
5.1 NOISE

This section provides a description of projected noise exposure in the Airport environs for the alternatives under consideration, including the Build Alternatives (C, D and G) and the No Action Alternative (Alternative A).

In addition, this section presents supplemental analyses for the No Action Alternative and Alternative C,¹ including: (1) an assessment of aircraft ground noise, vehicle traffic noise, and rail traffic noise with and without the proposed projects; (2) the cumulative effects of project related activity; (3) an assessment of noise generated on high altitude aircraft routes (e.g., routes above 3,000 feet above ground level) associated with potential Build Alternatives at O'Hare and other regional airports that may be impacted; (4) supplemental noise metrics; and (5) a discussion of potential sleep disturbance. This section concludes with a summary of potential measures for mitigating possible noise impacts.

Appendix F, Noise, contains a description of aircraft noise characteristics and the methodology, assumptions, and metrics used to estimate aircraft noise exposure. Additional information regarding potential noise impacts on environmental justice populations is included in **Section 5.21, Environmental Justice**.

5.1.1 Background and Methodology

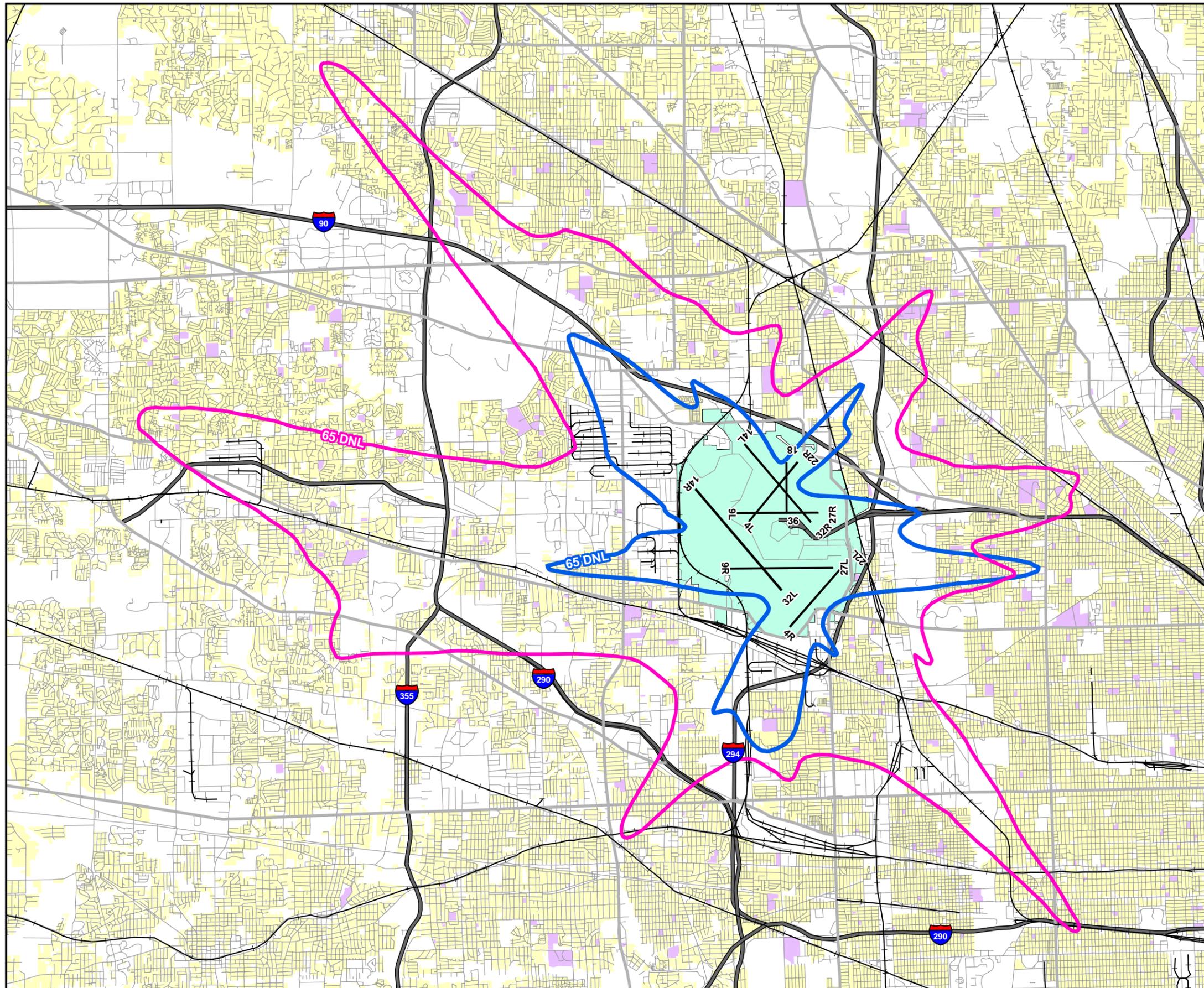
The following sections discuss the regulations, thresholds of significance, and methodologies used to assess noise impacts. A detailed discussion of the measurement of noise and acoustic principles is provided in **Appendix F**.

5.1.1.1 Baseline to Baseline Noise Comparison

For comparison purposes, the FAA presents information from its O'Hare 1984 Final EIS regarding an earlier airport improvement project. The 1984 Final EIS identified 94,720 noise-affected homes in its 1982 Baseline 65 DNL contour. In contrast, the estimated number of homes exposed to the 2002 Baseline 65 DNL is approximately 8, 108 homes. What is more, even with an increase in operations at O'Hare from 591,807 in 1982 to 922,787 in 2002, the housing units within the 65 DNL contour during that same period diminished by over 90 percent. See **Exhibit 5.1-1** for a representation of the 2002 Baseline contour compared to the 1982 Baseline contour. Thus, even though this EIS projects, at most, a slight increase in affected residences (within the 65 DNL Build Alternative contours) when compared to the 2002 Baseline contour, this small overall increment should be viewed in the historic context of meaningful noise reduction in the communities surrounding O'Hare.

¹ Supplemental noise metric analysis was completed for only Alternative C because it would affect more homes than Alternative D or G.

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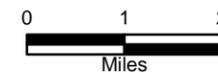


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-  1982 65 DNL*
-  2002 65 DNL
-  Rail Roads
-  Freeways
-  Secondary Roads
-  Local Streets
-  Existing Airport Property
-  Compatible Land Use
-  Residential
-  Public, Hospitals, Institutional

*Note: Contour from 1984 E.I.S.



**Noise Contours,
2002 Baseline 65 DNL
Compared to 1982 65 DNL**

► Exhibit 5.1-1

5.1.1.2 Regulatory Context

The analysis of aviation noise impacts falls under the responsibility of the FAA. A list of Federal statutes, FAA regulations, and FAA guidance related to the consideration of noise impacts follows:

- 49 U.S.C. 47501-47507, The Aviation Safety and Noise Abatement Act of 1979, as amended
- 49 U.S.C. 40101 et seq., The Federal Aviation Act of 1958, as amended
- 49 U.S.C. 44715, The Control and Abatement of Aircraft Noise and Sonic Boom Act of 1968, as amended
- 49 U.S.C. 47101 et seq., The Airport and Airway Improvement Act, as amended
- 49 U.S.C. 47521-47533, The Airport Noise and Capacity Act of 1990
- 49 U.S.C. 44715, The Noise Control Act of 1972
- 14 CFR Part 150, Airport Noise Compatibility Planning
- 14 CFR part 161, Notice and Approval of Airport Noise and Access Restrictions
- FAA Order 5050.4A, Airport Environmental Handbook
- FAA Order 1050.1E, Environmental Impacts: Policies and Procedures

The metric used in environmental analysis is DNL—the day-night average sound level—a cumulative sound level that provides a measure of the total sound energy during a specified time period. DNL logarithmically averages the sound levels at a location over a 24-hour period, with a 10-decibel (dB) weighting penalty added to all sounds occurring during nighttime hours (between 10:00 PM and 6:59:59 AM).² The 10 dB penalty represents the added intrusiveness of noise that occurs during sleeping hours and because ambient sound levels during nighttime hours are typically about 10 dB lower than during daytime hours.

Estimates of noise effects resulting from aircraft operations can be interpreted in terms of the probable effect on human activities characteristic of specific land uses. Suggested guidelines for evaluating land use compatibility with noise exposure developed by the Federal government and adopted by the FAA are presented in **Section 5.2, Compatible Land Use**. Compatible or incompatible land use is determined by comparing the predicted DNL at a specific site with the compatibility guidelines provided in **Table 5.2-1**. Land uses are generally considered compatible with noise levels less than DNL 65, but only certain uses are compatible with noise levels at or above DNL 65. These guidelines reflect the average response of large groups of people to noise, and therefore, might not reflect an individual's perception of an actual noise environment.

² A 10 dB change in sound level is perceived by the average person as a doubling, or halving, of the sound's loudness.

5.1.1.3 Thresholds of Significance

Day Night Noise Level (DNL) is a cumulative measure of total sound energy generally compiled on an annual basis. The DNL represents a logarithmic average of the sound levels at a location over a 24 hour period, with a 10 decibel (dB) weighting penalty added to all sounds occurring during nighttime hours (between 10:00 PM and 6:59:59 AM). The 10 dB penalty represents the added intrusiveness of noise at nighttime because ambient sound levels during nighttime hours are typically about 10 dB lower than during daytime hours, and because of the annoyance associated with sleep disruption.

The threshold of significance for aircraft noise is incorporated into FAA Order 1050.1E, Appendix A, Paragraph 14.3, which reads as follows:

If the above comparisons show a DNL 1.5 dB or greater increase over a noise sensitive area exposed to DNL 65 dB or greater as a result of the proposed project or any of its reasonable alternatives (except no action), a level of significant noise impact has been reached.

This level of significance was subsequently re-examined and confirmed by the Federal Interagency Committee on Noise (FICON) in 1992. In accordance with this Federal policy, FAA Order 1050.1E states the following:

A significant noise impact would occur if analysis shows that the proposed action will cause noise sensitive areas to experience an increase in noise of DNL 1.5 dB or more at or above DNL 65 dB noise exposure when compared to the no action alternative for the same timeframe. For example, an increase from 63.5 dB to 65 dB is considered a significant impact. Special consideration needs to be given to the evaluation of the significance of noise impacts on noise sensitive areas within national parks, national wildlife refuges and historic sites, including traditional cultural properties. For example, the DNL 65 dB threshold does not adequately address the effects of noise on visitors to areas within a national park or national wildlife refuge where other noise is very low and a quiet setting is a generally recognized purpose and attribute.

Aircraft noise exposure is customarily evaluated relative to the probable effect on human activities characteristic of specific land uses. Federal guidelines (14 CFR Part 150 Table A) and thresholds for evaluating such effects on land use are outlined in **Section 5.2, Compatible Land Use**. Land uses are generally considered to be compatible with noise less than DNL 65, but only certain uses are compatible at levels at or above DNL 65. As discussed above, changes in DNL of 1.5 dB or more in noise sensitive areas at or above DNL 65 are considered to be significant.

In addition to the threshold of significance discussed above, the 1992 FICON recommended that examination of noise levels between DNL 65 and 60 dB be conducted if analysis shows that noise sensitive areas at or above DNL 65 dB would have an increase of DNL 1.5 dB or more. This analysis should identify noise-sensitive areas between DNL 60-65 dB having an increase of DNL 3 dB or more due to the proposed action. The FICON recommendations also state that the potential for mitigating noise in those areas should be considered, including consideration of the same range of mitigation options available at DNL 65 dB and higher and eligibility for federal funding. As noted in FAA Order 1050.1E, the consideration of mitigation for noise impacts between DNL 60 and 65 "...is not to be interpreted as a commitment to fund or otherwise implement mitigation measures in any particular area."

5.1.1.4 Methodologies

Aircraft Flight Operations

Except where noted, the FAA's commercially available Integrated Noise Model (INM), Version 6.1, was used to generate aircraft noise exposure contours and evaluate effects. The INM is the computer program used to determine the total effect of aircraft noise in an airport's environs. The INM produces noise contours, which are computer-generated lines connecting points of equal noise levels resulting from aircraft operations. A grid point analysis was also conducted for each alternative using INM. Grid points show the change in noise levels over specific locations, and are helpful in determining where significant noise changes may occur. For this analysis, two sets of grid points were established. An inner set of points was defined to generally capture areas that would be exposed to DNL 60 or greater for one or more Alternatives, and an outer set of points was defined to generally capture areas that would be exposed to levels in the range of 45 DNL to 60 DNL for one or more Alternatives. The inner set of points are 0.2 nautical miles (1,215 feet) per side and extend 6 nautical miles west, 4.2 nautical miles south, 6 nautical miles east, and 6 nautical miles north of the Airport Reference Point. The outer set of grid points begin at the boundary of the inner set, are 0.6 nautical miles (3,645 feet) per side, and extend 15 nautical miles west, 12 nautical miles south, 15 nautical miles east and 12 nautical miles to the north of the Airport Reference Point. A Geographic Information System (GIS) was used to quantify areas exposed to each noise exposure interval. The grid point analysis above also presents population points of 3 dB within DNL 60 to 65 dB, and 5 dB within DNL 45 to 60 dB, which are related to proposed airspace changes at O'Hare associated with a Build Alternative.

In addition, the effects of proposed airspace changes at O'Hare on noise levels in the vicinity of other airports are also presented in **Appendix F, Attachment F-7**.

A detailed Noise Modeling Protocol was prepared pursuant to the environmental requirements of FAA Orders 5050.4A, *Airport Environmental Handbook*, and 1050.1E, *Environmental Impacts: Policies and Procedures* and all noise assessments were conducted accordingly. This Noise Modeling Protocol is included in **Appendix F, Noise**.

Aircraft Ground Operations

For aircraft ground operations, the SoundPLAN computer model was used to estimate sound propagation characteristics between potential noise sources and prediction sites. SoundPLAN estimates sound levels at a distance from a specific noise source, or sources, taking into account the individual characteristics of each noise source, terrain features, ground effects due to areas of pavement and unpaved ground, shielding and reflections due to intervening buildings, and atmospheric effects. Because of these features, the SoundPLAN model is more appropriate for evaluation of aircraft ground operations than the INM, which is intended primarily for the evaluation of aircraft flight operations. SoundPLAN is a commercially available product.

Highway Vehicle and Railroad Operations

Highway vehicle noise analyses were performed in accordance with Federal Highway Administration (FHWA) Federal Aid Policy Guide, Subchapter H, Part 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise*, and the Illinois Department of Transportation (IDOT) guidelines contained in BDE Procedure Memorandum Number 18-00, dated April 3, 2000. Traffic noise predictions were prepared using FHWA's commercially available Traffic Noise Model (TNM) software. The TNM creates 3-dimensional computer models of specific sites considering such features as topography, roadway geometry, traffic volumes and speeds, ground surfaces, and existing walls and buildings. The software predicts traffic noise levels at receptor locations specified by the user.

Railroad vehicle noise analyses were performed in accordance with the procedures set forth in the U.S. DOT Federal Transit Authority (FTA) manual, *Transit Noise and Vibration Impact Assessment*. The manual was developed for analyzing noise from transit rail, but the methods are also used to assess freight rail noise.

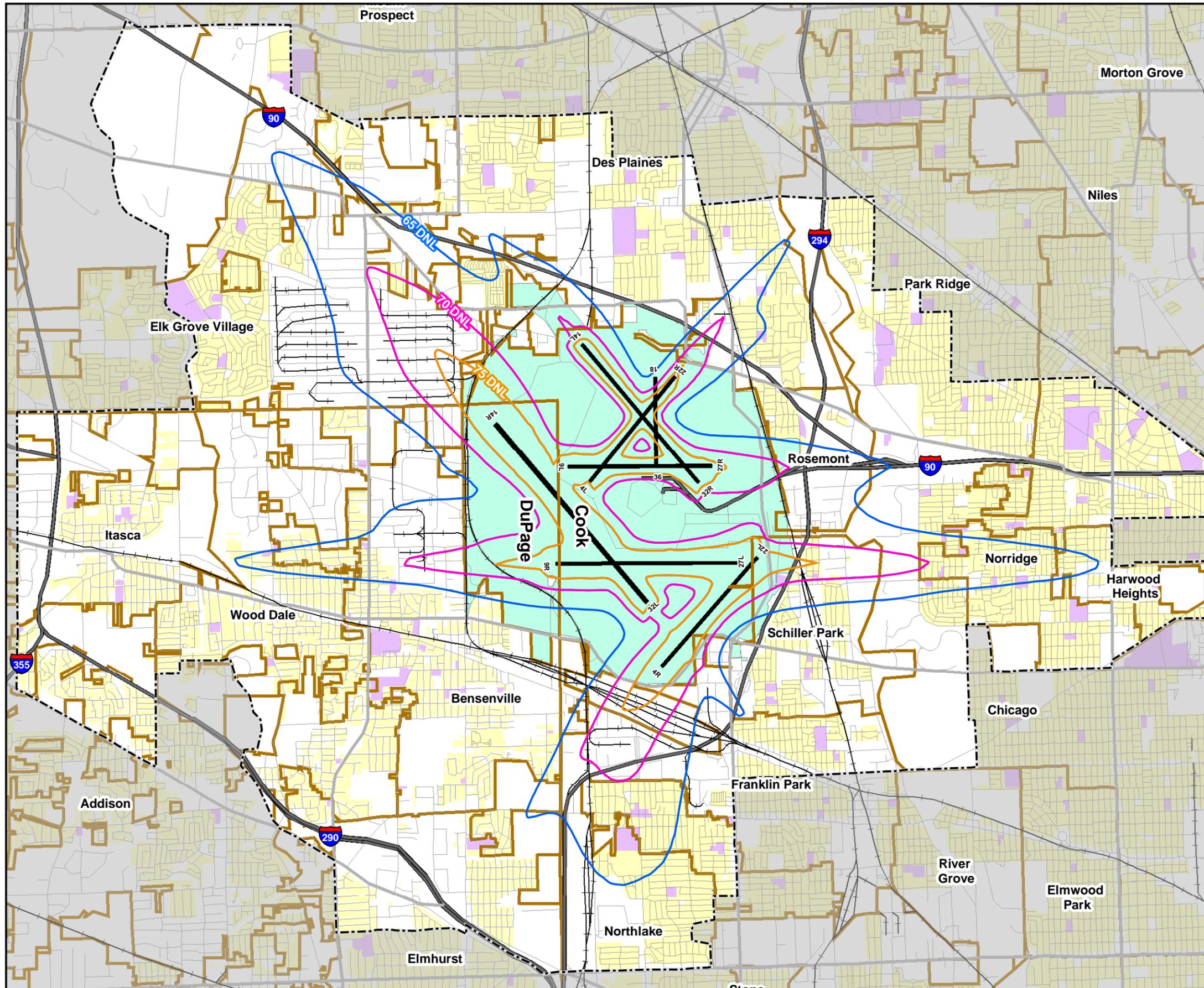
5.1.2 Baseline Aircraft Noise Exposure

Noise exposure contours for 2002 Baseline conditions are presented on **Exhibit 5.1-2**. Estimates of the total area exposed to aircraft noise at or above DNL 65 for 2002 Baseline conditions are provided in **Table 5.1-1**. As presented, the total area exposed to DNL 65 and greater is estimated to be 13,538 acres. This land area includes 1,287 acres of single-family residential use; 109 acres of multifamily use; and 609 acres of public parks.

**TABLE 5.1-1
NOISE EXPOSURE - 2002 BASELINE CONDITIONS**

Land Use (Acres)	Contours			Total
	65-70	70-75	75+	
Single-Family	1,216	68	3	1,287
Multifamily	104	5	0	109
Mobile-Homes	85	0	0	85
Commercial	318	25	0	343
Industrial	3,551	1,130	113	4,794
Public Parks	478	118	13	609
Institutional	130	13	1	144
Undeveloped	147	21	20	188
Airport	2,334	1,634	1,961	5,929
Water	43	6	1	50
Total	8,406	3,020	2,112	13,538
Noise Sensitive Facilities (count)				
Public Parks	24	0	0	24
Historic Properties	3	1	0	4
Places of Worship	8	0	0	8
Nursing Homes	0	0	0	0
Hospitals	0	0	0	0
Libraries	0	0	0	0
Universities	0	1	0	1
Schools	6	1	0	7
<i>Sound Insulated Schools (included above)</i>	5	1	0	6
Total	40	3	0	43
Population and Housing (count)				
Population	18,841	1,072	94	20,007
Housing Units	8,108	372	29	8,509
<i>Single-Family Housing Units (included above)</i>	5,157	232	13	5,402
<i>Multi-Family Housing Units (included above)</i>	2,951	140	16	3,107
<i>Sound Insulated Housing Units (included above)</i>	2,525	259	24	2,808
Sources: Housing and Population database: City of Chicago 2002 Contour: Landrum & Brown, Inc. [CCT]. Land Use, Noise Sensitive Facilities, Population and Housing data: TPC Analysis, July 2005.				

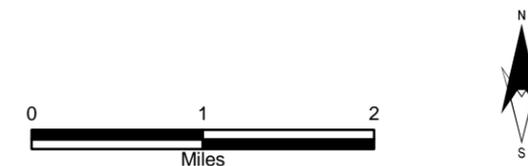
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- Rail Roads
- Freeways
- Secondary Roads
- Local Streets
- 65 DNL
- 70 DNL
- 75 DNL
- Project Area
- Municipal Boundary
- Compatible Land Use
- Residential
- Public, Hospitals, Institutional
- Existing Airport Property



Noise Contours
Baseline Conditions

► Exhibit 5.1-2

Source: StreetMapUSA, ESRI 2004. Land Use, DuPage Co. 2002, City of Park Ridge, 1996, Northeastern Illinois Planning Commission, 1992. Noise Contours: INM version 6.0c, Leigh Fisher Associates, 2004.

5.1.3 Aircraft Noise Alternatives Analysis

This section presents the FAA's projections of noise impacts associated with approval of any of the Build Alternatives. First however, this section describes noise impacts associated with aircraft operations during the proposed period of construction of improvements at O'Hare.

As previously discussed in **Section 5.0, Introduction**, and in more detail in **Section 5.20, Construction Impacts**, in an effort to bound the potential timeframe under which construction could commence or be completed, two additional construction schedule scenarios were considered in addition to the "original" schedule: the Compressed Schedule and the Delayed Schedule. This section also presents the results of analyses of these two additional construction scenarios.

Representative years beyond those considered in the Original Schedule as outlined below, and the results of further analyses of these additional construction scenarios, are also presented in this section.

Aircraft noise exposure contours were developed in accordance with the methodology previously described for each alternative in the following development phases:

- Construction Phase I, the first year of operation for the first phase of development of the Build Alternatives (C, D and G).
- Construction Phase II, the first year of operation for the second phase of development of the Build Alternatives (C, D and G).
- Build Out, the first year of operation for the full build out of development the Build Alternatives (C, D and G).
- Build Out + 5, the long-term conditions following the estimated completion of the final phase of development of the Build Alternatives (C, D and G).

The year 2013 is assumed to be the first year of full operation for all alternatives C, D and G. Current construction activity estimates indicate:

- Construction of the far north Runway 9L-27R would be completed in 2007 and that the first full year of operation would be 2007. Accordingly, the year 2007 represents the first year of operation of Phase I of Alternatives C, D and G.
- Construction of the closely spaced south parallel Runway 10C/28C would be completed in 2009. Accordingly, the year 2009 represents the first year of operation of Phase II of Alternatives C, D and G.
- Construction of the closely-spaced north parallel Runway 9C/27C and far south Runway 10R/28L in the case of Alternative C; the closely-spaced north parallel Runway 9C/27C in the case of Alternative D; and of the closely spaced north parallel Runway 9C/27C and Runway 12/30 in the case of Alternative G would be completed in 2013. Accordingly, 2013 represents the Build Out of Alternatives C, D and G.

- The long-term extent (Build Out + 5) following the estimated completion of all Build Alternatives, C, D and G is expected to take place in 2018.

A summary of the total area exposed to aircraft noise at or above DNL 65 for all alternatives in each development phase is provided in **Table 5.1-2**.

**TABLE 5.1-2
SUMMARY NOISE EXPOSURE ESTIMATES - DNL 65 AND GREATER**

Alternative	Area (acres)	Difference from Alternative A (No Action Alternative)
Construction Phase I		
A	14,908	N/A
C	15,086	178
D	15,086	178
G	15,086	178
Construction Phase II		
A	15,052	N/A
C	13,637	(1,415)
D	13,637	(1,415)
G	13,637	(1,415)
Build Out		
A	12,427	N/A
C	11,263	(1,164)
D	11,187	(1,240)
G	11,216	(1,211)
Build Out + 5		
A	12,897	N/A
C	12,609	(288)
D	12,525	(372)
G	12,623	(274)

Note: Numbers within () denote a decrease.
Source: TPC analysis, December 2004.

As presented, the total area exposed to aircraft noise DNL 65 and greater for each Build Alternative is less than the area exposed under Alternative A (No Action Alternative) in each phase except Construction Phase I. Approximately 178 additional acres would be exposed to aircraft noise DNL 65 and greater under Alternatives C, D and G in Construction Phase I as compared to Alternative A (No Action Alternative).

The following sections present the noise exposure contours and estimates of the total area exposed to aircraft noise DNL 65 and greater for each Build Alternative in each development phase. **Section 5.2, Compatible Land Use**, discusses the potential impacts to population, housing, and other noise sensitive facilities within the DNL 65 contour areas.

Finally, in response to USEPA and public comments on the Draft EIS, **Attachment F-2 in Appendix F, Noise**, provides supplemental information on the projected flight tracks that were used in preparing the noise exposure contours to further assist the reader in comparing the contours for Alternative A (No Action Alternative) to each of the Build Alternatives (Alternatives C, D and G). The exhibits in this appendix section display the projected flight

tracks aircraft would utilize when landing or taking off from the Airport for each alternative over a land use map of the airport environs.

5.1.3.1 Construction Phase I

As described in **Chapter 3, Alternatives, Section 3.4, Description of Alternatives Retained for Detailed Consideration**, in Construction Phase I Alternatives C, D and G would have the same physical and operational characteristics. The following sections present the noise exposure contours, grid points, and the total area exposed to DNL 65 and higher for Alternatives A, C, D and G in Construction Phase I. A comparison of potential noise exposure between alternatives in Construction Phase I is provided in **Table 5.1-2**.

Original Schedule

Alternative A (No Action Alternative)

Noise exposure contours for Alternative A (No Action Alternative) in Construction Phase I are presented on **Exhibit 5.1-3**. Estimates of the total area exposed to aircraft noise at or above DNL 65 for Alternative A (No Action Alternative) in Construction Phase I are provided in **Table 5.1-3**. As presented, a total of 14,908 acres would be exposed to DNL 65 and greater. These land areas would include 1,575 acres of single-family residential use; 122 acres of multifamily use; and 804 acres of public parks.

Alternatives C, D and G

Noise exposure contours and grid points for Alternatives C, D and G in Construction Phase I are presented on **Exhibits 5.1-4** and **5.1-5**, respectively. Estimates of the total area exposed to aircraft noise at or above DNL 65 for Alternatives C, D and G in Construction Phase I are provided in **Table 5.1-4**.

In Construction Phase I, Alternatives C, D and G would differ from Alternative A (No Action Alternative) in adding a new widely spaced east-west runway at the northern perimeter of O'Hare. Although all existing runways would continue in operation, this new runway would alter runway use and the resulting pattern of noise exposure.

As presented in **Table 5.1-4**, a total of 15,086 acres would be exposed to DNL 65 and greater for Alternatives C, D and G, representing a 1 percent increase over Alternative A (No Action Alternative). These land areas would include 1,770 acres of single-family residential use; 129 acres of multifamily use; and 702 acres of public parks. Compared to Alternative A, this represents an increase of 195 acres of single-family residential use; 7 acres of multifamily use; and a decrease of 102 acres of public parks. A complete comparison of Alternatives C, D and G to Alternative A is provided in **Table 5.1-4**.

Exhibit 5.1-4 depicts areas that are exposed to noise within the DNL 65, DNL 70 and DNL 75 contours for the Build Alternatives, which are the same for Construction Phase I. **Exhibit 5.1-5** depicts grid points at or above DNL 65 for the Build Alternatives that would experience a significant increase in noise of DNL 1.5 dB or more when compared to the No Action Alternative. These areas are generally located on the east and west sides of the Airport in the

cities of Chicago, Park Ridge, Rosemont, Des Plaines, Bensenville, Wood Dale, Elk Grove Village, and unincorporated areas. The area on the east side is associated with operation of the new Runway 9R/27L. The area on the west side is comprised of the increased operations on renamed Runway 10L/28R. Areas that would experience a DNL 1.5 dB decrease are located on the south, east and west sides of the Airport in the cities of Franklin Park, Schiller Park, Chicago, Rosemont, Des Plaines, Bensenville, Elk Grove Village, and unincorporated areas. The area on the north and west reflect the decrease in the use of Runway 14R/32L. The area on the south reflects a decrease in the use of Runway 4R/22L and the area on the east is reflective of a change in the usage of renamed Runway 10L/28R.

As recommended for discussion by FAA Order 1050.1E, **Exhibit 5.1-5** also depicts grid points of DNL 60 to DNL 65 for the Build Alternatives that would experience a change in noise of DNL 3.0 dB or more when compared to the No Action Alternative. These areas are located on the southwest and east sides of the Airport in the cities of Des Plaines, Park Ridge, Rosemont, Chicago, Bensenville, and unincorporated areas. The areas that would experience a DNL 3.0 dB decrease are located on the northeast, and southeast in the cities of Des Plaines, Rosemont, Chicago, Park Ridge, Schiller Park, Franklin Park, and unincorporated areas. The area on the northeast reflects decreased usage of Runway 4L/22R, the area on the southeast reflects a decrease in the use of Runway 14R/32L.

See **Exhibits 1 through 6** in **Attachment F-1, Appendix F, Noise**, for supplemental information on the grid point analysis for Alternatives C, D and G in Construction Phase I, including a depiction of points within the DNL 45 to DNL 60 range that would experience a change in noise of DNL 5.0 dB or more when compared to the No Action Alternative (Alternative A).

**TABLE 5.1-3
NOISE EXPOSURE, CONSTRUCTION PHASE I – ALTERNATIVE A
(NO ACTION ALTERNATIVE)**

Land Use (Acres)	Contours			Total
	65-70	70-75	75+	
Single-Family	1,416	159	0	1,575
Multifamily	122	0	0	122
Mobile-Homes	63	0	0	63
Commercial	435	24	0	459
Industrial	3,951	1,304	99	5,354
Public Parks	730	65	10	805
Institutional	164	25	0	189
Undeveloped	289	17	35	341
Airport	1,915	1,900	2,116	5,931
Water	63	5	1	69
Total	9,148	3,499	2,261	14,908
Noise Sensitive Facilities (count)				
Public Parks	22	0	0	22
Historic Properties	5	2	1	8
Places of Worship	8	0	0	8
Nursing Homes	1	0	0	1
Hospitals	0	0	0	0
Libraries	0	0	0	0
Universities		1	0	1
Schools	6	0	0	6
<i>Sound Insulated Schools (included above)</i>	5	0	0	5
Total	42	3	1	46
Population and Housing (count)				
Population	20,955	2,009	6	22,970
Housing Units	8,313	638	2	8,953
<i>Single-Family Housing Units (included above)</i>	5,500	488	2	5,990
<i>Multi-Family Housing Units (included above)</i>	2,813	150	0	2,963
<i>Sound Insulated Housing Units (included above)</i>	3,072	513	2	3,587
Source:	Housing and Population database: City of Chicago			
	Contours: Leigh Fisher Associates [TPC]			
	Land Use, Noise Sensitive Facilities, Population and Housing data: TPC Analysis, July 2005.			

**TABLE 5.1-4
NOISE EXPOSURE, CONSTRUCTION PHASE I – ALTERNATIVES C, D & G**

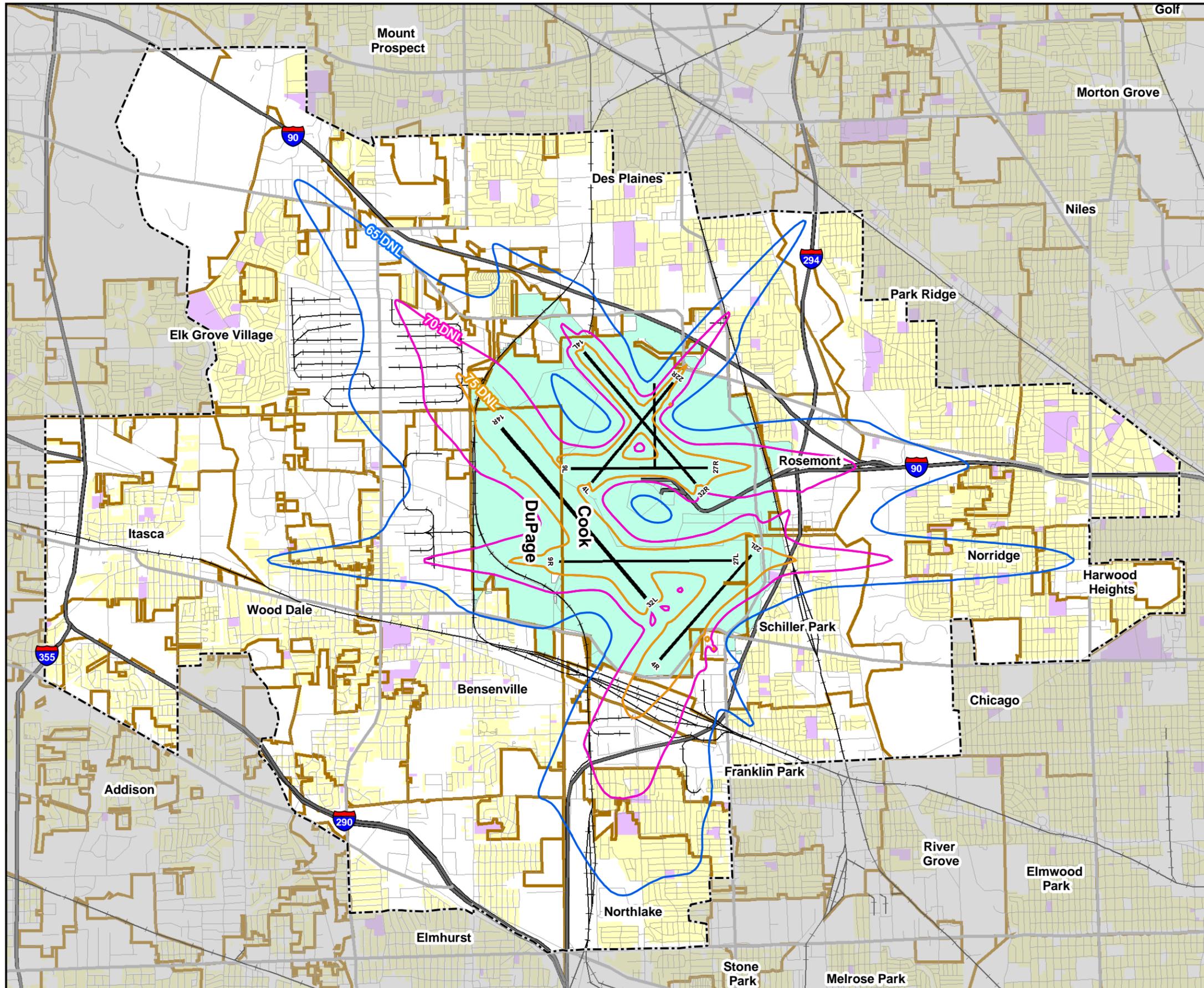
Land Use (Acres)	Contours				Difference from No Action Alternative (Table 5.1-3)			
	65-70	70-75	75+	Total	65-70	70-75	75+	Total
Single-Family	1,641	120	8	1,769	225	(39)	8	194
Multifamily	125	4	0	129	3	4	0	7
Mobile-Homes	112	0	0	112	49	0	0	49
Commercial	392	32	0	424	(43)	8	0	(35)
Industrial	3,854	1,269	59	5,182	(97)	(35)	(40)	(172)
Public Parks	573	122	7	702	(157)	57	(3)	(103)
Institutional	166	11	5	182	2	(14)	5	(7)
Undeveloped	306	75	32	413	17	58	(3)	72
Airport	1,971	1,945	2,195	6,111	56	45	79	180
Water	56	6	0	62	(7)	1	(1)	(7)
Total	9,196	3,584	2,306	15,086	48	85	45	178
Noise Sensitive Facilities (count)								
Public Parks	18	1	0	19	(4)	1	0	(3)
Historic Properties	6	0	1	7	1	(2)	0	(1)
Places of Worship	7	0	0	7	(1)	0	0	(1)
Nursing Homes	1	0	0	1	0	0	0	0
Hospitals	0	0	0	0	0	0	0	0
Libraries	1	0	0	1	1	0	0	1
Universities	1	1	0	2	1	0	0	1
Schools	7	1	0	8	1	1	0	2
Sound Insulated Schools (included above)	7	1	0	8	(2)	1	0	3
Total	41	3	1	45	(1)	0	0	(1)
Population and Housing (count)								
Population	24,810	1,555	207	26,572	3,855	(454)	201	3,602
Housing Units	10,201	539	63	10,803	1,888	(99)	61	1,850
Single-Family Housing Units (included above)	6,965	387	31	7,383	1,465	(101)	29	1,393
Multi-Family Housing Units (included above)	3,236	152	32	3,420	423	2	32	457
Sound Insulated Housing Units (included above)	3,026	388	56	3,470	(46)	(125)	54	(117)

Note: Number in () denotes a negative value when compared to the No Action Alternative (Alternative A).

Sources: Housing and Population database: City of Chicago

Contours: Leigh Fisher Associates [TPC]

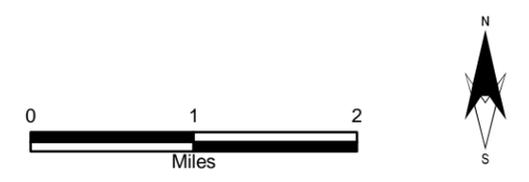
Land Use, Noise Sensitive Facilities, Population and Housing data: TPC Analysis, July 2005.



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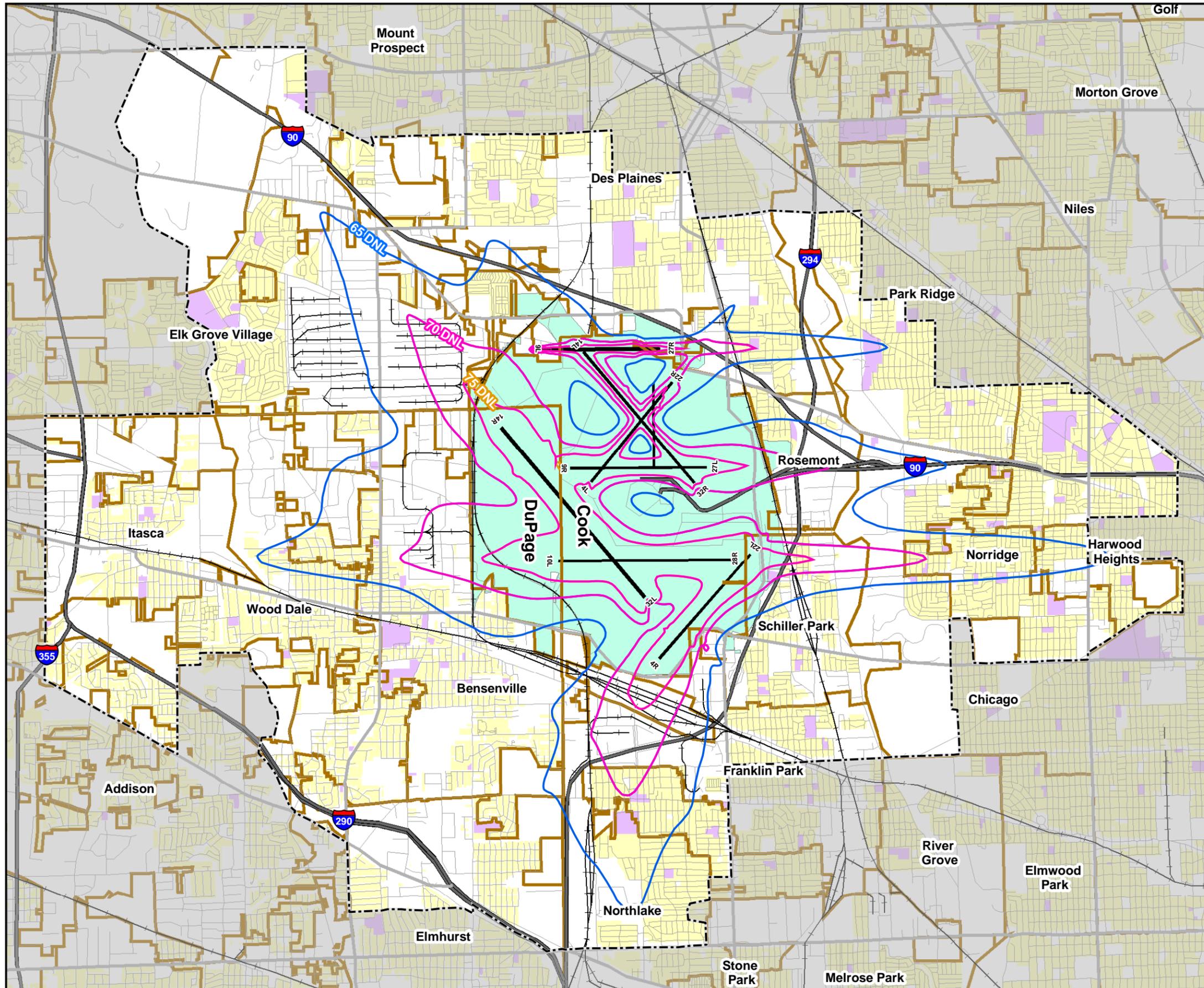
- Rail Roads
- == Freeways
- Secondary Roads
- Local Streets
- 65 DNL
- 70 DNL
- 75 DNL
- Project Area
- Municipal Boundary
- Compatible Land Use
- Residential
- Public, Hospitals, Institutional
- Existing Airport Property



Noise Contours
Construction Phase I
Alternative A (No Action)

► Exhibit 5.1-3

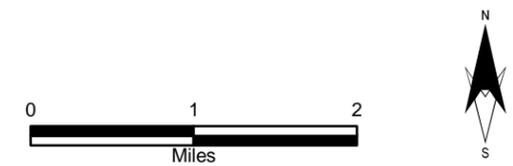
Source: StreetMapUSA, ESRI 2004. Land Use, DuPage Co. 2002, City of Park Ridge, 1996, Northeastern Illinois Planning Commission, 1992. Noise Contours: INM version 6.1, Leigh Fisher Associates, 2004.



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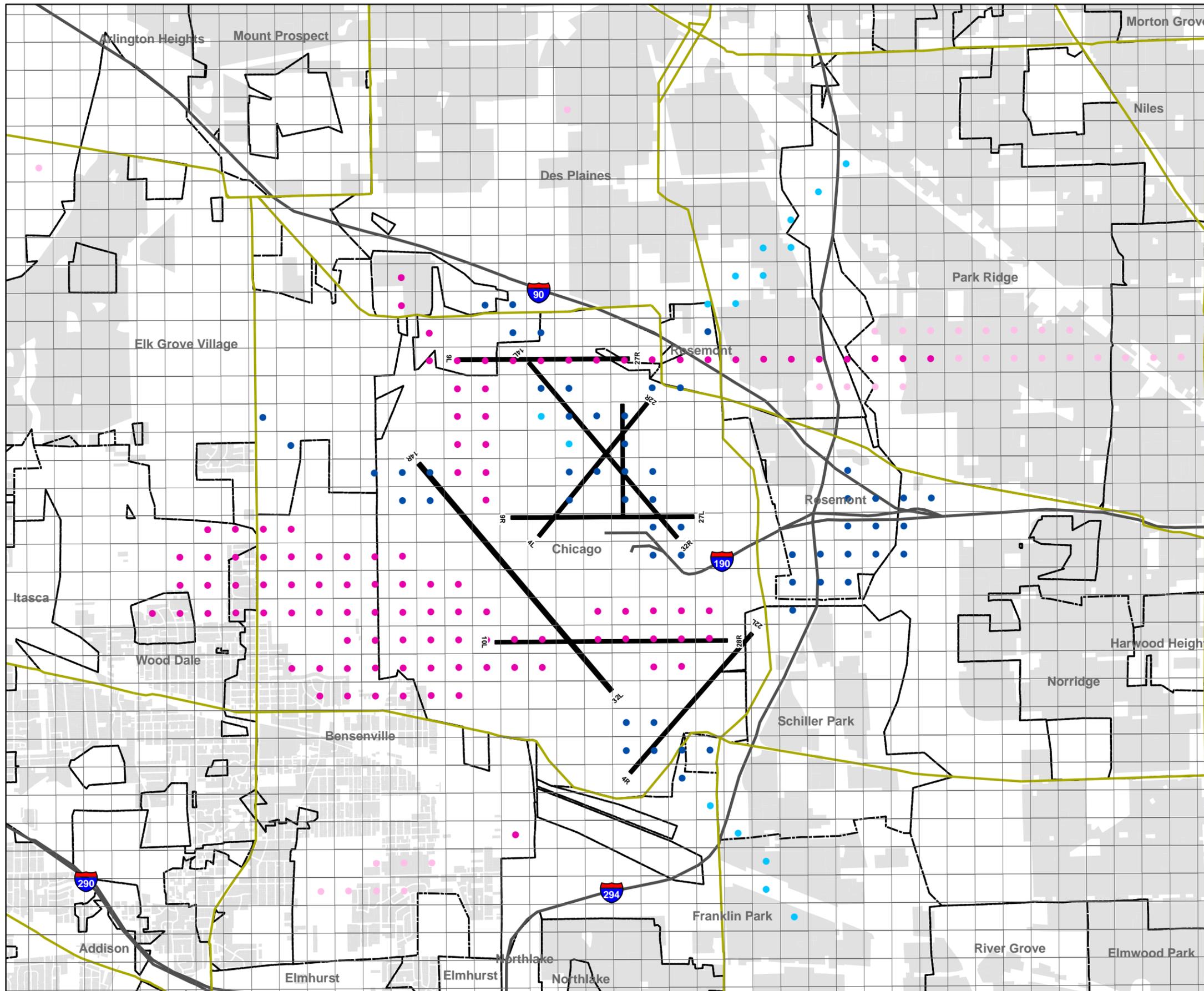
- +— Rail Roads
- Freeways
- Secondary Roads
- Local Streets
- 65 DNL
- 70 DNL
- 75 DNL
- Project Area
- Municipal Boundary
- Compatible Land Use
- Residential
- Public, Hospitals, Institutional
- Existing Airport Property



Noise Contours
Construction Phase I
Alternatives C, D, and G

► Exhibit 5.1-4

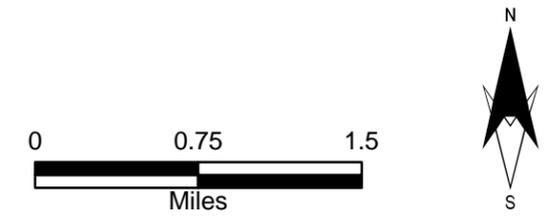
Source: StreetMapUSA, ESRI 2004. Land Use, DuPage Co. 2002, City of Park Ridge, 1996, Northeastern Illinois Planning Commission, 1992. Noise Contours: INM version 6.1, Leigh Fisher Associates, 2004.



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- Grid Points 65 DNL and Greater**
- 1.5 dB and Greater Increases
 - 1.5 dB and Greater Decreases
- Grid Points 60 DNL - 65 DNL**
- 3 dB and Greater Increases
 - 3 dB and Greater Decreases
- Freeways
 - Secondary Roads
 - 0.2 Nautical Mile Grids
 - - - Municipal Boundaries
 - Noise Sensitive Land Use



**Grid Points
Alternatives C, D, & G
Construction Phase I**

► Exhibit 5.1-5

Source: StreetMapUSA, ESRI 2004. Land Use, DuPage Co. 2002, City of Park Ridge, 1996, Northeastern Illinois Planning Commission, 1992. Grid Points: INM version 6.1 Leigh Fisher Associates, 2004.

Compressed Schedule

Alternative A – No Action

As indicated in **Section 5.0, Introduction**, total annual airport operations for Alternative A (No Action Alternative) would be constrained prior to 2007. Hence, no material change in the noise exposure forecast previously presented for this alternative under the Original Schedule would be anticipated under the Compressed Schedule.

Alternatives C, D and G

A hybrid noise contour was developed to assess the noise exposure associated with this development scenario. In this case, it was assumed that airport operations for the first nine months of 2007 would be represented by 75 percent of the activity in Construction Phase I Alternative A (No Action Alternative), and the last three months would be represented by 25 percent of the activity in Construction Phase I – Alternatives C, D and G.

Estimates of the total area exposed to aircraft noise at or above DNL 65 for Alternatives C, D and G under the Compressed Schedule are provided in **Table 5.1-5**. Under the Compressed Schedule, the total area exposed to DNL 65 and greater would decrease by 82 acres or 1 percent; population exposed to DNL 65 and greater would decrease by 2,984 people or 11 percent; and housing units exposed to DNL 65 and greater would decrease by 1,305 units, or approximately 12 percent.

Delayed Schedule

As portrayed in the Delayed Schedule described in **Section 5.0**, completion of the Construction Phase I Build Alternatives (C, D and G) would be delayed approximately one year until January 2008. The following reports on the estimated noise exposure impacts associated with this schedule scenario.

Alternative A – No Action

As indicated in **Section 5.0, Introduction**, total annual airport operations for the Alternative A (No Action Alternative) would be constrained prior to 2008. Hence, no material change in the noise exposure forecast previously presented for this alternative under the Original Schedule would be anticipated under the Delayed Schedule.

Alternatives C, D and G

With approximately one-year schedule delay, it is estimated that annual operations would be 1.4 percent greater for this alternative during the first year of operations than was assumed under the Original Schedule presented above since operations are forecast to continue to increase over time. This growth factor was applied to the operations input for this alternative and the noise exposure impacts were recalculated accordingly.

Estimates of the total area exposed to aircraft noise at or above DNL 65 for Alternatives C, D and G under the Delayed Schedule are provided in **Table 5.1-5**. Under the Delayed Schedule, the total area exposed to DNL 65 and greater would increase by 164 acres or 1 percent;

population exposed to DNL 65 and greater would increase by 404 people 2 percent; and housing units exposed to DNL 65 and greater would increase by 164 units, or 2 percent.

**TABLE 5.1-5
COMPARISON OF NOISE EXPOSURE ESTIMATES, CONSTRUCTION PHASE I
ORIGINAL, COMPRESSED, AND DELAYED SCHEDULES
(DNL 65 AND GREATER)**

Land Use (Acres)	Original	Compressed	Delayed
Single-Family	1,769	1,599	1,803
Multifamily	129	125	131
Mobile-Homes	112	84	113
Commercial	424	453	435
Industrial	5,182	5,244	5,255
Public Parks	702	747	722
Institutional	182	189	186
Undeveloped	413	359	416
Airport	6,111	6,102	5,917
Water	62	102	272
Total	15,086	15,004	15,250
Noise Sensitive Facilities (count)			
Public Parks	19	19	19
Historic Properties	7	6	7
Places of Worship	7	8	7
Nursing Homes	1	0	1
Hospitals	0	0	0
Libraries	1	0	1
Universities	2	1	2
Schools	8	7	8
<i>Sound Insulated Schools (included above)</i>	<i>8</i>	<i>7</i>	<i>8</i>
Total	32	28	32
Population and Housing (count)			
Population	26,572	23,588	26,976
Housing Units	10,803	9,498	10,967
<i>Single-Family Housing Units (included above)</i>	<i>7,383</i>	<i>6,318</i>	<i>7,513</i>
<i>Multi-Family Housing Units (included above)</i>	<i>3,420</i>	<i>3,180</i>	<i>3,454</i>
<i>Sound Insulated Housing Units (included above)</i>	<i>3,470</i>	<i>3,558</i>	<i>3,519</i>
Source: TPC Analysis, July 2005.			

5.1.3.2 Construction Phase II

As described in Chapter 3, Alternatives, Section 3.4, Description of Alternatives Retained For Detailed Consideration, Alternatives C, D and G would have the same physical and operational characteristics in this phase. The following sections present the noise exposure contours, grid points, and the total area exposed to DNL 65 and higher for Alternatives A, C, D

and G in Construction Phase II. A comparison of potential noise exposure between alternatives in Construction Phase II is provided in **Table 5.1-2**.

Original and Compressed Schedule

Alternative A - No Action

Noise exposure contours for Alternative A (No Action Alternative) in Construction Phase II are presented on **Exhibit 5.1-6**. Estimates of the total area exposed to aircraft noise at or above DNL 65 for Alternative A (No Action Alternative) in Construction Phase II are provided in **Table 5.1-6**. As presented, a total of 15,052 acres would be exposed to DNL 65 and greater. These land areas would include 1,660 acres of single-family residential use; 122 acres of multifamily use; and 726 acres of public parks.

Alternatives C, D and G

Noise exposure contours and grid points for Alternatives C, D and G in Construction Phase II are presented on **Exhibits 5.1-7** and **5.1-8**, respectively. Estimates of the total area exposed to aircraft noise at or above DNL 65 for Alternatives C, D and G in Construction Phase II are provided in **Table 5.1-7**.

In Construction Phase II, Alternatives C, D and G would differ from Alternative A (No Action Alternative) in adding a new closely spaced east-west runway immediately to the south of the existing Runway 9R/27L, in addition to the widely spaced north parallel runway added in Construction Phase I. Operation of the new east-west runways would substantially alter runway use and the resulting pattern of noise exposure by further reducing operations on crosswind runways.

As presented in **Table 5.1-7**, a total of 13,637 acres would be exposed to DNL 65 and greater for Alternatives C, D and G, representing a 9 percent decrease over Alternative A (No Action Alternative). These land areas would include 1,813 acres of single-family residential use; 177 acres of multifamily use; and 846 acres of public parks. Compared to Alternative A, this represents an increase of 153 acres of single-family residential use; 55 acres of multifamily use; and 120 acres of public parks. A complete comparison of Alternatives C, D and G to Alternative A is provided in **Table 5.1-7**.

Exhibit 5.1-7 depicts areas that are exposed to noise within the DNL 65, DNL 70 and DNL 75 contours for the Build Alternatives, which are the same for Construction Phase II. **Exhibit 5.1-8** depicts grid points at or above DNL 65 for the Build Alternatives that would experience a significant increase in noise of DNL 1.5 dB or more when compared to the No Action Alternative. These areas are generally located on the east and west sides of the Airport in the cities of Chicago, Park Ridge, Rosemont, Schiller Park, Des Plaines, Bensenville, Wood Dale, Elk Grove Village, Itasca, and unincorporated areas. The area on the east side is comprised of three segments corresponding to the groupings of east-west runways. The largest area on the east side experiencing an increase in noise is an area oriented along the I-90 corridor. The area on the west side is comprised of two segments corresponding to the southern half of the airfield and the far north runway. It is notable that there is no significant noise increase extending west

of 9R/27L. Areas that would experience a DNL 1.5 dB decrease are located on the south, east and west sides of the Airport in the cities of Franklin Park, Northlake, Schiller Park, Chicago, Rosemont, Des Plaines, Bensenville, Elk Grove Village, and unincorporated areas. The area on the west reflects the decrease in the use of Runway 14R/32L. The area on the south reflects a decrease in the use of Runway 4R/22L and the area on the east is reflective of a change in the usage of renamed Runway 10L/28R.

As recommended for discussion by FAA Order 1050.1E, **Exhibit 5.1-8** also depicts grid points of DNL 60 to DNL 65 for the Build Alternatives that would experience a change in noise of DNL 3.0 dB or more when compared to the No Action Alternative. These areas are located on the southwest, and east sides of the Airport in the cities of Des Plaines, Park Ridge, Rosemont, Chicago, Schiller Park, Bensenville, Wood Dale, Addison, and unincorporated areas. The area on the northeast side can be characterized as an easterly extension of the DNL 1.5 dB increases associated with the two northern east-west runways and Runway 10C/28C. The area on the southwest is a southerly broadening of the contour for the DNL 1.5 dB increase. The areas that would experience a DNL 3.0 dB decrease are located on the northwest, northeast, east, and southeast in the cities of Bensenville, Elk Grove Village, Des Plaines, Rosemont, Chicago, Norridge, Harwood Heights, Schiller Park, Franklin Park, Northlake, and unincorporated areas. The decrease area on the northwest reflects the decrease in the use of Runway 14R/32L. The area on the northeast reflects decreased usage of Runway 4L/22R, the area on the southeast reflects a decrease in the use of Runway 4R/22L and the decrease in the use of Runway 14R/32L. The area on the east is reflective of a change in the usage of renamed Runway 10L/28R.

See **Exhibits 7 through 18 in Attachment F-1, Appendix F, Noise**, for supplemental information on the grid point analysis for Alternatives C, D and G in Construction Phase II including a depiction of points within the DNL 45 to DNL 60 range that would experience a change in noise of DNL 5.0 dB or more when compared to the No Action Alternative (Alternative A).

**TABLE 5.1-6
NOISE EXPOSURE, CONSTRUCTION PHASE II – ALTERNATIVE A
(NO ACTION ALTERNATIVE)**

Land Use (Acres)	Contours			Total
	65-70	70-75	75+	
Single-Family	1,435	225	0	1,660
Multifamily	122	0	0	122
Mobile-Homes	54	0	0	54
Commercial	434	20	0	454
Industrial	4,030	1,296	141	5,467
Public Parks	655	61	10	726
Institutional	178	35	0	213
Undeveloped	297	16	37	350
Airport	1,962	1,851	2,124	5,937
Water	63	5	1	69
Total	9,230	3,509	2,313	15,052
Noise Sensitive Facilities (count)				
Public Parks	22	0	0	22
Historic Properties	4	1	0	5
Places of Worship	7	1	0	8
Nursing Homes	2	0	0	2
Hospitals	0	0	0	0
Libraries	0	0	0	0
Universities	0	1	0	1
Schools	6	0	0	6
<i>Sound Insulated Schools (included above)</i>	5	0	0	5
Total	41	3	0	44
Population and Housing (count)				
Population	20,705	2,918	0	23,623
Housing Units	8,172	886	0	9,058
<i>Single-Family Housing Units (included above)</i>	5,486	661	0	6,147
<i>Multi-Family Housing Units (included above)</i>	2,686	225	0	2,911
<i>Sound Insulated Housing Units (included above)</i>	3,094	670	0	3,764
Sources: Housing and Population database: City of Chicago Contours: Leigh Fisher Associates [TPC] Land Use, Noise Sensitive Facilities, Population and Housing data: TPC Analysis, July 2005.				

**TABLE 5.1-7
NOISE EXPOSURE, CONSTRUCTION PHASE II – ALTERNATIVES C, D & G**

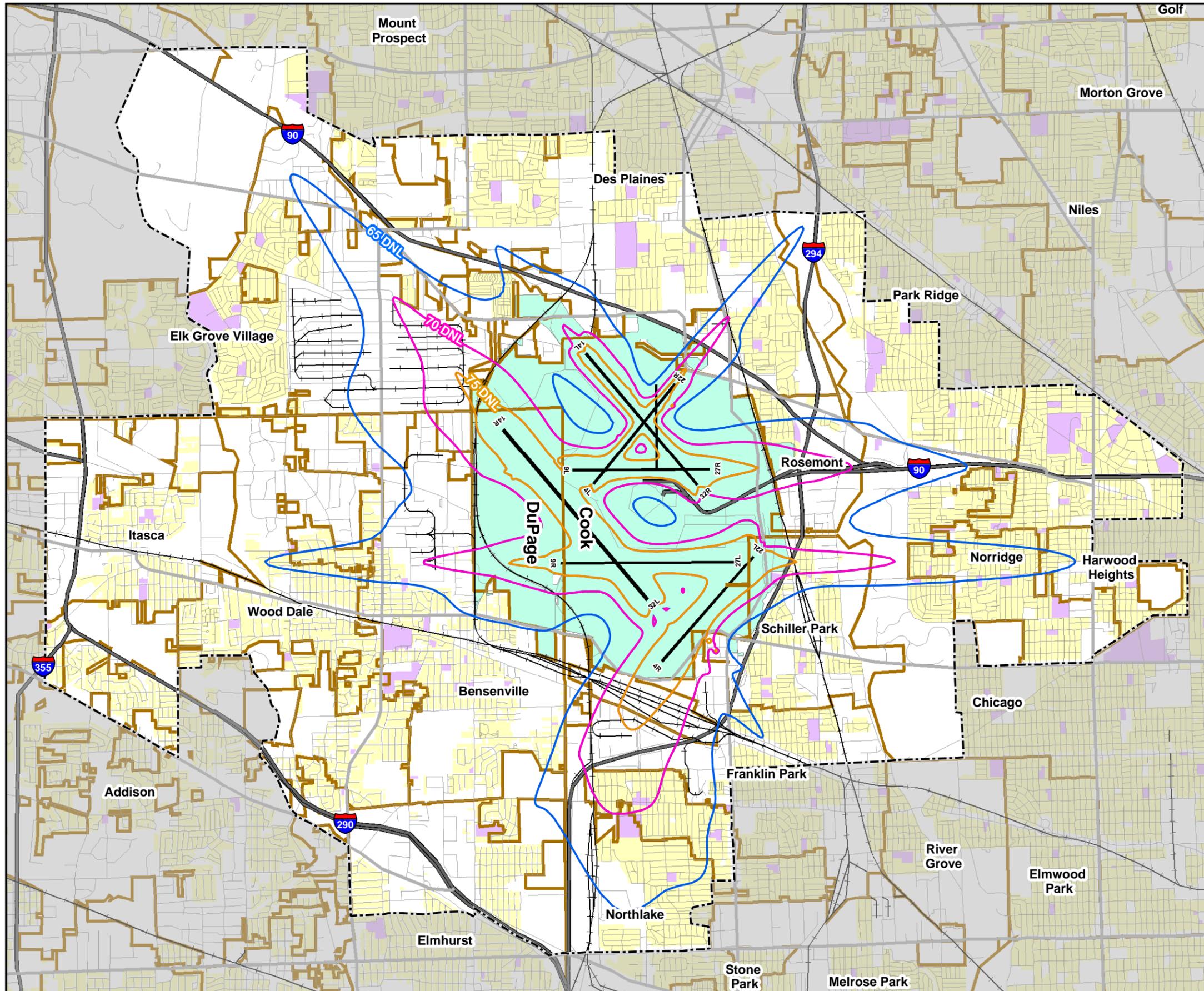
Land Use (Acres)	Contours				Difference from No Action Alternative (Table 5.1-6)			
	65-70	70-75	75+	Total	65-70	70-75	75+	Total
Single-Family	1,658	153	2	1,813	223	(72)	2	153
Multifamily	145	32	0	177	23	32	0	55
Mobile-Homes	82	0	0	82	28	0	0	28
Commercial	452	66	8	526	18	46	8	72
Industrial	2,592	1,148	75	3,815	(1,438)	(148)	(66)	(1,652)
Public Parks	773	73	0	846	118	12	(10)	120
Institutional	206	31	1	238	28	(4)	1	25
Undeveloped	261	113	32	406	(36)	97	(5)	56
Airport	1,992	1,600	2,081	5,673	30	(251)	(43)	(264)
Water	56	5	0	61	(7)	0	(1)	(8)
Total	8,217	3,221	2,199	13,637	(1,013)	(288)	(114)	(1,415)
Noise Sensitive Facilities (count)								
Public Parks	28	1	0	29	6	1	0	7
Historic Properties	5	0	0	5	1	(1)	0	0
Places of Worship	8	1	0	9	1	0	0	1
Nursing Homes	1	0	0	1	(1)	0	0	(1)
Hospitals	0	0	0	0	0	0	0	0
Libraries	2	0	0	2	2	0	0	2
Universities	1	1	0	2	1	0	0	1
Schools	10	2	0	12	4	2	0	6
Sound Insulated Schools (included above)	7	2	0	9	2	2	0	4
Total	55	5	0	60	14	2	0	16
Population and Housing (count)								
Population	23,306	3,523	0	26,829	2,601	605	0	3,206
Housing Units	9,229	1,130	0	10,359	1,057	244	0	1,301
Single-Family Housing Units (included above)	6,885	659	0	7,544	1,399	(2)	0	1,397
Multi-Family Housing Units (included above)	2,344	471	0	2,815	(342)	246	0	(96)
Sound Insulated Housing Units (included above)	2,036	578	0	2,614	(1,058)	(92)	0	(1,150)

Note: Number in () denotes a negative value when compared to the No Action Alternative (Alternative A).

Sources: Housing and Population database: City of Chicago

Contours: Leigh Fisher Associates [TPC]

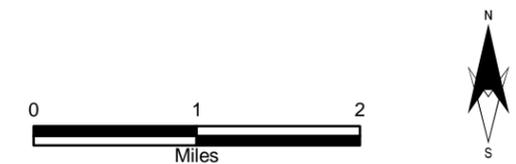
Land Use, Noise Sensitive Facilities, Population and Housing data: TPC Analysis, July 2005.



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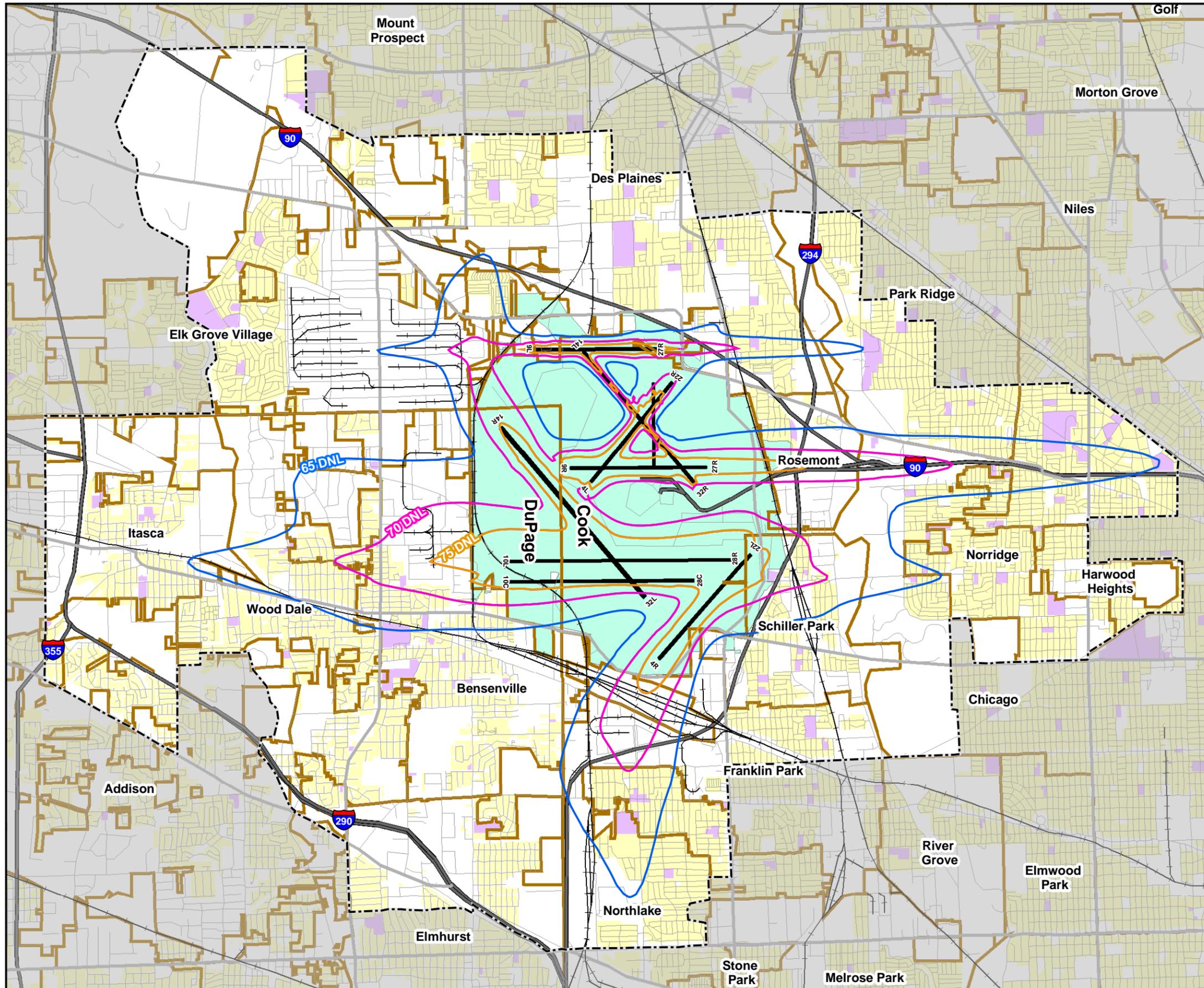
- Rail Roads
- Freeways
- Secondary Roads
- Local Streets
- 65 DNL
- 70 DNL
- 75 DNL
- Project Area
- Municipal Boundary
- Compatible Land Use
- Residential
- Public, Hospitals, Institutional
- Existing Airport Property



**Noise Contours
Construction Phase II
Alternative A (No Action)**

► Exhibit 5.1-6

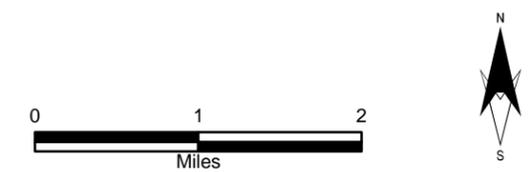
Source: StreetMapUSA, ESRI 2004. Land Use, DuPage Co. 2002, City of Park Ridge, 1996, Northeastern Illinois Planning Commission, 1992. Noise Contours: INM version 6.1, Leigh Fisher Associates, 2004.



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- +— Rail Roads
- Freeways
- Secondary Roads
- Local Streets
- 65 DNL
- 70 DNL
- 75 DNL
- ⋯ Project Area
- ▭ Municipal Boundary
- ▭ Compatible Land Use
- ▭ Residential
- ▭ Public, Hospitals, Institutional
- ▭ Existing Airport Property



Noise Contours
Construction Phase II
Alternatives C, D, and G

► Exhibit 5.1-7

Source: StreetMapUSA, ESRI 2004. Land Use, DuPage Co. 2002, City of Park Ridge, 1996, Northeastern Illinois Planning Commission, 1992. Noise Contours: INM version 6.1 Leigh Fisher Associates, 2004.

Delayed Schedule

Under the Delayed Schedule, the completion of the Construction Phase II Build Alternatives (C, D and G) would be delayed one year to January 2010. With this delay, it is estimated that annual operations would be 1.4 percent greater for the Build Alternative during the first year of operations than was assumed under the Original Schedule presented above. This growth factor was applied to the operations input for this Build Alternative and the noise exposure impacts were recalculated accordingly.

Alternative A – No Action

Total annual airport operations for the Alternative A (No Action Alternative) would be constrained prior to 2009. Hence, no material change in the noise exposure forecast previously presented for this alternative under the Original Schedule would be anticipated under the Delayed Schedule.

Alternatives C, D and G

Estimates of the total area exposed to aircraft noise at or above DNL 65 for Alternatives C, D and G under the Delayed Schedule are provided in **Table 5.1-8**. Under the Delayed Schedule, the total area exposed to DNL 65 and greater would increase by 140 acres or 1 percent; population exposed to DNL 65 and greater would increase by 1,007 people or 4 percent; and housing units exposed to DNL 65 and greater would increase by 581 units, or 6 percent.

**TABLE 5.1-8
COMPARISON OF NOISE EXPOSURE ESTIMATES, CONSTRUCTION PHASE II
ORIGINAL AND DELAYED SCHEDULES
(DNL 65 AND GREATER)**

Land Use (Acres)	Original	Delayed	Difference
Single-Family	1,814	1,841	27
Multifamily	177	181	4
Mobile-Homes	82	84	2
Commercial	526	533	7
Industrial	3,815	3,866	51
Public Parks	846	868	22
Institutional	237	243	6
Undeveloped	406	411	5
Airport	5,673	5,688	15
Water	61	62	1
Total	13,637	13,777	140
Noise Sensitive Facilities (count)			
Public Parks	29	29	0
Historic Properties	5	4	(1)
Places of Worship	9	9	0
Nursing Homes	1	1	0
Hospitals	0	0	0
Libraries	2	2	0
Universities	2	2	0
Schools	12	12	0
<i>Sound Insulated Schools (included above)</i>	9	9	0
Total	44	43	(1)
Population and Housing (count)			
Population	26,829	27,836	1,007
Housing Units	10,359	10,940	581
<i>Single-Family Housing Units (included above)</i>	7,544	7,657	113
<i>Multi-Family Housing Units (included above)</i>	2,815	3,283	468
<i>Sound Insulated Housing Units (included above)</i>	2,614	2,648	34
Sources: Housing and Population database: City of Chicago Contours: Leigh Fisher Associates [TPC] Land Use, Noise Sensitive Facilities, Population and Housing data: TPC Analysis, July 2005.			

5.1.3.3 Build Out

As described in the following sections, the three Build Alternatives under consideration would differ from each other at this stage of development (a more detailed description of the Build Alternatives is provided in **Section 3.4, Description of Alternatives Retained for Detailed Consideration**, in **Chapter 3, Alternatives**). The following sections present the noise exposure contours, grid points, and the total area exposed to DNL 65 and higher for Alternatives A, C, D

and G in the Build Out phase. A comparison of potential noise exposure between alternatives in the Build Out phase is provided in **Table 5.1-2**.

Original and Compressed Schedule

Alternative A - No Action

Noise exposure contours for Alternative A (No Action Alternative) in the Build Out phase are presented on **Exhibit 5.1-9**. Estimates of the total area exposed to aircraft noise at or above DNL 65 for Alternative A (No Action Alternative) in the Build Out phase are provided in **Table 5.1-9**. As presented, a total of 12,427 acres would be exposed to DNL 65 and greater. These land areas would include 1,060 acres of single-family residential use; 60 acres of multifamily use; and 451 acres of public parks.

Alternative C

Noise exposure contours and grid points for Alternative C in the Build Out phase are presented on **Exhibits 5.1-10** and **5.1-11**, respectively. Estimates of the total area exposed to aircraft noise at or above DNL 65 for Alternative C in the Build Out phase is provided in **Table 5.1-10**.

In the Build Out phase, Alternative C would differ from Alternative A (No Action Alternative) in adding a new closely spaced east-west runway immediately north of existing Runway 9L/27R in addition to the two new runways provided in Construction Phases I and II. Alternative C also includes a new widely spaced runway to the south as described in **Chapter 3, Alternatives, Section 3.1, Range of Alternatives Considered**. Operation of the new east-west runway system would result in the elimination of the parallel northwest-southeast runways. This new runway configuration would alter runway use and the resulting pattern of noise exposure.

As presented in **Table 5.1-10**, a total of 11,263 acres would be exposed to DNL 65 and greater, representing a 9 percent decrease over Alternative A (No Action Alternative). These land areas would include 1,260 acres of single-family residential use; 88 acres of multifamily use; and 458 acres of public parks. Compared to Alternative A, this represents an increase of 200 acres of single-family residential use; 28 acres of multifamily use; and 7 acres of public parks. A complete comparison of Alternatives C to Alternative A is provided in **Table 5.1-10**.

Exhibit 5.1-10 depicts areas that are exposed to noise within the DNL 65, DNL 70 and DNL 75 contours for Alternative C. **Exhibit 5.1-11** depicts grid points at or above DNL 65 for Alternative C that would experience a significant increase in noise of DNL 1.5 dB or more when compared to the No Action Alternative. These areas are generally located on the east and west sides of the Airport in the cities of Chicago, Park Ridge, Rosemont, Schiller Park, Des Plaines, Bensenville, Wood Dale, Elk Grove Village, Itasca, and unincorporated areas. The area on the east side is comprised of four segments corresponding to the groupings of east-west runways. The largest area on the east side experiencing an increase in noise is an area oriented along the I-90 corridor. The area on the west side is comprised of two segments corresponding to the southern half of the airfield and the far north runway. It is notable that there is no significant noise increase extending west of the 9C/27C and 9R/27L runway pair. Areas that would experience a DNL 1.5 dB decrease are located on the south, east and west sides of the Airport in

the cities of Franklin Park, Schiller Park, Chicago, Rosemont, Bensenville, Elk Grove Village and unincorporated areas. The area on the west reflects the decommissioning of Runway 14R/32L. The area on the south reflects a decrease in the use of Runway 4R/22L and the area on the east is reflective of a change in the usage of renamed Runway 10L/28R.

As recommended for discussion by FAA Order 1050.1E, **Exhibit 5.1-11** also depicts grid points of DNL 60 to DNL 65 for Alternative C that would experience a change in noise of DNL 3.0 dB or more when compared to the No Action Alternative. These areas are located on the southwest, and east sides of the Airport in the cities of Des Plaines, Park Ridge, Chicago, Niles, Schiller Park, Bensenville, Wood Dale, Addison, and unincorporated areas. The area on the northeast side can be characterized as an easterly extension of the DNL 1.5 dB increases associated with the 3 northern east-west runways and Runway 10R/28L. The area on the southwest is a southerly broadening of the contour for the DNL 1.5 dB increase. The areas that would experience a DNL 3.0 dB decrease are located on the northwest, northeast, east, and southeast in the cities of Bensenville, Elk Grove Village, Des Plaines, Rosemont, Chicago, Norridge, Harwood Heights, Schiller Park, Franklin Park, Northlake, and unincorporated areas. The decrease area on the northwest reflects the decommissioning of Runway 14R/32L. The area on the northeast reflects decreased usage of Runway 4L/22R, the area on the southeast reflects a decrease in the use of Runway 4R/22L and the decommissioning of Runway 14R/32L. The area on the east is reflective of a change in the usage of renamed Runway 10L/28R.

See **Exhibit 19** through **32** in **Attachment F-1, Appendix F, Noise**, for supplemental information on the grid point analysis for Alternative C in the Build Out phase including a depiction of points within the DNL 45 to DNL 60 range that would experience a change in noise of DNL 5.0 dB or more when compared to the No Action Alternative (Alternative A).

Alternative D

Noise exposure contours and grid points for Alternative D in the Build Out phase are presented on **Exhibits 5.1-12** and **5.1-13**, respectively. Estimates of the total area exposed to aircraft noise at or above DNL 65 for Alternative D in the Build Out phase is provided in **Table 5.1-11**.

In the Build Out phase, Alternative D would differ from Alternative A (No Action Alternative) in adding a new closely spaced east-west runway immediately to the north of the existing Runway 9L/27R in addition to the two new runways provided in Construction Phases I and II. Unlike alternative C, this alternative does not include the new widely spaced runway to the south (see **Section 3.1, Range of Alternatives Considered** in **Chapter 3, Alternatives**). This runway configuration would alter runway use and the resulting pattern of noise exposure.

As presented in **Table 5.1-11**, a total of 11,187 acres would be exposed to DNL 65 and greater, representing a 10 percent decrease over Alternative A (No Action Alternative). These land areas would include 1,283 acres of single-family residential use; 96 acres of multifamily use; and 546 acres of public parks. Compared to Alternative A, this represents an increase of 223 acres of single-family residential use; 36 acres of multifamily use; and 95 acres of public parks. A complete comparison of Alternatives D to Alternative A is provided in **Table 5.1-11**.

Exhibit 5.1-12 depicts areas that are exposed to noise within the DNL 65, DNL 70 and DNL 75 contours for Alternative D. **Exhibit 5.1-13** depicts grid points at or above DNL 65 for Alternative D that would experience a significant increase in noise of DNL 1.5 dB or more when compared to the No Action Alternative. These areas are generally located on the east and west sides of the Airport in the cities of Chicago, Park Ridge, Rosemont, Schiller Park, Des Plaines, Bensenville, Wood Dale, Elk Grove Village, Itasca, and unincorporated areas. The area on the east side is comprised of four segments corresponding to the groupings of east-west runways. The largest area on the east side experiencing an increase in noise is an area oriented along the I-90 corridor. The area on the west side is comprised of two segments corresponding to the southern half of the airfield and the far north runway. It is notable that there is no significant noise increase extending west of the 9C/27C and 9R/27L runway pair. Areas that would experience a DNL 1.5 dB decrease are located on the south, east and west sides of the Airport in the cities of Franklin Park, Schiller Park, Chicago, Rosemont, Bensenville, Elk Grove Village, and unincorporated areas. The area on the west reflects the decommissioning of Runway 14R/32L. The area on the south reflects a decrease in the use of Runway 4R/22L and the area on the east is reflective of a change in the usage of renamed Runway 10L/28R.

As recommended for discussion by FAA Order 1050.1E, **Exhibit 5.1-13** also depicts grid points of DNL 60 to DNL 65 for Alternative D that would experience a change in noise of DNL 3.0 dB or more when compared to the No Action Alternative. These areas are located on the southwest, west and east sides of the Airport in the cities of Des Plaines, Park Ridge, Chicago, Niles, Schiller Park, Bensenville, Wood Dale, Itasca, Addison, and unincorporated areas. The area on the east side can be characterized as an easterly extension of the DNL 1.5 dB increases associated with the 3 northern east-west runways and 10R/28L. The area on the west is a westerly extension of the 1.5 dB increase from 9L/27R. The area on the southwest is a southerly broadening of the contour for the DNL 1.5 dB increase. The areas that would experience a DNL 3.0 dB decrease are located on the northwest, northeast, east, and southeast in the cities of Bensenville, Elk Grove Village, Des Plaines, Rosemont, Chicago, Norridge, Harwood Heights, Schiller Park, Franklin Park, Northlake, and unincorporated areas. The decrease area on the northwest reflects the decommissioning of Runway 14R/32L. The area on the northeast reflects decreased usage of Runway 4L/22R, the area on the southeast reflects a decrease in the use of Runway 4R/22L and the decommissioning of Runway 14R/32L. The area on the east is reflective of a change in the usage of renamed Runway 10L/28R.

See **Exhibits 33** through **45** in **Attachment F-1, Appendix F, Noise**, for supplemental information on the grid point analysis for Alternative D in the Build Out phase including a depiction of points within the DNL 45 to DNL 60 range that would experience a change in noise of DNL 5.0 dB or more when compared to the No Action Alternative (Alternative A).

Alternative G

Noise exposure contours and grid points for Alternative G in the Build Out phase are presented on **Exhibits 5.1-14** and **5.1-15**, respectively. Estimates of the total area exposed to aircraft noise at or above DNL 65 for Alternative G in the Build Out phase is provided in **Table 5.1-12**.

In the Build Out phase, Alternative G would differ from Alternative A (No Action Alternative) in adding a new closely spaced east-west runway immediately to the north of the existing Runway 9L/27R in addition to the two new runways provided in Construction Phases I and II. Instead of the widely spaced south runway included in Alternative C, this alternative incorporates a new Runway 12/30 (see **Section 3.1, Range of Alternatives Considered in Chapter 3, Alternatives**). As with the other Build Alternatives, this runway configuration would alter runway use and the resulting pattern of noise exposure.

As presented in **Table 5.1-12**, a total of 11,216 acres would be exposed to DNL 65 and greater, representing a 10 percent decrease over Alternative A (No Action Alternative). These land areas would include 1,275 acres of single-family residential use; 86 acres of multifamily use; and 490 acres of public parks. Compared to Alternative A, this represents an increase of 215 acres of single-family residential use; 26 acres of multifamily use; and 39 acres of public parks. A complete comparison of Alternatives G to Alternative A is provided in **Table 5.1-12**.

Exhibit 5.1-14 depicts areas that are exposed to noise within the DNL 65, DNL 70 and DNL 75 contours for Alternative G. **Exhibit 5.1-15** depicts grid points at or above DNL 65 for Alternative G that would experience a significant increase in noise of DNL 1.5 dB or more when compared to the No Action Alternative. These areas are generally located on the east and west sides of the Airport in the cities of Chicago, Park Ridge, Rosemont, Schiller Park, Des Plaines, Bensenville, Wood Dale, Elk Grove Village, Itasca, and unincorporated areas. The area on the east side is comprised of four segments corresponding to the groupings of east-west runways. The largest area on the east side experiencing an increase in noise is an area oriented along the I-90 corridor. The area on the west side is comprised of two segments corresponding to the southern half of the airfield and the far north runway. It is notable that there is no significant noise increase extending west of the 9C/27C and 9R/27L runway pair. Areas that would experience a DNL 1.5 dB decrease are located on the south, east and west sides of the Airport in the cities of Franklin Park, Schiller Park, Chicago, Rosemont, Bensenville, Elk Grove Village, and unincorporated areas. The area on the west reflects the decommissioning of Runway 14R/32L. The area on the south reflects a decrease in the use of Runway 4R/22L and the area on the east is reflective of a change in the usage of renamed Runway 10L/28R.

As recommended for discussion by FAA Order 1050.1E, **Exhibit 5.1-15** also depicts grid points of DNL 60 to DNL 65 for Alternative G that would experience a change in noise of DNL 3.0 dB or more when compared to the No Action Alternative. These areas are located on the southwest and east sides of the Airport in the cities of Des Plaines, Park Ridge, Chicago, Niles, Schiller Park, Bensenville, Wood Dale, Itasca, Addison, and unincorporated areas. The area on the east side can be characterized as an easterly extension of the DNL 1.5 dB increases associated with the 3 northern east-west runways and Runway 10R/28L. The area on the southwest is a southerly broadening of the contour for the DNL 1.5 dB increase. The areas that would experience a DNL 3.0 dB decrease are located on the northwest, northeast, east, and southeast in the cities of Bensenville, Elk Grove Village, Des Plaines, Rosemont, Chicago, Norridge, Harwood Heights, Schiller Park, Franklin Park, Northlake, and unincorporated areas. The decrease area on the northwest reflects the decommissioning of Runway 14R/32L. The area on the northeast reflects decreased usage of Runway 4L/22R, the area on the southeast reflects a

decrease in the use of Runway 4R/22L and the decommissioning of Runway 14R/32L. The area on the east is reflective of a change in the usage of renamed Runway 10L/28R.

See Exhibits 46 through 59 in Attachment F-1, Appendix F, Noise, for supplemental information on the grid point analysis for Alternative G in the Build Out phase including a depiction of points within the DNL 45 to DNL 60 range that would experience a change in noise of DNL 5.0 dB or more when compared to the No Action Alternative (Alternative A).

**TABLE 5.1-9
NOISE EXPOSURE, BUILD OUT – ALTERNATIVE A (NO ACTION ALTERNATIVE)**

Land Use (Acres)	Contours			Total
	65-70	70-75	75+	
Single-Family	1,026	34	0	1,060
Multifamily	60	0	0	60
Mobile-Homes	2	0	0	2
Commercial	240	16	0	256
Industrial	3,391	980	34	4,405
Public Parks	392	50	9	451
Institutional	116	9	0	125
Undeveloped	246	15	26	287
Airport	2,072	1,734	1,929	5,735
Water	42	4	0	46
Total	7,587	2,842	1,998	12,427
Noise Sensitive Facilities (count)				
Public Parks	16	0	0	16
Historic Properties	3	1	0	4
Places of Worship	7	0	0	7
Nursing Homes	0	0	0	0
Hospitals	0	0	0	0
Libraries	0	0	0	0
Universities	0	1	0	1
Schools	2	2	0	4
<i>Sound Insulated Schools (included above)</i>	<i>1</i>	<i>2</i>	<i>0</i>	<i>3</i>
Total	28	4	0	32
Population and Housing (count)				
Population	13,704	808	0	14,512
Housing Units	4,927	272	0	5,199
<i>Single-Family Housing Units (included above)</i>	<i>3,629</i>	<i>130</i>	<i>0</i>	<i>3,759</i>
<i>Multi-Family Housing Units (included above)</i>	<i>1,298</i>	<i>142</i>	<i>0</i>	<i>1,440</i>
<i>Sound Insulated Housing Units (included above)</i>	<i>2,284</i>	<i>174</i>	<i>0</i>	<i>2,458</i>
Sources: Housing and Population database: City of Chicago Contours: Leigh Fisher Associates [TPC] Land Use, Noise Sensitive Facilities, Population and Housing data: TPC Analysis, July 2005.				

**TABLE 5.1-10
NOISE EXPOSURE, BUILD OUT – ALTERNATIVE C**

Land Use (Acres)	Contours				Total	Difference from No Action (Alternative A) (Table 5.1-9)				Total
	65-70	70-75	75+	Total		65-70	70-75	75+	Total	
Single-Family	1,199	60	1	1,260	173	26	1	200		
Multifamily	73	15	0	88	13	15	0	28		
Mobile-Homes	0	0	0	0	(2)	0	0	(2)		
Commercial	390	27	2	419	150	11	2	166		
Industrial	2,325	529	24	2,878	(1,066)	(451)	(10)	(1,527)		
Public Parks	431	27	0	458	39	(23)	(9)	7		
Institutional	145	16	1	162	29	7	1	37		
Undeveloped	223	129	24	376	(23)	114	(2)	89		
Airport	2,024	1,703	1,867	5,594	(48)	(31)	(62)	(141)		
Water	26	2	0	28	(16)	(2)	(0)	(18)		
Total	6,836	2,508	1,919	11,263	(751)	(334)	(79)	(1,164)		
Noise Sensitive Facilities (count)										
Public Parks	9	2	0	11	(7)	2	0	(5)		
Historic Properties	3	0	0	3	0	(1)	0	(1)		
Places of Worship	6	0	0	6	(1)	0	0	(1)		
Nursing Homes	0	0	0	0	0	0	0	0		
Hospitals	1	0	0	1	1	0	0	1		
Libraries	2	0	0	2	2	0	0	2		
Universities	0	1	0	1	0	0	0	0		
Schools	8	0	0	8	6	(2)	0	4		
Sound Insulated Schools (included above)	7	0	0	7	6	(2)	0	4		
Total	29	3	0	32	1	(1)	0	0		
Population and Housing (count)										
Population	18,312	1,265	0	19,577	4,608	633	0	5,241		
Housing Units	6,318	436	0	6,754	1,391	164	0	1,555		
Single-Family Housing Units (included above)	5,056	165	0	5,221	1,427	35	0	1,462		
Multi-Family Housing Units (included above)	1,262	271	0	1,533	(36)	129	0	93		
Sound Insulated Housing Units (included above)	1,435	146	0	1,581	(849)	(28)	0	(877)		

Notes: Number in () denotes a negative value when compared to the No Action Alternative (Alternative A).

Sources: Housing and Population database: City of Chicago

Contours: Leigh Fisher Associates [TPC]

Land Use, Noise Sensitive Facilities, Population and Housing data: TPC Analysis, July 2005.

**TABLE 5.1-11
NOISE EXPOSURE, BUILD OUT – ALTERNATIVE D**

Land Use (Acres)	Contours				Total	Difference from No Action				Total
	65-70	70-75	75+	75+		65-70	70-75	75+	75+	
Single-Family	1,208	74	1	1	1,283	182	40	1	223	
Multifamily	80	16	0	0	96	20	16	0	36	
Mobile-Homes	0	0	0	0	0	(2)	0	0	(2)	
Commercial	408	32	2	2	442	168	16	2	186	
Industrial	2,349	601	24	24	2,974	(1,042)	(379)	(10)	(1,431)	
Public Parks	510	36	0	0	546	118	(14)	(9)	95	
Institutional	152	21	1	1	174	36	12	1	49	
Undeveloped	216	113	0	0	329	(30)	98	(26)	41	
Airport	1,770	1,667	1,869	1,869	5,306	(302)	(67)	(60)	(429)	
Water	34	3	0	0	37	(8)	(1)	0	(9)	
Total	6,727	2,563	1,897	1,897	11,187	(860)	(279)	(101)	(1,240)	
Noise Sensitive Facilities (count)										
Public Parks	9	2	0	0	11	(7)	2	0	(5)	
Historic Properties	3	0	0	0	3	0	(1)	0	(1)	
Places of Worship	6	0	0	0	6	(1)	0	0	(1)	
Nursing Homes	0	0	0	0	0	0	0	0	0	
Hospitals	1	0	0	0	1	1	0	0	1	
Libraries	2	0	0	0	2	2	0	0	2	
Universities	0	1	0	0	1	0	0	0	0	
Schools	8	0	0	0	8	6	(2)	0	4	
Sound Insulated Schools (included above)	7	0	0	0	7	6	(2)	0	4	
Total	29	3	0	0	32	1	(1)	0	0	
Population and Housing (count)										
Population	19,713	1,441	0	0	21,154	6,009	633	0	6,642	
Housing Units	6,897	495	0	0	7,392	1,970	223	0	2,193	
Single-Family Housing Units (included above)	5,354	220	0	0	5,574	1,725	90	0	1,815	
Multi-Family Housing Units (included above)	1,543	275	0	0	1,818	245	133	0	378	
Sound Insulated Housing Units (included above)	1,443	185	0	0	1,628	(841)	11	0	(830)	

Notes: Number in () denotes a negative value when compared to the No Action Alternative (Alternative A).

Sources: Housing and Population database: City of Chicago

Contours: Leigh Fisher Associates [TPC]

Land Use, Noise Sensitive Facilities, Population and Housing data: TPC Analysis, July 2005.

**TABLE 5.1-12
NOISE EXPOSURE, BUILD OUT – ALTERNATIVE G**

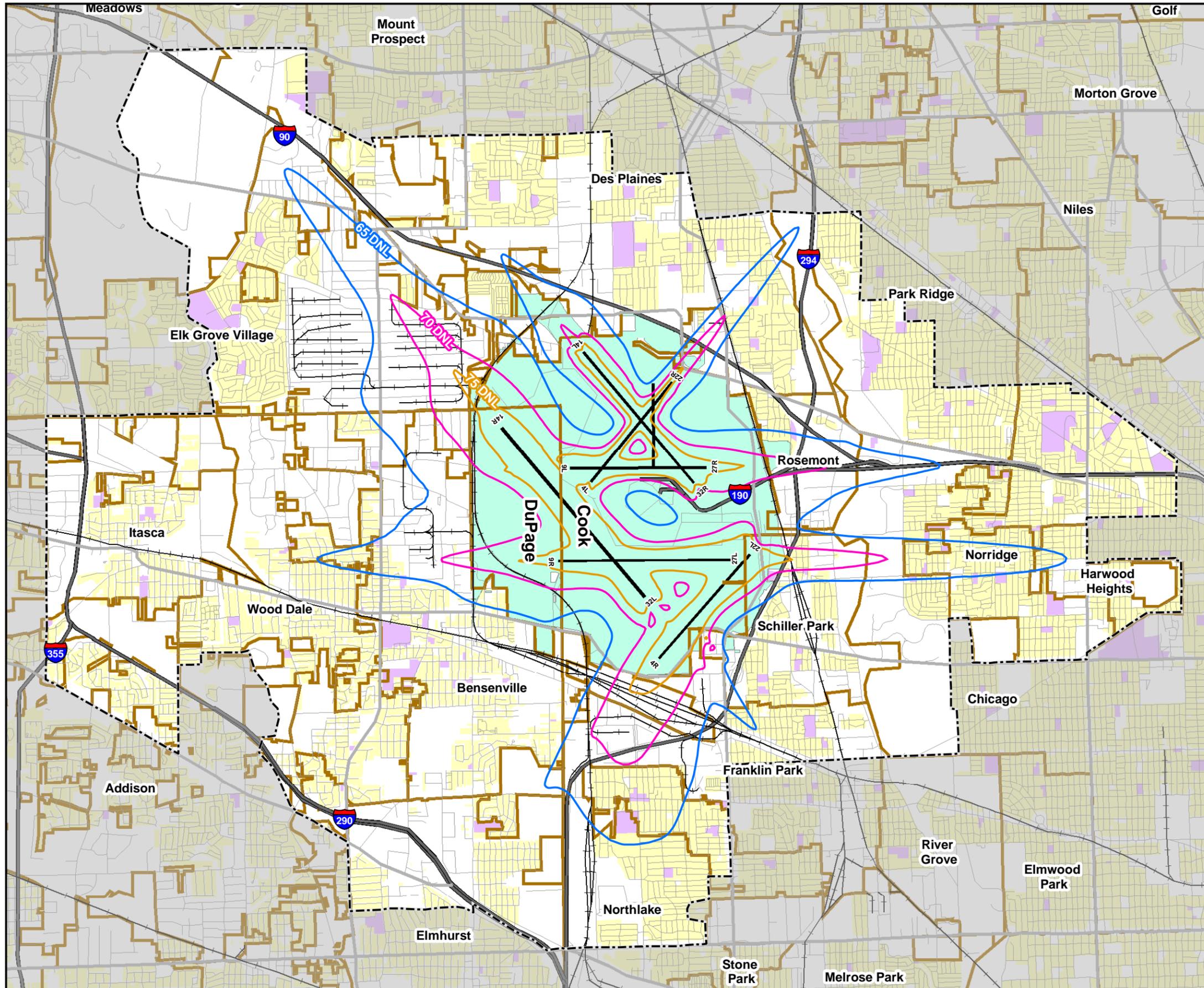
Land Use (Acres)	Contours				Total	Difference from No Action				Total
	65-70	70-75	75+	75+		65-70	70-75	75+	75+	
Single-Family	1,209	65	1	1,275	183	31	1	215		
Multifamily	71	15	0	86	11	15	0	26		
Mobile-Homes	0	0	0	0	(2)	0	0	(2)		
Commercial	373	29	2	404	133	13	2	148		
Industrial	2,384	597	25	3,006	(1,007)	(383)	(9)	(1,399)		
Public Parks	464	26	0	490	73	(24)	(9)	39		
Institutional	149	17	1	167	33	8	1	42		
Undeveloped	200	101	37	338	(46)	86	11	51		
Airport	1,917	1,672	1,831	5,420	(155)	(62)	(98)	(315)		
Water	28	2	0	30	(14)	(2)	(0)	(16)		
Total	6,795	2,524	1,897	11,216	(792)	(318)	(101)	(1,211)		
Noise Sensitive Facilities (count)										
Public Parks	7	2	0	9	(9)	2	0	(7)		
Historic Properties	3	0	0	3	0	(1)	0	(1)		
Places of Worship	6	0	0	6	(1)	0	0	(1)		
Nursing Homes	0	0	0	0	0	0	0	0		
Hospitals	1	0	0	1	1	0	0	1		
Libraries	2	0	0	2	2	0	0	2		
Universities	0	1	0	1	0	0	0	0		
Schools	8	0	0	8	6	(2)	0	4		
Sound Insulated Schools (included above)	7	0	0	7	6	(2)	0	4		
Total	27	3	0	30	(1)	(1)	0	(2)		
Population and Housing (count)										
Population	17,784	1,352	0	19,135	4,080	544	0	4,624		
Housing Units	6,109	463	0	6,572	1,182	191	0	1,373		
Single-Family Housing Units (included above)	4,993	188	0	5,181	1,364	58	0	1,422		
Multi-Family Housing Units (included above)	1,116	275	0	1,391	(182)	133	0	(49)		
Sound Insulated Housing Units (included above)	1,593	162	0	1,755	(691)	(12)	0	(703)		

Note: Number in () denotes a negative value when compared to the No Action Alternative (Alternative A).

Sources: Housing and Population database: City of Chicago

Contours: Leigh Fisher Associates [TPC]

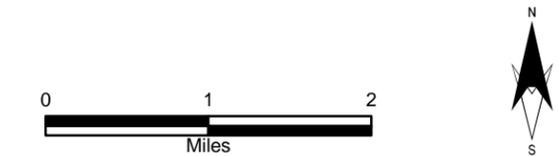
Land Use, Noise Sensitive Facilities, Population and Housing data: TPC Analysis, July 2005.



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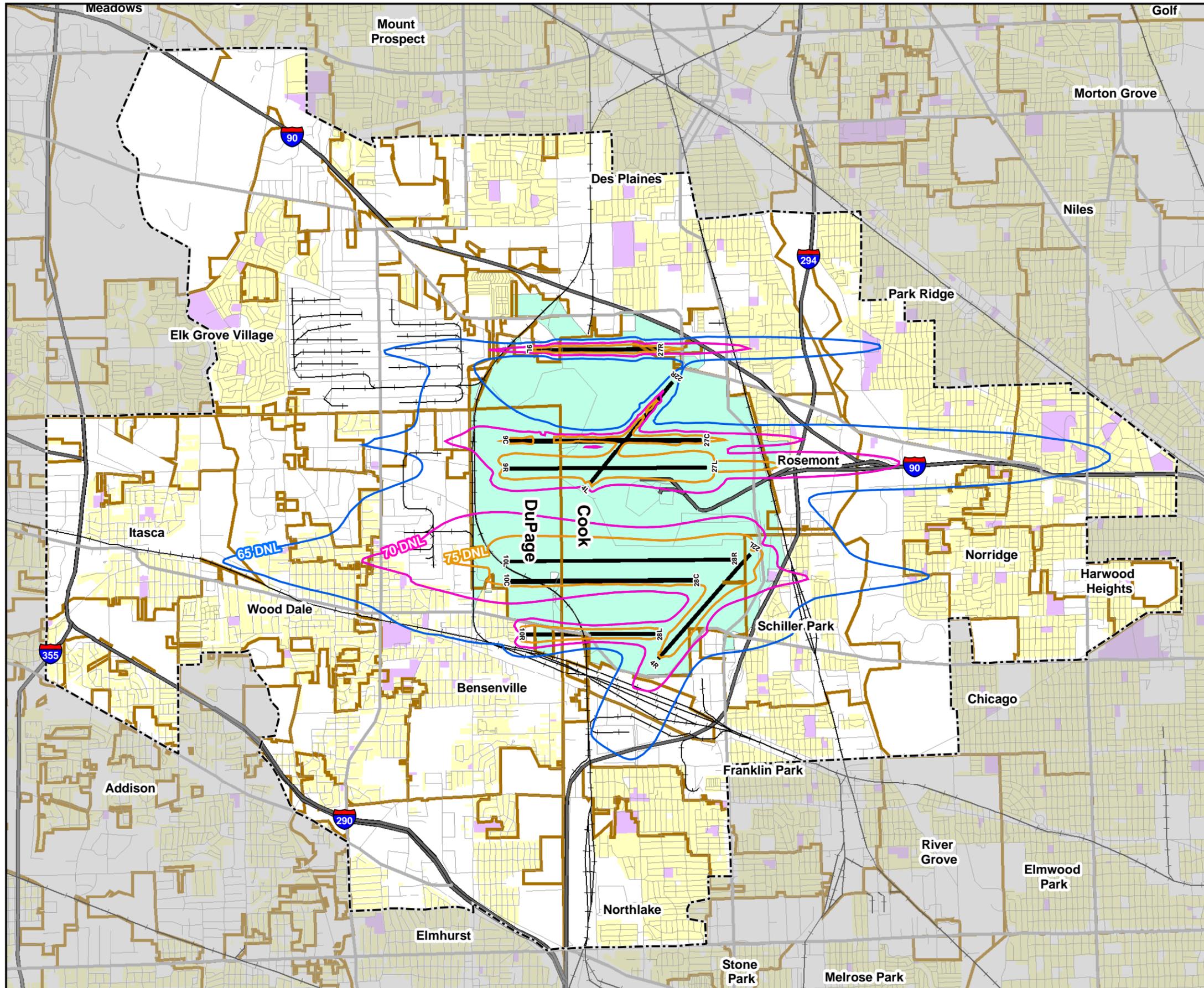
- Rail Roads
- Freeways
- Secondary Roads
- Local Streets
- 65 DNL
- 70 DNL
- 75 DNL
- Project Area
- Municipal Boundary
- Compatible Land Use
- Residential
- Public, Hospitals, Institutional
- Existing Airport Property



**Noise Contours,
Build Out Phase
Alternative A (No Action)**

► Exhibit 5.1-9

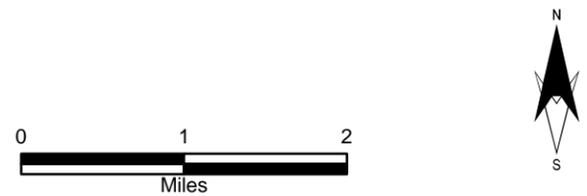
Source: StreetMapUSA, ESRI 2004. Land Use, DuPage Co. 2002, City of Park Ridge, 1996, Northeastern Illinois Planning Commission, 1992. Noise Contours: INM version 6.1, Leigh Fisher Associates, 2004.



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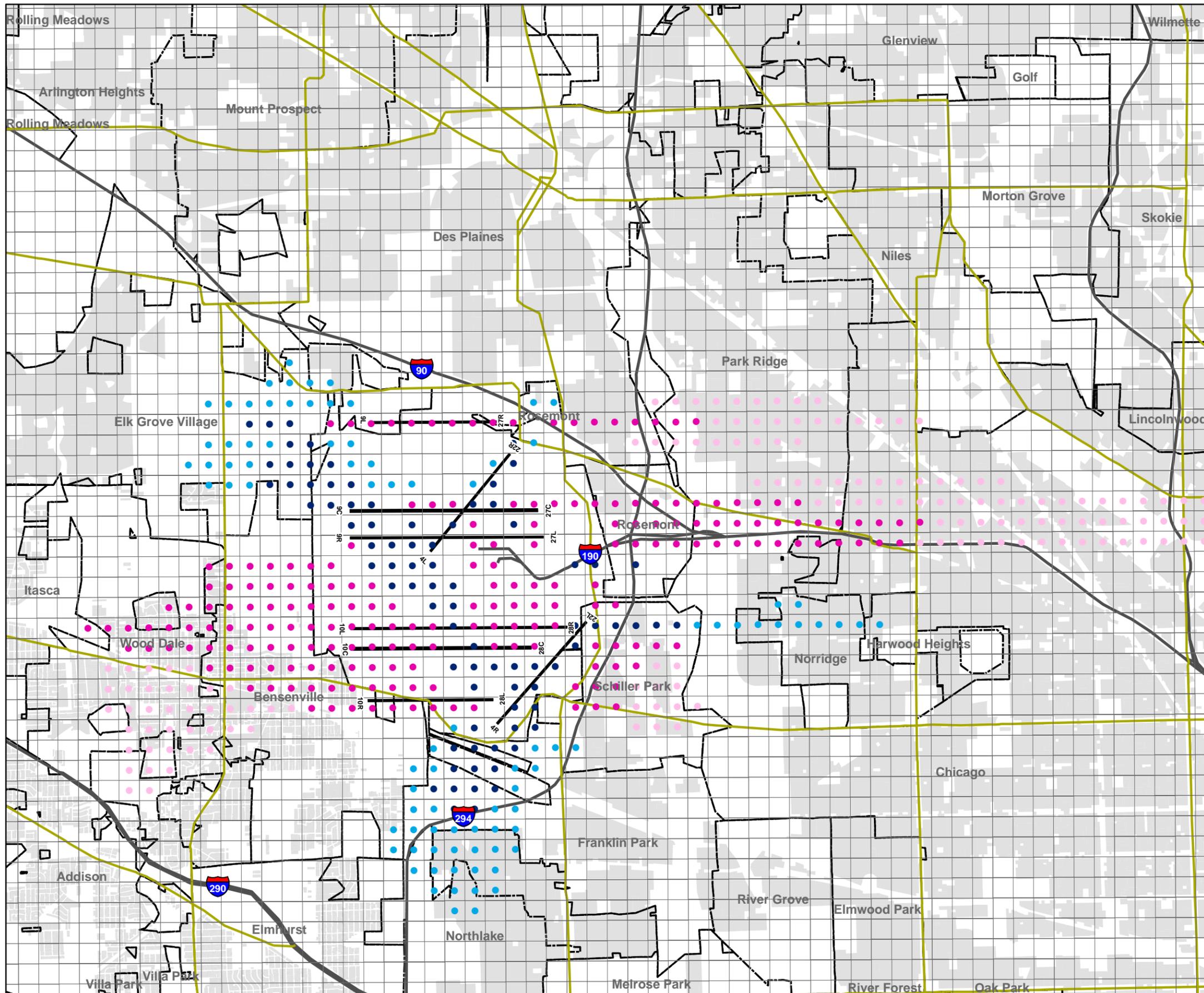
- Rail Roads
- Freeways
- Secondary Roads
- Local Streets
- 65 DNL
- 70 DNL
- 75 DNL
- Project Area
- Municipal Boundary
- Compatible Land Use
- Residential
- Public, Hospitals, Institutional
- Existing Airport Property



Noise Contours,
Build Out Phase
Alternative C

► Exhibit 5.1-10

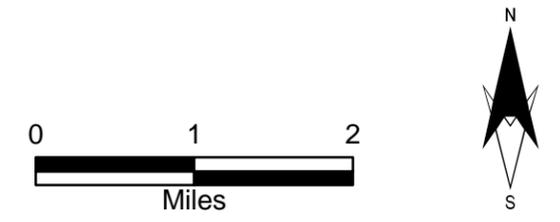
Source: StreetMapUSA, ESRI 2004. Land Use, DuPage Co. 2002, City of Park Ridge, 1996, Northeastern Illinois Planning Commission, 1992. Noise Contours: INM version 6.1, Leigh Fisher Associates, 2004.



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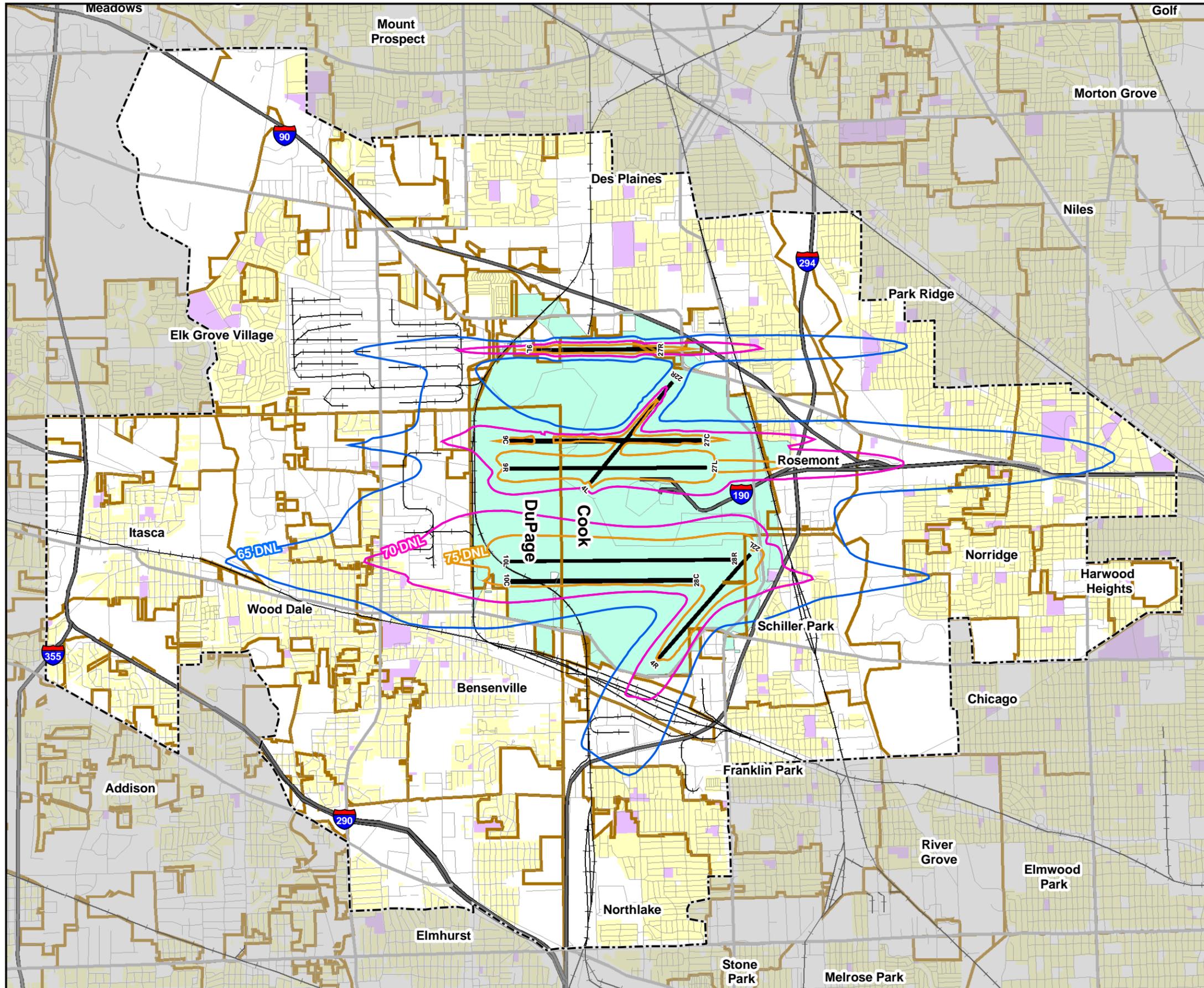
- Grid Points 65 DNL and Greater**
- 1.5 dB and Greater Increases
 - 1.5 dB and Greater Decreases
- Grid Points 60 DNL - 65 DNL**
- 3 dB and Greater Increases
 - 3 dB and Greater Decreases
- Freeways
 - Secondary Roads
 - 0.2 Nautical Mile Grids
 - Municipal Boundaries
 - Noise Sensitive Land Use



**Grid Points
Alternative C
Build Out Phase**

► Exhibit 5.1-11

Source: StreetMapUSA, ESRI 2004. Land Use, DuPage Co. 2002, City of Park Ridge, 1996, Northeastern Illinois Planning Commission, 1992. Grid Points: INM version 6.1 Leigh Fisher Associates, 2004.



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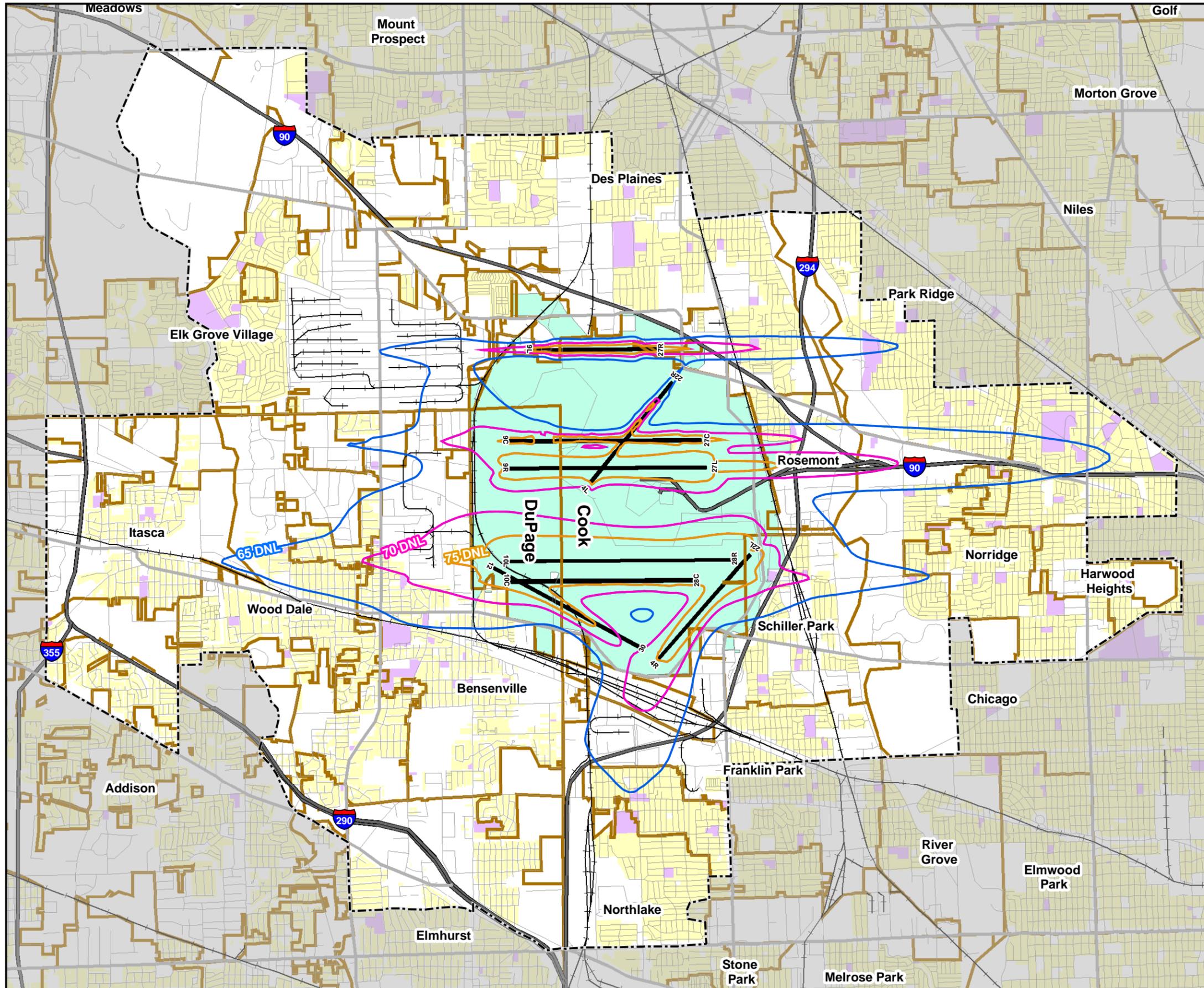
- Rail Roads
- Freeways
- Secondary Roads
- Local Streets
- 65 DNL
- 70 DNL
- 75 DNL
- Project Area
- Municipal Boundary
- Compatible Land Use
- Residential
- Public, Hospitals, Institutional
- Existing Airport Property



Noise Contours,
Build Out Phase
Alternative D

► Exhibit 5.1-12

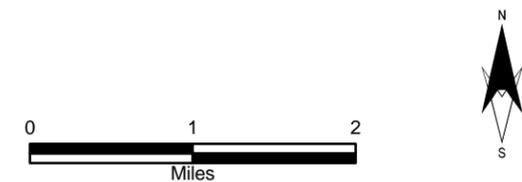
Source: StreetMapUSA, ESRI 2004. Land Use, DuPage Co. 2002, City of Park Ridge, 1996, Northeastern Illinois Planning Commission, 1992. Noise Contours: INM version 6.1, Leigh Fisher Associates, [TPC] 2004.



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- Rail Roads
- Freeways
- Secondary Roads
- Local Streets
- 65 DNL
- 70 DNL
- 75 DNL
- Project Area
- Municipal Boundary
- Compatible Land Use
- Residential
- Public, Hospitals, Institutional
- Existing Airport Property



Noise Contours,
Build Out Phase
Alternative G

► Exhibit 5.1-14

Source: StreetMapUSA, ESRI 2004. Land Use, DuPage Co. 2002, City of Park Ridge, 1996, Northeastern Illinois Planning Commission, 1992. Noise Contours: INM version 6.1, Leigh Fisher Associates, 2004.

Delayed Schedule

Under the Delayed Schedule, the completion of Build Out Alternatives (C, D and G) would be delayed one year to January 2014. With this delay, it is estimated that annual operations would be 1.4 percent greater for these Build Alternative during the first year of operations than was assumed under the Original Schedule presented above. This growth factor was applied to the operations input for the Build Alternative, and noise exposure impacts were recalculated accordingly.

Alternative A – No Action

As indicated in **Section 5.0, Introduction**, total annual airport operations for the Alternative A (No Action Alternative) would be constrained prior to 2014. Hence, no material change in the noise exposure forecast previously presented for this alternative in the Original Schedule section would be anticipated under the Delayed Schedule.

Alternative C

Estimates of the total area exposed to aircraft noise at or above DNL 65 for Alternative C under the Delayed Schedule are provided in **Table 5.1-13**. Under the Delayed Schedule, the total area exposed to DNL 65 and greater would increase by 106 acres or 1 percent; population exposed to DNL 65 and greater would increase by 275 people, or 1 percent; and housing units exposed to DNL 65 and greater would increase by 97 units, or 1 percent.

Alternative D

Estimates of the total area exposed to aircraft noise at or above DNL 65 for Alternative D under the Delayed Schedule are provided in **Table 5.1-13**. Under the Delayed Schedule, the total area exposed to DNL 65 and greater would increase by 108 acres or 1 percent; population exposed to DNL 65 and greater would decrease by 717 people or 3 percent; and housing units exposed to DNL 65 and greater would decrease by 217 units or 3 percent.

Alternative G

Estimates of the total area exposed to aircraft noise at or above DNL 65 for Alternative G under the Delayed Schedule are provided in **Table 5.1-13**. Under the Delayed Schedule, the total area exposed to DNL 65 and greater would increase by 110 acres or 1 percent; population exposed to DNL 65 and greater would increase by 442 people or 2 percent; and housing units exposed to DNL 65 and greater would increase by 152 units or 2 percent.

**TABLE 5.1-13
COMPARISON OF NOISE EXPOSURE ESTIMATES, BUILD OUT - ORIGINAL AND DELAYED SCHEDULES
(DNL 65 AND GREATER)**

Land Use (Acres)	Alternative C			Alternative D			Alternative G		
	Original	Delayed	Difference	Original	Delayed	Difference	Original	Delayed	Difference
Single-Family	1,260	1,285	25	1,283	1,312	29	1,275	1,306	31
Multifamily	88	90	2	96	99	3	86	89	3
Mobile-Homes	0	0	0	0	0	0	0	0	0
Commercial	419	425	6	442	445	3	404	411	7
Industrial	2,878	2,924	46	2,974	3,011	37	3,006	3,042	36
Public Parks	458	468	10	546	560	14	490	503	13
Institutional	162	166	4	174	177	3	167	170	3
Undeveloped	376	379	3	328	332	4	338	341	3
Airport	5,594	5,603	9	5,268	5,282	14	5,420	5,433	13
Water	28	29	1	76	77	1	30	31	1
Total	11,263	11,369	106	11,187	11,295	108	11,216	11,326	110
Noise Sensitive Facilities (count)									
Public Parks	11	11	0	11	11	0	9	9	0
Historic Properties	3	3	0	3	3	0	3	3	0
Places of Worship	6	6	0	6	6	0	6	6	0
Nursing Homes	0	0	0	0	0	0	0	0	0
Hospitals	1	1	0	1	1	0	1	1	0
Libraries	2	2	0	2	2	0	2	2	0
Universities	1	2	1	1	1	0	1	1	0
Schools	8	8	0	8	8	0	8	8	0
Sound Insulated Schools (included above)	7	7	0	7	7	0	7	7	0
Total	32	33	1	32	32	0	30	30	0
Population and Housing (count)									
Population	19,576	19,851	274	21,154	20,437	(717)	19,135	19,578	442
Housing Units	6,754	6,851	97	7,392	7,175	(217)	6,572	6,724	152
Single-Family Housing Units (included above)	5,221	5,302	81	5,574	5,412	(162)	5,181	5,295	114
Multi-Family Housing Units (included above)	1,533	1,549	16	1,818	1,763	(55)	1,391	1,429	38
Sound Insulated Housing Units (included above)	1,581	1,588	7	1,628	1,649	21	1,755	1,787	32

Note: Number in () denotes a negative value when compared to the No Action Alternative (Alternative A).
Sources: Housing and Population database: City of Chicago. Contours: Leigh Fisher Associates [TPC]
Land Use, Noise Sensitive Facilities, Population and Housing data: TPC Analysis, July 2005.

5.1.3.4 Build Out + 5

As in the Build Out phase, the three Build Alternatives under consideration would differ from each other at this stage of development (a more detailed description of the Build Alternatives is provided in **Section 3.4, Description of Alternatives Retained for Detailed Consideration in Chapter 3, Alternatives**). The following sections present the noise exposure contours, grid points, and total area exposure to DNL 65 and higher for each alternative in the Build Out + 5 phase. A comparison of potential noise exposure between alternatives in the Build Out + 5 phase is provided in **Table 5.1-2**.

Original and Compressed Schedule

Alternative A - No Action

Noise exposure contours for Alternative A (No Action Alternative) in the Build Out + 5 phase are presented on **Exhibit 5.1-16**. Estimates of the total area exposed to aircraft noise at or above DNL 65 for Alternative A (No Action Alternative) in the Build Out + 5 phase is provided in **Table 5.1-14**. As presented, a total of 12,897 acres would be exposed to DNL 65 and greater. These land areas would include 1,135 acres of single-family residential use; 72 acres of multifamily use; and 534 acres of public parks.

Alternative C

Noise exposure contours and grid points for Alternative C in the Build Out + 5 phase are presented on **Exhibits 5.1-17** and **5.1-18**, respectively. Estimates of the total area exposed to aircraft noise at or above DNL 65 for Alternative C in the Build Out + 5 phase is provided in **Tables 5.1-15**. The runway configuration for Alternative C in the Build Out + 5 phase would be the same as described above for Build Out. Compared to Alternative A (No Action Alternative), this alternative would alter runway use and the resulting pattern of noise exposure.

As presented in **Table 5.1-15**, a total of 12,609 acres would be exposed to DNL 65 and greater, representing a 2 percent decrease over Alternative A (No Action Alternative). These land areas would include 1,562 acres of single-family residential use; 117 acres of multifamily use; and 584 acres of public parks. Compared to Alternative A, this represents an increase of 427 acres of single-family residential use; 45 acres of multifamily use; and 50 acres of public parks. A complete comparison of Alternatives C to Alternative A is provided in **Table 5.1-15**.

Exhibit 5.1-17 depicts areas that are exposed to noise within the DNL 65, DNL 70 and DNL 75 contours for Alternative C. **Exhibit 5.1-18** depicts grid points at or above DNL 65 for Alternative C that would experience a significant increase in noise of DNL 1.5 dB or more when compared to Alternative A (No Action Alternative). These areas are generally located on the east and west sides of the Airport in the cities of Chicago, Park Ridge, Rosemont, Schiller Park, Des Plaines, Bensenville, Wood Dale, Elk Grove Village, Itasca, and unincorporated areas. The area on the east is comprised of four segments corresponding to the groupings of east-west runways. The largest area experiencing an increase in noise is oriented along the I-90 corridor.

The area on the west side is comprised of two segments corresponding to the southern half of the airfield and the far north runway. It is notable that there is no significant noise increase extending west of the 9C/27C and 9R/27L runway pair. Areas that would experience a DNL 1.5 dB decrease are located on the south, east and west sides of the Airport in the cities of Franklin Park, Northlake, Schiller Park, Chicago, Elk Grove Village, and unincorporated areas. The area on the west reflects the decommissioning of Runway 14R/32L. The area on the south reflects a decrease in the use of Runway 4R/22L and the area on the east is reflective of a change in the usage of renamed Runway 10L/28R.

As recommended for discussion by FAA Order 1050.1E, **Exhibit 5.1-18** also depicts grid points of DNL 60 to DNL 65 for Alternative C that would experience a change in noise of DNL 3.0 dB or more when compared to the No Action Alternative. These areas are located on the northwest and southwest sides of the Airport in the cities of Des Plaines, Park Ridge, Niles, Bensenville, Wood Dale, Addison, and unincorporated areas. The area on the northeast side can be characterized as an easterly extension of the DNL 1.5 dB increases associated with the 3 northern east-west runways. The area on the southwest is a southerly broadening of the contour for the DNL 1.5 dB increase. The areas that would experience a DNL 3.0 dB decrease are located on the northwest, northeast, east, and southeast in the cities of Elk Grove Village, Des Plaines, Chicago, Norridge, Schiller Park, Franklin Park, Northlake, and unincorporated areas. The decrease area on the northwest reflects the decommissioning of Runway 14R/32L. The area on the northeast reflects decreased usage of Runway 4L/22R, the area on the southeast reflects a decrease in the use of Runway 4R/22L and the decommissioning of Runway 14R/32L. The area on the east is reflective of a change in the usage of renamed Runway 10L/28R.

See **Exhibits 60** through **72** in **Attachment F-1, Appendix F, Noise**, for supplemental information on the grid point analysis for Alternative C in the Build Out + 5 phase including a depiction of points within the DNL 45 to DNL 60 range that would experience a change in noise of DNL 5.0 dB or more when compared to the No Action Alternative (Alternative A).

Alternative D

Noise exposure contours and grid points for Alternative D in the Build Out + 5 phase are presented on **Exhibits 5.1-19** and **5.1-20**, respectively. Estimates of the total area exposed to aircraft noise at or above DNL 65 for Alternative D in the Build Out + 5 phase is provided in **Table 5.1-16**. The runway configuration for Alternative D in the Build Out + 5 phase would be the same as described above for the Build Out phase. Compared to Alternative A (No Action Alternative), this alternative would alter runway use and the resulting pattern of noise exposure.

As presented in **Table 5.1-16**, a total of 12,525 acres would be exposed to DNL 65 and greater, representing a 3 percent increase over Alternative A (No Action Alternative). These land areas would include 1,519 acres of single-family residential use; 126 acres of multifamily use; and 705 acres of public parks. Compared to Alternative A, this represents an increase of 384 acres of single-family residential use; 54 acres of multifamily use; and 171 acres of public parks. A complete comparison of Alternatives D to Alternative A is provided in **Table 5.1-16**.

Exhibit 5.1-19 depicts areas that are exposed to noise within the DNL 65, DNL 70 and DNL 75 contours for Alternative D. **Exhibit 5.1-20** depicts grid points at or above DNL 65 for Alternative D that would experience a significant increase in noise of DNL 1.5 dB or more when compared to Alternative A (No Action Alternative). These areas are generally located on the east and west sides of the Airport in the cities of Chicago, Park Ridge, Rosemont, Schiller Park, Des Plaines, Bensenville, Wood Dale, Elk Grove Village, Itasca, and unincorporated areas. The area on the east side is comprised of four segments corresponding to the groupings of east-west runways. The largest area on the east side experiencing an increase in noise is an area oriented along the I-90 corridor. The area on the west side is comprised of two segments corresponding to the southern half of the airfield and the far north runway. It is notable that there is no significant noise increase extending west of the 9C/27C and 9R/27L runway pair. Areas that would experience a DNL 1.5 dB decrease are located on the south, east and west sides of the Airport in the cities of Franklin Park, Northlake, Schiller Park, Chicago, Elk Grove Village, and unincorporated areas. The area on the west reflects the decommissioning of Runway 14R/32L. The area on the south reflects a decrease in the use of Runway 4R/22L and the area on the east is reflective of a change in the usage of renamed Runway 10L/28R.

As recommended for discussion by FAA Order 1050.1E, **Exhibit 5.1-20** also depicts grid points of DNL 60 to DNL 65 for Alternative D that would experience a change in noise of DNL 3.0 dB or more when compared to the No Action Alternative. These areas are located on the northwest and southwest sides of the Airport in the cities of Des Plaines, Park Ridge, Niles, Bensenville, Wood Dale, Addison, and unincorporated areas. The area on the northeast side can be characterized as an easterly extension of the DNL 1.5 dB increases associated with the three northern east-west runways. The area on the southwest is a southerly broadening of the contour for the DNL 1.5 dB increase. The areas that would experience a DNL 3.0 dB decrease are located on the northwest, northeast, east, and southeast in the cities of Elk Grove Village, Des Plaines, Chicago, Norridge, Schiller Park, Franklin Park, Northlake, and unincorporated areas. The decrease area on the northwest reflects the decommissioning of Runway 14R/32L. The area on the northeast reflects decreased usage of Runway 4L/22R, the area on the southeast reflects a decrease in the use of Runway 4R/22L and the decommissioning of Runway 14R/32L. The area on the east is reflective of a change in the usage of renamed Runway 10L/28R.

See **Exhibits 73 through 86** in **Attachment F-1, Appendix F, Noise**, for supplemental information on the grid point analysis for Alternative D in the Build Out + 5 phase including a depiction of points within the DNL 45 to DNL 60 range that would experience a change in noise of DNL 5.0 dB or more when compared to the No Action Alternative (Alternative A).

Alternative G

Noise exposure contours and grid points for Alternative G in the Build Out + 5 phase are presented on **Exhibits 5.1-21** and **5.1-22**, respectively. Estimates of the total area exposed to aircraft noise at or above DNL 65 for Alternative G in the Build Out + 5 phase is provided in **Table 5.1-17**. The runway configuration for Alternative G in the Build Out + 5 phase would be the same as described above for the Build Out phase. Compared to Alternative A (No Action Alternative), this alternative would alter runway use and the resulting pattern of noise exposure.

As presented in **Table 5.1-17**, a total of 12,623 acres would be exposed to DNL 65 and greater, representing a 2 percent decrease over Alternative A (No Action Alternative). These land areas would include 1,546 acres of single-family residential use; 122 acres of multifamily use; and 621 acres of public parks. Compared to Alternative A, this represents an increase of 411 acres of single-family residential use; 50 acres of multifamily use; and 87 acres of public parks. A complete comparison of Alternatives G to Alternative A is provided in **Table 5.1-17**.

Exhibit 5.1-21 depicts areas that are exposed to noise within the DNL 65, DNL 70 and DNL 75 contours for Alternative G. **Exhibit 5.1-22** depicts grid points at or above DNL 65 for Alternative G that would experience a significant increase in noise of DNL 1.5 dB or more when compared to the No Action Alternative. These areas are generally located on the east and west sides of the Airport in the cities of Chicago, Park Ridge, Rosemont, Schiller Park, Des Plaines, Bensenville, Wood Dale, Elk Grove Village, Itasca, and unincorporated areas. The area on the east side is comprised of four segments corresponding to the groupings of east-west runways. The largest area on the east side experiencing an increase in noise is an area oriented along the I-90 corridor. The area on the west side is comprised of two segments corresponding to the southern half of the airfield and the far north runway. It is notable that there is no significant noise increase extending west of the 9C/27C and 9R/27L runway pair. Areas that would experience a DNL 1.5 dB decrease are located on the south, east and west sides of the Airport in the cities of Franklin Park, Northlake, Schiller Park, Chicago, Elk Grove Village, and unincorporated areas. The area on the west reflects the decommissioning of Runway 14R/32L. The area on the south reflects a decrease in the use of Runway 4R/22L and the area on the east is reflective of a change in the usage of renamed Runway 10L/28R.

As recommended for discussion by FAA Order 1050.1E, **Exhibit 5.1-22** also depicts grid points of DNL 60 to DNL 65 for Alternative G that would experience a change in noise of DNL 3.0 dB or more when compared to the No Action Alternative. These areas are the same as for Alternative D, and are located on the northwest and southwest sides of the Airport in the cities of Des Plaines, Park Ridge, Niles, Bensenville, Wood Dale, Addison, and unincorporated areas. The area on the northeast side can be characterized as an easterly extension of the DNL 1.5 dB increases associated with the 3 northern east-west runways. The area on the southwest is a southerly broadening of the contour for the DNL 1.5 dB increase. The areas that would experience a DNL 3.0 dB decrease are located on the northwest, northeast, east, and southeast in the cities of Elk Grove Village, Des Plaines, Chicago, Norridge, Schiller Park, Franklin Park, Northlake, and unincorporated areas. The area on the northwest reflects the decommissioning of Runway 14R/32L. The area on the northeast reflects decreased usage of Runway 4L/22R, the area on the southeast reflects a decrease in the use of Runway 4R/22L and the decommissioning of Runway 14R/32L. The area on the east is reflective of a change in the usage of renamed Runway 10L/28R.

See **Exhibits 87 through 100** in **Attachment F-1, Appendix F, Noise**, for supplemental information on the grid point analysis for Alternative G in the Build Out + 5 phase including a depiction of points within the DNL 45 to DNL 60 range that would experience a change in noise of DNL 5.0 dB or more when compared to the No Action Alternative (Alternative A).

**TABLE 5.1-14
NOISE EXPOSURE, BUILD OUT + 5 – ALTERNATIVE A
(NO ACTION ALTERNATIVE)**

Land Use (Acres)	Contours			Total
	65-70	70-75	75+	
Single-Family	1,091	42	2	1,135
Multifamily	71	1	0	72
Mobile-Homes	3	0	0	3
Commercial	283	22	0	305
Industrial	3,466	907	19	4,392
Public Parks	452	74	8	534
Institutional	108	8	0	116
Undeveloped	258	34	16	308
Airport	2,214	1,780	1,995	5,989
Water	38	5	0	43
Total	7,984	2,873	2,040	12,897
Noise Sensitive Facilities (count)				
Public Parks	19	0	0	19
Historic Properties	3	1	0	4
Places of Worship	7	0	0	7
Nursing Homes	0	0	0	0
Hospitals	0	0	0	0
Libraries	0	0	0	0
Universities	0	1	0	1
Schools	2	1	0	3
<i>Sound Insulated Schools (included above)</i>	<i>1</i>	<i>1</i>	<i>0</i>	<i>2</i>
Total	31	3	0	34
Population and Housing (count)				
Population	16,551	905	44	17,500
Housing Units	6,090	301	14	6,405
<i>Single-Family Housing Units (included above)</i>	<i>4,246</i>	<i>163</i>	<i>8</i>	<i>4,417</i>
<i>Multi-Family Housing Units (included above)</i>	<i>1,844</i>	<i>138</i>	<i>6</i>	<i>1,988</i>
<i>Sound Insulated Housing Units (included above)</i>	<i>2,383</i>	<i>202</i>	<i>11</i>	<i>2,596</i>
Sources: Housing and Population database: City of Chicago Contours: Leigh Fisher Associates [TPC] Land Use, Noise Sensitive Facilities, Population and Housing data: TPC Analysis, July 2005.				

**TABLE 5.1-15
NOISE EXPOSURE, BUILD OUT + 5 – ALTERNATIVE C**

Land Use (Acres)	Contours				Difference from No Action (Alternative A) (Table 5.1-14)			
	65-70	70-75	75+	Total	65-70	70-75	75+	Total
Single-Family	1,449	112	1	1,562	3578	70	(1)	427
Multifamily	90	27	0	117	19	26	0	45
Mobile-Homes	0	0	0	0	(3)	0	0	(3)
Commercial	480	44	2	526	197	22	2	221
Industrial	2,691	693	36	3,420	(775)	(214)	17	(972)
Public Parks	534	50	0	584	82	(24)	(8)	50
Institutional	177	29	1	207	69	21	0	91
Undeveloped	215	162	41	418	(43)	128	25	110
Airport	1,869	1,713	2,157	5,739	(345)	(67)	162	(250)
Water	32	4	0	36	(6)	(1)	0	(7)
Total	7,537	2,834	2,238	12,609	(447)	(39)	198	(288)
Noise Sensitive Facilities (count)								
Public Parks	23	1	0	24	4	1	0	5
Historic Properties	3	1	0	4	0	0	0	0
Places of Worship	10	0	0	10	3	0	0	3
Nursing Homes	0	0	0	0	0	0	0	0
Hospitals	1	0	0	1	1	0	0	1
Libraries	2	0	0	2	2	0	0	2
Universities	0	1	0	1	0	0	0	0
Schools	7	2	0	9	5	1	0	6
Sound Insulated Schools (included above)	6	2	0	8	5	1	0	6
Total	46	5	0	51	15	2	0	17
Population and Housing (count)								
Population	21,755	2,230	0	23,985	5,204	1,325	(44)	6,485
Housing Units	7,762	742	0	8,504	1,672	441	(14)	2,099
Single-Family Housing Units (included above)	5,957	399	0	6,356	1,711	236	(8)	1,939
Multi-Family Housing Units (included above)	1,805	343	0	2,148	(39)	205	(6)	160
Sound Insulated Housing Units (included above)	1,431	320	0	1,751	(952)	118	(11)	(845)

Note: Number in () denotes a negative value when compared to the No Action Alternative (Alternative A).

Sources: Housing and Population database: City of Chicago. Contours: Leigh Fisher Associates [TPC].

Land Use, Noise Sensitive Facilities, Population and Housing data: TPC Analysis, July 2005.

**TABLE 5.1-16
NOISE EXPOSURE, BUILD OUT + 5 – ALTERNATIVE D**

Land Use (Acres)	Contours					Difference from No Action (Alternative A) (Table 5.1-14)				
	65-70	70-75	75+	Total	Total	65-70	70-75	75+	Total	Total
Single-Family	1,390	128	1	1,519	1,519	299	86	(1)	384	384
Multifamily	92	34	0	126	126	21	33	0	54	54
Mobile-Homes	0	0	0	0	0	(3)	0	0	(3)	(3)
Commercial	480	51	2	533	533	197	29	2	228	228
Industrial	2,741	752	37	3,530	3,530	(725)	(155)	18	(862)	(862)
Public Parks	652	53	0	705	705	200	(21)	(8)	171	171
Institutional	172	34	1	207	207	64	26	1	91	91
Undeveloped	229	126	15	370	370	(29)	92	(1)	62	62
Airport	1,734	1,620	2,132	5,486	5,486	(480)	(160)	137	(503)	(503)
Water	45	4	0	49	49	7	(1)	0	6	6
Total	7,535	2,802	2,188	12,525	12,525	(449)	(71)	148	(372)	(372)
Noise Sensitive Facilities (count)										
Public Parks	17	2	0	19	19	(2)	2	0	0	0
Historic Properties	3	0	0	3	3	0	(1)	0	(1)	(1)
Places of Worship	8	0	0	8	8	1	0	0	1	1
Nursing Homes	0	0	0	0	0	0	0	0	0	0
Hospitals	1	0	0	1	1	1	0	0	1	1
Libraries	2	0	0	2	2	2	0	0	2	2
Universities	0	1	0	1	1	0	0	0	0	0
Schools	8	2	0	10	10	6	1	0	7	7
Sound Insulated Schools (included above)	6	2	0	8	8	5	1	0	6	6
Total	39	5	0	44	44	8	2	0	10	10
Population and Housing (count)										
Population	20,626	2,754	0	23,380	23,380	4,074	1,849	(44)	5,880	5,880
Housing Units	7,445	909	0	8,354	8,354	1,355	608	(14)	1,949	1,949
Single-Family Housing Units (included above)	5,722	461	0	6,183	6,183	1,476	298	(8)	1,766	1,766
Multi-Family Housing Units (included above)	1,723	448	0	2,171	2,171	(121)	310	(6)	183	183
Sound Insulated Housing Units (included above)	1,454	353	0	1,807	1,807	(929)	151	(11)	(789)	(789)

Note: Number in () denotes a negative value when compared to the No Action Alternative (Alternative A).

Sources: Housing and Population database: City of Chicago. Contours: Leigh Fisher Associates [TPC]

Land Use, Noise Sensitive Facilities, Population and Housing data: TPC Analysis, July 2005.

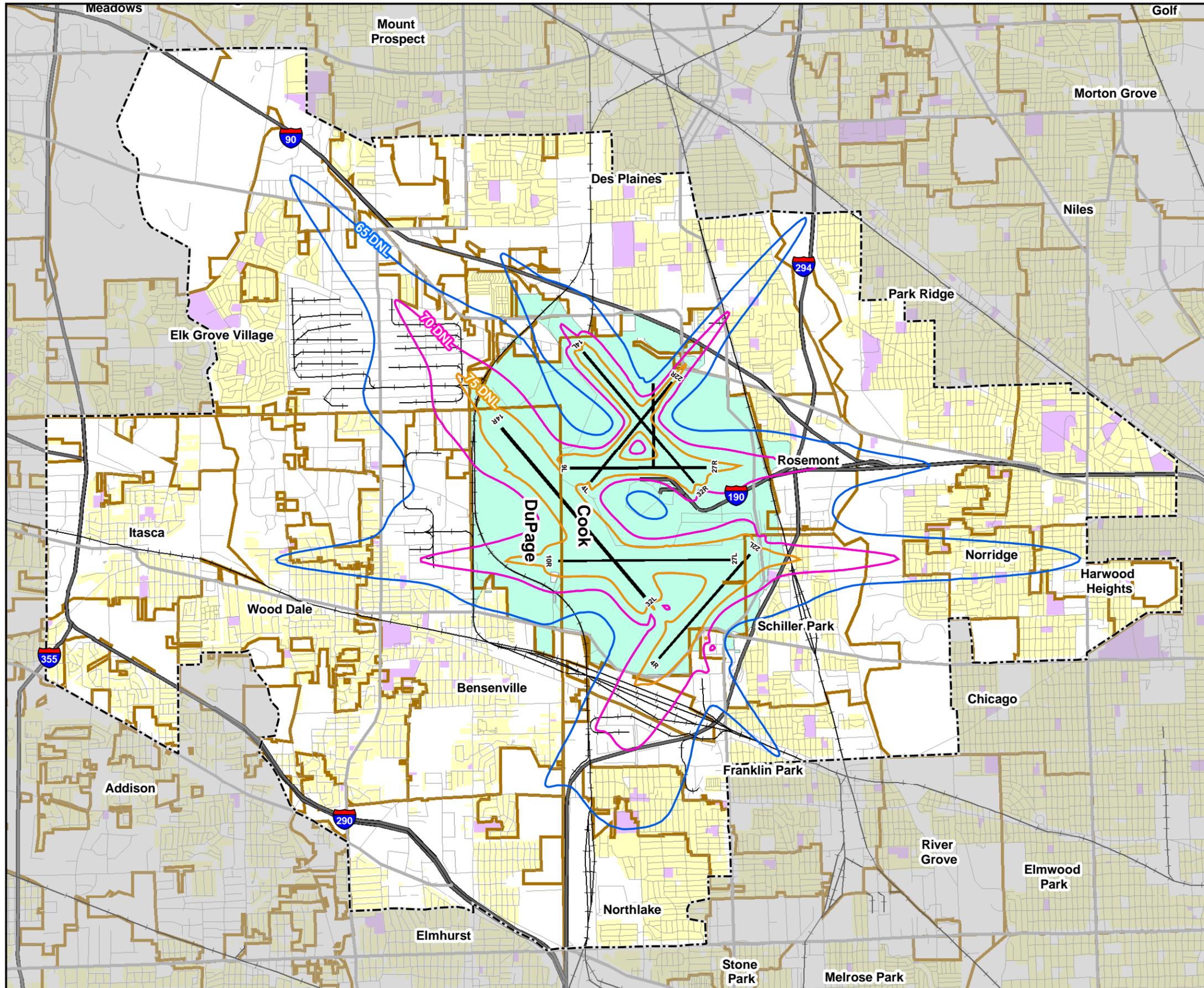
**TABLE 5.1-17
NOISE EXPOSURE, BUILD OUT + 5 – ALTERNATIVE G**

Land Use (Acres)	Contours				Total	Difference from No Action (Alternative A) (Table 5.1-14)				Total
	65-70	70-75	75+	Total		65-70	70-75	75+	Total	
Single-Family	1,421	124	1	1,546	330	82	(1)	411		
Multifamily	94	28	0	122	23	27	0	50		
Mobile-Homes	0	0	0	0	(3)	0	0	(3)		
Commercial	459	47	2	508	176	25	2	203		
Industrial	2,802	744	39	3,585	(664)	(163)	20	(807)		
Public Parks	570	51	0	621	118	(23)	(8)	87		
Institutional	173	30	1	204	65	22	1	88		
Undeveloped	216	114	46	376	(42)	80	30	68		
Airport	1,856	1,651	2,115	5,622	(358)	(129)	120	(367)		
Water	35	4	0	39	(3)	(1)	0	(4)		
Total	7,626	2,793	2,204	12,623	(358)	(80)	164	(274)		
Noise Sensitive Facilities (count)										
Public Parks	17	2	0	19	(2)	2	0	0		
Historic Properties	3	0	0	3	0	(1)	0	(1)		
Places of Worship	8	0	0	8	1	0	0	1		
Nursing Homes	0	0	0	0	0	0	0	0		
Hospitals	1	0	0	1	1	0	0	1		
Libraries	2	0	0	2	2	0	0	2		
Universities	0	1	0	1	0	0	0	0		
Schools	8	2	0	10	6	1	0	7		
Sound Insulated Schools (included above)	6	2	0	8	5	1	0	6		
Total	39	5	0	44	8	2	0	10		
Population and Housing (count)										
Population	20,473	2,461	0	22,935	3,922	1,556	(44)	5,435		
Housing Units	7,245	811	0	8,056	1,155	510	(14)	1,651		
Single-Family Housing Units (included above)	5,652	448	0	6,100	1,406	285	(8)	1,683		
Multi-Family Housing Units (included above)	1,593	363	0	1,956	(251)	225	(6)	(32)		
Sound Insulated Housing Units (included above)	1,545	339	0	1,884	(838)	137	(11)	(712)		

Note: Number in () denotes a negative value when compared to the No Action Alternative (Alternative A).

Sources: Housing and Population database: City of Chicago. Contours: Leigh Fisher Associates [TPC].

Land Use, Noise Sensitive Facilities, Population and Housing data: TPC Analysis, July 2005.



Chicago

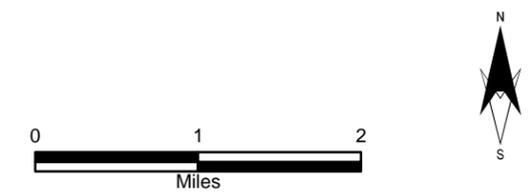
O'Hare

International

Airport

O'Hare Modernization
Environmental Impact Statement

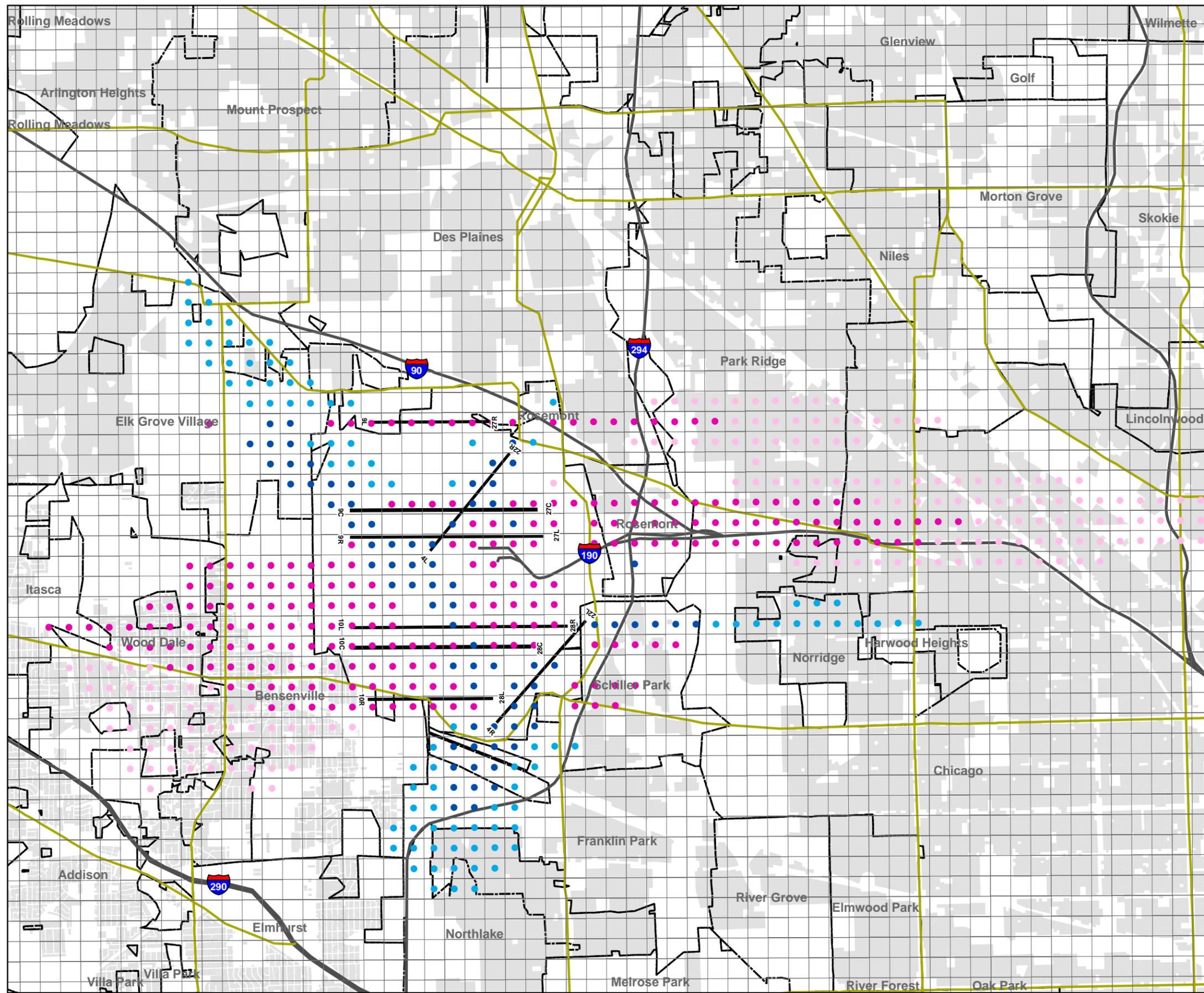
- Rail Roads
- Freeways
- Secondary Roads
- Local Streets
- 65 DNL
- 70 DNL
- 75 DNL
- Project Area
- Municipal Boundary
- Compatible Land Use
- Residential
- Public, Hospitals, Institutional
- Existing Airport Property



**Noise Contours,
Build Out +5 Years
Alternative A (No Action)**

► Exhibit 5.1-16

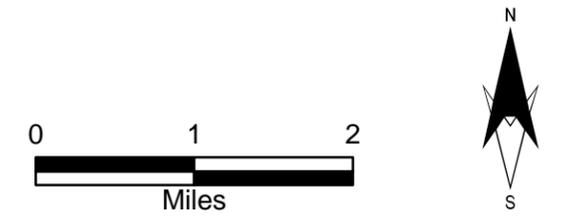
Source: StreetMapUSA, ESRI 2004. Land Use, DuPage Co. 2002, City of Park Ridge, 1996, Northeastern Illinois Planning Commission, 1992. Noise Contours: INM version 6.1, Leigh Fisher Associates, 2004.



Chicago
O'Hare
International
Airport

O'Hare Modernization
Environmental Impact Statement

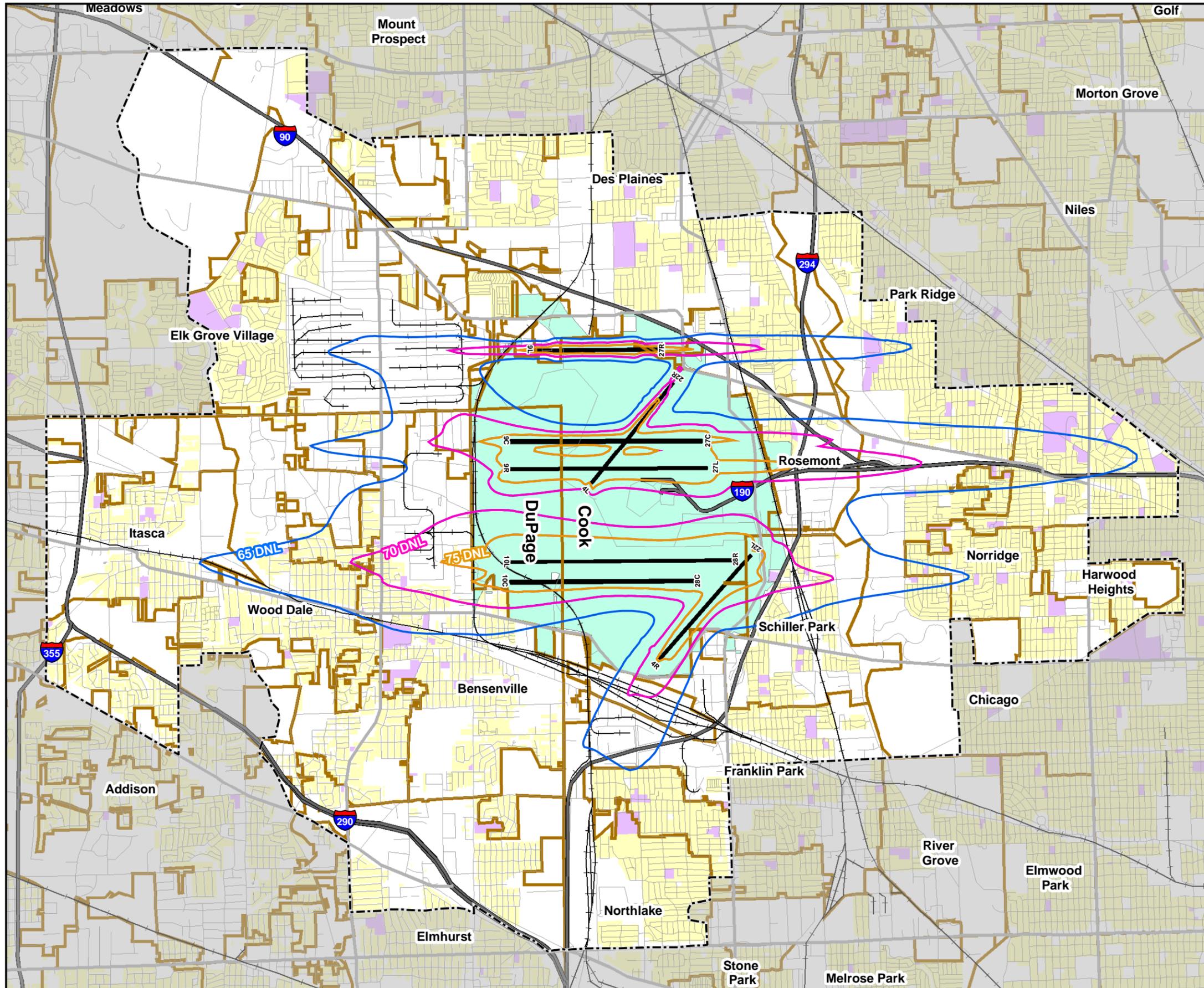
- Grid Points 65 DNL and Greater**
- 1.5 dB and Greater Increases
 - 1.5 dB and Greater Decreases
- Grid Points 60 DNL - 65 DNL**
- 3 dB and Greater Increases
 - 3 dB and Greater Decreases
- Freeways
 - Secondary Roads
 - 0.2 Nautical Mile Grids
 - Municipal Boundaries
 - Noise Sensitive Land Use



**Grid Points
Alternative C
Build Out +5 Years Phase**

► Exhibit 5.1-18

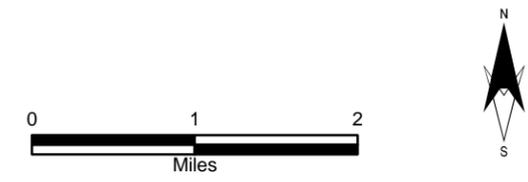
Source: StreetMapUSA, ESRI 2004. Land Use, DuPage Co. 2002, City of Park Ridge, 1996, Northeastern Illinois Planning Commission, 1992. Grid Points: INM version 6.1 Leigh Fisher Associates, 2004.



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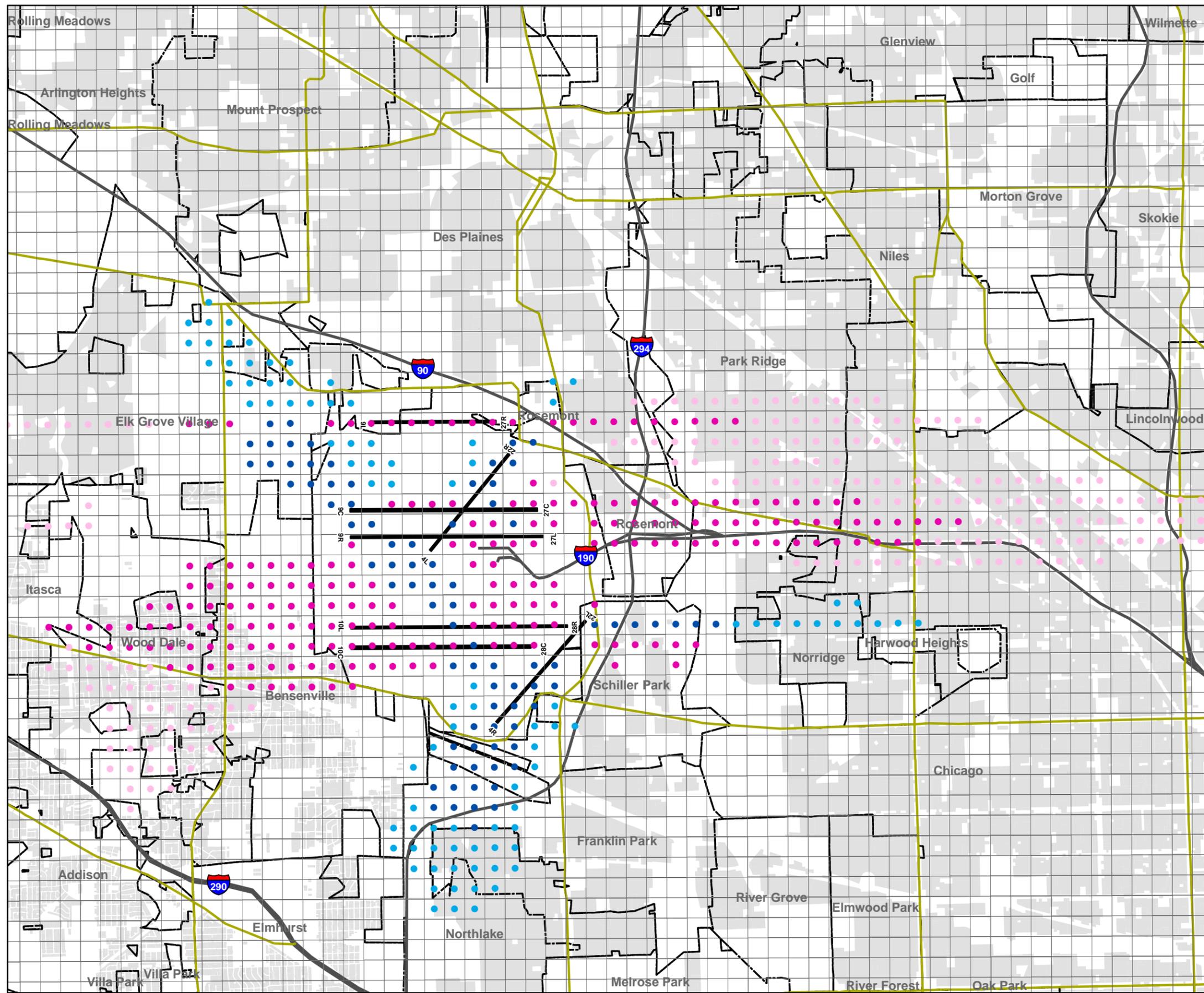
- +— Rail Roads
- Freeways
- Secondary Roads
- Local Streets
- 65 DNL
- 70 DNL
- 75 DNL
- ▭ Project Area
- ▭ Municipal Boundary
- ▭ Compatible Land Use
- ▭ Residential
- ▭ Public, Hospitals, Institutional
- ▭ Existing Airport Property



**Noise Contours,
Build Out Phase +5 Years
Alternative D**

► Exhibit 5.1-19

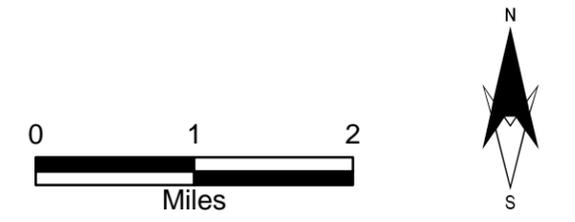
Source: StreetMapUSA, ESRI 2004. Land Use, DuPage Co. 2002, City of Park Ridge, 1996, Northeastern Illinois Planning Commission, 1992. Noise Contours: INM version 6.1, Leigh Fisher Associates, 2004.



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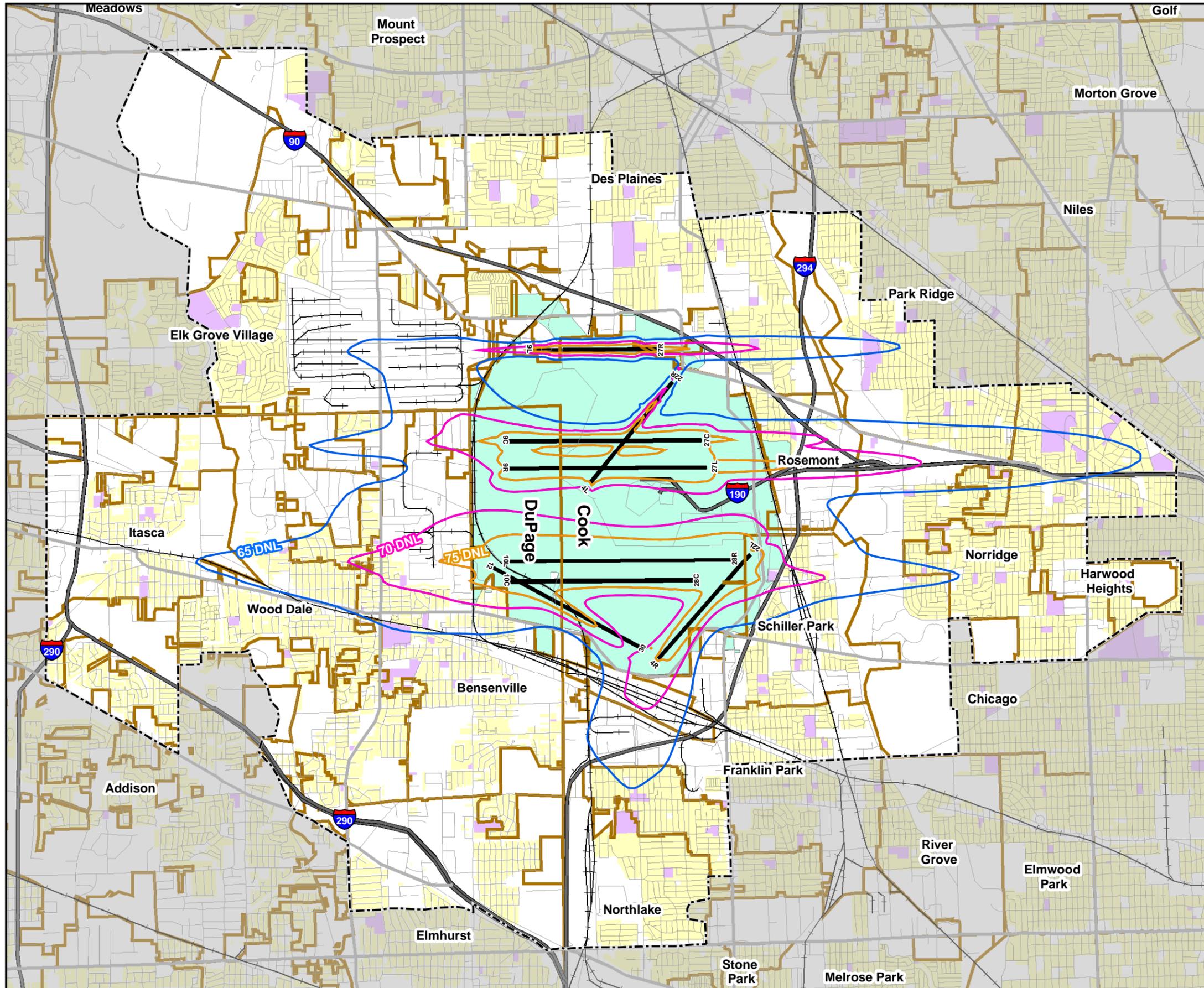
- Grid Points 65 DNL and Greater**
- 1.5 dB and Greater Increases
 - 1.5 dB and Greater Decreases
- Grid Points 60 DNL - 65 DNL**
- 3 dB and Greater Increases
 - 3 dB and Greater Decreases
- Freeways
 - Secondary Roads
 - 0.2 Nautical Mile Grids
 - Municipal Boundaries
 - Noise Sensitive Land Use



**Grid Points
Alternative D
Build Out +5 Years Phase**

► Exhibit 5.1-20

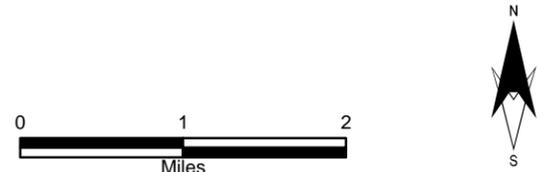
Source: StreetMapUSA, ESRI 2004. Land Use, DuPage Co. 2002, City of Park Ridge, 1996, Northeastern Illinois Planning Commission, 1992. Grid Points: INM version 6.1 Leigh Fisher Associates, 2004.



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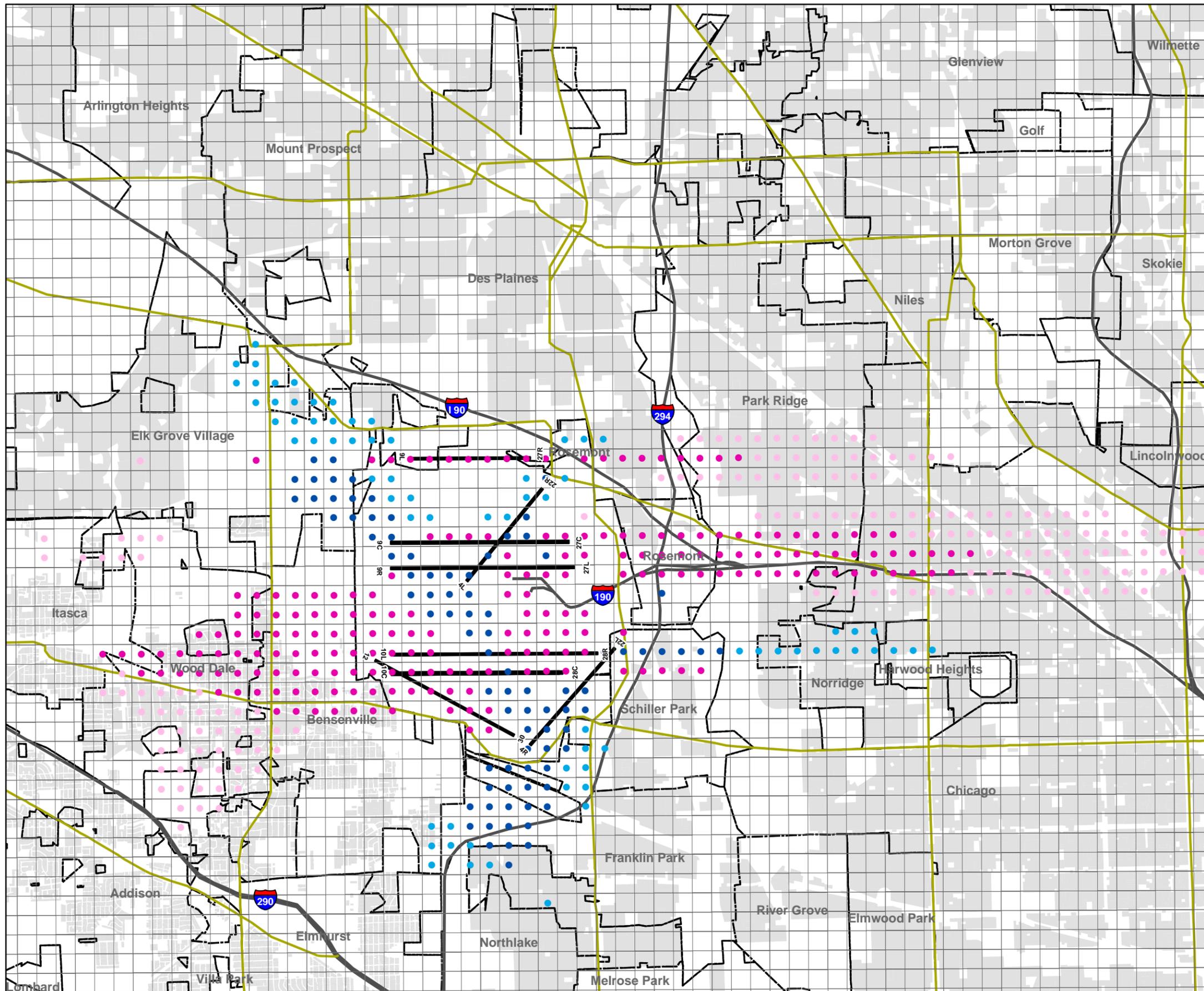
- +— Rail Roads
- Freeways
- Secondary Roads
- Local Streets
- 65 DNL
- 70 DNL
- 75 DNL
- ▭ Project Area
- ▭ Municipal Boundary
- ▭ Compatible Land Use
- ▭ Residential
- ▭ Public, Hospitals, Institutional
- ▭ Existing Airport Property



**Noise Contours,
Build Out +5 Years Phase
Alternative G**

► Exhibit 5.1-21

Source: StreetMapUSA, ESRI 2004. Land Use, DuPage Co. 2002, City of Park Ridge, 1996, Northeastern Illinois Planning Commission, 1992. Noise Contours: INM version 6.1, Leigh Fisher Associates, 2004.



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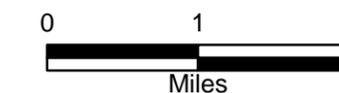
Grid Points 65 DNL and Greater

- 1.5 dB and Greater Increases
- 1.5 dB and Greater Decreases

Grid Points 60 DNL - 65 DNL

- 3 dB and Greater Increases
- 3 dB and Greater Decreases

- Freeways
- Secondary Roads
- 0.2 Nautical Mile Grids
- Municipal Boundaries
- Noise Sensitive Land Use



**Grid Points
Alternative G
Build Out +5 Years Phase**

► Exhibit 5.1-22

Source: StreetMapUSA, ESRI 2004. Land Use, DuPage Co. 2002, City of Park Ridge, 1996, Northeastern Illinois Planning Commission, 1992. Grid Points: INM version 6.1 Leigh Fisher Associates, 2004.

Delayed Schedule

Under the Delayed Schedule, the completion of Build Out + 5 Alternatives (C, D and G) would be delayed one year to January 2019. With this delay, it is estimated that annual operations would be 2.4 percent greater for these Build Alternative during the first year of operations than was assumed under the Original Schedule presented above. This growth factor was applied to the operations input for the Build Alternative, and the noise exposure impacts were recalculated accordingly.

Alternative A – No Action

Total annual airport operations for Alternative A (No Action Alternative) would be constrained prior to 2019. Hence, no material change in the noise exposure forecast previously presented for this alternative in the Original Schedule section would be anticipated under the Delayed Schedule.

Alternatives C

Estimates of the total area exposed to aircraft noise at or above DNL 65 for Alternative C under the Delayed Schedule are provided in **Table 5.1-18**. Under the Delayed Schedule, the total area exposed to DNL 65 and greater would increase by 206 acres, or 2 percent; population exposed to DNL 65 and greater would increase by 461 people, or 2 percent; and housing units exposed to DNL 65 and greater would increase by 175 units, or 2 percent.

Alternative D

Estimates of the total area exposed to aircraft noise at or above DNL 65 for Alternative D under the Delayed Schedule are provided in **Table 5.1-18**. Under the Delayed Schedule, the total area exposed to DNL 65 and greater would increase by 214 acres, or 2 percent; population exposed to DNL 65 and greater would increase by 651 people or 3 percent; and housing units exposed to DNL 65 and greater would increase by 271 units or 3 percent.

Alternative G

Estimates of the total area exposed to aircraft noise at or above DNL 65 for Alternative G under the Delayed Schedule are provided in **Table 5.1-18**. Under the Delayed Schedule, the total area exposed to DNL 65 and greater would increase by 208 acres or 2 percent; population exposed to DNL 65 and greater would increase by 688 people, or 3 percent; and housing units exposed to DNL 65 and greater would increase by 279 units, or 3 percent.

**TABLE 5.1-18
COMPARISON OF NOISE EXPOSURE ESTIMATES, BUILD OUT + 5 - ORIGINAL AND DELAYED SCHEDULES
(DNL 65 AND GREATER)**

Land Use (Acres)	Alternative C			Alternative D			Alternative G		
	Original	Delayed	Difference	Original	Delayed	Difference	Original	Delayed	Difference
Single-Family	1,562	1,608	46	1,519	1,572	53	1,546	1,599	53
Multifamily	117	122	5	126	131	5	122	126	4
Mobile-Homes	0	0	0	0	0	0	0	0	0
Commercial	526	547	21	533	546	13	508	525	17
Industrial	3,420	3,499	79	3,530	3,610	80	3,585	3,662	77
Public Parks	584	606	22	705	727	22	621	643	22
Institutional	207	216	9	207	213	6	204	211	7
Undeveloped	418	427	9	370	379	9	376	385	9
Airport	5,739	5,753	14	5,485	5,510	25	5,622	5,640	18
Water	36	37	1	50	51	1	39	40	1
Total	12,609	12,815	206	12,525	12,739	214	12,623	12,831	208
Noise Sensitive Facilities (count)									
Public Parks	24	24	0	19	19	0	19	19	0
Historic Properties	4	4	0	3	3	0	3	7	4
Places of Worship	10	10	0	8	8	0	8	8	0
Nursing Homes	0	0	0	0	0	0	0	0	0
Hospitals	1	1	0	1	1	0	1	1	0
Libraries	2	2	0	2	2	0	2	2	0
Universities	1	1	0	1	1	0	1	1	0
Schools	9	9	0	10	10	0	10	10	0
Sound Insulated Schools (included above)	8	8	0	8	8	0	8	8	0
Total	51	51	0	44	44	0	44	48	4
Population and Housing (count)									
Population	23,985	24,446	461	23,380	24,031	651	22,935	23,623	688
Housing Units	8,504	8,679	175	8,354	8,625	271	8,056	8,335	279
Single-Family Housing Units (included above)	6,356	6,511	155	6,183	6,354	171	6,100	6,247	147
Multi-Family Housing Units (included above)	2,148	2,168	20	2,171	2,271	100	1,956	2,088	132
Sound Insulated Housing Units (included above)	1,751	1,768	17	1,807	1,833	26	1,884	1,923	39

Sources: Housing and Population database: City of Chicago, Contours: Leigh Fisher Associates [TPC]
Land Use, Noise Sensitive Facilities, Population and Housing data: TPC Analysis, July 2005.

5.1.4 Supplemental Noise Studies

The following sections present the results of supplemental studies intended to assess aircraft ground noise, vehicle traffic noise, and rail traffic noise with the No Action and the Build Alternatives. Only the Original Schedule was utilized for these studies since the results of the analyses are anticipated to be similar under the Compressed and Delayed Schedules.

5.1.4.1 Aircraft Ground Operations

An evaluation of potential noise impacts caused by aircraft ground operations in Alternative A (No Action Alternative) and Alternative C³ in the Build Out and Build Out + 5 phases was prepared for this EIS. Values of DNL were computed for both alternatives at noise prediction sites chosen to represent noise-sensitive locations on all sides of the Airport. The projections included the following sources of aircraft ground operations noise:

- Aircraft taxiing between runways, passenger terminal areas, or air cargo areas
- Aircraft idling while in departure queues
- Aircraft idling while holding near gate areas
- Aircraft ground maintenance run-ups in the Ground Run-up Enclosure (GRE) and at the existing Runway 9R (potential future Runway 10L) hold pad
- Auxiliary Power Units (APUs) on cargo aircraft parked in the air cargo areas⁴

For each type of operation and every prediction site, the modeling effort accounted for (1) sound propagation characteristics between the noise source and the prediction site; (2) noise emission level data for each type of aircraft ground operation; and (3) aircraft operational data (i.e. how many of each type of operation occurred at which locations during either the day or the night).

Computed Build Out and Build Out + 5 DNL values at representative noise sensitive sites within approximately one mile of the Airport's property line range from below 40 dB up to nearly 60 dB. At most residential prediction sites, computed values fall within the DNL 40 dB to 50 dB range. Because no computed sound levels at noise-sensitive sites result in a 1.5 dB increase within the DNL 65 dB or greater, there are no significant impacts attributed to aircraft ground operations noise.

A complete summary of the aircraft ground noise analysis is included in **Appendix F, Noise**.

³ Aircraft ground noise supplemental noise metric analysis was completed only for Alternative C because it would affect more homes than Alternative D or G.

⁴ APUs on passenger aircraft were not included in the evaluation because 400-Hertz power and pre-conditioned air would be provided by equipment built-in at most gates. In addition, because the noise exposure contours produced by the INM include both takeoff roll and use of thrust reversers upon landing, these noise sources were not included in the evaluation of aircraft ground operations.

5.1.4.2 Highway Traffic

An evaluation of potential noise impacts caused by surface traffic noise in the area of proposed relocated Irving Park Road in the Build Out + 5 phase for Alternative A (No Action Alternative) and Alternative C was prepared for this EIS. None of the receptors included in the analysis are predicted to experience highway noise impacts under Alternative C compared to Alternative A (No Action Alternative).

A complete summary of the traffic noise analysis is included in **Appendix F, Noise**.

5.1.4.3 Railroad Noise and Vibration

An evaluation of potential railroad noise and vibration impacts caused by the proposed relocated railroad tracks in the southwest corner of the Airport in the Build Out + 5 phase for Alternative C was prepared for this EIS.

The results of the vibration screening found no vibration sensitive land uses within 200 feet of proposed relocated railroad tracks in Alternative C. Thus, no land uses would be impacted by project-induced railroad vibration, and no further analyses were conducted.

The railroad noise analyses concluded that the proposed relocated railroad tracks would not significantly affect the noise in the project area. Four residential units (represented by two receptors) would experience minimal impacts under Alternative C. However, these residential units are already included in the O'Hare Residential Sound Insulation Program, and no mitigation measures are required.

A complete summary of the railroad noise analysis and vibration screening is included in **Appendix F**.

5.1.5 Composite Noise Analysis

An evaluation of potential noise impacts caused by the cumulative effect of aircraft flight operations, aircraft ground operations, roadway noise, and railway noise in Alternative A (No Action Alternative) and Alternative C in the Build Out and Build Out + 5 phases was prepared for this EIS. Values of DNL were evaluated at approximately 6,600 receiver grid point locations in the study area, which include noise-sensitive sites selected for analysis, as well as a lattice of points spaced at regular intervals. Approximately 4,700 of these points were included in the noise impact analysis where the computed DNL from at least one of the noise sources was projected to be 45 dB or higher.

The total number of points exposed to DNL 65 or higher in the Build Out phase is 223 with Alternative C and 241 points in Alternative A (No Action Alternative). The total number of points exposed to DNL 65 or higher in the Build Out + 5 phase is 279 under Alternative C and 261 points in Alternative A (No Action Alternative). Significant noise impacts, with increases over the No Action Alternative of 1.5 dB or more and future DNL of 65 dB or greater would occur under Alternative C at 161 receiver grid points in the Build Out phase; and at 193 receiver grid points in the Build Out+ 5 phase. The noise impacts from composite noise are only slightly

greater than those from flight operations noise alone, since flight operations noise controls the composite noise levels.

A complete summary of the composite noise analysis is included in **Appendix F, Noise**.

5.1.6 High Altitude Airspace Assessment

Beyond the immediate noise environment of O'Hare itself, air traffic and airspace analyses conducted for this EIS indicate some traffic arriving and departing other airports in the vicinity would be affected by the Build Alternatives. Specifically, implementation of the Build Alternatives would result in changes to aircraft operations in five geographical areas, as follows:

- General Mitchell International Airport (MKE) Eastbound Departure Corridor from Milwaukee, Wisconsin
- Midway Airport (MDW) arrivals Southeast from the Brickyard VORTAC (VHP) between 6,000 and 24,000 feet MSL
- South Bend Airport (SBN) flight tracks while O'Hare (ORD) is in west flow
- Rockford Airport (RFD) flight tracks while ORD is in east flow
- DuPage Airport (DPA) westbound departures while ORD is in east flow

FAA Order 1050.1E indicates that

for air traffic airspace actions where the study area is larger than the immediate vicinity of an airport, incorporates more than one airport, or includes actions above 3,000 feet AGL, noise modeling will be conducted using NIRS... Noise contours will not be prepared for the NIRS, however, NIRS will be used to produce change-of-exposure tables and maps at population centroids using the following criteria:

- DNL 60-65 dB ± 3 dB
- DNL 45-60 dB ± 5 dB

An evaluation of potential noise impacts caused by changes to aircraft operations in Alternative A (No Action Alternative) and Alternative C in the Build Out + 5 phase was prepared for this EIS. For this EIS, Alternative C was analyzed to represent the Build Alternatives (Alternatives C, D, and G), as the same airspace changes would be required for all Build Alternatives. The changes listed above would not cause noise levels in Alternative C to exceed FAA's criteria for significant noise impacts. The effect of the changes on total noise exposure is expected to be minimal because the number of affected aircraft operations is small, and most of the changes occur where aircraft are at altitudes above 3,000 feet.

In addition to there being no significant noise impact, the airspace analysis indicates that no noise impact is expected with respect to a DNL 5 dB increases at values above DNL 45 dB or DNL 3 dB increases at values above DNL 60 dB.

A complete summary of the airspace noise analysis is included in **Appendix F**.

5.1.7 Sleep Disturbance

Sleep disturbance is recognized to be a major consideration in community annoyance. To some extent, the 10 dB penalty for nighttime noise events incorporated in the DNL metric reflects this concern. Further discussion on sleep disturbance is included in **Appendix F, Noise**.

5.1.8 Supplemental Noise Metrics

FAA Order 1050.1E states the following

14.5a. The Federal Interagency Committee on Noise (FICON) report, "Federal Agency Review of Selected Airport Noise Analysis Issues," dated August 1992, concluded that the Day-Night Average Sound Level (DNL) is the recommended metric and should continue to be used as the primary metric for aircraft noise exposure. However, DNL analysis may optionally be supplemented on a case-by-case basis to characterize specific noise effects. Because of the diversity of situations, the variety of supplemental metrics available, and the limitations of individual supplemental metrics, the FICON report concluded that the use of supplemental metrics to analyze noise should remain at the discretion of individual agencies.

Supplemental noise metrics (DNL, SEL, and L_{max}) are described in **Section F.1.1.2, Supplemental Noise Metrics**, in **Appendix F**, and estimated exposure levels based on supplemental metrics are presented in **Section F.3.3, Supplemental Metrics and Noise Sensitive Facilities**, in **Appendix F**.

5.1.9 Noise Abatement Measures

The following sections summarize the Airport's existing noise abatement programs, and identify potential noise abatement measures that could be implemented to mitigate significant impacts. Existing and potential *land use compatibility* measures to mitigate significant impacts are discussed in **Section 5.2.4, Potential Mitigation Measures**.

5.1.9.1 Existing Noise Abatement Programs

This Section summarizes the Airport's existing noise abatement programs. See **Appendix F** for a more detailed description of these current programs.

O'Hare Noise Compatibility Commission

In 1996, the City initiated the formation of the O'Hare Noise Compatibility Commission (ONCC) to oversee noise mitigation efforts around O'Hare. The Commission is comprised of representatives of various communities and public school districts located within the O'Hare area. The ONCC participates in the planning of noise relief projects to be implemented in the O'Hare area, oversees the operation of O'Hare's noise monitoring system, and advises the City on O'Hare-related noise issues.

Fly Quiet Program

In June 1997, the City, in cooperation with the ONCC, user airlines, and the FAA implemented the Fly Quiet Program at O'Hare. The program consists of a series of voluntary noise abatement flight and operating procedures designed to reduce the impact of aircraft noise during the nighttime hours (10 PM to 6:59:59 AM). The three main elements of the Fly Quiet Program are (1) preferential runway use, (2) arrival and departure flight procedures, and (3) ground run-up procedures.

Ground Run-Up Enclosure

Aircraft ground run-ups are routine aircraft engine and systems maintenance tests that require the operation of an engine at high power for extended periods of time, generating continuous elevated noise levels. All run-ups of turbojet engines after 10 PM and before 6:59:59 AM require the pilot or mechanic to obtain approval from Airport Operations prior to contacting the O'Hare Air Traffic Control Tower (ATCT). To significantly reduce routine aircraft engine maintenance run-up noise, the City has constructed a state-of-the-art acoustical dampening Ground Run-Up Enclosure (GRE) facility. This facility is currently located on the scenic hold pad in the north quadrant of the Airport. Under any of the Build Alternatives, this facility would be relocated a short distance to the northeast on the same scenic hold.

5.1.9.2 Potential Noise Abatement Measures

Particularly with respect to noise impacts related to the project, NEPA and CEQ require that FAA consider mitigation of significant adverse impacts that are reasonably foreseeable. In addition, 49 USC 47106 (c)(1)(B) imposes a substantive obligation upon the Agency to document appropriate mitigation in such context. Accordingly, the FAA could require the City to take steps to minimize significant noise impacts as a result of any of the Build Alternatives, if selected.

Significant noise impacts are anticipated to be reduced with specific noise abatement techniques. Such techniques could include the following:

- All eligible residences and schools within the Build Out 65 DNL and greater noise contour for a Build Alternative, but outside of the Build Out 65 DNL and greater noise contour for No Action, if approved by FAA's issuance of a ROD, would be insulated by the City of Chicago by the time Build Out would occur. In addition, all eligible residences with a 1.5 DNL or greater increase within the 65 DNL and greater noise contour area for a Build Alternative would be insulated by the time Build Out would occur.
- After Build Out occurs, the City of Chicago would produce a 65 DNL noise contour based on the operational characteristics of the Build Out configuration but with forecasted operational levels five years in the future from when Build Out occurs, thus creating a new contour referred to as Build Out +5 Forecast Contour (BO +5 F). The City would then insulate all eligible residences and schools within the BO +5 F

65 DNL and greater noise contour, but outside of the No Action (Alternative A) Build Out +5 65 DNL and greater noise contour presented in the FEIS, by the time Build Out +5 would occur. In addition, all eligible residences with a 1.5 DNL or greater increase within the 65 DNL and greater noise contour area for a Build Alternative would be insulated by the time Build Out +5 would occur.

- At this point it is not reasonable to either assume that there would be a new Fly Quiet Program or speculate about what a new Fly Quiet Program would be. FAA will, however, give consideration to suggestions for changes in the Fly Quiet Program developed by the ONCC and requested of the FAA by the City of Chicago. It is FAA's understanding that it is the City Chicago's intent to continue the existing Fly Quiet Program. The Fly Quiet Program would be modified by ONCC in the future only if needed; such modification would be done in consultation with the FAA and the City of Chicago Department of Aviation. Modification requiring FAA action would be subsequent to its prior approval, and any necessary environmental review. If FAA's ROD approves a Build Alternative, the existing Fly Quiet Program would remain in place, except as affected by runway decommissioning. The EIS discloses the potential effects of runway decommissioning on the Fly Quiet Program
- Continuation of the ONCC to oversee noise mitigation efforts around O'Hare.
- Continued use of the ground run-up enclosure during engine run-up testing.