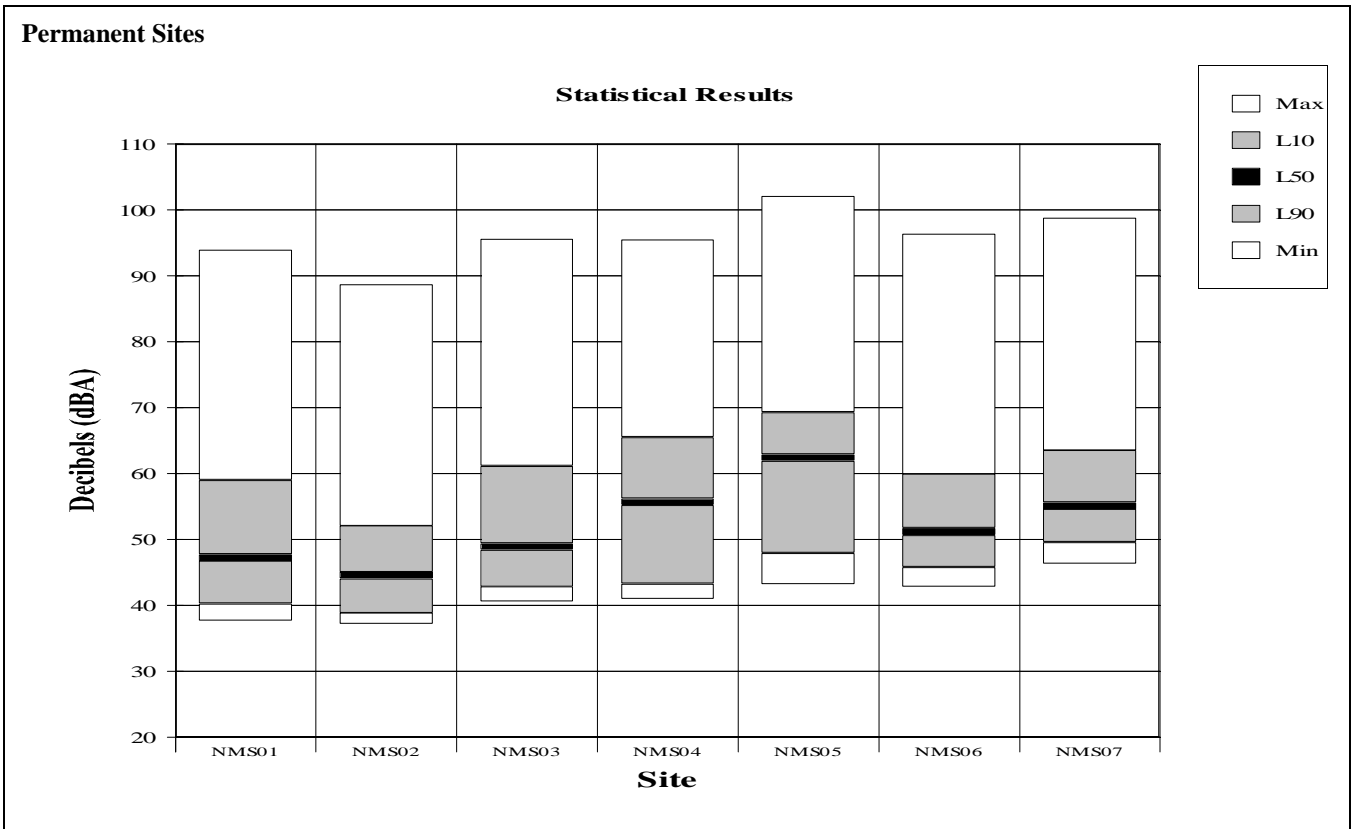


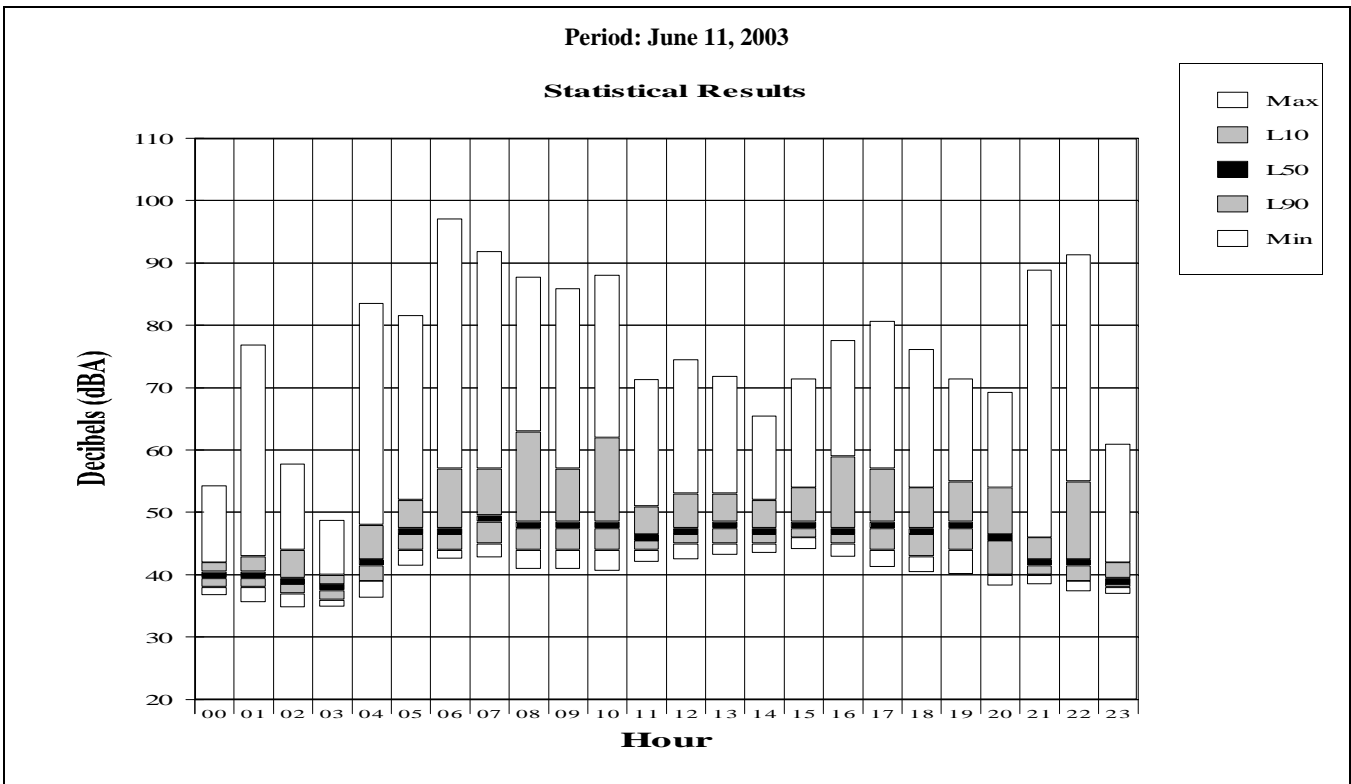
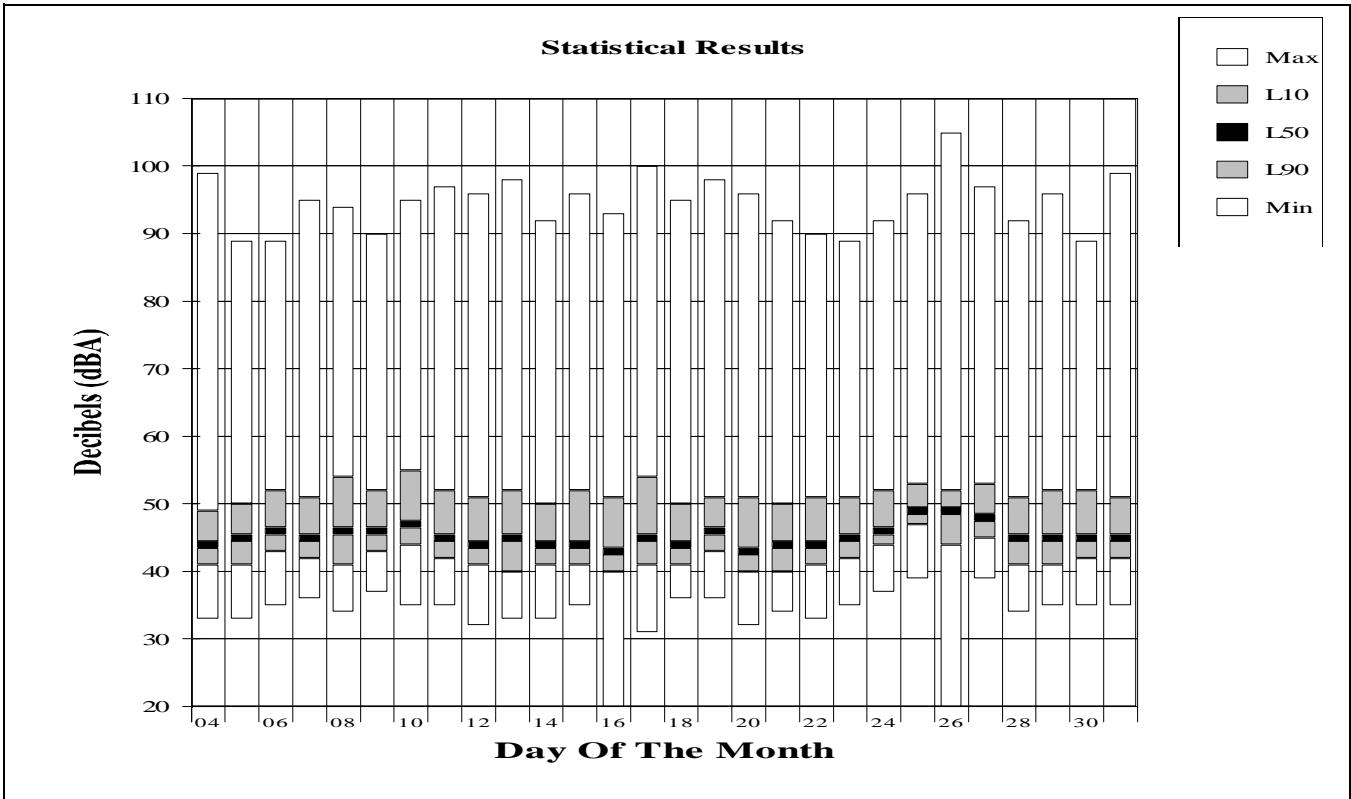
Figure D3

AMBIENT NOISE MEASUREMENT RESULTS (SITE - M102)

General Mitchell International Airport FAR Part 150 Noise Compatibility Study

Period: June 4, 2003 to July 1, 2003

Site: M102 - 3813 S. Alabama



Aircraft Single Event Noise Measurement Results

Aircraft single event noise levels were identified at each measurement site. The acoustic data included the maximum noise level (L_{max}), Sound Exposure Level (SEL), and the time duration of aircraft events. The single events measured during the survey were correlated with flight operations information. With this correlated single event noise data, it was possible to separately identify the single event noise levels from the different aircraft types generating noise. The single event results are summarized in the following paragraphs. Additional single event noise data are presented in the Appendix.

The number of aircraft noise events measured daily at a site is presented graphically in Figure D4. This figure presents one day of events for one measurement site. The table presents the SEL noise value plotted as a histogram. The vertical axis presents the number of events in each hour. The horizontal axis reports the hour of the day. The SEL values are plotted vertically for each event in each hour.

The single event data were analyzed in terms of noise level per aircraft type and in terms of the total range in noise events. An example of the range in noise data is presented for two sites in Figure D5. This figure presents a histogram of all the aircraft events that were measured at Sites M01 and at NMS05. The histogram shows number of measured aircraft events on the vertical column and the measured SEL noise level on the horizontal column. Site M01 is representative of a location close to the Airport while site NMS05 is representative of a location more distant from the Airport. These results show the wide range in aircraft events that occur at each site as well as the number of noise events.

Once correlated to the operational information, the single event data were analyzed in terms of noise level per aircraft type. An example of the single event noise level by aircraft type is presented in Figures D6 and D7. The data for site NMS06, is presented in Figure D6 for departure information and Figure D7 for arrival information. These figures show the type of aircraft, the number of measured noise events correlated to that aircraft type, and the average noise level measured for that aircraft type. The longer bar graph illustrates those aircraft with the loudest events. The louder events were generally older generation commercial aircraft. These data also illustrate the difference in noise events generated by departures versus arrivals. These data shows that departure noise generates higher noise level and a wider range in noise per the different aircraft types. For arrivals, the relative difference in noise among the different aircraft types is less.

Figure D5
Range of Noise and Number of Events Histograms
 General Mitchell International Airport
 Period: June 4, 2003 to July 1, 2003
 Sites: M01 Milwaukee - 4401 S. Lenox St. (top) - NMS05 Milwaukee - Oklahoma Ave by Taylor Ave. (bottom)

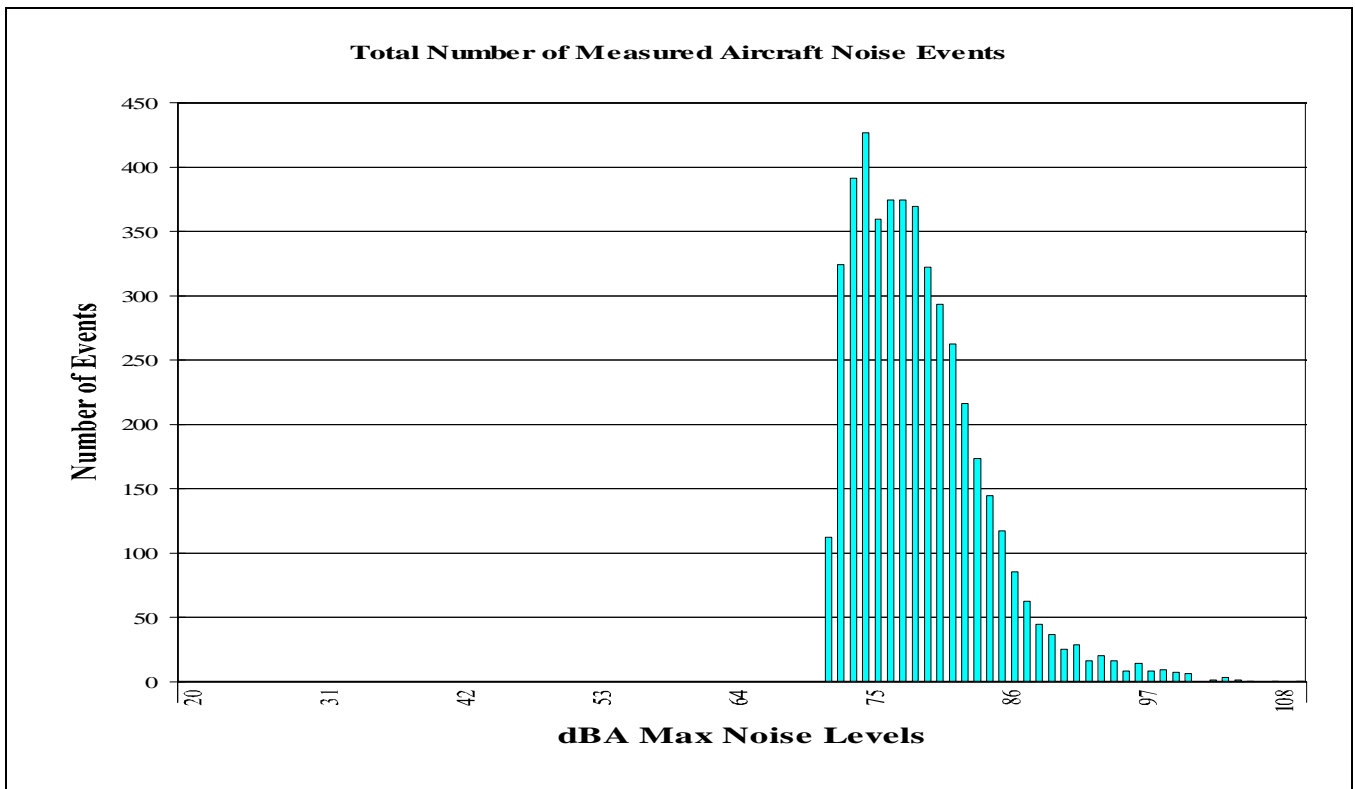
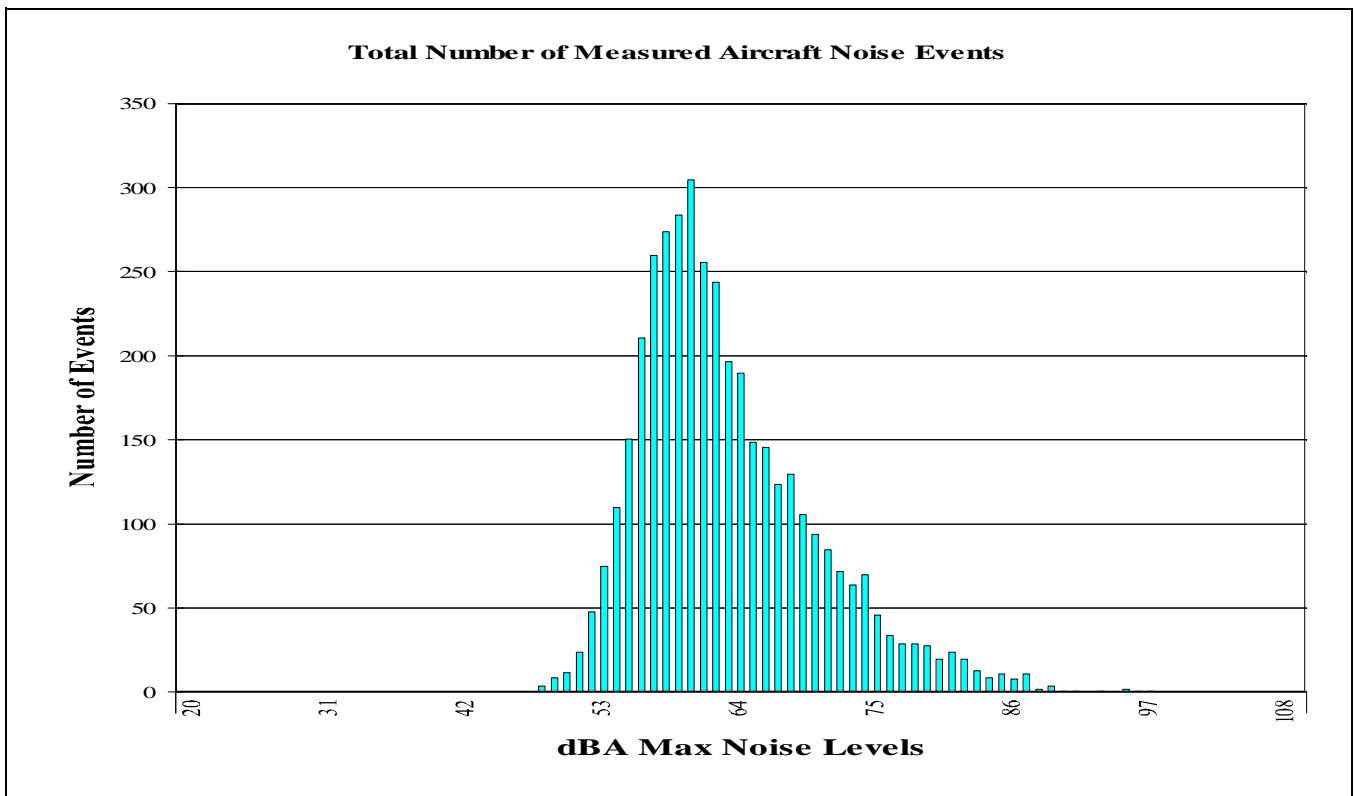


Figure D6

SINGLE EVENT NOISE LEVEL BY AIRCRAFT (NMS06)

General Mitchell International Airport FAR Part 150 Noise Compatibility Study

Period: June 2003

Site: NMS06 - 23rd St and Kimberley Av

Operations: Departures Runways: 25L Tracks: ALL

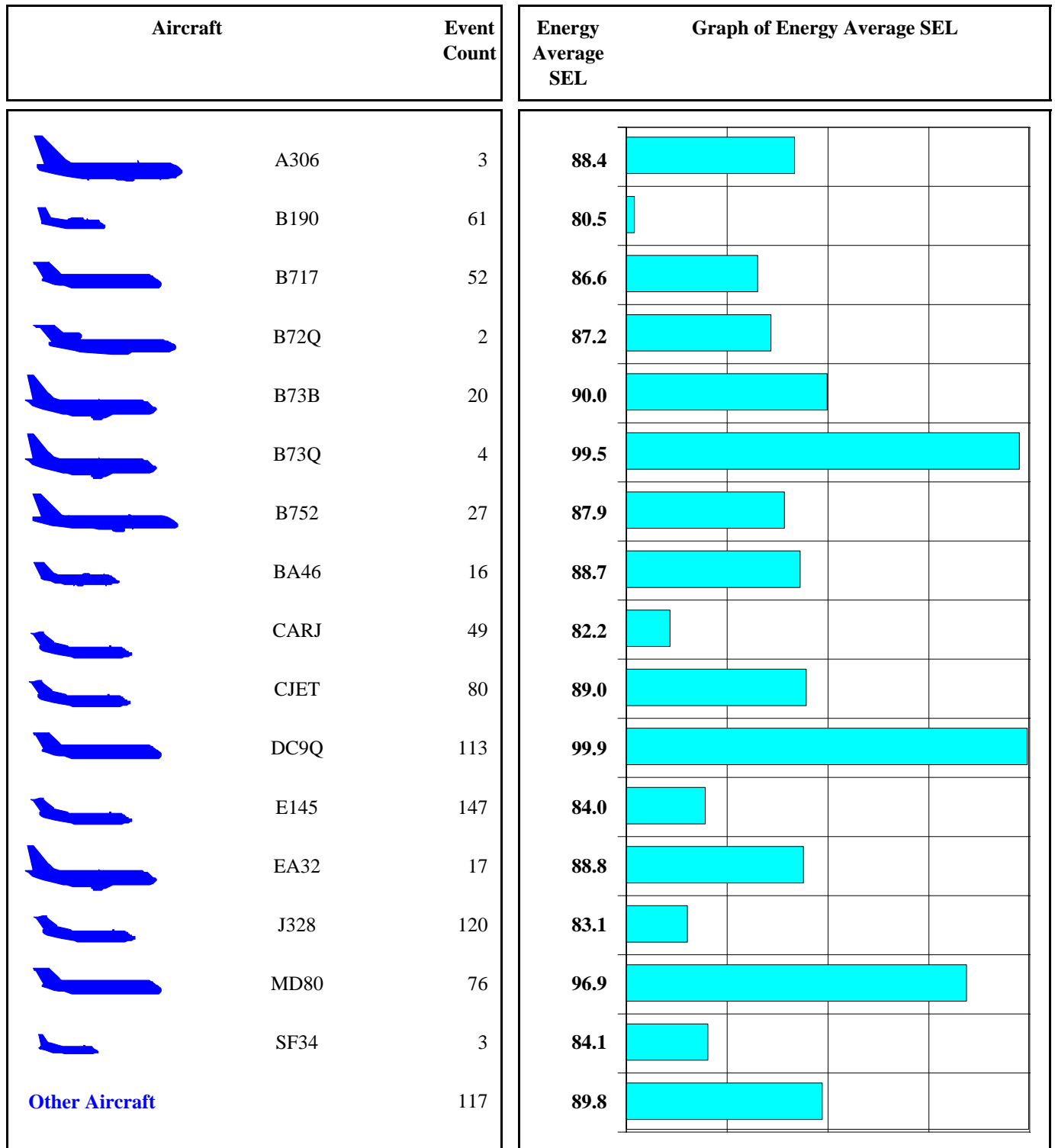


Figure D7

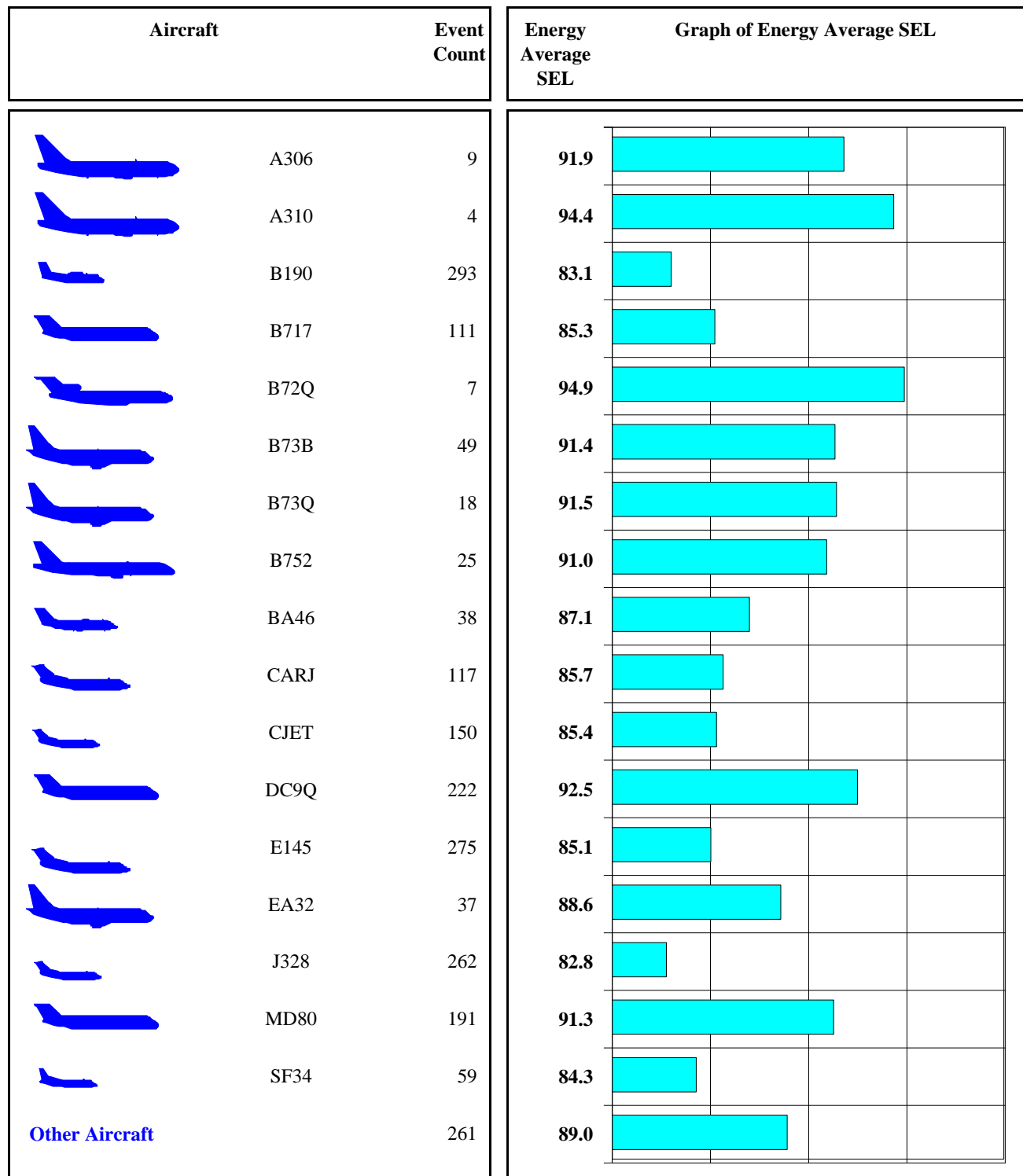
SINGLE EVENT NOISE LEVEL BY AIRCRAFT (NMS06 - ARRIVALS)

General Mitchell International Airport FAR Part 150 Noise Compatibility Study

Period: June 2003

Site: NMS06 - 23rd St and Kimberley Av

Operations: Arrivals Runways: 7R Tracks: ALL



Note:

Energy Average is average of all events on a noise energy basis.

FAR36 Stage is for general categories and does not account for hushkitted aircraft.

To better illustrate which aircraft generate the highest noise events, the 25 loudest single event noise levels at each measurement site were identified. These events were correlated with an aircraft type and plotted. The results are shown in Figures D8 and D9 for sites M02 and NMS01, respectively. The figure includes the date and time of the event, the aircraft type, the operation, and the associated noise levels. For most of the measurement locations, the loudest identified aircraft were typically older generation commercial aircraft, such as DC9s and MD80s. Data for other sites are presented on the General Mitchell International Airport Part 150 project web site.

DNL Noise Measurement Results

Aircraft-related DNL levels were identified for each of the permanent noise monitoring locations and the portable monitoring locations. Table D2 presents the results of the DNL noise measurements at the 7 sites from the Airport's noise monitoring system and from the 11 portable noise-monitoring locations. This table lists the average DNL due to aircraft events for the period monitored at each site (June 4, 2003 to July 1, 2003).

Figure D10 shows the same results of the DNL noise measurements at the 7 permanent locations and the 11 portable noise-monitoring locations in a graphical format. The top portion of the graph shows the average DNL noise level measured at each noise monitoring location. The bottom portion of the table shows the range of daily DNL values, along with the overall DNL for the entire measurement period. The results show the wide range in noise level that is experienced at each location. The number of operations and the pattern of the operations vary with the weather, which affects which runway is used. Peak DNL days were an average of 3 to 7 dBA higher than the average day.

Figure D11 graphically presents the DNL noise level due to the aircraft events for each day the noise level was monitored at Site NMS03 (Cudahy). Figure D12 graphically presents the same data at Site M02 (Milwaukee). This figure presents the day-to-day change in noise levels. The bottom portion of the graphic represents the range of measured SEL noise levels during the measurement period. Additional figures presenting this information for the other sites are presented on the General Mitchell International Airport Part 150 project web site.

Table D2

DNL NOISE MEASUREMENT RESULTS FOR ALL SITES*General Mitchell International Airport FAR Part 150 Noise Compatibility Study*

NMS	Description	Address	Aircraft DNL Noise Level
Permanent Sites (Part 150 Measurement Period: Jan 1, 2002 to Dec 31, 2002)			
NMS01	Oak Creek	S Clement and Manitowoc	63
NMS02	S. Milwaukee	End of Marion St.	60
NMS03	Cudahy	Hately Av by Somers Ave	65
NMS04	Milwaukee	Vermont and Oklahoma	61
NMS05	Milwaukee	Oklahoma Av by Taylor Ave	64
NMS06	Milwaukee	23rd St and Kimberley Ave	63
NMS07	Oak Creek	20th St and Timber Ridge	62
Portable Sites (Part 150 Measurement Period: June 4, 2003 to July 1, 2003)			
M01	Milwaukee	4401 Lenox St.	62
M02	Milwaukee	3813 Alabama	64
M03	Milwaukee	1702 Eden	63
M04	Milwaukee	1901 Kimberly	64
M05	Milwaukee	707 W. Maplewood Ct.	58
M07	Oak Creek	410 Marquette	63
M09	Oak Creek	6775 Juniper	62
M10	Cudahy	3225 Mallory	62
M11	Cudahy	3713 Holmes	65
M12	Cudahy	3025 Holmes	65
M13	Milwaukee	6632 S. 19th St.	55

Figure D8
Loudest Aircraft Noise Events Site Report
 General Mitchell International Airport
 Period: June 4, 2003 to July 1, 2003
 Site: M02 - 3813 Alabama



Aircraft	Airline	Event Time	Aircraft	Ops	Rwy	Lmax	SEL	Graph Of SEL
	UNITED STATES POSTAL SERVICE	Jun 04, 06:13	B722	D	1L	99.3	105.7	
	MIDWEST AIRLINES	Jun 12, 17:54	DC93	D	1L	94.7	102.7	
	MIDWEST AIRLINES	Jun 26, 09:06	MD88	D	1L	94.1	102.4	
	MIDWEST AIRLINES	Jun 18, 17:14	DC93	D	1L	95.4	102.3	
	MIDWEST AIRLINES	Jun 13, 07:44	DC93	D	1L	95.8	101.9	
	MIDWEST AIRLINES	Jun 12, 08:57	MD88	D	1L	93.9	101.1	
	POLAR AIR CARGO	Jun 08, 21:55	B743	D	1L	93.7	100.6	
	U	Jun 18, 17:44	U	D	1L	93.1	100.6	
	MIDWEST AIRLINES	Jun 14, 16:07	DC93	D	1L	92.4	100.5	
	AIRBORNE EXPRESS	Jun 12, 22:31	DC9Q	D	1L	93.9	100.3	
	MIDWEST AIRLINES	Jun 12, 07:48	U	D	1L	94.0	100.2	
	MIDWEST AIRLINES	Jun 28, 08:56	MD88	D	1L	91.5	100.1	
	MIDWEST AIRLINES	Jun 08, 22:04	DC93	D	1L	91.5	100.1	
	MIDWEST AIRLINES	Jun 12, 22:13	MD82	D	1L	92.8	99.8	
	UNITED STATES POSTAL SERVICE	Jun 25, 23:27	B722	A	19R	95.6	99.8	
	MIDWEST AIRLINES	Jun 08, 22:08	MD82	D	1L	91.2	99.7	
	MIDWEST AIRLINES	Jun 12, 21:56	DC93	D	1L	92.0	99.2	
	MIDWEST AIRLINES	Jun 18, 17:30	MD82	D	1L	90.3	98.7	
	MIDWEST AIRLINES	Jun 12, 22:45	DC93	D	1L	91.5	98.7	
	AIRBORNE EXPRESS	Jul 01, 22:19	U	D	1L	91.3	98.6	
	MIDWEST AIRLINES	Jun 04, 22:06	DC93	D	1L	90.7	98.4	
	NORTHWEST	Jun 28, 06:13	DC95	D	1L	91.2	98.3	
	NORTHWEST	Jun 18, 17:22	DC93	D	1L	90.6	98.3	
	MIDWEST AIRLINES	Jun 03, 21:52	DC93	D	1L	90.0	97.9	
	AIRBORNE EXPRESS	Jun 04, 22:18	DC9Q	D	1L	91.3	97.8	

Figure D9
Loudest Aircraft Noise Events Site Report
 General Mitchell International Airport
 Period: June 4, 2003 to July 2, 2003
 Site: NMS01 - S Clement Ave and Manitowoc Ave





























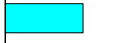





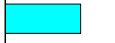

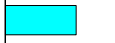














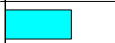


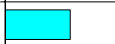


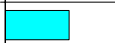





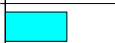

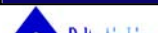










Aircraft	Airline	Event Time	Aircraft	Ops	Rwy	Lmax	SEL	Graph Of SEL
	 UNITED STATES POSTAL SERVICE.	Jun 04, 23:58	B722	D	19R	92.0	100.5	
	 NORTHWEST	Jun 09, 06:08	DC95	D	19R	90.2	99.8	
	 MIDWEST AIRLINES	Jun 05, 07:51	DC93	D	19R	91.2	98.7	
	 Delta Air Lines	Jun 09, 07:48	MD80	D	19R	90.3	98.5	
	 MIDWEST AIRLINES	Jun 26, 08:01	DC93	D	19R	91.0	98.4	
	 MIDWEST AIRLINES	Jun 26, 08:04	DC93	D	19R	89.7	98.2	
	 MIDWEST AIRLINES	Jun 24, 09:06	MD88	D	19R	88.1	97.9	
	 MIDWEST AIRLINES	Jun 05, 07:33	DC93	D	19R	89.7	97.8	
	 MIDWEST AIRLINES	Jun 21, 07:43	DC93	D	19R	87.4	96.9	
	 MIDWEST AIRLINES	Jul 02, 08:06	U	D	19R	88.0	96.8	
	 Delta Air Lines	Jun 09, 06:22	B73Q	D	19R	87.6	96.7	
	U	Jul 02, 07:48	U	D	19R	86.7	96.3	
	 MIDWEST AIRLINES	Jun 09, 07:34	DC93	D	19R	86.5	96.3	
	 MIDWEST AIRLINES	Jun 05, 08:54	MD81	D	19R	86.8	96.3	
	 Delta Air Lines	Jun 05, 07:47	MD80	D	19R	87.6	96.2	
	 MIDWEST AIRLINES	Jun 09, 07:41	MD81	D	19R	86.2	96.1	
	 UNITED STATES POSTAL SERVICE.	Jun 24, 06:44	B722	D	19R	86.6	95.9	
	 Delta Air Lines	Jun 25, 16:30	B73Q	D	19R	87.0	95.8	
	 Delta Air Lines	Jun 08, 07:48	MD80	D	19R	86.6	95.7	
	 MIDWEST AIRLINES	Jun 18, 07:37	DC93	D	19R	87.0	95.5	
	 MIDWEST AIRLINES	Jun 09, 09:00	MD81	D	19R	86.0	95.5	
	 Delta Air Lines	Jun 22, 18:09	MD80	D	19R	85.8	95.4	
	 MIDWEST AIRLINES	Jun 09, 08:02	DC93	D	19R	85.6	95.4	
	 MIDWEST AIRLINES	Jun 13, 20:17	MD81	D	19R	85.1	95.4	
	 MIDWEST AIRLINES	Jun 05, 08:00	DC93	D	19R	86.3	95.3	

Figure D10
Aircraft DNL at Permanent and Long-term Sites
 General Mitchell International Airport
 Period: June 4, 2003 to July 1, 2003

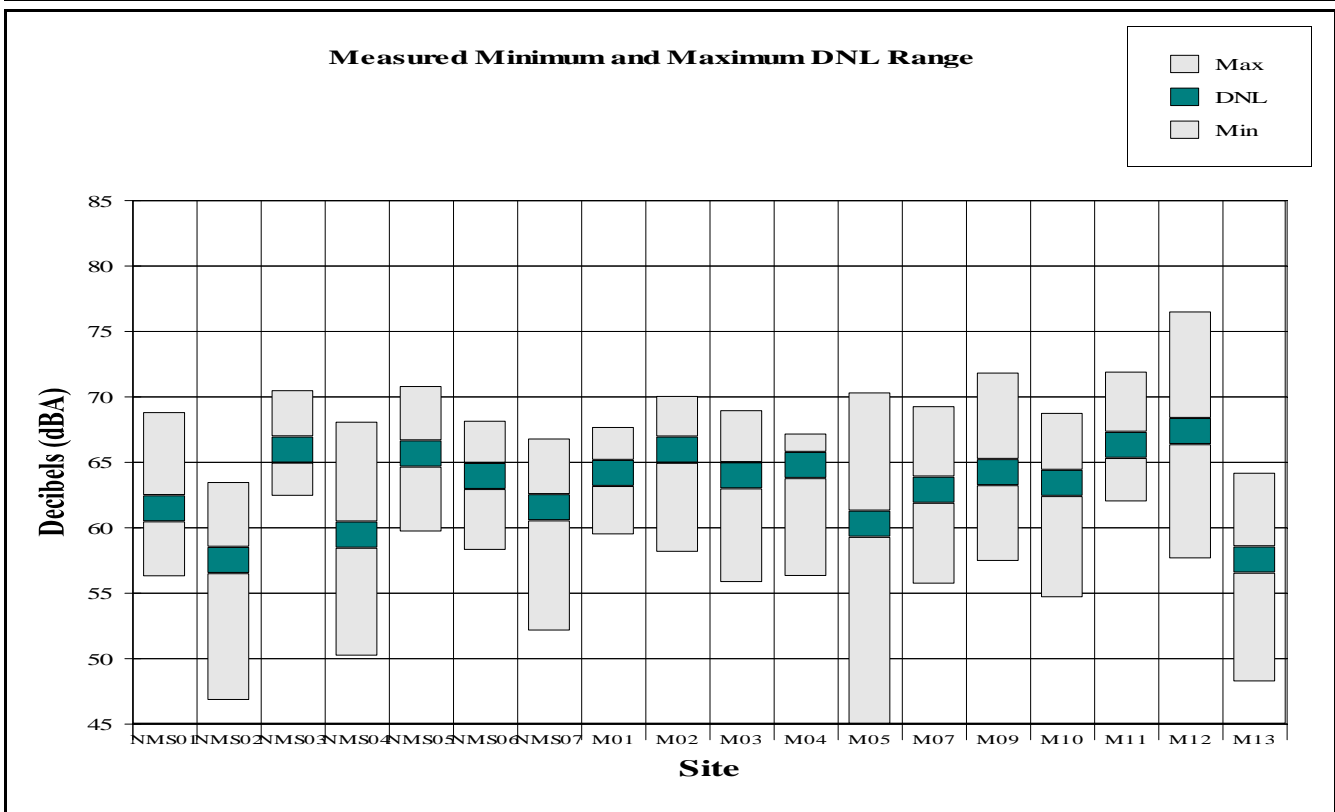
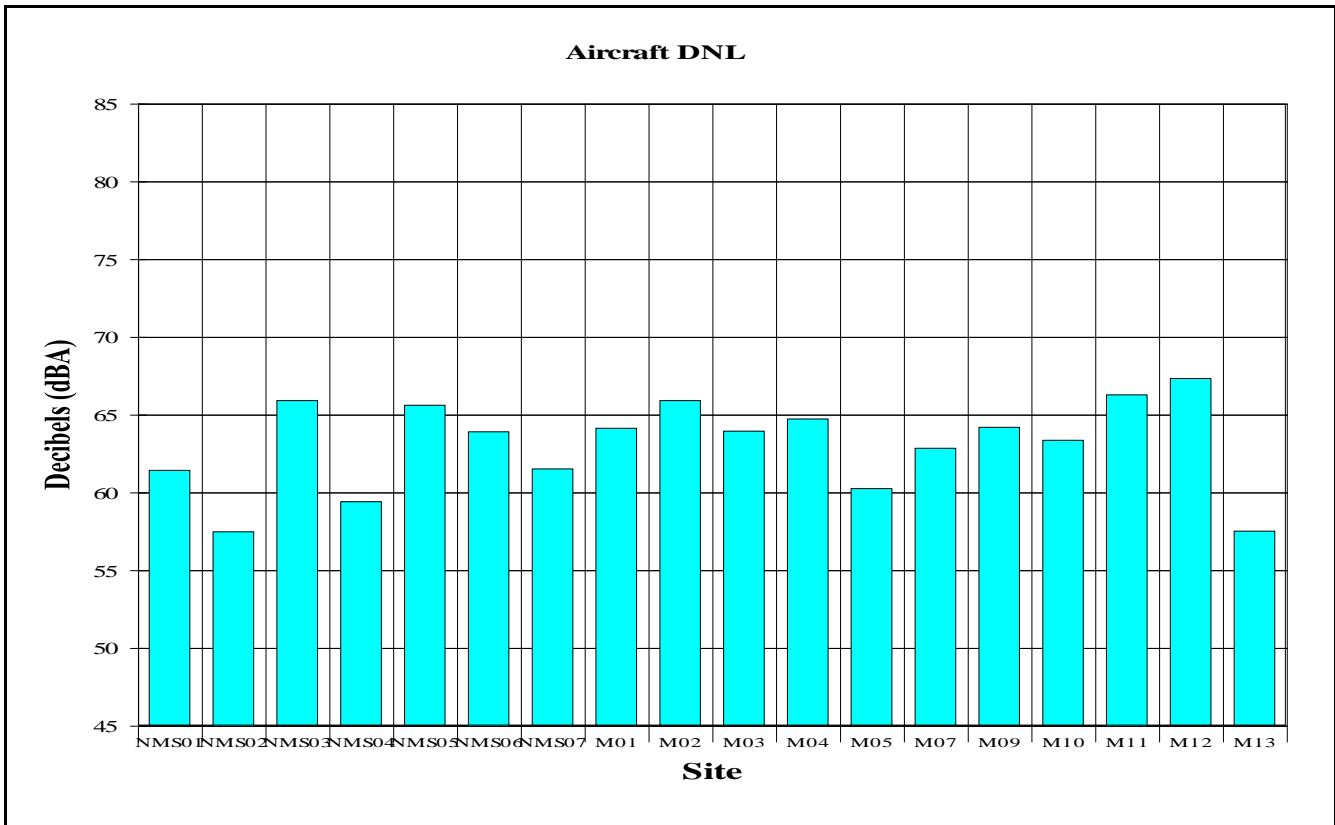


Figure D11

MEASURED AIRCRAFT NOISE LEVELS (NMS03)

General Mitchell International Airport FAR Part 150 Noise Compatibility Study

Period: June 4, 2003 to July 1, 2003

Site: NMS03 - Hatley Av by Somers Av

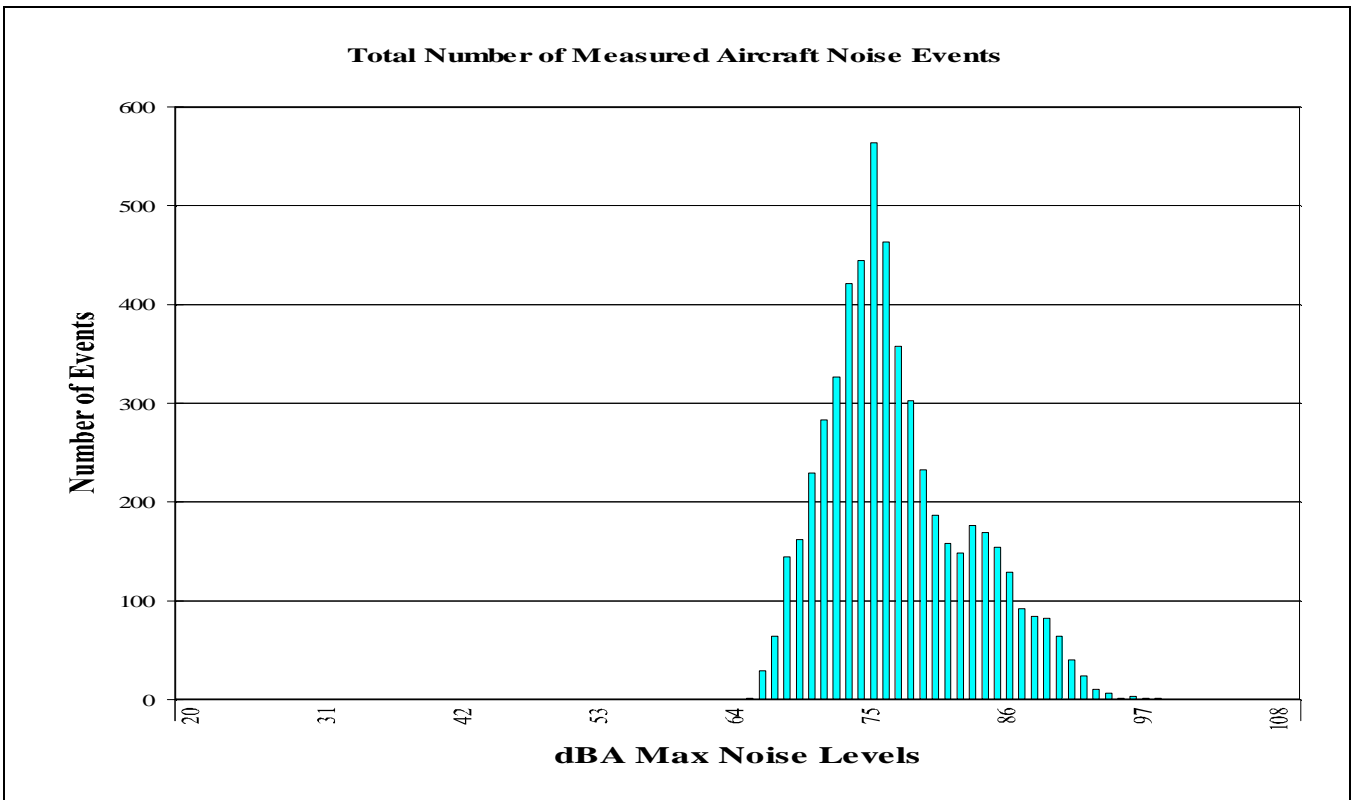
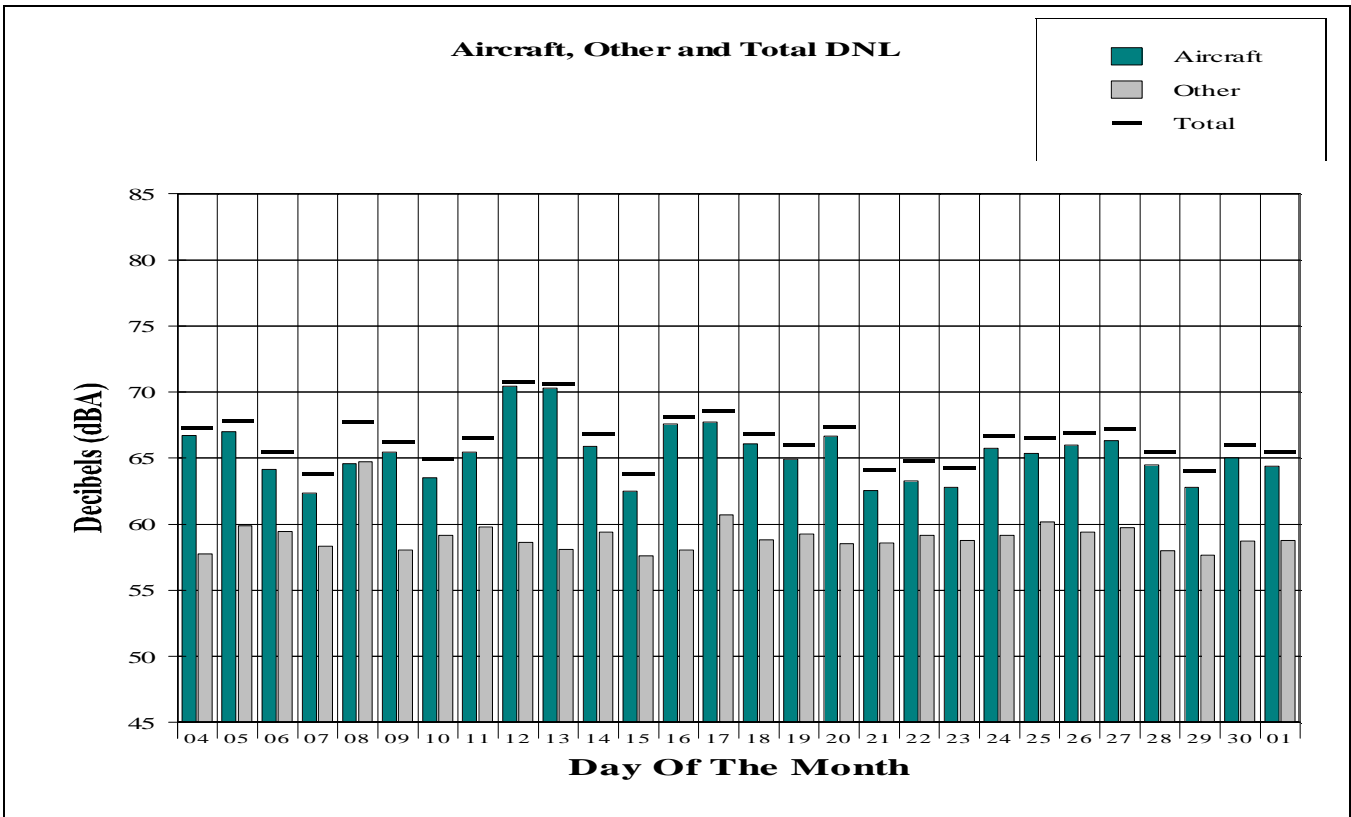


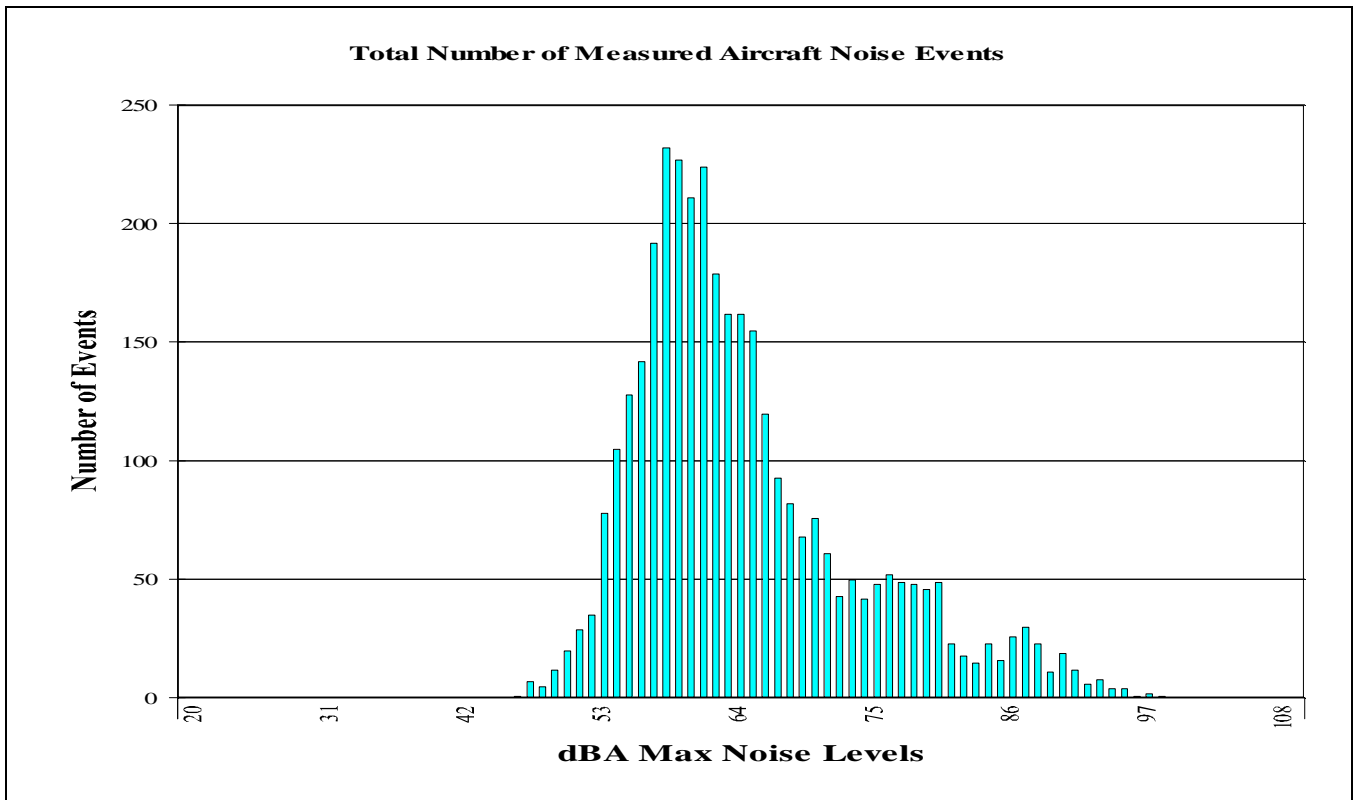
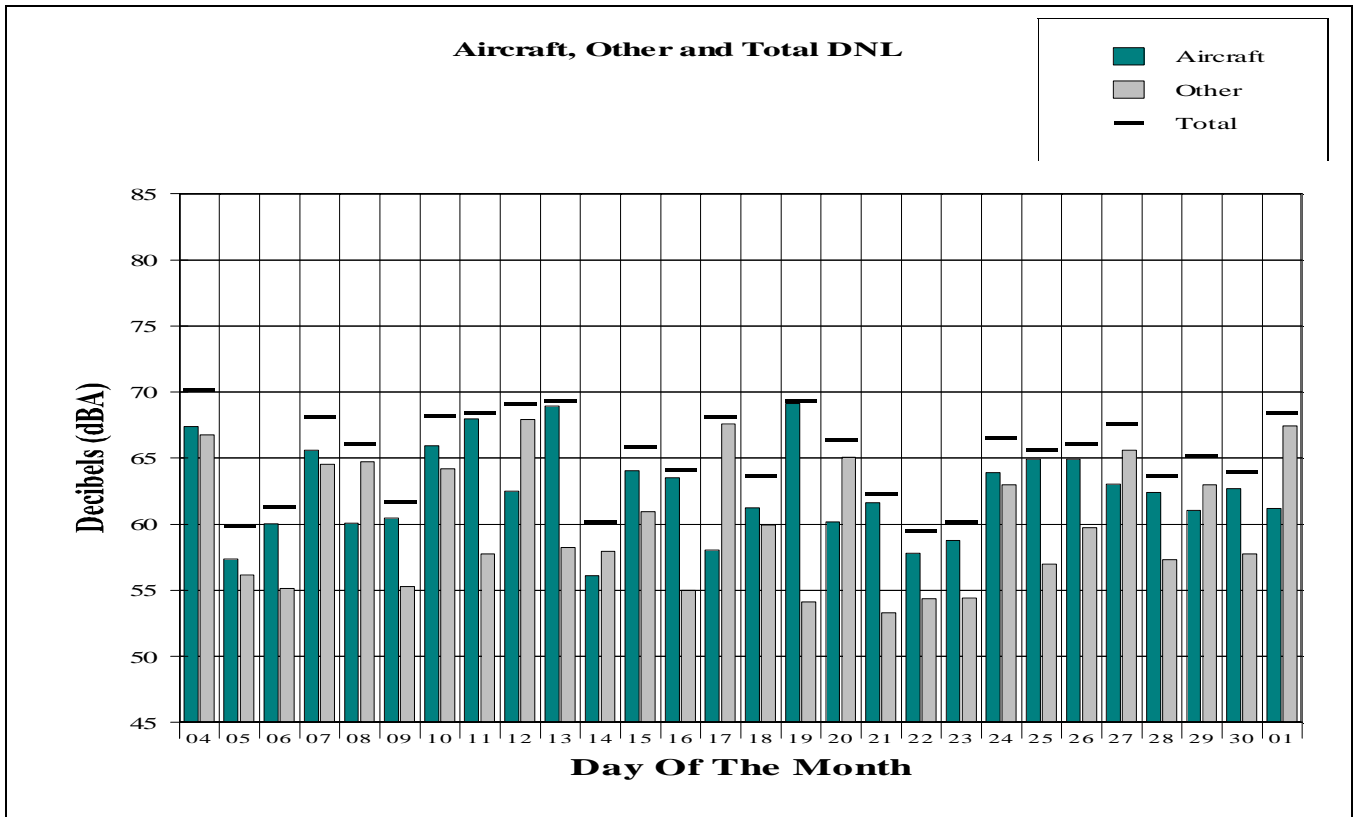
Figure D12

MEASURED AIRCRAFT NOISE LEVELS (M102)

General Mitchell International Airport FAR Part 150 Noise Compatibility Study

Period: June 4, 2003 to July 1, 2003

Site: M102 - 3813 Alabama



The measured DNL noise level from the permanent noise monitoring sites reflects the annual DNL noise level for the base period of the study (January 1, 2002 through December 31, 2002). The measured DNL noise level for the portable noise monitoring locations is for the time period of the portable measurements and do not necessarily reflect annual noise level conditions. As described in the Methodology section, the primary purpose of the measurements was not to measure DNL, but to measure the single event noise levels that can be used to validate the INM modeling.

Hourly LEQ Noise Measurement Results

Hourly noise level data were determined for each of the portable measurement locations. Hourly values include the Aircraft LEQ, non aircraft LEQ, and total LEQ. In addition, Time Above noise levels in terms of minutes per hour was also determined. This includes the Time Above 85 dBA, 75 dBA and 65 dBA.

An example of the hourly LEQ noise data for site NMS01 is presented in Table D3. This table shows that the hourly noise level varies throughout the day. Also note that there are some louder nighttime hours. These are a result of the night cargo operations.

Time Above Noise Measurement Results

Time Above is the time in minutes per day that the noise levels were greater than a specific sound level. The Time Above (TA) levels that were determined from the noise measurement survey are: TA 65 dBA which is designed to reflect when aircraft are clearly audible; TA 75 dBA which is designed to reflect when aircraft would start to cause speech interference, and TA 85 dBA which is designed to reflect when aircraft are sufficiently loud so that speech is clearly interfered with.

The Time Above 65 dBA is not to imply that noise levels below 65 dBA would not be audible or be annoying to all individuals, but it is reflective of when an aircraft would be clearly audible in the typical daytime environments. The results of the Time Above measurements are summarized in Table D4. These results show the amount of time that the noise levels were greater than the specified noise levels.

The results show that the Time Above 85 dBA noise levels occur less than 3 minutes per day, except for one site. Time Above 85 dBA represents the high interruption level. There results show that the high noise levels do not occur often and when they do occur the level is of short duration. Generally the noise is only above 85 dBA when an aircraft is directly overhead or in close proximity. The duration of events that have a maximum noise level greater than 85 dBA is typically less than 10 seconds. The data shows that the majority of the noise from aircraft operations is below 85 dBA.

Table D3

Hourly LEQ Noise Measurements Results

General Mitchell International Airport

Period: June 4, 2003 to July 1, 2003

Site: NMS01 - Clement Av and Manitowoc Av

Metric: Total LEQ



DATE	Hour Of The Day																							DNL	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22		23
Jun 4	50	48	50	45	57	54	59	59	56	55	55	54	57	55	58	59	61	57	57	57	57	57	56	65	64
Jun 5	58	56	48	44	59	56	60	69	66	58	57	58	55	58	60	58	58	57	58	60	56	60	58	53	64
Jun 6	59	50	52	49	54	59	59	65	62	56	57	58	60	63	60	64	62	60	60	55	62	56	57	50	64
Jun 7	49	46	59	46	58	54	55	67	62	62	62	66	60	67	65	56	72	54	55	55	56	54	59	56	65
Jun 8	48	54	72	62	62	61	57	62	62	61	57	64	74	63	64	58	58	55	54	56	54	56	57	54	70
Jun 9	52	47	50	54	50	53	67	69	65	63	58	57	56	55	57	58	60	57	57	56	53	56	58	49	66
Jun 10	63	48	60	45	51	55	60	61	61	62	60	61	62	62	58	64	65	61	56	55	53	58	58	54	65
Jun 11	48	51	53	49	52	57	56	60	58	57	59	61	61	62	62	60	61	60	59	65	59	59	60	55	63
Jun 12	51	46	55	41	52	55	58	57	58	58	54	57	54	70	57	57	57	56	57	55	54	57	56	56	62
Jun 13	51	51	51	42	52	56	55	55	59	58	55	61	55	56	61	60	60	61	61	57	62	55	60	55	62
Jun 14	51	49	49	46	50	58	59	58	55	54	61	56	55	57	55	59	58	57	58	62	56	56	54	52	61
Jun 15	51	48	46	58	54	45	51	55	54	62	57	57	63	58	60	60	57	57	60	56	57	56	53	52	61
Jun 16	50	45	44	58	54	53	58	64	55	56	56	54	56	56	56	58	55	57	56	55	53	53	54	58	62
Jun 17	51	51	51	41	60	54	54	57	55	55	54	58	60	55	55	58	57	55	60	53	55	57	64	54	63
Jun 18	59	47	58	42	52	58	60	66	65	58	55	53	54	55	59	61	55	58	55	57	56	57	58	57	64
Jun 19	59	52	49	43	53	57	55	57	56	54	69	60	58	58	57	57	61	57	61	55	54	56	55	57	63
Jun 20	57	48	53	55	53	61	59	57	55	55	56	55	58	54	56	56	58	56	57	62	55	55	54	55	63
Jun 21	53	47	47	58	52	53	57	67	62	54	54	56	56	61	55	55	61	57	60	56	59	54	51	52	62
Jun 22	50	47	47	45	48	54	61	61	57	61	62	64	61	65	64	60	69	61	62	61	55	53	55	52	63
Jun 23	50	43	45	42	50	53	60	65	63	54	58	54	55	54	54	55	55	60	63	60	55	56	56	60	62
Jun 24	49	47	56	43	48	53	63	64	65	67	57	60	54	55	55	56	56	59	59	59	53	56	56	52	63
Jun 25	58	51	50	50	55	59	61	62	65	56	55	54	58	53	53	56	64	59	56	58	54	56	57	58	64
Jun 26	61	43	45	42	47	50	59	66	67	55	55	56	55	57	57	58	60	57	57	58	54	59	61	62	64
Jun 27	59	56	58	48	55	58	60	61	67	61	55	56	56	56	57	57	62	60	66	58	68	65	53	52	65
Jun 28	52	49	48	45	54	58	56	55	59	66	63	62	55	57	61	54	56	53	56	57	58	54	54	55	62
Jun 29	49	52	57	46	52	49	51	62	63	62	60	58	56	55	55	61	56	55	66	58	55	55	52	59	62
Jun 30	51	46	50	43	58	52	62	65	62	56	55	55	55	55	56	55	56	55	55	59	55	53	52	56	63
Jul 1	49	61	50	44	62	55	61	68	67	62	57	55	54	56	53	55	61	65	56	54	54	54	54	55	65
Energy Average	56	52	59	52	56	56	60	64	63	60	60	59	62	61	59	59	63	59	60	58	58	57	57	57	64

In terms of the Time Above 75 dBA level, the results show that the Time Above 75 dBA noise levels occur less than 19 minutes per day. Time Above 75 dBA roughly represents when some degree of activity interference may occur such as speech communication. For those aircraft events that generate noise levels greater than 75 dBA the noise from the aircraft overflight is generally above 75 dBA for a period of 10 to 30 seconds.

The results in terms of Time Above 65 dBA occurs between 13 and 64 minutes per day. The majority of measurable noise events from aircraft operations generated noise levels greater than 65 dBA. The noise events from aircraft noise are on average above 65 dBA for 50 seconds. Many events from older and louder Hush Kit aircraft can last longer.

Table D4

TIME ABOVE MEASUREMENT RESULTS

General Mitchell International Airport FAR Part 150 Noise Compatibility Study

NMS	Description	Address	Time Above Noise Level (Minutes per Day)		
			TA-65	TA-75	TA-85
Portable Sites					
M01	Milwaukee	4401 Lenox St.	28.7	6.3	0.5
M02	Milwaukee	3813 Alabama	16.3	3.6	0.8
M03	Milwaukee	1702 Eden	13.3	3.2	0.5
M04	Milwaukee	1901 Kimberly	47.1	15.1	2.6
M05	Milwaukee	707 W. Maplewood Ct.	27.3	3.8	0.2
M07	Oak Creek	410 Marquette	32.5	5.0	0.4
M09	Oak Creek	6775 Juniper	29.8	5.1	0.3
M10	Cudahy	3225 Mallory	44.9	9.8	1.5
M11	Cudahy	3713 Holmes	63.7	18.6	2.8
M12	Cudahy	3025 Holmes	63.9	13.9	3.1
M13	Milwaukee	6632 S. 19th St.	19.7	3.6	0.1

Existing Baseline Noise Modeling Inputs

Existing Aircraft Operations

The existing noise environment for General Mitchell International Airport was analyzed based upon 2003 operational conditions. A Part 150 Noise Compatibility Study requires that the baseline noise exposure contours reflect annual conditions using the most recent 12-month period. The development of the Baseline conditions utilizes data from a variety of sources. The sources of data for this study are listed below:

- Aircraft Tower Counts
- Flight Operations and Radar data from the Airports Noise and Flight Track Monitoring System
- Aircraft Situational Display (ASD) Data
- Field observations and noise monitoring results from noise measurement survey
- Discussions with airport staff

The INM noise model requires a variety of operational data to model the noise environment around an airport. These data includes the following information, which are discussed in detail in the following paragraphs:

- Total Aircraft Activity Levels
- Aircraft Fleet Mix Categories
- Detailed Fleet Mix
- Time of Day
- Runway Use
- Departure and Arrival Procedures
- Flight Paths
- Flight Path Utilization

Total Aircraft Activity Levels

The total aircraft operational levels were derived directly from the Air Traffic Control (ATC) tower counts. The tower count data showed that for the 2003 base period, there were a total of approximately 211,418 operations, or an average of 579 operations per day (an operation is one takeoff or one landing). The tower count information also

contains a breakdown as to ATC category of operations. The total operations and the breakdown for the baseline period are presented in Table D5.

Table D5

AIRPORT TOWER COUNT FOR BASELINE PERIOD

General Mitchell International Airport FAR Part 150 Noise Compatibility Study

Category	Annual Operations	Average Daily Operations
Air Carrier	43,861	120
Air Taxi	135,399	371
General Aviation	28,332	78
Military	4,814	13
TOTAL	211,418	579

Year 2003

Aircraft Fleet Mix Categories

The breakdown by the categories used by ATC are useful for air traffic purposes, but do not provide sufficient detail necessary for the noise analysis or the details that are often of interest to the general public. As a result, the breakdown by aircraft fleet mix categories of aircraft operations are presented within this section. The categories are defined relative to type of user, (i.e., passenger or cargo) and type of aircraft (i.e., jet or propeller). The breakdown by these categories was determined from the different sources of operational data that were described above with the primary source being the landing reports. Table D6 presents operations for the different categories of aircraft.

It is not possible to definitively categorize all of the operations into unique groups. For example, some corporate jet operations are actually unscheduled cargo flights. Similarly some air taxi operations are small single-engine piston aircraft that may be categorized as general aviation piston, or vice versa. But these generally define the categories of operations that occur at the Airport and will be used within this study.

Table D6
OPERATIONS BY AIRCRAFT CATEGORY FOR 2003 BASELINE PERIOD
General Mitchell International Airport FAR Part 150 Noise Compatibility Study

Category	Annual Operations
<i>Passenger Air Carrier and Air Cargo</i>	
Wide Body Jets	1,632
Narrow Body Jets	63,895
Regional Jets	61,881
Commuter Prop	41,300
<i>General Aviation and Small Air Taxi</i>	
Corporate Jets	14,050
Single & Multi-Engine Prop	24,030
<i>Military</i>	
Tankers	1,805
Transports	2,825
Total Operations	211,418

Calendar year 2003

Detailed Aircraft Fleet Mix

The mix of aircraft that operate at the Airport is one of the most important factors in terms of the airport noise environment. Fleet mix data were determined from all of the data described previously with the primary source being the radar data from the airport's noise monitoring system. A full year of radar data for 2003 was used to determine this fleet mix. The fleet mix assumptions are presented in Table D7. This table presents the average daily operations for each type of aircraft used in the INM noise model as well as a description of these aircraft.

The INM aircraft type assigned for each of the aircraft operating at General Mitchell International Airport was based upon the INM type that most closely matched the type of aircraft that each airline operated at the Airport. Some aircraft with smaller numbers of operations were grouped into the aircraft type that was most representative of those aircraft. Note that there are the same INM types shown more than once in the table. This is to identify the separate categories of operations

Table D7 (Revised September 7, 2004)

DETAILED AIRLINE FLEET MIX (2003)

General Mitchell International Airport FAR Part 150 Noise Compatibility Study

Period: January 1, 2003 to December 31, 2003



Aircraft Category	INM Type	Daily Arrivals		Daily Departures		Daily Operations	Annual Operations
		Day	Night	Day	Night		
Air Carrier Wide Body	74720B	0.04	0.00	0.01	0.04	0.08	28
Air Carrier Wide Body	A30062	0.97	1.15	1.19	2.12	4.24	1,547
Air Carrier Wide Body	A310	0.06		0.06	0.06	0.12	45
Air Carrier Wide Body	DC1030	0.01	0.01	0.00	0.01	0.03	11
Air Carrier Narrow Body	717200	12.63	0.32	1.19	12.95	25.90	9,453
Air Carrier Narrow Body	727EM1	0.25	0.13	0.19	0.38	0.76	279
Air Carrier Narrow Body	727EM2	0.63	1.28	1.24	1.91	3.81	1,392
Air Carrier Narrow Body	7373B2	4.57	0.45	0.47	5.02	10.04	3,664
Air Carrier Narrow Body	737400	0.18	0.01	0.02	0.19	0.38	139
Air Carrier Narrow Body	737800	1.54	0.20	0.09	1.74	3.49	1,272
Air Carrier Narrow Body	737N17	2.83	0.04	0.61	2.88	5.75	2,099
Air Carrier Narrow Body	757PW	3.83	0.88	0.42	4.71	9.42	3,439
Air Carrier Narrow Body	757RR	0.71	0.08	0.20	0.79	1.57	573
Air Carrier Narrow Body	A319	2.31	0.74	0.65	3.05	6.10	2,227
Air Carrier Narrow Body	A320	3.13	0.70	0.69	3.83	7.66	2,796
Air Carrier Narrow Body	A32123	0.34	0.19	0.18	0.52	1.04	381
Air Carrier Narrow Body	DC870	0.09	1.23	0.66	1.33	2.65	967
Air Carrier Narrow Body	DC95HW	23.02	2.37	2.74	25.39	50.78	18,533
Air Carrier Narrow Body	F10065	0.01			0.01	0.02	9
Air Carrier Narrow Body	MD83	21.02	1.82	1.54	22.84	45.68	16,672
Regional Jets	BAE146	2.58	0.00	0.01	2.59	5.17	1,887
Regional Jets	BAE300	2.13			2.13	4.27	1,558
Regional Jets	EMB145	27.37	1.25	3.77	28.62	57.24	20,892
Regional Jets	EMB14L	16.21	2.37	3.76	18.58	37.16	13,562
Regional Jets	J328	29.73	3.10	2.78	32.83	65.67	23,970
Commuter Prop	BEC190	40.26	5.10	4.66	45.36	90.73	33,115
Commuter Prop	DHC6	1.32	0.06	0.11	1.38	2.76	1,008
Commuter Prop	DHC8	1.70	0.17	1.19	1.88	3.75	1,370
Commuter Prop	EMB120	0.09	0.65	0.31	0.74	1.48	541
Commuter Prop	SF340	7.27	1.00	1.50	8.27	16.54	6,038
General Aviation Jet	CIT3	2.24	0.19	0.38	2.44	4.87	1,779
General Aviation Jet	CL600	1.42	0.07	0.28	1.49	2.98	1,086
General Aviation Jet	CNA55B	5.82	0.27	0.54	6.10	12.19	4,449
General Aviation Jet	CNA750	0.97	0.07	0.04	1.03	2.07	755
General Aviation Jet	FAL20	0.28	0.03	0.00	0.31	0.62	227
General Aviation Jet	GIIB	0.34	0.02	0.01	0.36	0.72	264
General Aviation Jet	GIV	1.31	0.14	0.13	1.44	2.89	1,054
General Aviation Jet	IA1125	0.32	0.02	0.01	0.34	0.68	249
General Aviation Jet	LEAR25	0.17	0.01	0.03	0.19	0.37	136
General Aviation Jet	LEAR35	1.80	0.18	0.21	1.98	3.96	1,446
General Aviation Jet	SABR80	3.34	0.23	0.40	3.57	7.13	2,603
General Aviation Prop	BEC58P	4.00	1.76	3.21	5.76	11.51	4,203
General Aviation Prop	CNA441	6.17	1.49	4.47	7.67	15.33	5,596
General Aviation Prop	GASEPF	1.75	0.16	0.15	1.92	3.84	1,400
General Aviation Prop	GASEPV	7.20	0.61	0.70	7.81	15.63	5,704
General Aviation Prop AT	BEC9F	0.29	0.02	0.05	0.31	0.61	223
General Aviation Prop AT	CNA208	6.60	1.57	5.28	8.17	16.34	5,964
Military	C130	3.75	0.12	0.12	3.87	7.74	2,825
Military	F16GE	0.25			0.25	0.50	183
Military	KC135R	2.30	0.17	0.17	2.47	4.94	1,803
Total		257.17	32.44	46.42	289.61	579.23	211,418

The mix of jet aircraft is illustrated in Figures D13 and D14. Figure D13 presents the average daily operations of commercial/cargo jet aircraft. Figure D14 shows the number of these jet aircraft operations by each airline. These figures also show the percentage of jet aircraft that are hush kit aircraft versus manufactured Stage 3.

Time of Day

In the DNL metric, any operations that occur after 10 p.m. and before 7 a.m. are considered more intrusive and their noise levels are penalized by adding 10 dBA. The nighttime operations assumptions were determined from the Airport's flight-track monitoring system during the base period. The overall percentage of nighttime operations at General Mitchell International Airport was determined to be 13.9 percent as summarized in Table D8 for each category of aircraft. The time of day assumptions used in the model were specific to each aircraft operation. The specific percentages were presented in the previous Table (Table D7). Table D8 presents a summary of nighttime operations by INM aircraft type, and by departures and arrivals.

Table D8

SUMMARY HOURS OF OPERATIONS BY CATEGORY, YEAR 2003

General Mitchell International Airport FAR Part 150 Noise Compatibility Study

Category	Percentage Nighttime Operations		
	Arrivals	Departures	Average
Air Carrier Wide Body	52.4%	56.8%	54.5%
Air Carrier Narrow Body	11.9%	12.4%	12.2%
Regional Jets	7.9%	12.2%	10.0%
Commuter Prop	15.5%	25.9%	20.6%
General Aviation Corporate Jet	6.4%	10.6%	8.4%
General Aviation Prop	14.2%	25.5%	19.8%
Military	4.4%	4.4%	4.4%
TOTAL	11.6%	16.4%	13.9%


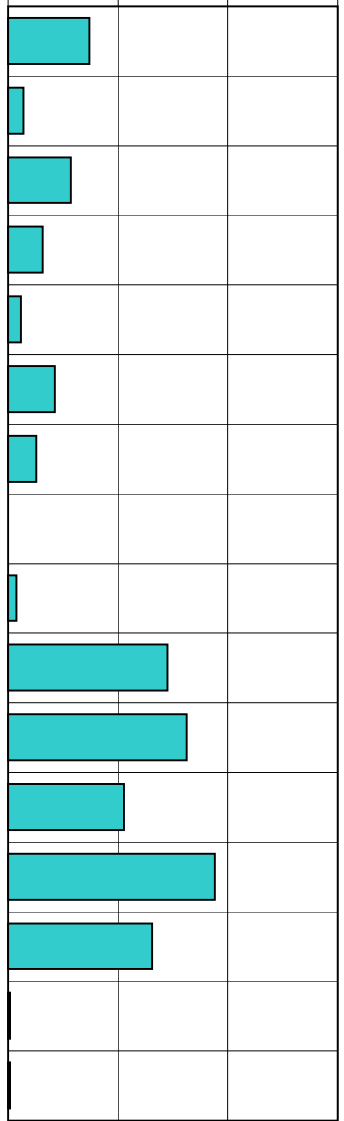













Figure D13

COMMERCIAL JET OPERATIONS BY AIRCRAFT TYPE (2003)

General Mitchell International Airport FAR Part 150 Noise Compatibility Study

Period: January 1, 2003 to December 31, 2003



Jet Aircraft	Built FAR 36 Stage	Operations	Percentage Of Total	
		Average Per Day	Percent of Total	
 B717-200	3	26.0	7%	
 B727 Hush Kit	2	5.0	1%	
 B737 New Series	3	20.0	6%	
 B757 All Series	3	11.0	3%	
 A300/A310	3	4.0	1%	
 A320/A319/A321	3	15.0	4%	
 BAe146	3	9.0	3%	
 DC10 All Series	3	0.0	0%	
 DC8-70	3	2.7	1%	
 DC9 Hush Kit	2	51.0	15%	
 EMB-145	3	57.0	16%	
 CL Regional Jet	3	37.0	11%	
 J328	3	66.0	19%	
 MD80 All Series	3	46.0	13%	
Other Aircraft (Built Stage 2)	2	0.7	0%	
Other Aircraft (Built Stage 3)	3	0.5	0%	

Numbers are rounded to nearest 0.0 value

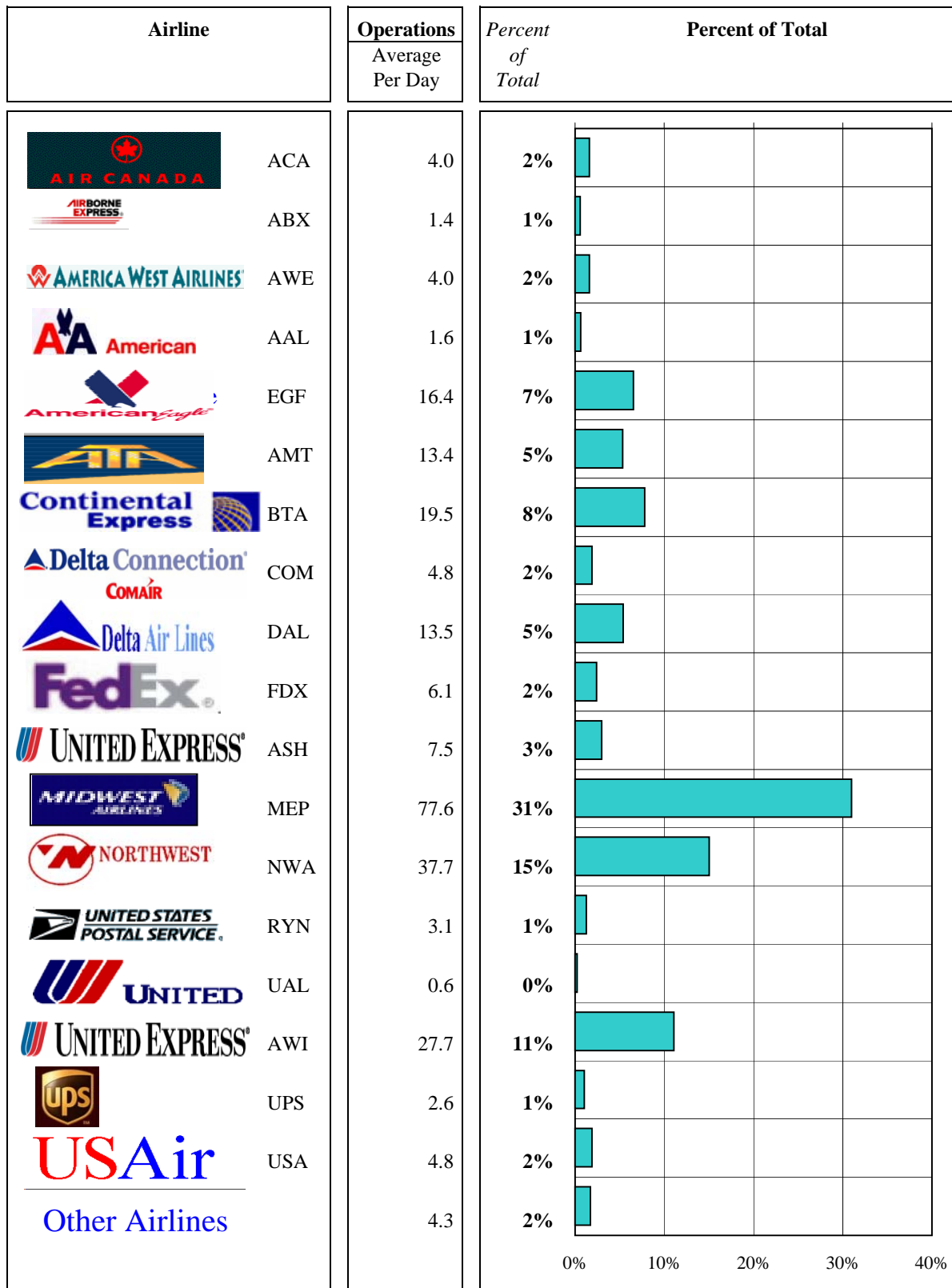
Source: BridgeNet International

Figure D14

COMMERCIAL JET OPERATIONS BY AIRLINE (2003)

General Mitchell International Airport FAR Part 150 Noise Compatibility Study

Period: January 1, 2003 to December 31, 2003



Numbers are rounded to nearest 0.0 value

Source: BridgeNet International

Runway Use

An additional important consideration in developing the noise exposure contours is the percentage of time each runway is utilized. The speed and direction of the wind dictate the runway direction that is utilized by an aircraft. From a safety and stability standpoint, it is desirable, and usually necessary, to arrive and depart an aircraft into the wind. When the wind direction changes, the operations are shifted to the runway end that favors the new wind direction.

The other categories in this report are modeled for the year 2003; runway use is modeled for the year 2002 because it is the most recent year with a full year of average or typical operations. The 2003 year data were not used for the Runway Use category due to runway construction. Because of the runway construction, operational changes took place, such as runway closures that precluded the use of the normal runway patterns and the preferential runway use program.

The existing conditions runway use presented in Table D9 is based upon a full year of radar data from the Airport's noise and flight track monitoring system. This table presents the percentage utilization of each runway for departures and arrivals separately, and during the daytime and nighttime hours. These same data are presented graphically in Figure D15. The top portion of this figure shows the total number of departure operations per hour of the day for each runway. The same data are presented in the bottom portion of the graph for arrivals.

Table D9

PERCENTAGE RUNWAY UTILIZATION BY TIME OF DAY

General Mitchell International Airport FAR Part 150 Noise Compatibility Study

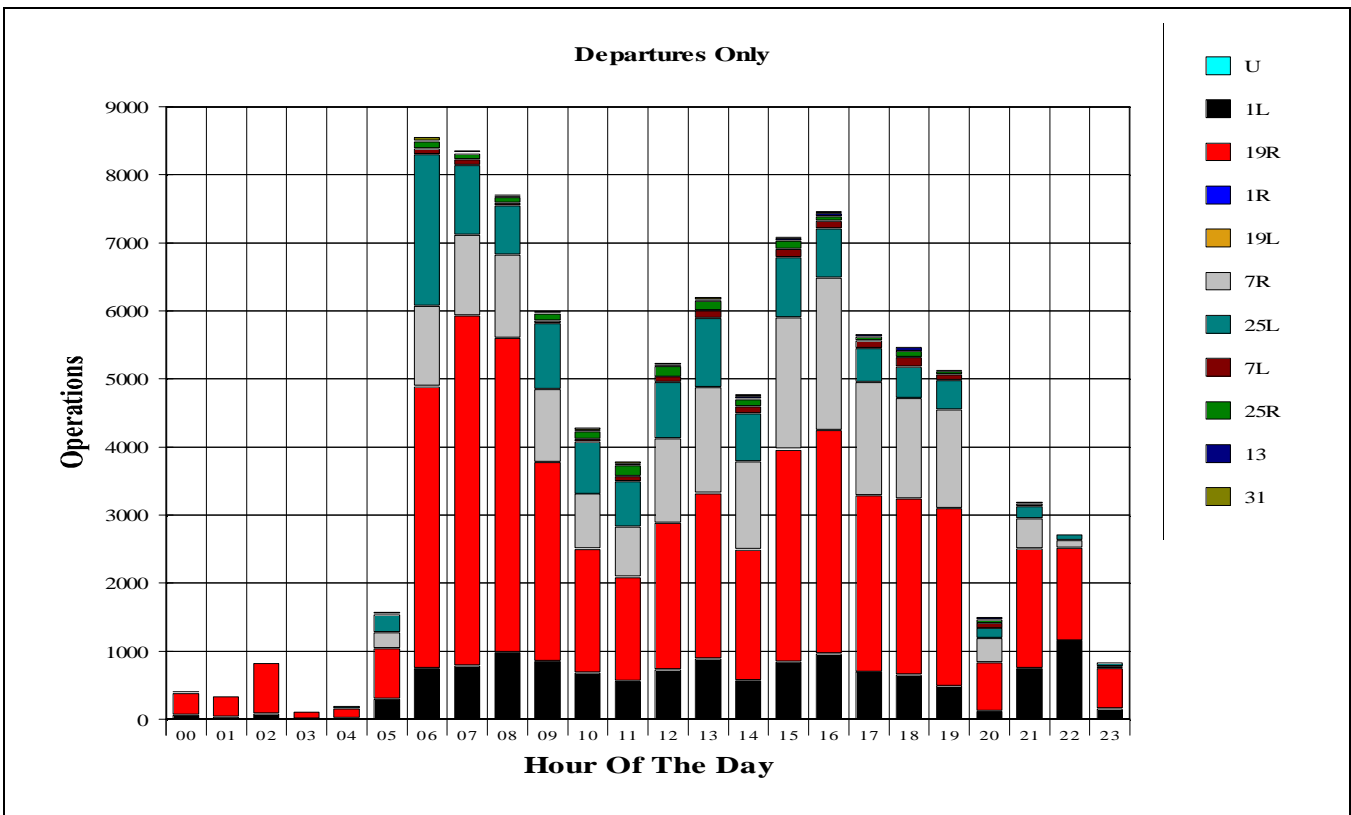
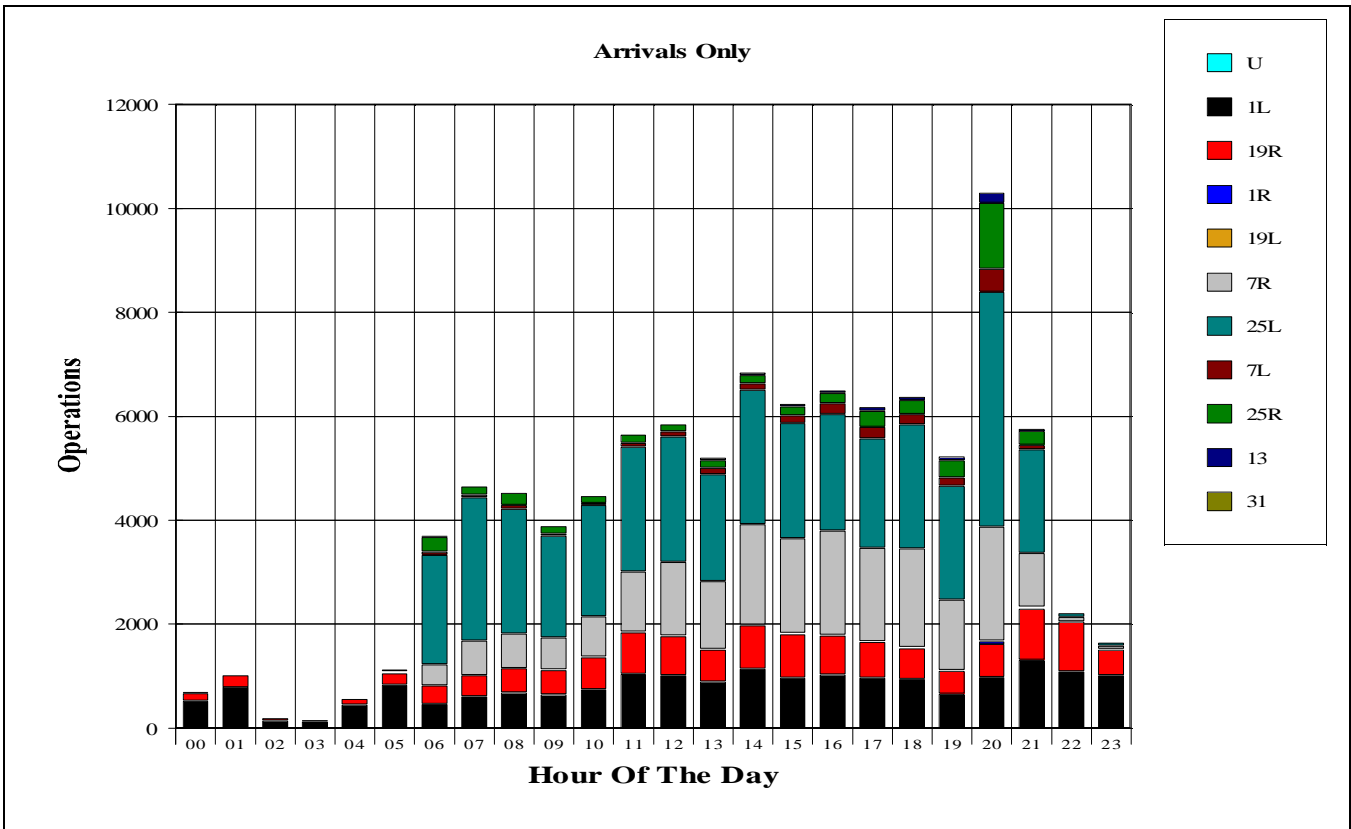
Runway	Arrivals		Departures	
	<i>Daytime</i>	<i>Nighttime</i>	<i>Daytime</i>	<i>Nighttime</i>
1L	15.9%	46.3%	13.1%	16.6%
1R	0.2%	0.1%	0.0%	0.1%
7R	24.4%	5.9%	24.0%	10.3%
13	0.6%	0.0%	0.4%	0.1%
19L	0.1%	0.0%	0.0%	0.0%
19R	11.1%	22.2%	48.4%	53.1%
25L	42.1%	21.9%	12.1%	17.9%
31	0.2%	0.3%	0.2%	0.5%
7L	1.7%	0.5%	1.1%	0.7%
25R	3.9%	2.7%	0.7%	0.8%
TOTAL	100%	100%	100%	100%

Figure D15

OPERATIONS PER EACH HOUR OF THE DAY PER RUNWAY

General Mitchell International Airport FAR Part 150 Noise Compatibility Study

Period: January 1, 2002 to December 31, 2002



The runway utilization information used in the noise model is specific to each type of aircraft. Different aircraft have different runway utilization based upon aircraft size and performance.

The more detailed breakdown of runway use by category of aircraft presented in Tables D10 and D11 include the percentage of operations by category utilizing each of the runways, for daytime and nighttime hours, respectively.

Table D10
DAYTIME RUNWAY UTILIZATION BY CATEGORY OF AIRCRAFT,
(7 a.m. to 10 p.m.)
General Mitchell International Airport FAR Part 150 Noise Compatibility Study

Aircraft Type	Percentage Utilization									
	1L	1R	7R	13	19L	19R	25L	31	7L	25R
<i>Arrivals</i>										
Air Carrier Wide Body	15%	0%	32%	0%	0%	12%	41%	0%	0%	0%
Air Carrier Narrow Body	17%	0%	25%	0%	0%	11%	47%	0%	0%	0%
Regional Jet	17%	0%	26%	0%	0%	11%	46%	0%	0%	0%
Commuter Prop	15%	0%	22%	1%	0%	11%	40%	0%	0%	0%
GA Corporate Jet	16%	0%	27%	0%	0%	12%	44%	0%	0%	0%
GA Prop/Small AT	9%	2%	13%	5%	1%	8%	19%	1%	13%	30%
Military	17%	0%	46%	0%	0%	12%	25%	0%	0%	0%
<i>Departures</i>										
Air Carrier Wide Body	9%	0%	23%	0%	0%	48%	21%	0%	0%	0%
Air Carrier Narrow Body	15%	0%	22%	0%	0%	51%	12%	0%	0%	0%
Regional Jet	13%	0%	25%	0%	0%	49%	12%	0%	0%	0%
Commuter Prop	12%	0%	27%	0%	0%	47%	12%	0%	1%	1%
GA Corporate Jet	12%	0%	20%	1%	0%	57%	10%	0%	0%	0%
GA Prop/Small AT	5%	0%	9%	4%	0%	35%	16%	2%	17%	11%
Military	23%	0%	41%	0%	0%	32%	5%	0%	0%	0%

Table D11
NIGHTTIME RUNWAY UTILIZATION BY CATEGORY OF AIRCRAFT,
(10 p.m. to 7 a.m.)
General Mitchell International Airport FAR Part 150 Noise Compatibility Study

Aircraft Type	Percentage Utilization									
	1L	1R	7R	13	19L	19R	25L	31	7L	25R
<i>Arrivals</i>										
Air Carrier Wide Body	67%	0%	3%	0%	0%	18%	12%	0%	0%	0%
Air Carrier Narrow Body	58%	0%	4%	0%	0%	23%	15%	0%	0%	0%
Regional Jet	32%	0%	9%	0%	0%	26%	33%	0%	0%	0%
Commuter Prop	33%	0%	8%	1%	0%	17%	38%	0%	1%	3%
GA Corporate Jet	50%	8%	27%	0%	0%	25%	17%	0%	0%	0%
GA Prop/Small AT	54%	2%	3%	5%	1%	25%	4%	1%	2%	10%
Military	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
<i>Departures</i>										
Air Carrier Wide Body	27%	0%	12%	0%	0%	51%	10%	0%	0%	0%
Air Carrier Narrow Body	25%	0%	9%	0%	0%	61%	5%	0%	0%	0%
Regional Jet	18%	0%	11%	0%	0%	65%	5%	0%	0%	0%
Commuter Prop	19%	0%	10%	0%	0%	55%	14%	0%	2%	1%
GA Corporate Jet	20%	0%	8%	0%	0%	69%	2%	0%	0%	0%
GA Prop/Small AT	7%	0%	11%	4%	0%	35%	42%	1%	1%	2%
Military	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%

Departure Climb Profile

The aircraft departure stage length is the distance the aircraft flies from the Airport to its first destination. The stage length of a flight can be used as a rough surrogate for the aircraft departure weight. Generally, heavier aircraft climb at a slower rate, and thus the noise levels under the flight path are likely to be louder. The rate of climb of an aircraft is called the departure climb profile. The stage length assumption is used to determine the rate of climb of each of the different aircraft operating at the airport. Small aircraft such as commuter aircraft that can only fly shorter distances only have Stage Length 1 available. The different stage lengths used in the INM model are listed below.

Stage Length 1	0 to 500 nautical miles flight distance
Stage Length 2	500 to 999 nautical miles flight distance
Stage Length 3	1000 to 1499 nautical miles flight distance
Stage Length 4	1500 to 2499 nautical miles flight distance
Stage Length 5	2500 to 3499 nautical miles flight distance
Stage Length 6	3500 to 4499 nautical miles flight distance
Stage Length 7	+4500 nautical miles flight distance

Figure D16 presents the location of North American airports that are points of service for commercial and cargo jet operations at General Mitchell International Airport. The larger the dot, the greater the number of operations associated with that airport. Note that the graphic shows that many of the aircraft flights are to nearby hub airports for the major airlines. Thus, the majority of the stage lengths for General Mitchell International Airport are less than 1,000 nautical miles (Stage Length 2 or less).

The INM noise model contains different departure climb profiles for each of the aircraft contained in the model. These climb profiles define the rate of climb, speed, and engine thrust based upon the weight of the aircraft. Typically the flight distance stage length is used to assign the departure climb profile using the flight distance data as was presented in the previous figure. However, flight distance does not always correlate to the departure climb profile.

Thus for this study, the aircraft departure climb profiles were identified based upon the actual climb gradient for aircraft operating at General Mitchell International Airport. This was obtained from the FAA radar data. The radar data can be used to show the rate of climb for different aircraft. A full year's worth of radar data were used to assign the climb profile for each specific aircraft.

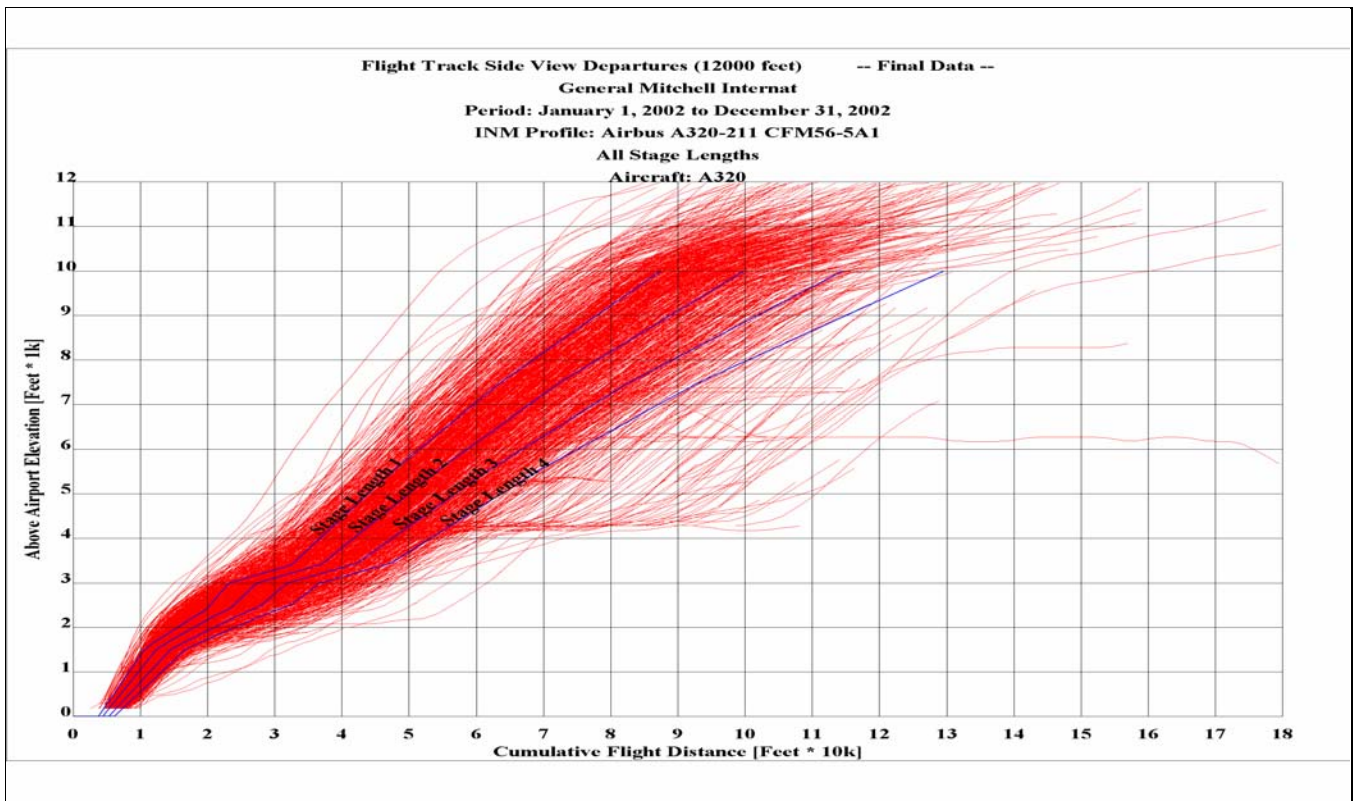
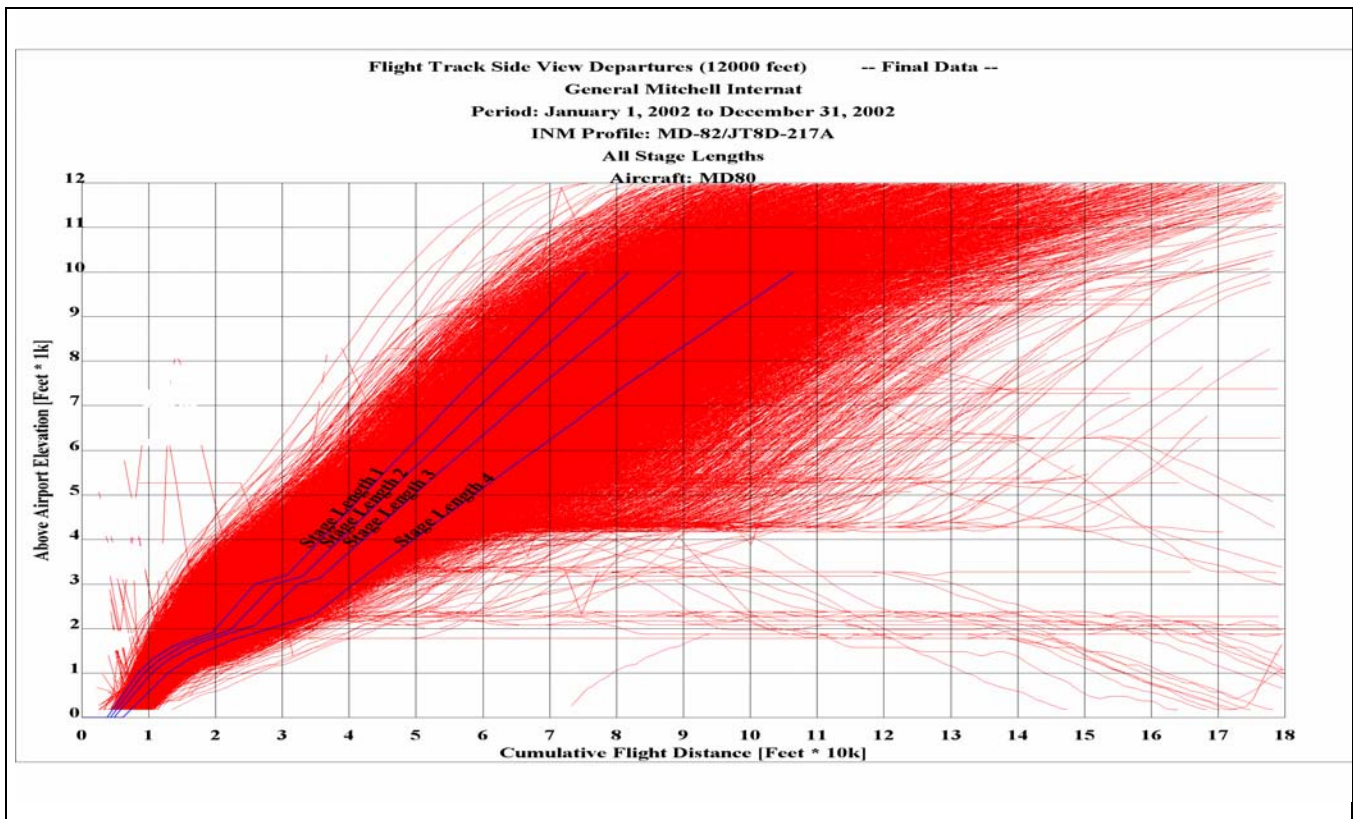
An example of the departure climb profiles for the MD80 and the A319 aircraft are presented in Figure D17. The red lines are actual radar data plots for those aircraft. The lines show the distance flown along the X axis versus the altitude along the Y axis. The green line shows the average climb profile for these aircraft. The blue lines illustrate the departure profiles contained in the INM noise model.

Based upon these data, the departure climb profiles that were used in the model were those that were actually flown based upon the radar data. Each aircraft is assigned the climb profile that most closely matches the climb profile that was flown. For example, the B737-300 aircraft were all modeled at the lower climb profile which more closely matched the measured departure climb gradients. This methodology resulted in low climb rates and thus higher noise levels than would have occurred using standard methodology. This also more closely matched the noise measurement data results.

Figure D16
 Flight Destinations for MKE Jet Aircraft Operations
 General Mitchell International Airport



Figure D17
Departure Profiles for MD80 and A320 Aircraft
 General Mitchell International Airport
 Period: January 1, 2002 to December 31, 2002



Flight Paths and Flight Path Utilization

The Federal Aviation Administration (FAA) and the Airport have established paths for aircraft arriving and departing from General Mitchell International Airport. These paths are not precisely defined ground tracks, but represent a path along the ground over which aircraft generally fly. The identification of the location and use of the flight tracks is based upon the FAA's radar data, field observations, and discussions with noise-abatement personnel. A full year of actual radar data were used in the development of the INM flight paths. The flight paths used in the noise model are derived from all of the actual flight paths flown throughout the base period study year.

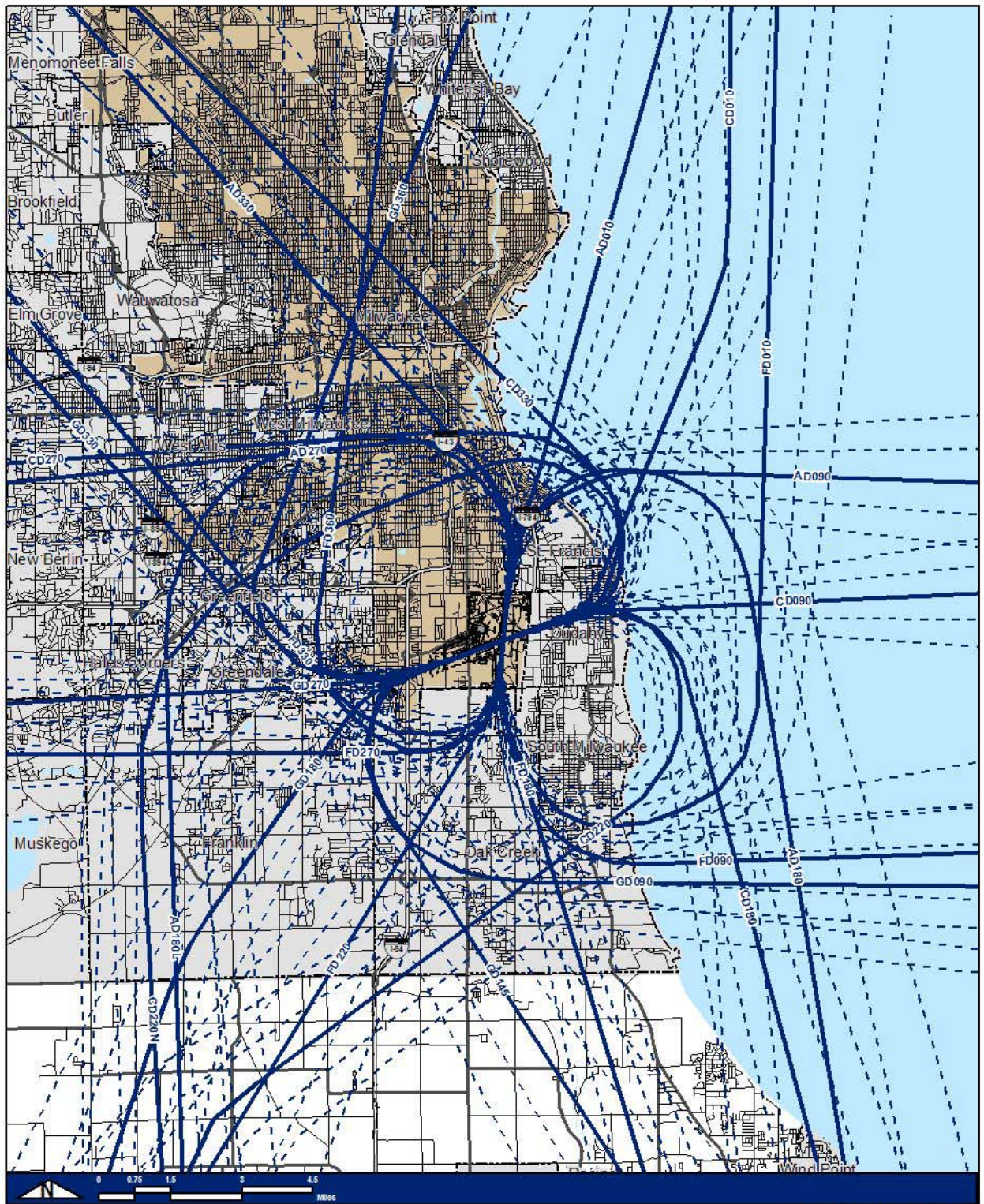
In the development of the existing noise contours it is important to aggregate the flight tracks into a set of generalized flight paths of aircraft operating at the Airport to allow the modeling of different alternative scenarios that may involve the shifting or redesign of the flight procedures.

In the INM noise model, a flight path consists of a backbone or center flight path, and the dispersion or spread of all flights that use that backbone. A computer program was used to develop the INM flight paths from the actual radar flight track data. The program first assigns each aircraft operation to an air traffic control procedure. The software then calculates the average path of all the aircraft that flew those procedures. The program also determines the dispersion of the flight tracks on that path. An example of the process used to calculate each of the flight paths was presented in the methodology section.

The modeling analysis for existing conditions included a total of 42 departure flight paths and 30 arrival flight paths at the Airport. The flight paths modeled in the study were those within the general range of the radar.

The INM flight tracks used in the modeling analysis are presented in Figures D18a, 18b and D19. Figure D18a presents the dispersed departure flight tracks that are primarily used by jet aircraft. Figure D18b presents the dispersed departure flight tracks that are primarily used by propeller aircraft. Figure D19 presents the dispersed arrival flight tracks. The arrival flight track figure present tracks for both jet and propeller aircraft.

An example of an overlay of one INM flight path with actual radar data are presented in Figure D20. This figure illustrates a flight path for aircraft departing on Runway 7R and then turning southbound. The tracks in red are the actual tracks flying this procedure. The solid blue line is the centerline of the flight path as determined by a computer calculation. The dashed blue lines reflect the dispersion of that flight path. The utilization of each flight path was determined based upon a full year of radar data. Each operation was assigned to one of these flight paths based upon the actual path that was flown.



INM FLIGHT TRACK LEGEND



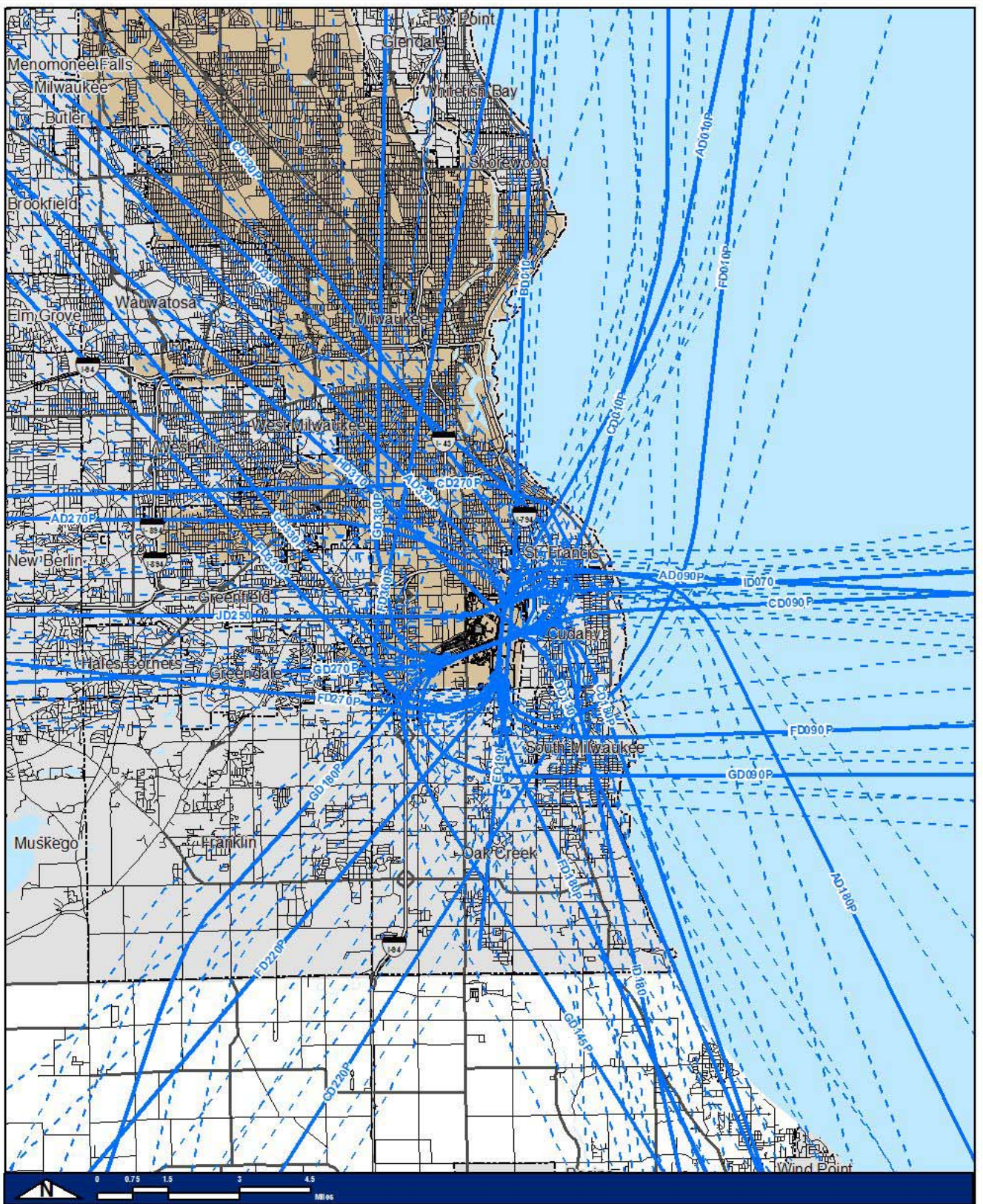
-  Jets Main INM Departure Tracks
-  Jets Subordinate INM Departure Flight Tracks

Figure D18a INM Departure Flight Tracks (Jets)



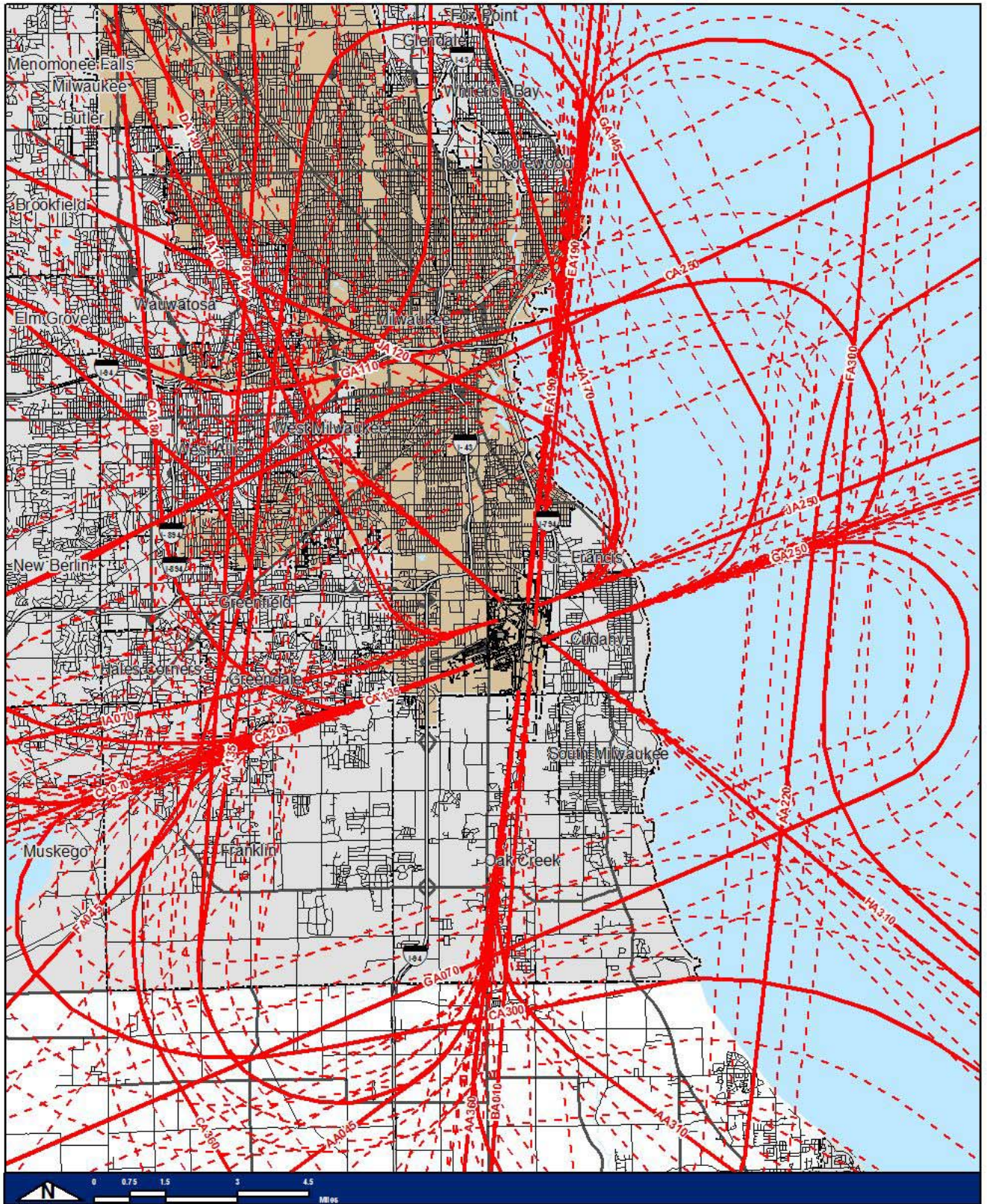


INM FLIGHT TRACK LEGEND

-  Prop Main INM Departure Tracks
-  Prop Subordinate INM Departure Flight Tracks

Figure D18b INM Departure Flight Tracks (Props)

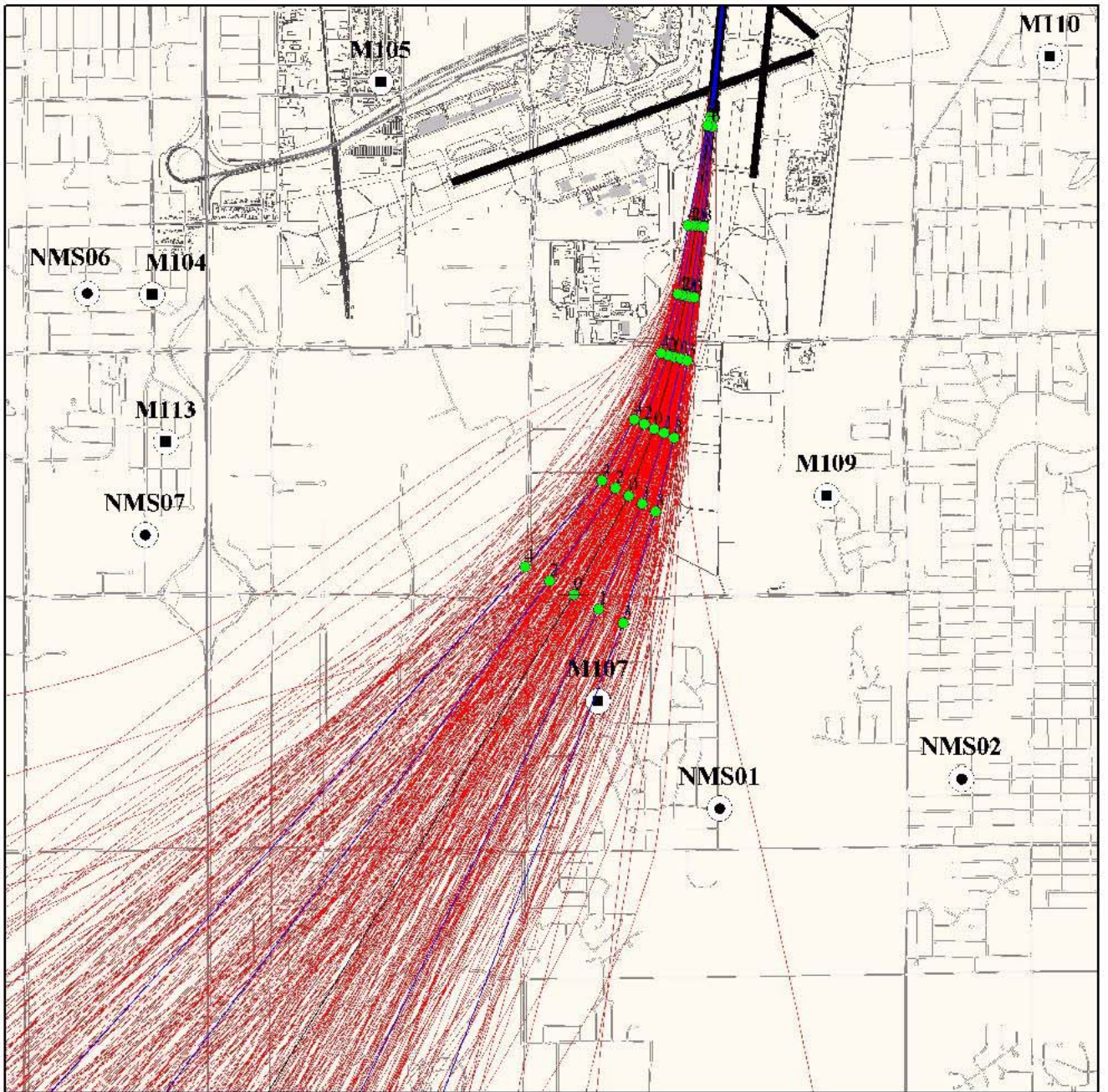




Flight Track Legend

- Main INM Arrival Tracks (All Aircraft Types)
- Subordinate INM Arrival Flight Tracks (All Aircraft Types)

Figure D19 INM Arrival Flight Tracks



MILWAUKEE COUNTY'S



GENERAL
MITCHELL
INTERNATIONAL AIRPORT

Figure D20 Example INM Flight Path and Actual Flight Tracks

Existing Baseline Noise Conditions

Noise exposure contours were developed using a variety of different noise metrics described in the background section of the report including both cumulative noise levels (i.e., averaged over a period of time) and single-event noise levels (noise level from one operation).

As required by the FAA, the primary noise criterion to describe the existing noise environment is DNL. Additional cumulative noise levels include the Time Above (TA) noise level. TA sums the number of minutes throughout the day that the noise levels exceed a threshold, such as 65 dBA. The single-event analysis was quantified in terms of SEL. The TA and SEL data were used to supplement the DNL analysis.

DNL Noise Contours. The existing annual base period 2003 DNL noise exposure contours for General Mitchell International Airport are presented in Figure D21. This figure presents the 65, 70 and 75 DNL noise exposure contours.

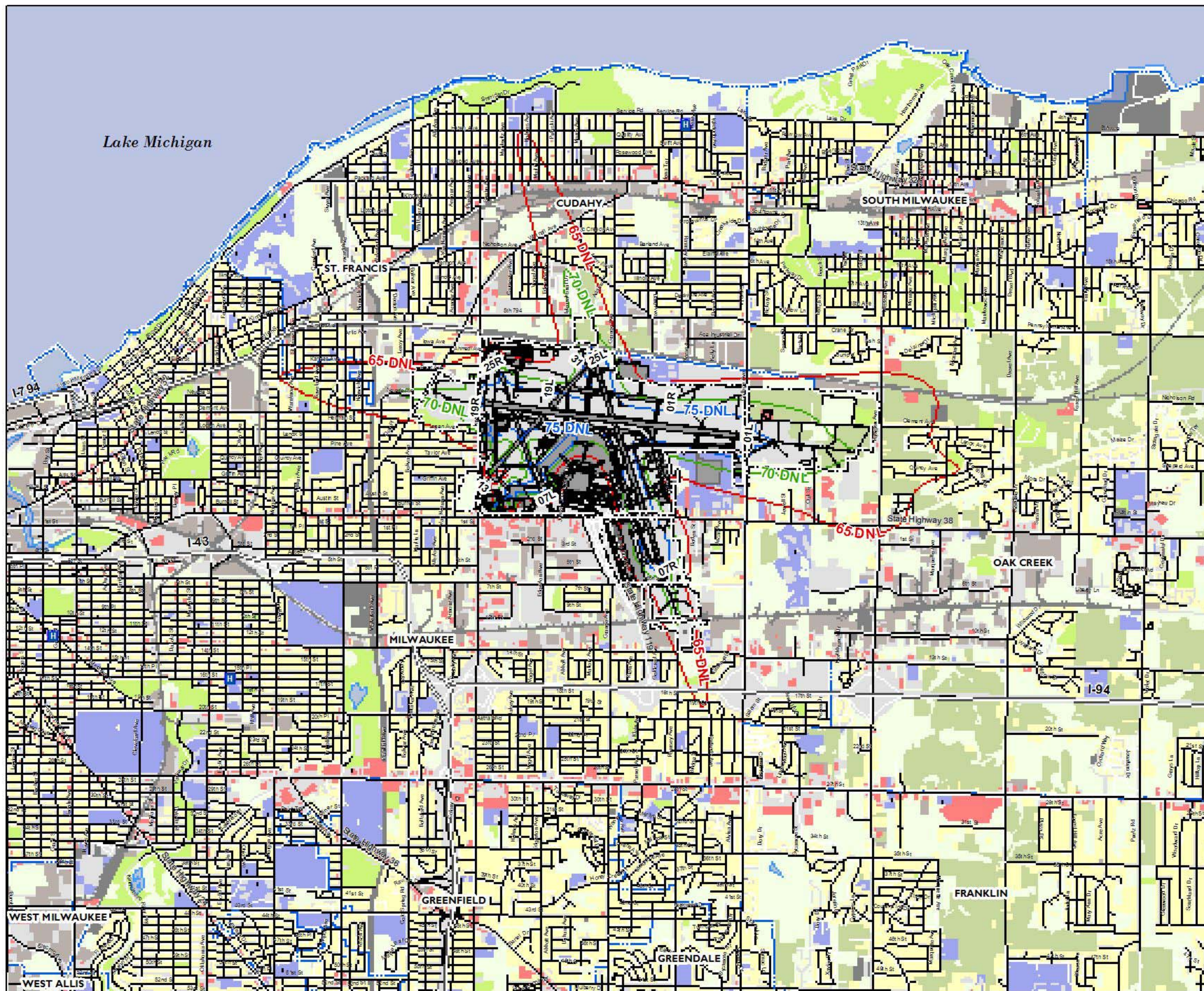
Time Above Noise Contours. The existing annual base period Time Above noise contours are presented in Figure D22. In this figure, the lines of the contours reflect the number of minutes throughout the day that the noise level exceeded 65 dBA. The results show similar shape as to the DNL noise contours.

Number of Events above (NA65) Noise Contours. The existing annual base period Number of Events above 65 dBA noise contours are presented in Figure D23. In this figure, the lines of the contours reflect the number of times throughout the day that the noise level exceeded 65 dBA.

Single-Event Noise Contours

Single-event noise exposure contours for sample aircraft were also developed. These contours represent the single-event noise levels for one (1) departure and one (1) arrival operation. These contours are presented in terms of the SEL noise metric. Sample single-event noise exposure contours are presented in Figures D24 through D27 for the MD80, DC9, B717-200, and EMB145 aircraft respectively. These noise exposure contours illustrate a south flow operation on Runway 19R for both a departure on a south turn and a straight in arrival. The noise contours present the 90, 95, 100 and 105 SEL noise levels.

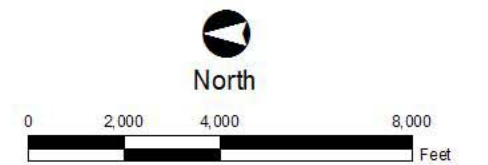
Figure D21
Existing 2003 - DNL Noise Contour
 Generalized Existing Land Use

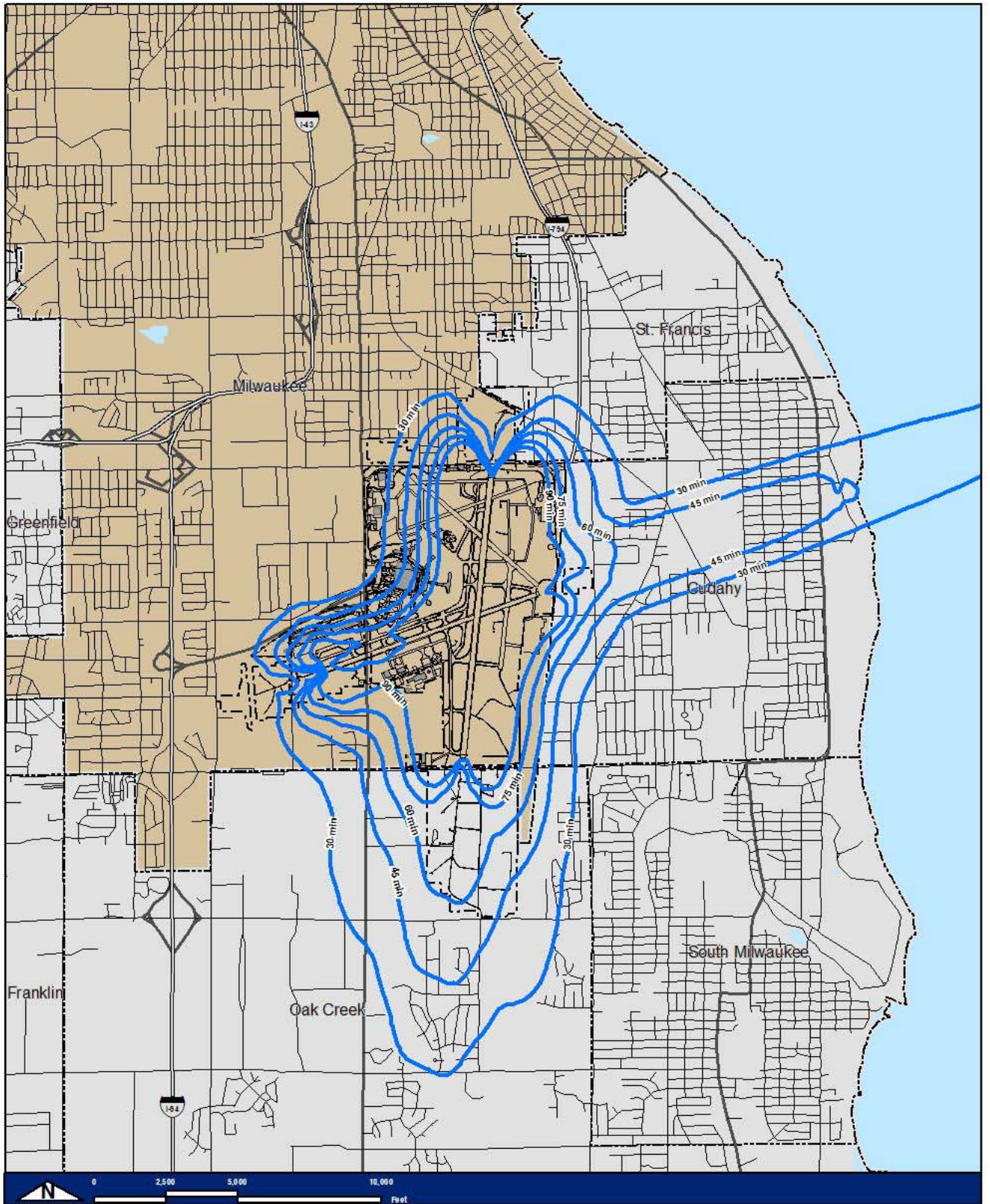


Legend

- 65 DNL Contour
- 70 DNL Contour
- 75 DNL Contour
- RESIDENTIAL
- COMMERCIAL
- GOVERNMENT/INSTITUTIONAL
- INDUSTRIAL
- AGRICULTURAL
- RECREATIONAL
- OPEN LANDS
- COMMUNICATION/UTILITIES
- TRANSPORTATION
- COMMUNITY FACILITY
- CORPORATE BOUNDARY
- AIRPORT BOUNDARY
- H hospitals
- S schools
- C churches

Source: Milwaukee County, 2003





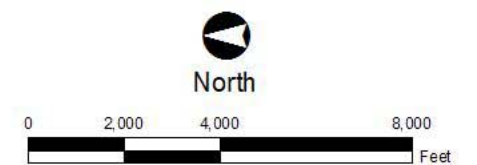
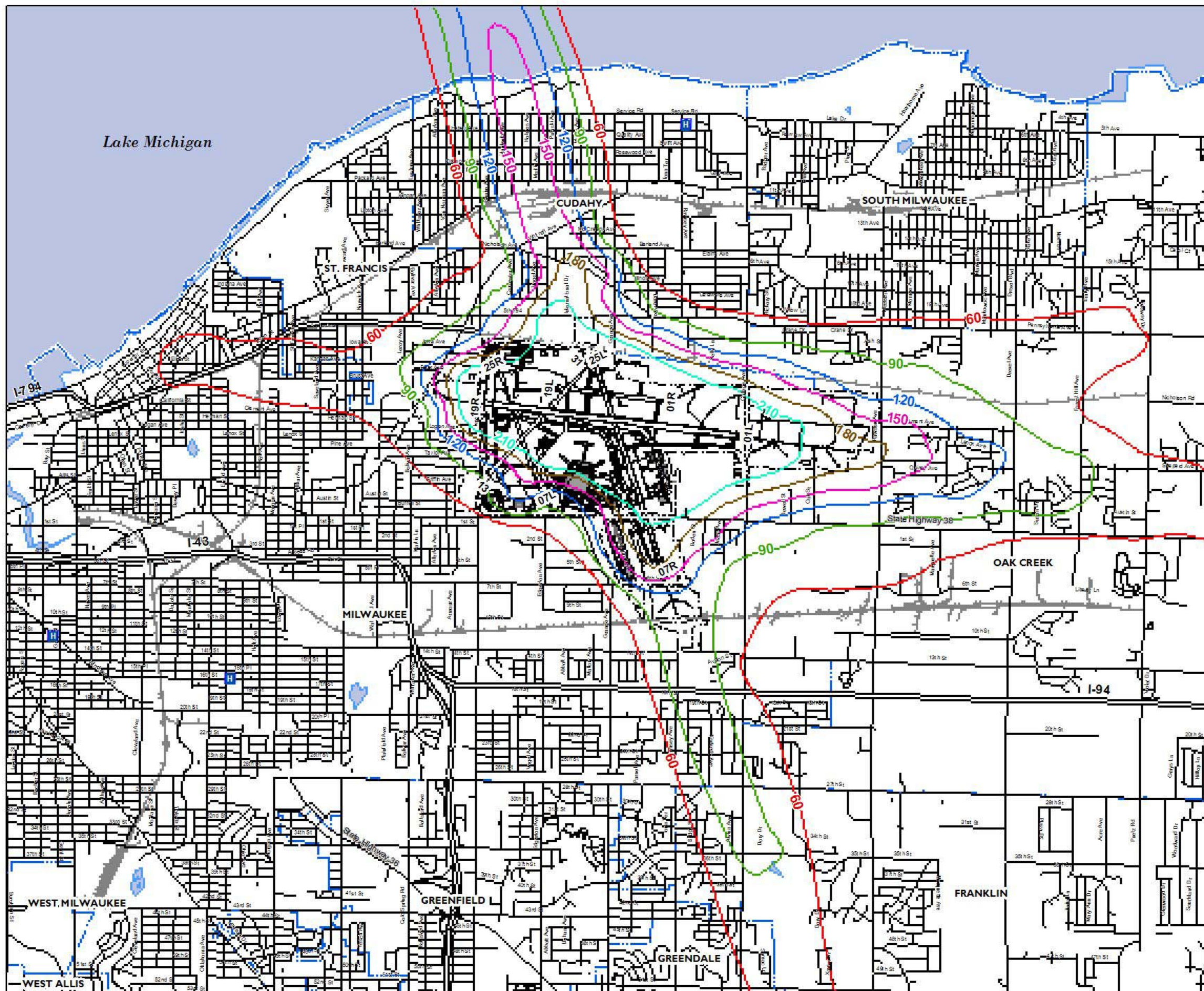
CONTOUR LEGEND
 2003 Time Above 65 DNL Contour

MILWAUKEE COUNTY'S



Figure D22 Existing Daily Average Time Above 65 dBA Noise Contour

Figure D23
 Existing 2003 - Daily Average
 Number of Events Above 65 DNL



Legend

- ~ 60
- ~ 90
- ~ 120
- ~ 150
- ~ 180
- ~ 210



Value of Additional Noise Metrics

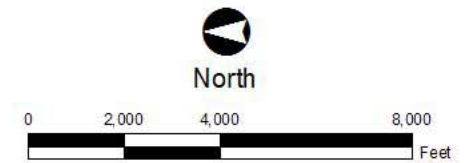
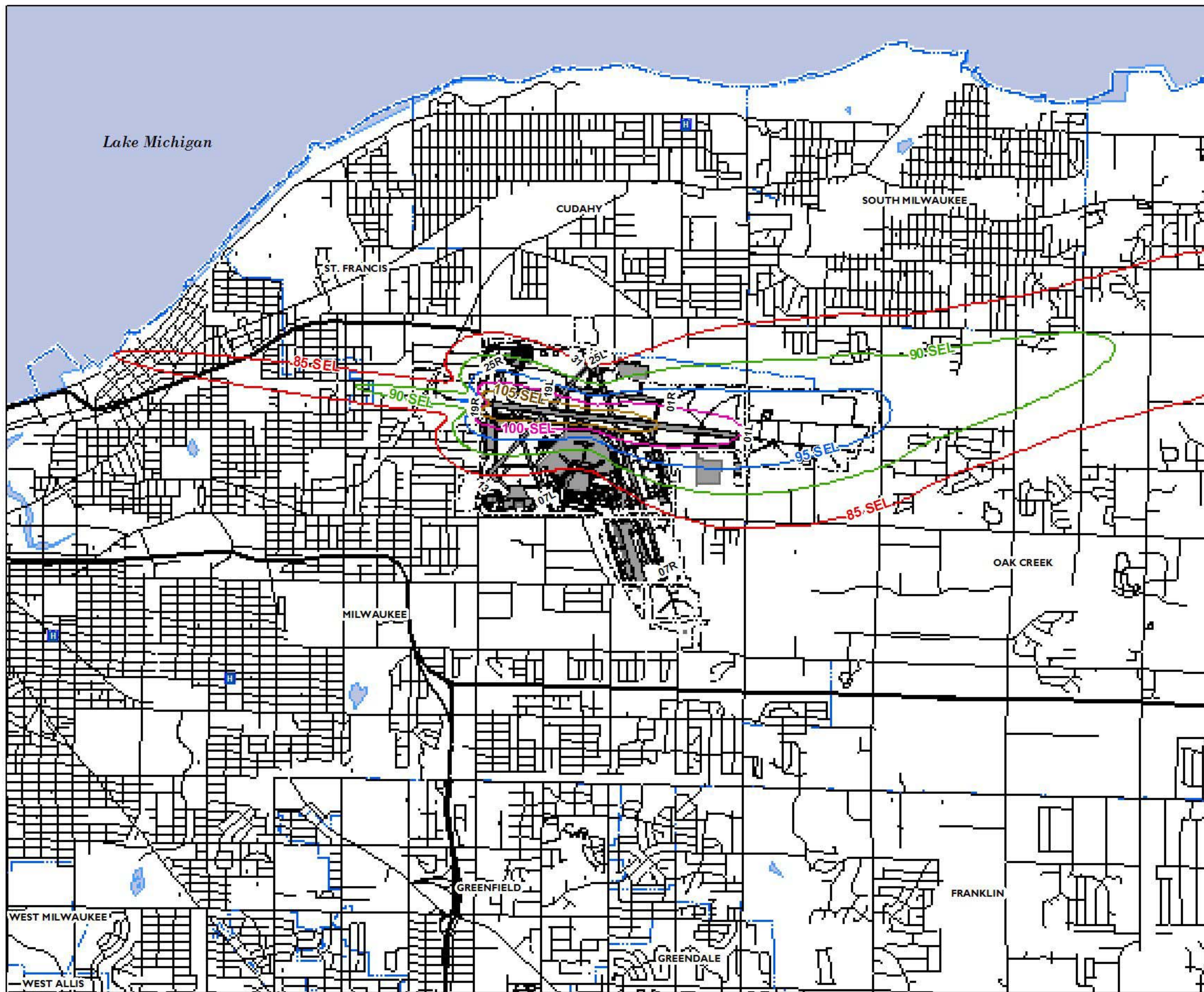
This FAR Part 150 Study extended the standard noise analysis in two significant ways: conducting sample noise monitoring in locations around the Airport and supplementing DNL contours with additional noise metrics including the SEL and Time Above (TA) noise metrics. Both of these tasks were initiated in response to community desire to view the noise data in as many different lights as possible. Additionally there was a very strong desire for noise information to be related to daily living activities, particularly speech and sleep.

Field noise measurement allowed adjustment to be made to the INM model to more accurately reflect actual fleet and meteorological conditions in Milwaukee. Similarly, providing SEL contours to describe the probable impact on sleep interference and providing TA data to predict the frequency of speech interference can produce a level of comfort with the study findings. The NA data can illustrate how many times in the day that noise disturbances could occur. Using additional measuring and metrics does not reduce differences of opinion on the value of various noise abatement alternatives, but it can change the nature of the debate. As a result, it is desired that discussion will not only be over simply the accuracy of the data but on to the substance of the findings. The goal is to center the discussion centers on the relative alternatives and the desirability of those alternatives.

Single-Event Noise Contours

Single-event noise exposure contours for sample aircraft were also developed. These contours represent the single-event noise levels for one (1) departure and one (1) arrival operation. These contours are presented in terms of the SEL noise metric. Sample single-event noise exposure contours are presented in Figures D24 through D27 for the MD80, DC9, B717-200, and EMB145 aircraft respectively. These noise exposure contours illustrate a south flow operation on Runway 19R for both a departure on a south turn and a straight in arrival. The noise contours present the 90, 95, 100 and 105 SEL noise levels.

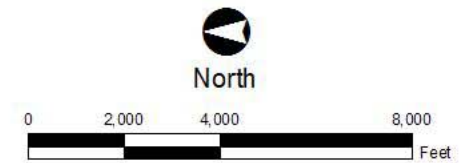
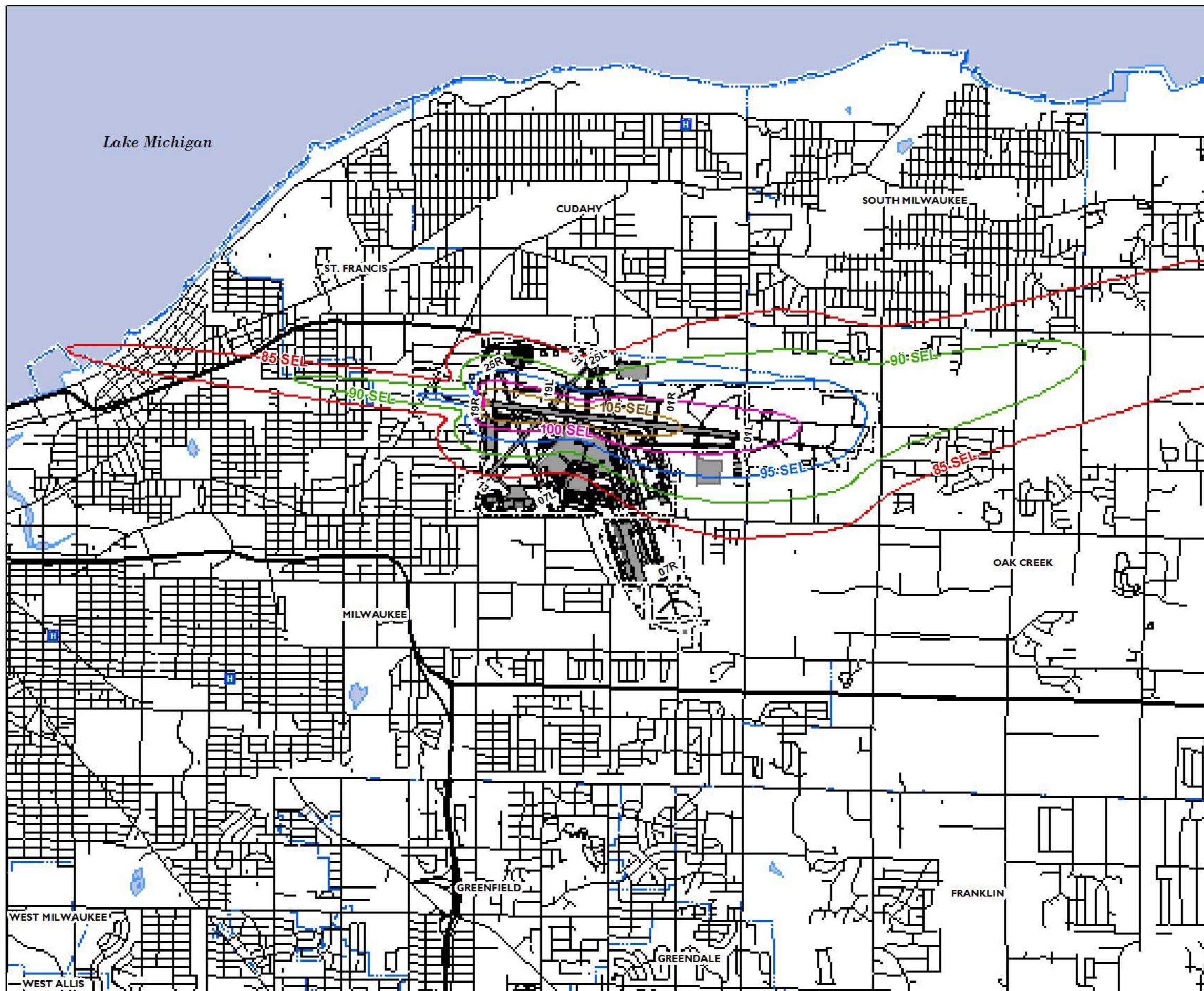
Figure D24
Example Single Event Noise Contour
 MD-80 South Flow



Legend

- CONTOUR 105
- CONTOUR 100
- CONTOUR 95
- CONTOUR 90
- CONTOUR 85

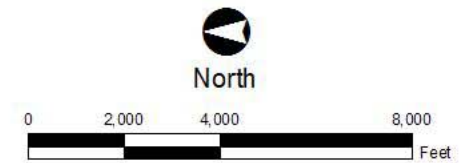
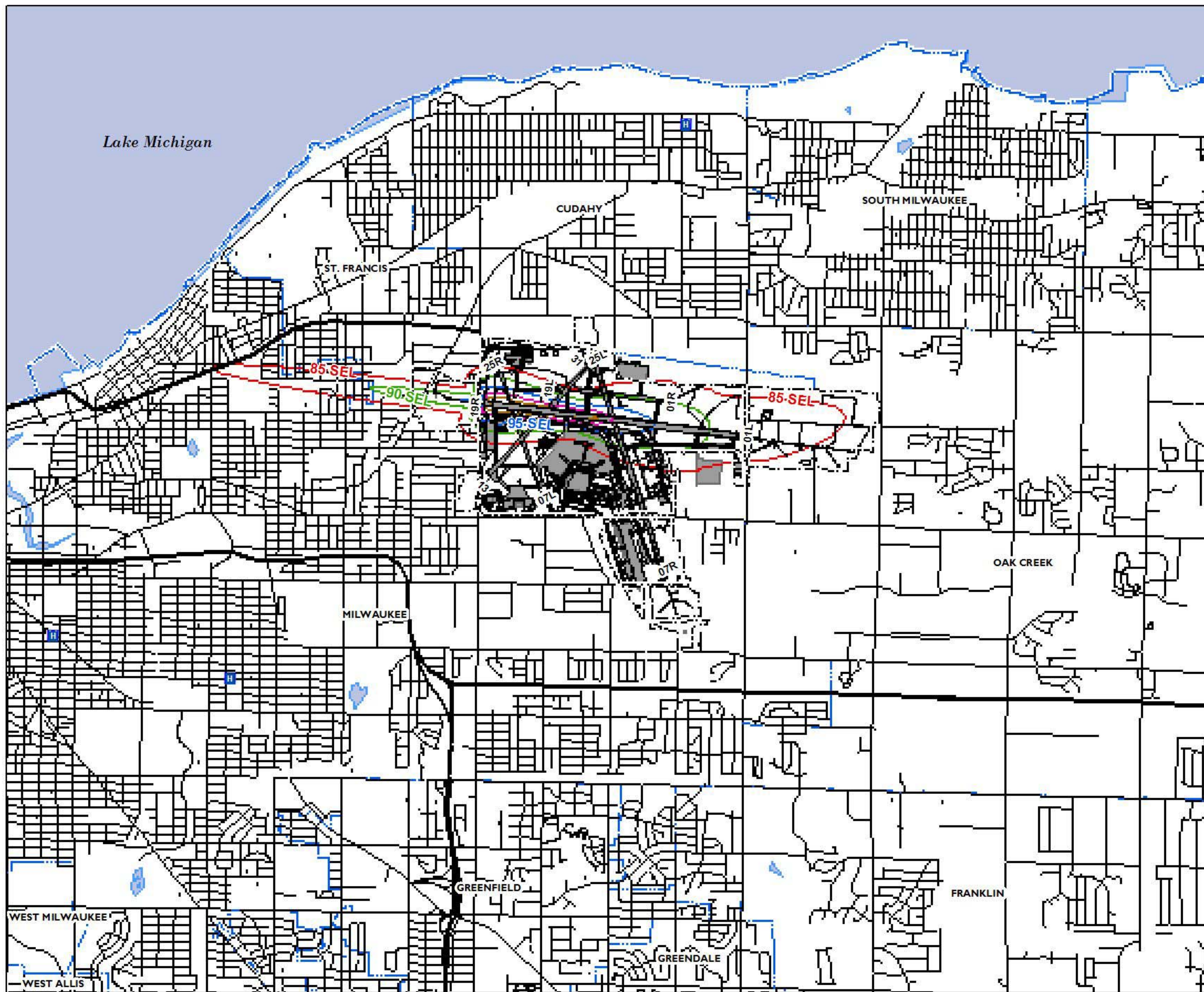
Figure D25
Example Single Event Noise Contour
 DC-9 South Flow



Legend

- CONTOUR 105
- CONTOUR 100
- CONTOUR 95
- CONTOUR 90
- CONTOUR 85

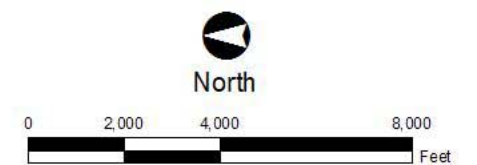
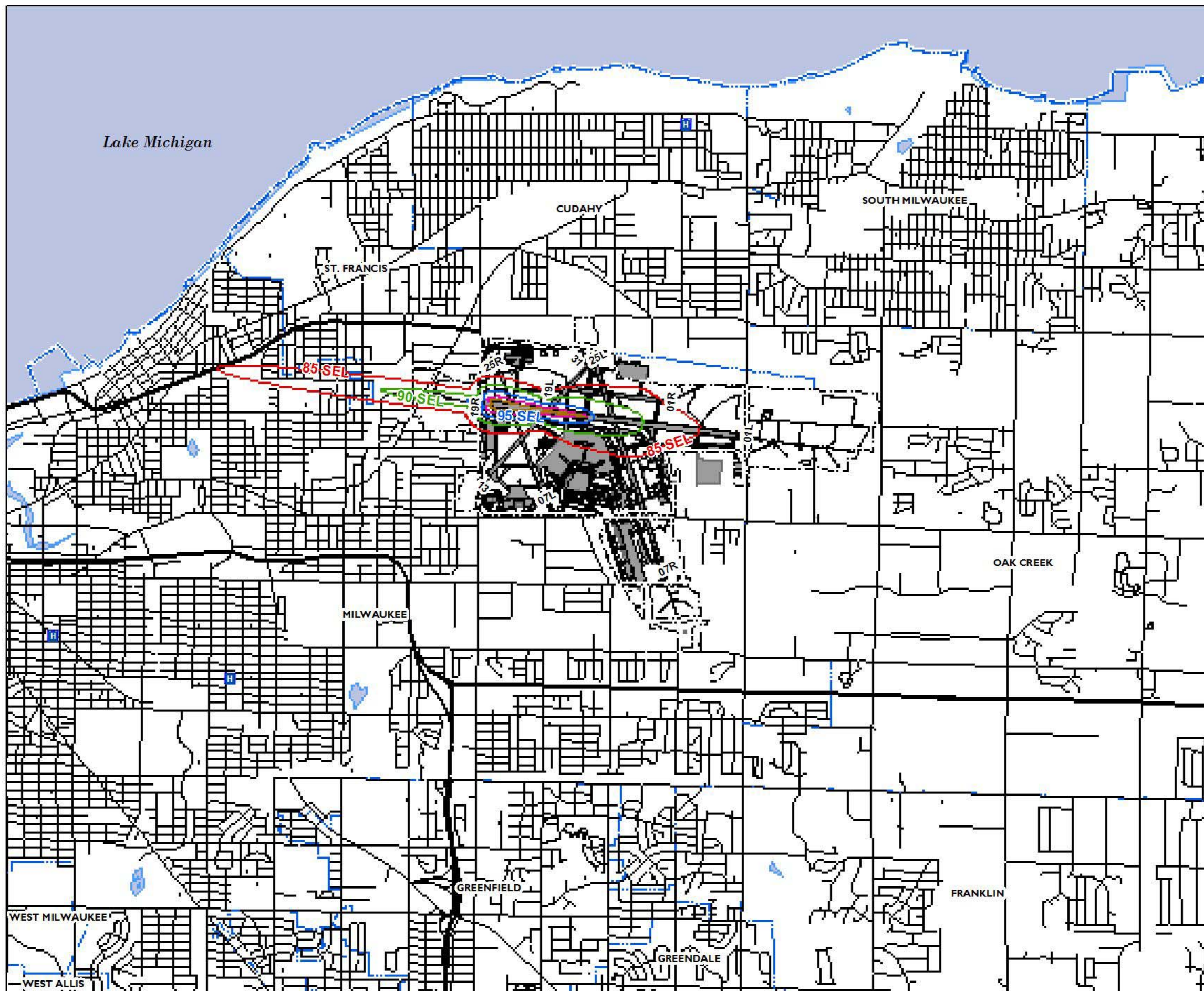
Figure D26
Example Single Event Noise Contour
 B 717-200 South Flow



Legend

- CONTOUR 105
- CONTOUR 100
- CONTOUR 95
- CONTOUR 90
- CONTOUR 85

Figure D27
Example Single Event Noise Contour
 EMB-145 South Flow



Legend

- CONTOUR 105
- CONTOUR 100
- CONTOUR 95
- CONTOUR 90
- CONTOUR 85

Future Baseline Noise Modeling Inputs

2009 Aircraft Operations

The future noise environment for General Mitchell International Airport was analyzed based upon 2009 operational conditions. The aircraft operational levels come directly from the aviation forecast presented in the Forecasts Chapter of the Part 150 Study. The forecast data shows that for the Year 2009, a total of 234,466 operations are anticipated to occur at the Airport. This equates to an average of 642 operations per day (an operation is either one takeoff or one landing).

Aircraft Fleet Mix Categories. The breakdown by aircraft type or fleet mix, categories of aircraft operations are presented in this section. The categories of aircraft are defined relative to type of user, (i.e., passenger or cargo) and type of aircraft (i.e., jet or propeller). The breakdown by these categories was determined from the aviation forecast. Table D12 presents operations for the different categories of aircraft.

Table D12

OPERATIONS BY AIRCRAFT CATEGORY FOR FUTURE 2009 BASE CONDITIONS

General Mitchell International Airport FAR Part 150 Noise Compatibility Study

Category	Annual Operations
<i>Passenger Air Carrier and Air Cargo</i>	
Wide Body Jets	1,179
Narrow Body Jets	49,803
Regional Jets	77,544
Commuter Prop	54,260
<i>General Aviation and Small Air Taxi</i>	
Corporate Jets	13,575
Single & Multi-Engine Prop	33,596
<i>Military</i>	
Tankers	1,690
Transports	2,819
Total Operations	234,466

Detailed Aircraft Fleet Mix. The mix of aircraft that operate at the Airport is one of the most important factors in terms of the airport noise environment. Fleet mix data were determined from all of the data described previously. The fleet mix assumptions are presented in Table D13. This table presents the average daily operations for each type of aircraft used in the Integrated Noise Model (INM) as well as a description of these aircraft.

The INM aircraft type assigned to each of the aircraft operating at General Mitchell International Airport was based upon aircraft in the INM database that most closely matched the aircraft each airline operated at the Airport. Some aircraft with smaller numbers of operations were grouped into the aircraft type that most closely represented those aircraft. Note that these are the same INM types shown more than once in the table. This is to identify the separate categories of operations. The percentage of operations for each of the aircraft types is also presented. The MD80 series aircraft are the dominant noise aircraft operating at General Mitchell International Airport during the future year study period.

Additional Operational Assumptions

Assumptions such as runway use, time of day, flight tracks and flight track usage and departure procedures remain the same as with the existing conditions.

Table D13

DETAILED BREAKDOWN OF PROJECTED AIRCRAFT OPERATIONS- 2009

General Mitchell International Airport FAR Part 150 Noise Compatibility Study

Period: January 1, 2009 to December 31, 2009 (TAF)



Aircraft Category	INM Type	Daily Arrivals		Daily Departures		Daily Operations	Annual Operations
		Day	Night	Day	Night		
Air Carrier Wide Body	74720B	0.01	0.01	0.01	0.01	0.05	19
Air Carrier Wide Body	A310	0.41	0.26	0.23	0.44	1.35	492
Air Carrier Wide Body	DC1030	0.30	0.01	0.31		0.62	227
Air Carrier Wide Body	A30062	0.39	0.21	0.34	0.26	1.21	440
Air Carrier Narrow Body	727EM1	0.24	0.18	0.07	0.35	0.83	304
Air Carrier Narrow Body	727EM2	1.88	1.00	1.55	1.34	5.77	2,106
Air Carrier Narrow Body	7373B2	4.05	0.07	3.90	0.21	8.23	3,006
Air Carrier Narrow Body	737400	0.39	0.01	0.40	0.01	0.80	293
Air Carrier Narrow Body	757PW	2.26	0.69	2.72	0.23	5.89	2,149
Air Carrier Narrow Body	757RR	0.24	0.05	0.12	0.17	0.58	213
Air Carrier Narrow Body	A320	2.90	0.43	2.67	0.65	6.65	2,427
Air Carrier Narrow Body	DC870	0.06	0.58	0.24	0.40	1.28	469
Air Carrier Narrow Body	F10065	0.15		0.15		0.30	109
Air Carrier Narrow Body	MD83	11.57	0.80	11.29	1.07	24.73	9,026
Air Carrier Narrow Body	737N17	0.05	0.01	0.05	0.01	0.10	38
Air Carrier Narrow Body	DC95HW	3.68	0.25	3.52	0.41	7.87	2,872
Air Carrier Narrow Body	A319	3.57	0.11	3.52	0.16	7.35	2,683
Air Carrier Narrow Body	717200	27.86	1.92	26.68	3.11	59.57	21,743
Air Carrier Narrow Body	737800	3.15	0.09	3.11	0.14	6.48	2,367
Regional Jets	BAE146	4.30	0.32	4.59	0.03	9.23	3,370
Regional Jets	BAE300	4.48	0.21	4.67	0.02	9.39	3,426
Regional Jets	EMB145	34.77	1.04	31.66	4.14	71.61	26,139
Regional Jets	EMB14L	18.38	2.39	17.35	3.42	41.54	15,162
Regional Jets	J328	36.07	4.27	36.64	3.70	80.68	29,448
Commuter Prop	DHC6	1.40	1.11	1.27	1.24	5.03	1,837
Commuter Prop	DHC8	2.09	0.19	0.75	1.53	4.56	1,666
Commuter Prop	SF340	8.33	1.18	8.21	1.30	19.02	6,941
Commuter Prop	EMB120	0.04	0.92	0.29	0.66	1.91	698
Commuter Prop	BEC190	53.51	5.56	54.00	5.06	118.13	43,117
General Aviation Jet	CIT3	2.14	0.17	2.02	0.29	4.61	1,684
General Aviation Jet	CL600	1.31	0.04	1.06	0.29	2.70	986
General Aviation Jet	FAL20	0.24	0.02	0.25	0.01	0.51	187
General Aviation Jet	GIIB	0.21	0.01	0.21	0.01	0.43	158
General Aviation Jet	GIV	1.19	0.12	1.16	0.15	2.62	957
General Aviation Jet	IA1125	0.31	0.02	0.32	0.01	0.65	237
General Aviation Jet	LEAR25	0.07		0.07	0.00	0.15	54
General Aviation Jet	LEAR35	2.07	0.18	2.02	0.23	4.49	1,641
General Aviation Jet	SABR80	3.37	0.25	3.25	0.37	7.24	2,641
General Aviation Jet	CNA55B	5.53	0.31	5.18	0.65	11.67	4,260
General Aviation Jet	CNA750	0.99	0.07	0.98	0.08	2.11	770
General Aviation Prop	BEC58P	5.80	3.48	3.79	5.49	18.56	6,774
General Aviation Prop	CNA441	2.83	2.36	2.90	2.29	10.39	3,793
General Aviation Prop	GASEPF	2.41	0.32	2.35	0.38	5.46	1,992
General Aviation Prop	GASEPV	5.19	0.25	4.53	0.91	10.87	3,969
Air Taxi	BEC9F	8.16	0.61	8.16	0.61	17.53	6,399
Air Taxi	CNA208	14.19	0.43	14.19	0.43	29.23	10,669
Military	KC135R	2.16	0.16	2.16	0.16	4.63	1,690
Military	C130	3.75	0.11	3.75	0.11	7.72	2,819
Total		288.42	32.77	278.65	42.53	642.37	234,466

Future 2009 Baseline Noise Conditions

Future noise contours were developed using a variety of different noise metrics described in the background section of the report including both cumulative noise levels (i.e., averaged over a period of time) and single-event noise levels (noise levels generated by one operation).

As required by the FAA, the primary noise criterion to describe the existing noise environment is the cumulative measure commonly referred to as DNL. Additional cumulative noise levels include the Time Above (TA) noise level and Number of events Above (NA). TA sums the number of minutes throughout the day that the noise levels exceed a threshold, such as 65 dBA. NA reflects the number of times per day that a certain noise level is exceeded, again such as 65 dBA. The single-event analysis was quantified in terms of SEL. The TA, NA and SEL data were used to supplement the DNL analysis.

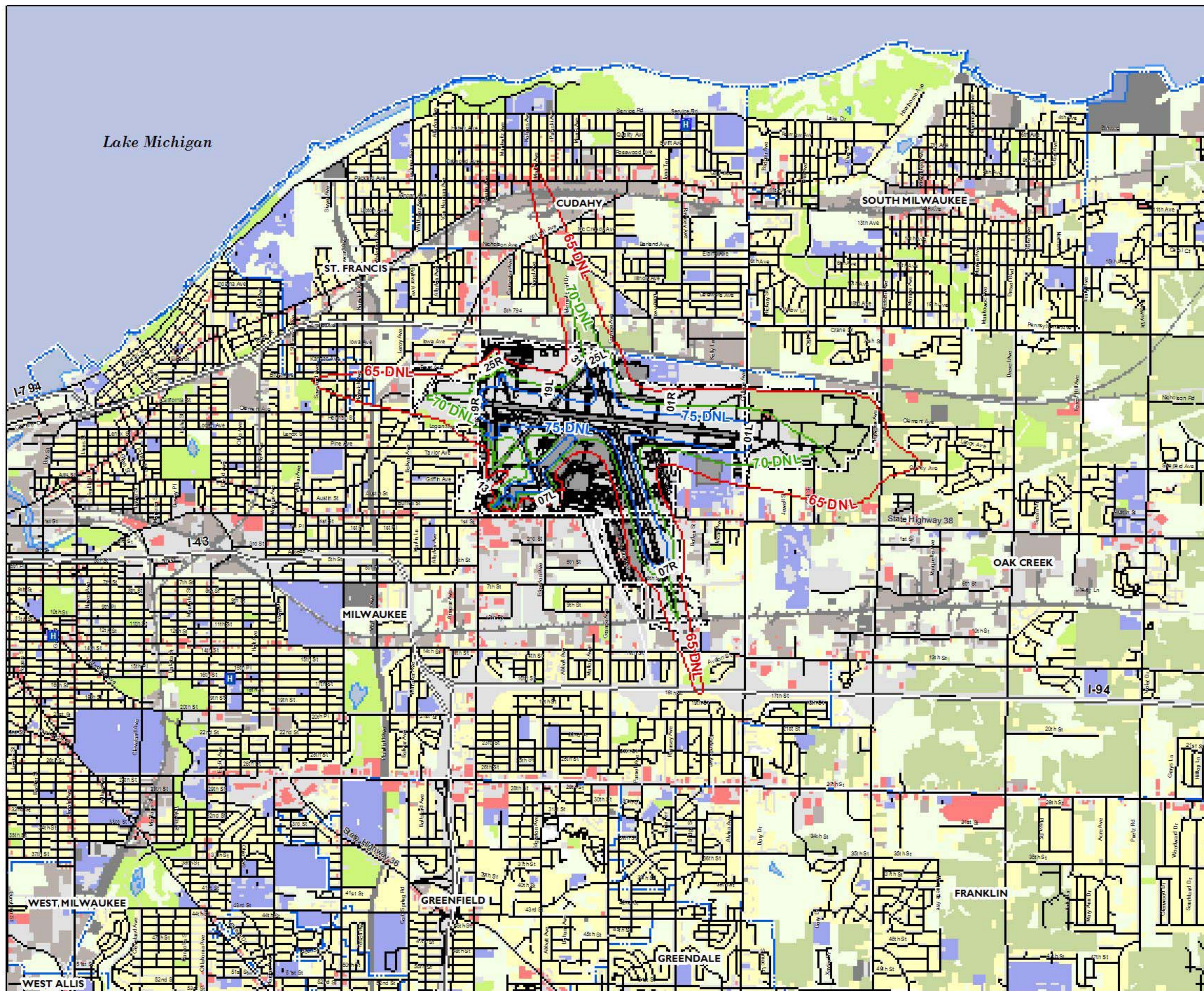
DNL Noise Contours. The future annual base period 2009 DNL noise exposure contours for General Mitchell International Airport are presented in Figure D28. This figure presents the 65, 70 and 75 DNL noise contours.

Time Above Noise Contours. The future 2009 annual base period Time Above noise contours are presented in Figure D29. In this figure, the lines of the contours reflect the number of minutes throughout the day that the noise level exceeded 65 dBA. This includes contours showing 5, 15, 30, 60 and 90 minutes per day that the noise levels exceed 65 dBA. The results show similar shape as the DNL noise contours. The time above noise contours are useful in illustrating the amount of time that communication interference can occur.

Noise Events Above Contours. The NA65 is the number of times per day that aircraft noise exceeds 65 dBA. Figure D30 presents the NA65 contours for the 2009 conditions. The figure shows the average daily number of times that the noise level exceeds 65 dBA. Contours are presented in terms of 10, 50, 100, 150 times per day.

Single-Event Noise Contours. Single-event noise exposure contours for sample aircraft were developed and presented in the Existing Noise Environment section. The same aircraft that exist today are assumed to be in operation in 2009, so the single-event analysis remains the same as with existing conditions.

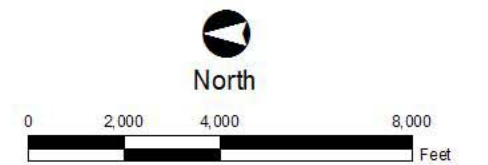
Figure D28
Future 2009 Base Case-DNL Noise Contour
 Generalized Existing Land Use

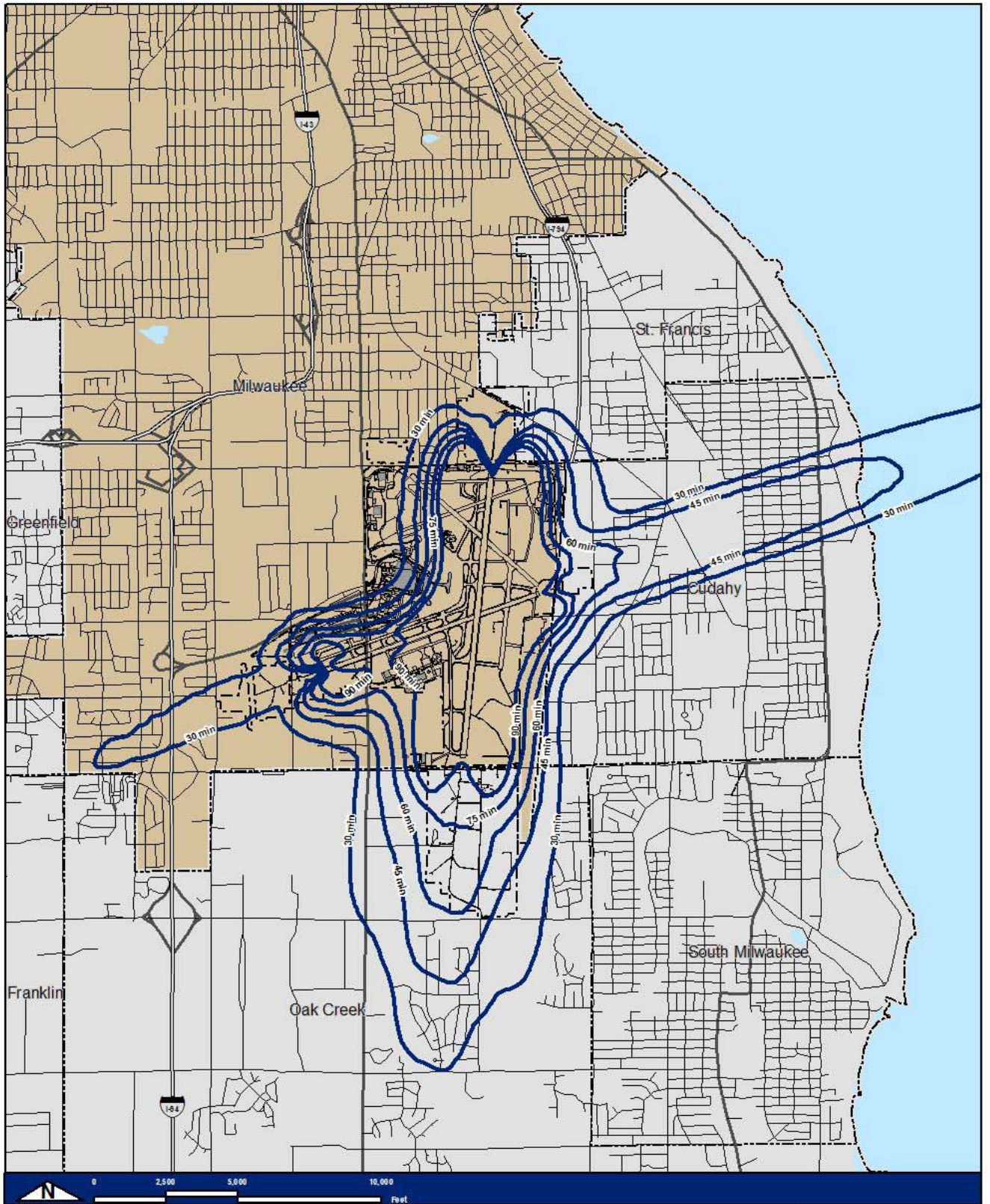


Legend

- 65 DNL Contour
- 70 DNL Contour
- 75 DNL Contour
- RESIDENTIAL
- COMMERCIAL
- GOVERNMENT/INSTITUTIONAL
- INDUSTRIAL
- AGRICULTURAL
- RECREATIONAL
- OPEN LANDS
- COMMUNICATION/UTILITIES
- TRANSPORTATION
- COMMUNITY FACILITY
- CORPORATE BOUNDARY
- AIRPORT BOUNDARY
- hospitals
- schools
- churches

Source: Milwaukee County, 2003





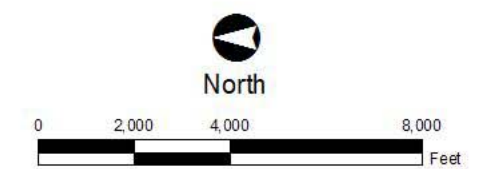
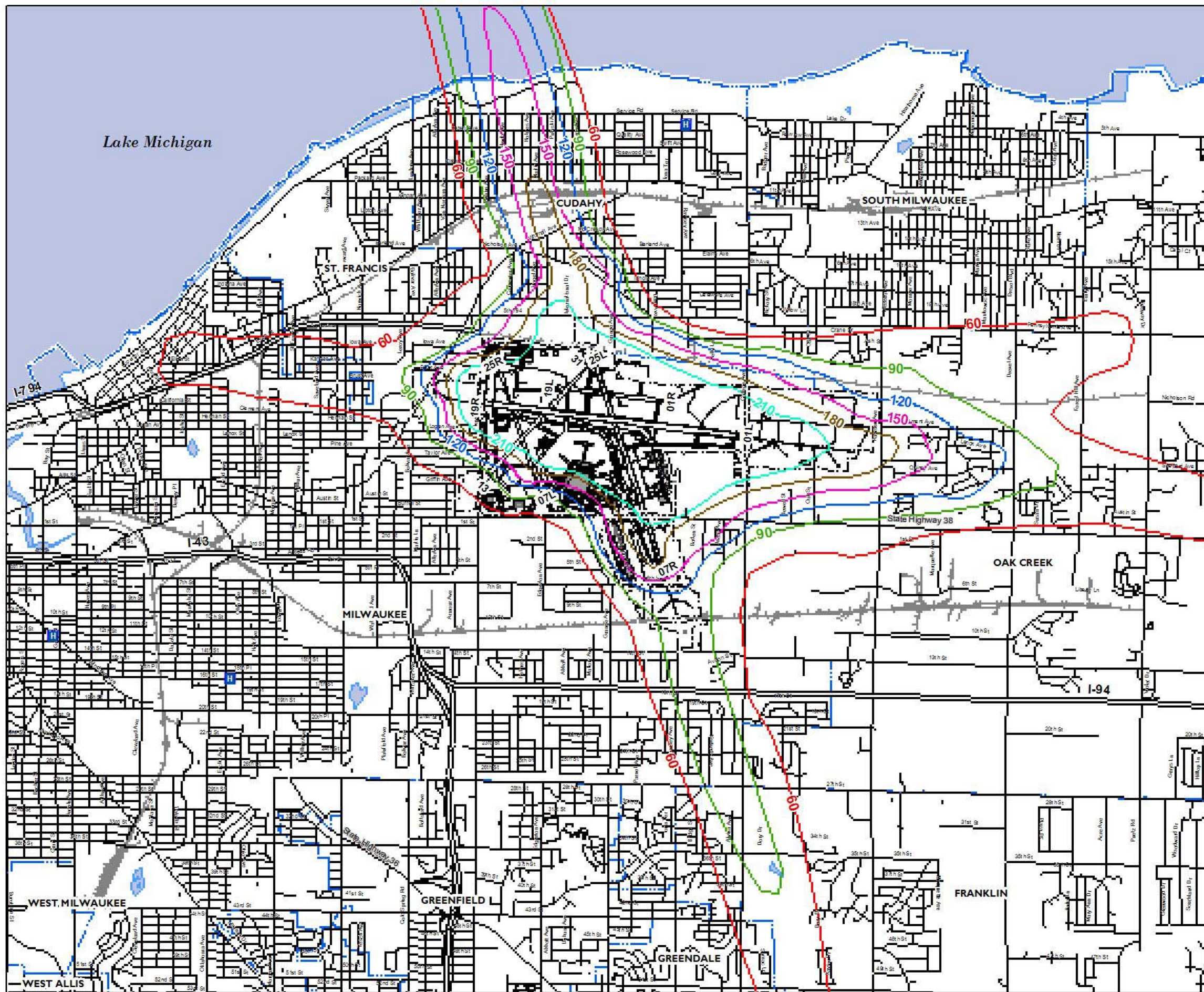
CONTOUR LEGEND
 ~ 2009 Time Above 65 DNL Contour

MILWAUKEE COUNTY'S



Figure D29 Base Case 2009 - Daily Average Time Above 65 dBA Contour

Figure D30
 Base Case 2009 - Daily Average
 Number of Events Above 65 DNL



Legend

- ~ 60
- ~ 90
- ~ 120
- ~ 150
- ~ 180
- ~ 210

