5.5 NOISE AND NOISE-COMPATIBLE LAND USE

This section presents the aircraft and construction noise analysis conducted as part of this EA. Details of the conditions and alternatives analyzed are discussed in **Chapter 3**. The EA analysis includes summaries of the operational data used to calculate noise exposure levels; how noise is characterized and described; how people respond to it; and FAA guidance on land use compatibility with various levels of noise exposure. **Appendix F** provides detailed information on each of these aspects of noise characterization and the impact analysis.

5.5.1 Definition of Resource

Sound is a physical phenomenon consisting of minute vibrations (waveforms) that travel through a medium such as air. Noise is generally defined as unwanted sound because of its undesirable effects on ordinary daily activities, such as communication, sleep, or peace of mind (since it can cause annoyance). A person's reaction to noise varies according to several factors including the duration, type, and characteristics of the source; distance between the source and receiver; receiver's sensitivity; background noise level; and time of day. Noise may be intermittent or continuous, steady, or impulsive, and it may be generated by stationary or mobile sources. Aircraft are not the only source of noise in the project study area; they are, however, readily identifiable to those affected by their noise levels. Proposed changes in aircraft noise levels from the Proposed Action are discussed in this EA.

5.5.2 Regulatory Context

It is the FAA's responsibility to analyze aviation noise impacts from federal actions. This EA follows guidance and regulations provided in FAA Order 1050.1F, Environmental Impacts: Policies and Procedures, on how the impact assessment should occur, as well as other federal statutes, regulations, and specific agency orders. A list of these is presented in **Appendix F**.

These laws and guidance documents specify the use of the Day-Night Average Sound Level (DNL), the noise metric used in all FAA noise studies in airport communities. A cumulative sound level, DNL provides a measure of total sound energy. DNL is a logarithmic average of the sound levels of multiple events at a location over a 24-hour period, with a 10-decibel (dB) weighting added to all sounds occurring during nighttime hours (between 10:00:00 p.m. and 6:59:59 a.m.). The 10 dB increase for nighttime events represents the added intrusiveness of noise that occurs during typical sleeping hours. Ambient sound levels during nighttime hours are typically about 10 dB lower than during daytime hours. Expressing a DNL implies decibels, thus the "dB" nomenclature is omitted herein, e.g., "65 DNL" expresses a DNL of 65 dB.

The FAA requires that for a NEPA noise analysis, the 24-hour analysis period represent the average annual day (AAD), meaning average daily aircraft operations over a 365-day period. Further details on noise metrics, including DNL, can be found in **Attachment F-1**.

Estimates of noise effects resulting from aircraft operations can be interpreted in terms of the probable effects on human activities typical to specific land uses. The FAA has adopted suggested guidelines for evaluating land use compatibility with noise exposure. In general, most land uses are considered compatible with DNL less than 65 dB, but only certain uses are compatible with DNL greater than or equal to 65 dB. **Attachment F-5** to **Appendix F** contains further details on land use compatibility.

The noise analysis compares the No Action and Proposed Action Alternatives in each Condition (Interim and Build Out) using FAA's thresholds of significance. **Table 5.5-1** defines the significance threshold for changes in noise in accordance with FAA Order 1050.1F. When an action (compared with the No Action Alternative for the same timeframe) would cause noise-sensitive areas to have a DNL greater than or equal to 65 dB and experience a noise increase of at least 1.5 dB, the impact is considered significant. **Table 5.5-1** also lists FAA-defined reportable changes of noise levels.

TABLE 5.5-1
AIRCRAFT DNL THRESHOLDS AND IMPACT CATEGORIES

	65 DNL or Greater	Greater than or equal to 60 DNL but less than 65 DNL	Greater than or equal to 45 DNL but less than 60 DNL
Minimum Change in Proposed Action Alternative DNL	1.5 dB	3.0 dB	5.0 dB
Level of Change	Significant	Reportable	Reportable
Sources: FAA Order 1050.1F and the 1050.1F 2020 Desk Reference			

For an action occurring on or in the vicinity of a single airport, or as part of an air traffic action, the FAA uses the latest version of the AEDT (or another model as approved by the FAA). The computer model must be used to produce 65 DNL, 70 DNL, and 75 DNL contours and others as needed.

The aircraft noise analysis for this EA uses AEDT Version 2d Service Pack 2.

AEDT is a combined noise and emission model that uses a database of aircraft noise and performance characteristics. The AEDT predicts ground-based DNL values from user input for aircraft types, AAD aircraft operations, airport operating conditions, aircraft performance, and flight patterns. AEDT also calculates air pollutant emissions from aircraft engines for air quality analyses, enables noise and air quality calculations on a regional basis (as opposed to in the immediate airport environment only), and includes updated databases for newer aircraft models.

5.5.3 Land Use

O'Hare, northwest of the center of Chicago, is partially located in both Cook and DuPage Counties. The FAA obtained current and future land use information from DuPage and Cook Counties and classified each parcel into land use categories for the evaluation of noise-compatible land use. Land use consists of airport property, residential uses, and commercial/industrial land uses. The airport is largely surrounded to the north, east, and south by residential areas consisting of single-family and multi-family residences. The area west of the airport consists primarily of industrial and commercial facilities with, in Bensenville, small areas of residential land. Adjustments were made to the future land use to account for parcels that are being or have been redeveloped. In this EA, future land use parcels are used in the evaluation of noise-compatible land use. **Appendix F** contains additional details on the development of the land use data.

5.5.4 Affected Environment

This section provides the description of current noise conditions in the study areas for noise and noise-compatible land use (Noise Study Areas), which come primarily from aircraft noise. It should be noted that O'Hare is in an urban setting surrounded by other noise sources, such as highways, rail, and industry, and

aviation noise may not be the dominant source of noise levels in all areas. Noise exposure was developed from calendar year 2018 aircraft AAD operations to represent the Existing Condition.

5.5.4.1 Methodology

The following briefly describes the key noise terms, study areas, type of evaluation, and methodology of the aircraft noise analysis. Other noise sources evaluated are also discussed. **Appendix F** provides details for the items discussed in this chapter.

As required by NEPA and FAA Order 1050.1F, the noise analysis for the Existing Condition identifies:

- The DNL aircraft noise exposure contours and estimates of associated population, housing units, and land use in each contour interval
- Noise levels for uniformly spaced grids covering the study areas
- Noise levels at noise-sensitive sites

5.5.4.2 Noise Study Areas

To adequately capture the effects of aircraft noise, the Noise Study Areas must include not only the immediate airport environs, where aircraft flight paths are aligned with the runways, but also other potentially affected areas over which aircraft will fly as they follow new or changed flight corridors that join the surrounding airspace. The noise analysis of the EA has two study areas: a Primary Study Area (PSA) (see **Exhibit F-1** in **Appendix F**) for the area in the immediate vicinity of O'Hare and a Secondary Study Area (SSA) (see **Exhibit F-2** in **Appendix F**) for areas underlying proposed changes to air traffic procedures. The PSA was developed to encompass an area that would contain at least the lateral extent of the estimated 65 DNL contour resulting from aircraft flight and ground operations contemplated under the Proposed Action, with an adequate buffer to accommodate potential changes in the contour between the No Action and Proposed Action Alternatives. The SSA was developed to cover the geographic area underlying the proposed flight path changes to Instrument Arrival Procedures (IAPs) or where aircraft are lower than 7,000 feet Above Ground Level (AGL) in altitude. Details on the study areas are provided in **Section F.1.1.1** in **Appendix F.**

5.5.4.3 Grid Point Noise Calculations

AEDT can calculate DNL (or other metrics supported by the AEDT) for specific locations, defined as grid points, and can be presented in several formats. Grid point analyses can show changes in noise levels over specific locations and are helpful in determining where significant or reportable noise changes may occur.

For this EA, noise levels were developed for two area-wide grid sets covering the PSA and the SSA. Noise levels are provided for the following types of noise-sensitive facilities in the PSA: learning institutions, health care facilities, places of worship, and parks and Section 4(f) lands and historical properties.

5.5.4.4 Noise Exposure Mapping

DNL contours can be used to:

- Identify aircraft noise levels
- Assist in preparing noise compatibility programs

- Provide guidance in developing land use controls such as zoning ordinances, subdivision regulations, and building codes

For the purposes of this EA, DNL contours identify the degree of noise exposure associated with geographic areas in the vicinity of O'Hare for each condition and alternative. It is important to recognize that a line drawn on a map does not imply that a particular noise condition exists on one side of the line and not the other. For further information on the data and methodologies used in this EA, refer to **Appendix F**.

5.5.5 Existing Condition

The Existing Condition represents O'Hare's airfield and operating conditions in 2018, with seven active runways, five parallel east-west runways, and two parallel diagonal runways in a southwest-to-northeast configuration. Runway 15/33 was included in the modeling, but it had limited use and it was open only through March 2018. Runway 9C/27C was under construction in 2018 and is not considered in the Existing Condition.

5.5.5.1 Data Sources

As listed in **Table 5.5-2**, the 2018 Airport Noise Management System (ANMS) radar dataset was the primary data source used to develop most of the AEDT inputs for the Existing Condition. It provided the Existing Condition's runway use, flight tracks, and flight track use. The ANMS data consisted of flight track position and altitude data, flight numbers, aircraft types, origin/destination cities, routes used, and operation times. The following text summarizes how the input data for AEDT was developed.

Details of the AAD aircraft operations, separated by daytime and nighttime departures and arrivals for the Existing Condition, are presented in **Appendix F**. Details on modeled runway use and development of modeled flight tracks, examples of modeled AEDT tracks, and plots of radar data supporting the noise modeling methodology are also in **Appendix F**.

TABLE 5.5-2
DATA SOURCES FOR THE EXISTING CONDITION

Noise Model Input Data	Source
Airfield Layout	CDA-surveyed runway coordinates
Aircraft Operations and Fleet Mix	2018 ANMS Data
Flight Profiles and Stage Length	AEDT and 2018 ANMS Data
Runway Use	2018 ANMS Data
Maintenance Run-up Locations and Operations	CDA
Flight Track Location and Use	2018 ANMS Data and ATC Input
Weather Conditions	AEDT
Terrain	United States Geological Survey (USGS)
Source: HMMH, 2021 (ATC – Air Traffic Control)	

The Existing Condition operations were broken down into widebody jets, all other jets, and non-jet categories for the AEDT modeling as shown in **Table 5.5-3**. The 903,747 annual operations translate to

2,476 AAD operations. The total number of flight operations in **Table 5.5-3** is different from the FAA reported total by one annual operation due to rounding.

TABLE 5.5-3
ANNUAL FLIGHT OPERATIONS FOR THE EXISTING CONDITION

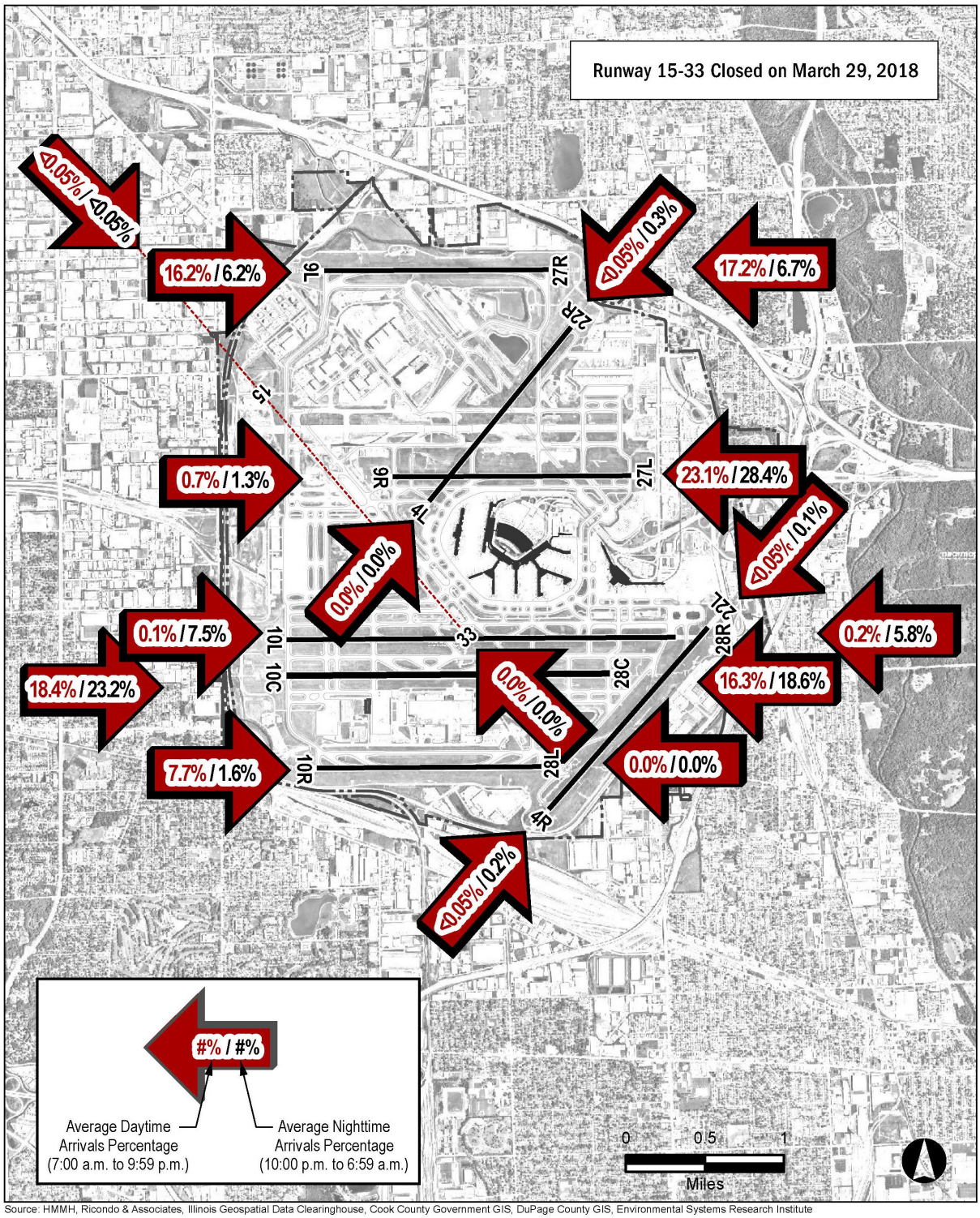
Body Category	Arrivals			Departures			Total		
	Day	Night	Total	Day	Night	Total	Day	Night	Total
Widebody Jet	27,678	6,232	33,910	25,594	8,316	33,910	53,272	14,548	67,820
Other Jet	361,169	52,906	414,075	379,774	34,301	414,075	740,943	87,207	828,150
Non-jet	3,588	301	3,889	3,777	112	3,889	7,365	413	7,778
Total	**392,435**	**59,439**	**451,874**	**409,145**	**42,729**	**451,874**	**801,580**	**102,168**	**903,748**
Percentage	43%	7%	50%	45%	5%	50%	89%	11%	100%
Source: HMMH analysis, 2021									

Two "flow" states are considered for O'Hare: 1) east flow, when winds are from the east, and 2) west flow, when winds are from the west. Overall, 57 percent of O'Hare's operations for the Existing Condition were in west flow and 43 percent in east flow.

During the Existing Condition in the daytime (7:00:00 a.m. to 9:59:59 p.m.), the typical arrival runways used were 9L, 10C, 10R, 27L, 27R, and 28C. At night (10:00:00 p.m. to 6:59:59 a.m.), the typical arrival runways used were 9L, 10C, 10L, 27L, 27R, 28C, and 28R. For departures during the day, the typical runways used were 9R, 10L, 22L, and 28R. At night, the departure runways typically used were 4L, 9R, 10L, 22L, 28C, and 28R.

Exhibit 5.5-1 provides the arrival runway use modeled for the Existing Condition and **Exhibit 5.5-2** provides the departure runway use modeled for the Existing Condition.

Modeled flight tracks to and from each runway end were developed and input into the AEDT to represent the flight path routes for each condition. A set of modeled flight tracks represents a flight path route to or from a runway; track-specific flight operations are weighted to represent the dispersion of actual traffic for that route. **Exhibit 5.5-3** presents all the modeled flight tracks for the Existing Condition and displays the arrival and departure tracks to all runways.



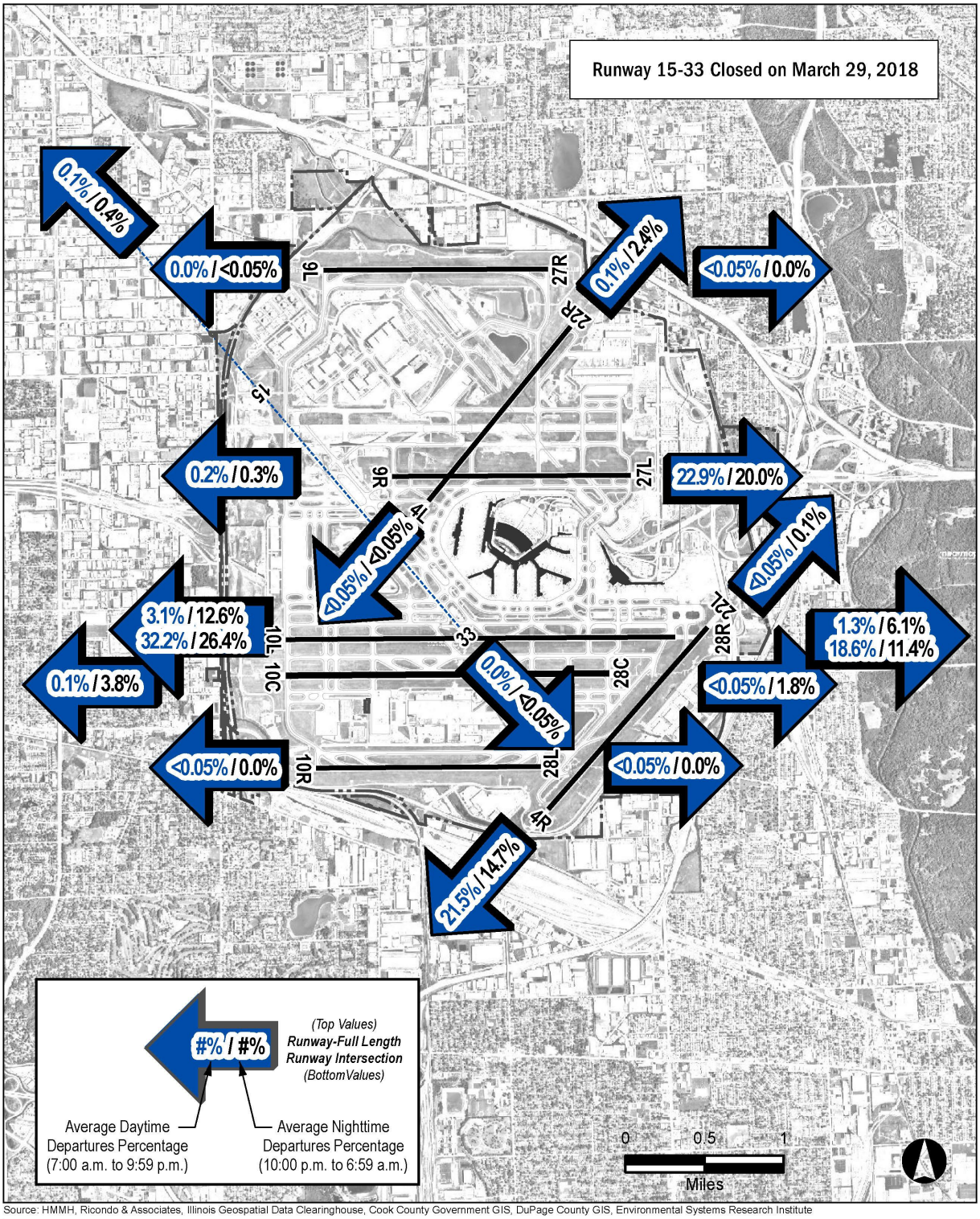
Source: HMMH, Ricondo & Associates, Illinois Geospatial Data Clearinghouse, Cook County Government GIS, DuPage County GIS, Environmental Systems Research Institute

Chicago O'Hare International Airport

Terminal Area Plan and Air Traffic Procedures Environmental Assessment

Existing Condition Arrival Runway Use

Exhibit 5.5-1



Source: HMMH, Ricondo & Associates, Illinois Geospatial Data Clearinghouse, Cook County Government GIS, DuPage County GIS, Environmental Systems Research Institute

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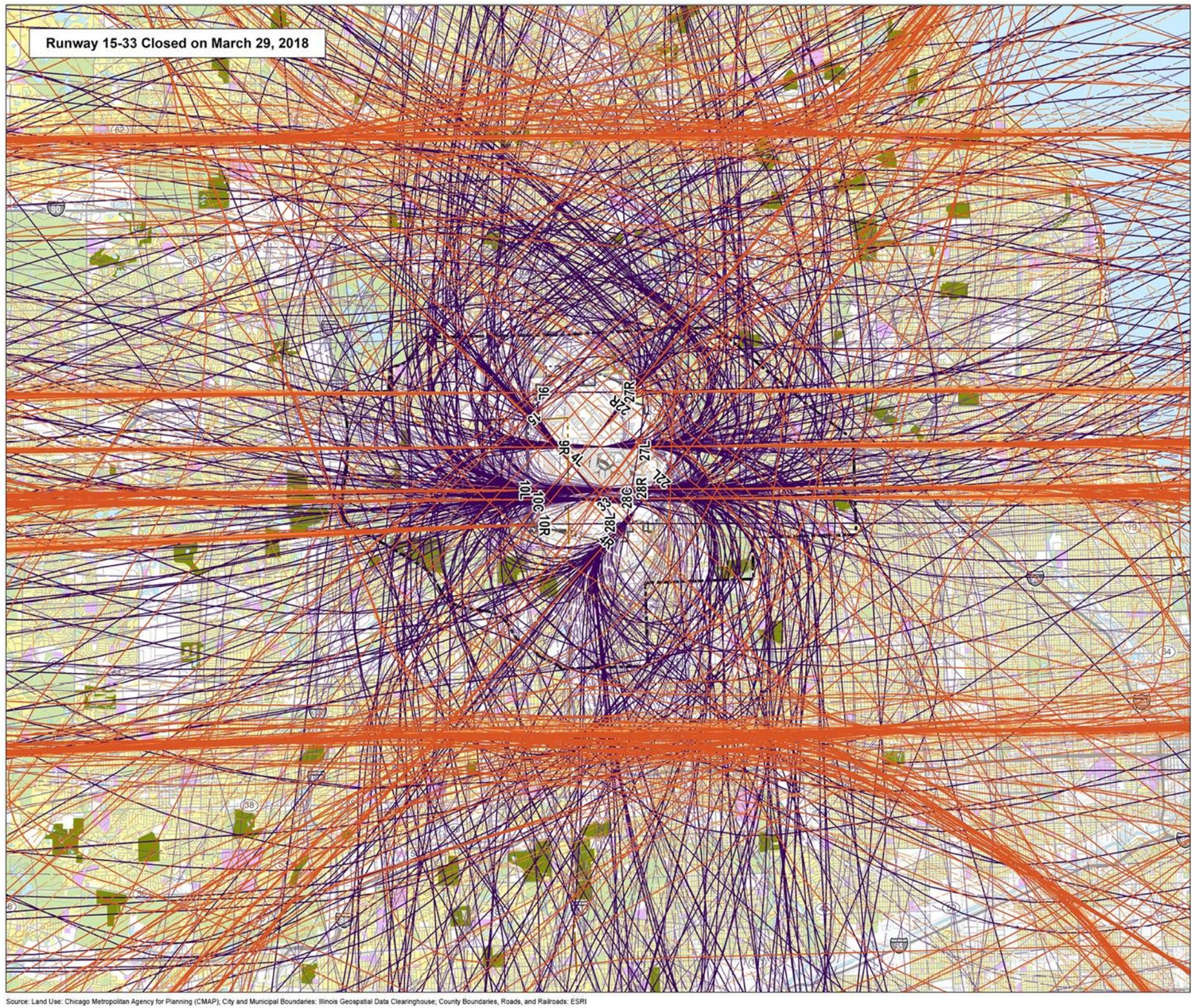
Existing Condition
Departure Runway Use

▶ Exhibit 5.5-2



Source: Land Use: Chicago Metropolitan Agency for Planning (CMAP); City and Municipal Boundaries: Illinois Geospatial Data Clearinghouse; County Boundaries, Roads, and Railroads: ESRI

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- Arrival Backbone Model Track (709)
- Arrival Model Subtrack (760)
- Departure Backbone Model Track (838)
- Departure Model Subtrack (1,096)
- Primary Study Area
- Airport Property Boundary
- Runways
- County Boundary
- Residential
- Public, Hospital, Institutional
- Open Space Recreation
- Golf
- Water / Stream
- Highway
- Primary Roads
- Secondary Roads
- Local Roads
- Railroad

0 2 4
Miles

Existing Condition Model Tracks

Exhibit 5.5-3

5.5.5.2 Noise Exposure

Table 5.5-4 estimates the land use area, number of noise-sensitive sites, population, and number of housing units exposed to aircraft noise of at least 65 DNL for the Existing Condition. The top portion of the table quantifies acreage in each contour band by land use category. The remainder of the table provides the count of noise-sensitive facilities and estimates of population and housing units for each DNL band.

For the Existing Condition, no non-compatible land use is exposed to DNL greater than or equal to 75 DNL. As presented, the area exposed to at least 65 DNL is approximately 10,280 acres. Land exposed to at least 65 DNL includes nearly 932 acres of single-family residential use; approximately 85 acres of multi-family residential use; and nearly 582 acres of public parks. This area also includes 58 noise-sensitive sites, including seven schools, six of which have been sound-insulated by the CDA. There were an estimated 18,894 people in 7,255 housing units within the 65 DNL. Of the 7,255 housing units, 4,844 have been sound-insulated by the CDA, and 252 are scheduled to be sound-insulated as part of Phase 18 and 19 of the CDA's RSIP. Most of the non-mitigated homes within the Existing Condition 65 DNL are currently not eligible as they are outside the DNL noise contour used for the existing Residential Sound Insulation Program (RSIP).[1]

Exhibit 5.5-4 provides the resultant DNL contours for the Existing Condition. In the Existing Condition, the DNL contours extend away from O'Hare on the east side in three main lobes (north, central, and south), on the west side in two main lobes (north and south), and in a single lobe on the south side.

- The north east-west lobe results from flight operations to and from Runway 9L/27R. The east lobe of the 65 DNL contour includes residential areas of Des Plaines, and its east extent is at South River Road. The west lobe of the 65 DNL contour includes mainly commercial industrial parcels, and its west extent is just east of Busse Road.
- The central east lobe is due to flight operations to and from Runway 9R/27L. The lobe of the 65 DNL contour follows Interstate 90 (I-90)/Kennedy Expressway and includes residential areas of Rosemont extending to North Oriole Avenue.
- The south east-west lobe results from flight operations to and from Runways 10L/28R and 10C/28C. The east lobe of the 65 DNL contour includes residential areas of Schiller Park and Norridge extending along West Lawrence Avenue and ending just before North Oriole Avenue. The west lobe of the 65 DNL contour includes residential areas of Bensenville, Wood Dale, and Itasca, extending out nearly to the intersection of East Washington Street and Parkside Avenue.
- The south lobe of the 65 DNL contour, due to flight operations to and from Runway 4R/22L, extends over industrial property, past Interstate 294 (I-294), and into the residential area of Franklin Park near Wolf Road, ending before Grand Avenue.

The 70 DNL contour for the Existing Condition includes residential parcels in two areas: 1) Schiller Park east of Runway 28R and 2) Bensenville west of Runways 10L and 10C.

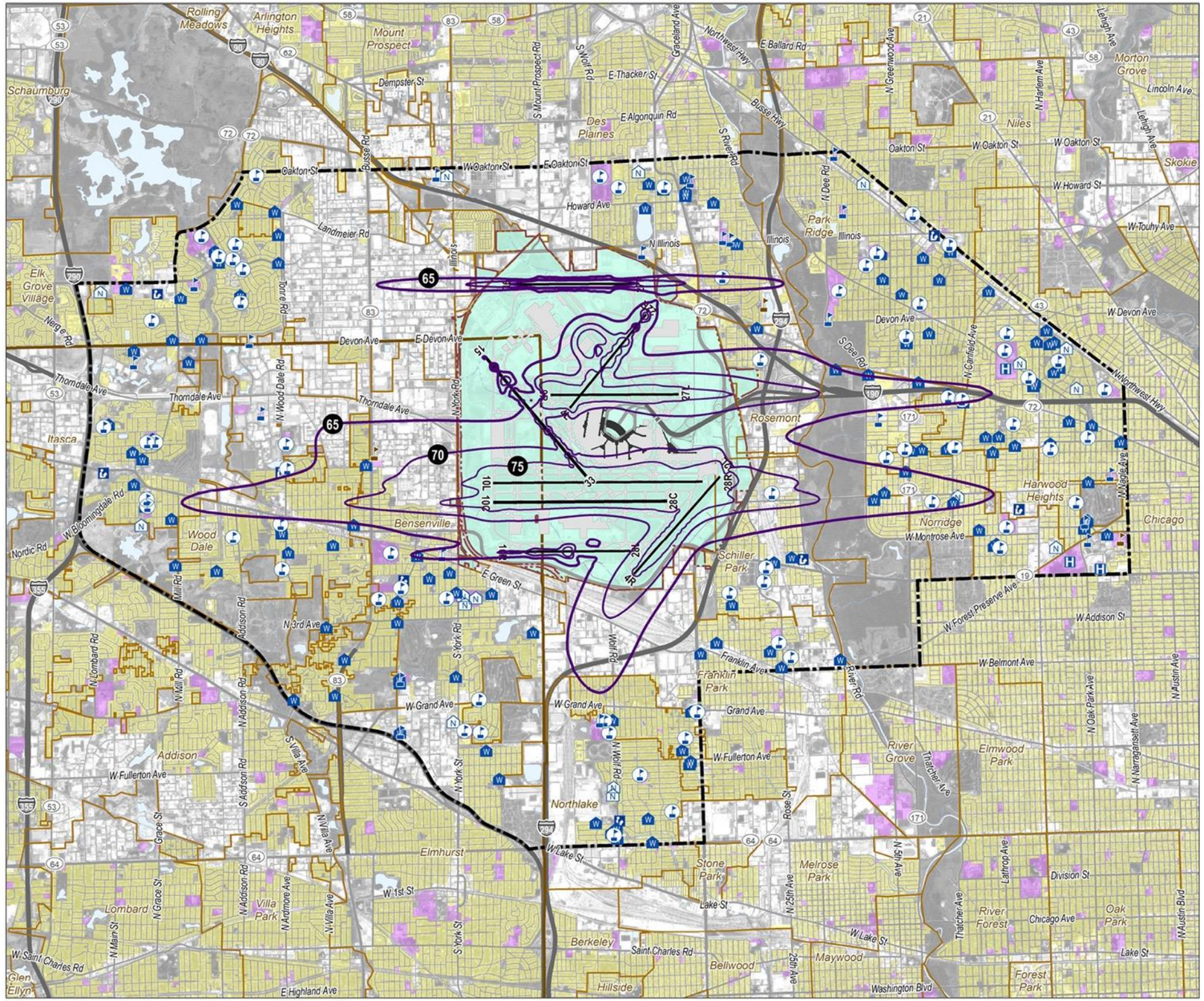
[1] The current sound insulation program is based on the FAA-approved O'Hare Modernization Program (OMP) Build-Out Noise Contour as defined by the FAA's Record of Decision for the Environmental Impact Statement (2005)

TABLE 5.5-4
NOISE EXPOSURE FOR THE EXISTING CONDITION

		DNL Contour Band			
	Compatibility	**65-70**	**70-75**	**75+**	**Total (65+)**
Land Use Area (acres)					
Single-Family Residential	Non-compatible	866.2	66.1	-	932.3
Multi-Family Residential		53.6	31.8	-	85.4
Transient Lodging (residential)		88.0	2.7	-	90.7
Mobile Home		-	-	-	-
School/Education		22.7	2.7	-	25.4
Commercial	Compatible	340.7	15.8	-	356.5
Industrial, Manufacturing, & Production		2,104.5	645.2	20.3	2,770.0
Recreational		555.6	26.3	-	581.9
Public Use (excluding School/Education)[1]		80.6	6.8	-	87.4
Undeveloped		125.8	8.9	0.4	135.1
Airport		2,196.9	1,457.2	1,545.4	5,199.5
Water		15.7	-	-	15.7
Subtotal Non-compatible Area (acres)		1,030.5	103.3	-	1,133.8
Subtotal Compatible Area (acres)		5,419.8	2,160.2	1,566.1	9,146.1
Total Area (acres)		**6,450.3**	**2,263.5**	**1,566.1**	**10,279.9**
Off-Airport Total Area (acres)		**4,253.4**	**806.3**	**20.7**	**5,080.4**
Noise-Sensitive Facilities (count)					
Universities		1	-	-	1
Schools		6	1	-	7
Sound-Insulated Schools (Included above)		*5*	*1*	-	*6*
Libraries		-	-	-	-
Hospitals		-	-	-	-
Nursing Homes		1	-	-	1
Places of Worship		11	-	-	11
Parks and 4(f) Lands		22	3	-	25
Historic Properties		11	2	-	13
Total		**52**	**6**	**-**	**58**
Population and Housing (estimated)					
Population		15,565	3,329	-	18,894
Housing Units		5,967	1,288	-	7,255
Non-mitigated single-family housing units (Included above)[2]		*1,365*	*96*	-	*1,461*
Non-mitigated multi-family housing units (Included above)[2]		*950*	-	-	*950*
Sound-insulated single-family housing units (included above)		*3,645*	*1,181*	-	*4,826*
Sound-insulated multi-family housing units (included above)		*7*	*11*	-	*18*

Notes:
1. For the purposes of this document, Public Use (excluding School/Education) land use is considered compatible.
2. The majority of the non-mitigated housing units (78.7%) are not eligible under the existing ORD RSIP because these units are outside the current RSIP DNL 65 dB contour.

Sources: ORD Residential Sound Insulation Program, January 2021 database: City of Chicago
2020 U.S. Census Bureau Census Block Population Data
Existing Condition Noise Contours, Land Use, Noise-Sensitive Facilities, Population and Housing data: HMMH Analysis, October 2021



Source: HMMH 2018, USCB 2016, USCB 2010, Illinois Geospatial Data Clearinghouse, CMAP Data Hub, ESRI

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- Existing Condition DNL Contours (65, 70, 75 dB)
- Primary Study Area
- Airport Boundary
- Runways
- Taxiway / Apron
- County Boundary
- Community Boundary
- Highway
- Primary Roads
- Secondary Roads
- Local Roads
- Railroad Lines
- School
- Library
- Sound Insulated School
- Nursing Home
- College/University
- Hospital
- Place of Worship
- Residential
- Public, Hospital, Institutional
- Compatible
- Water / Stream

0 1 2
Miles

Noise Exposure Contours for Existing Condition and Noise Sensitive Facilities

▸ Exhibit 5.5-4

5.5.6 Environmental Consequences

The Environmental Consequences section evaluates two future periods at O'Hare: 1) the Interim Condition (2025) and 2) the Build Out Condition (2032), as described in **Section 5.1**. For each condition, two alternatives were evaluated for noise: 1) the No Action Alternative and 2) the Proposed Action Alternative. To evaluate potential noise impacts, the EA compares the two alternatives for the same timeframe.

The future conditions evaluated for the Environmental Consequences represent O'Hare, with eight active runways, six parallel east-west runways, and two parallel diagonal runways in a southwest-to-northeast configuration. Compared with the Existing Condition, Runway 15/33 is closed (closed in March 2018), Runway 9C/27C is open and operational (commissioned on November 5, 2020), Runway 9R/27L has been extended 3,590 feet to the west (commissioned on December 2, 2021), and Runway 4L/22R is unidirectional.[2] Differences in the runway layout compared with the Existing Condition are a result of the OMP, and they are not part of the project that is the subject of this EA.

5.5.6.1 Interim and Build Out Condition Data Sources

As listed in **Table 5.5-5**, the TAAM simulations discussed in **Chapter 4** was the primary data source used to develop most of the AEDT inputs for the Interim and Build Out Conditions. The TAAM simulations provided the runway use, flight tracks, and flight track use. The TAAM data consisted of flight track position and altitude data for the Design Day Flight Schedule (DDFS) along with routes used and operation times.

Runway use assumptions were developed based on runway configurations used at O'Hare for the future conditions. Details of the AAD aircraft operations, separated by daytime and nighttime departures and arrivals for the Interim and Build Out Conditions, are presented in **Appendix F**. Details on modeled runway use and development of modeled flight tracks, examples of modeled AEDT tracks, and plots of radar data supporting the noise modeling methodology are also in **Appendix F**.

TABLE 5.5-5
DATA SOURCES FOR THE INTERIM AND BUILD OUT CONDITIONS

Noise Model Input Data	Source
Airfield Layout	CDA-surveyed runway coordinates
Aircraft Operations and Fleet Mix	CDA and TAAM
Flight Profiles and Stage Length	AEDT, CDA, and TAAM
Runway Use	TAAM and FAA
Maintenance Run-up Locations and Operations	CDA
Flight Track Location and Use	TAAM, 2018 ANMS Data, and ATC Input
Weather Conditions	AEDT
Terrain	United States Geological Survey (USGS)

Source: HMMH, 2021 (ATC – Air Traffic Control)

[2] Runway 4L is not available for arrivals and Runway 22R is not available for departures.

5.5.6.2 Interim No Action

The Interim No Action Alternative would have the same terminal layout as the Existing Condition except for two areas: the Terminal 3 Concourse L Stinger, which added two gates, and the Terminal 5 Concourse M extension. Both of these changes were previously approved through separate NEPA reviews and documentation.[3]

The Interim No Action operations were broken down into widebody jets, all other jets, and non-jet categories for the AEDT modeling as shown in **Table 5.5-6**. The 952,489 annual operations translate to 2,610 AAD operations. The total number of flight operations in **Table 5.5-6** is different from the forecast by one annual operation due to rounding.

TABLE 5.5-6
ANNUAL FLIGHT OPERATIONS FOR THE INTERIM NO ACTION

Body Category	Arrivals			Departures			Total		
	Day	Night	Total	Day	Night	Total	Day	Night	Total
Widebody Jet	32,995	10,585	43,580	33,315	10,265	43,580	66,310	20,850	87,160
Other Jet	372,955	56,332	429,287	394,385	34,902	429,287	767,340	91,234	858,574
Non-jet	3,040	338	3,378	3,378	0	3,378	6,418	338	6,756
Total	**408,990**	**67,255**	**476,245**	**431,078**	**45,167**	**476,245**	**840,068**	**112,422**	**952,490**
Percentage	43%	7%	50%	45%	5%	50%	88%	12%	100%

Note: Totals have been rounded to whole numbers for reporting.
Source: CDA 2020, HMMH analysis, 2021

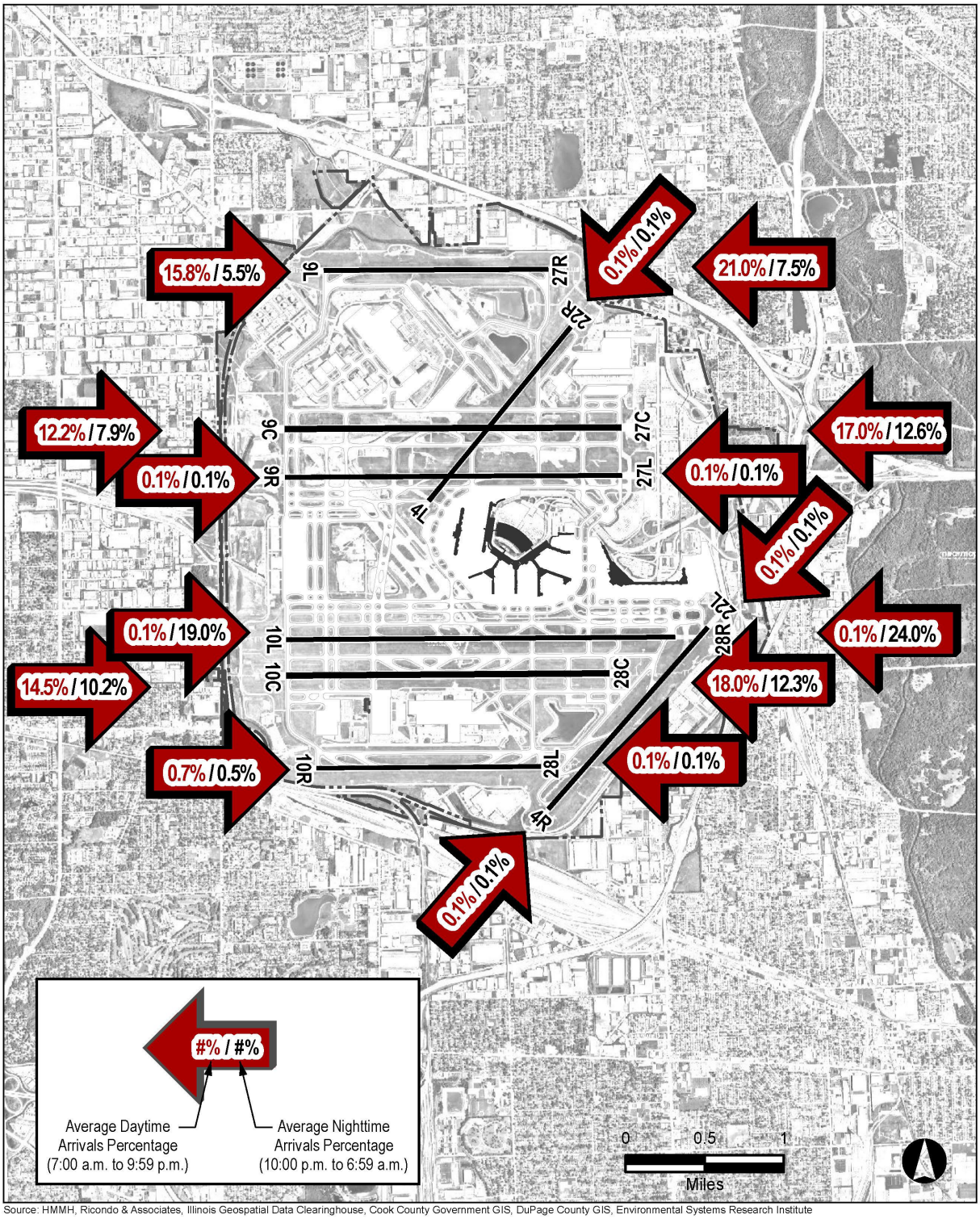
Two "flow" states are considered for O'Hare: 1) east flow, when winds are from the east, and 2) west flow, when winds are from the west. Overall, 56.5 percent of O'Hare's operations for the Interim No Action were in west flow and 43.5 percent were in east flow.

During the Interim No Action daytime operations (7:00:00 a.m. to 9:59:59 p.m.), the typical arrival runways used are 9L, 9C, 10C, 27C, 27R, and 28C. At nighttime (10:00:00 p.m. to 6:59:59 a.m.), the typical arrival runways used are 9L, 9C, 10L, 10C, 27C, 27R, 28C, and 28R. For departures during the day, the typical runways used are 9R, 10L, 22L, 27L, and 28R. At night, the typical departure runways used are 4L, 9R, 10L, 22L, 27L, and 28R.

Exhibit 5.5-5 provides the arrival runway use modeled for the Interim No Action, and **Exhibit 5.5-6** provides the departure runway use modeled for the Interim No Action.

The Interim No Action would not retain the offset air traffic approaches to Runway 10R and 28L. The final approach segments of arrival tracks to Runways 10R (on the west side of the airport) and to Runway 28L (on the east side of the airport) instead coincide with their extended runway centerlines (the offset arrival procedures were removed). The southside downwind segments of arrival tracks to all west side runway ends and the southside downwind approach to Runway 28L are parallel to the changes to the final approach segments.

[3] OM EIS Re-Evaluation Memo: Terminal 3 Concourse L Stinger Two-Gate Addition and Associated Apron Pavement, approved 7/20/2020 and OM EIS Re-Evaluation Memo: Terminal 5 East Expansion and Associated Apron Pavement, Approved 8/2/2018



Source: HMMH, Ricondo & Associates, Illinois Geospatial Data Clearinghouse, Cook County Government GIS, DuPage County GIS, Environmental Systems Research Institute

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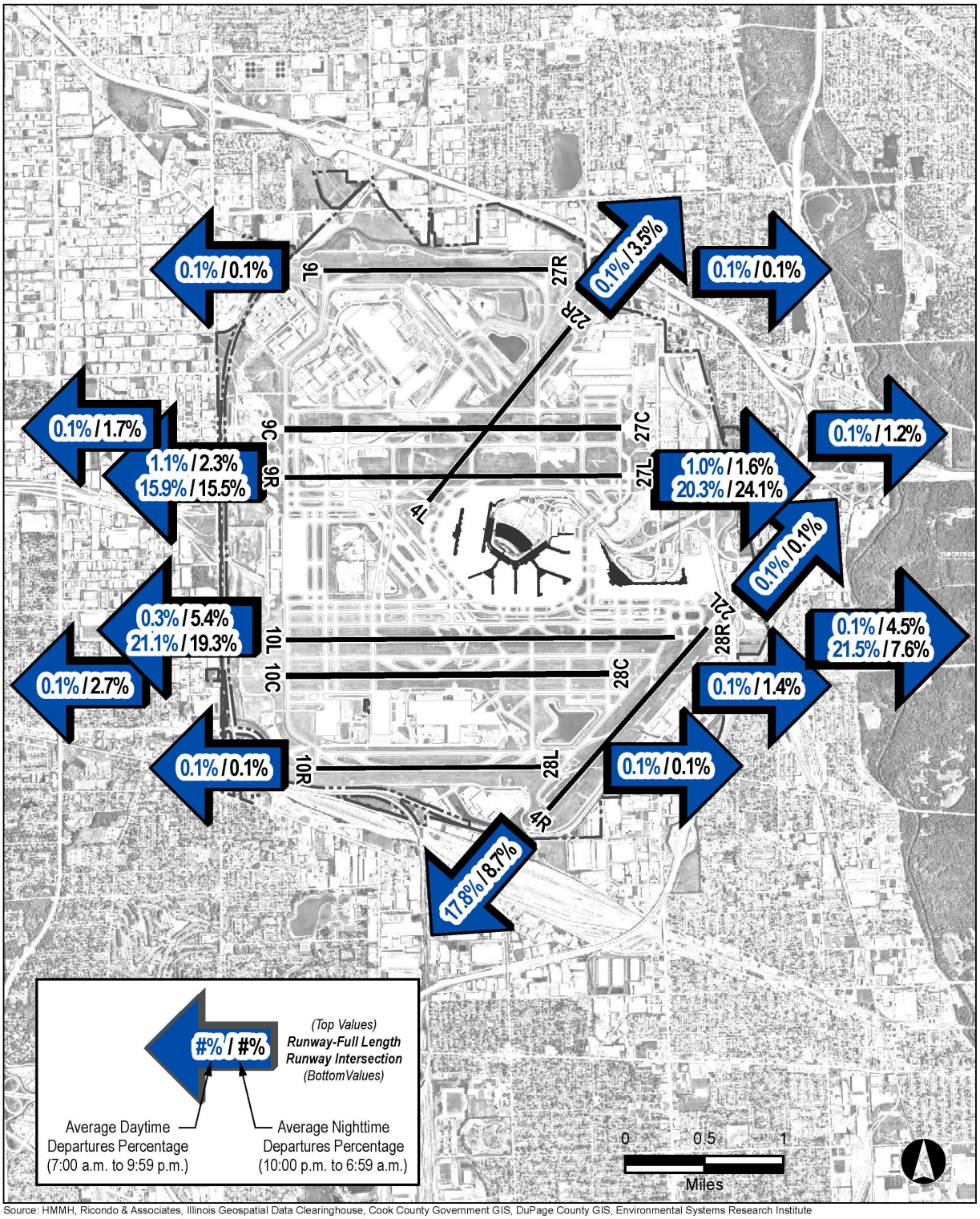
Interim No Action Arrival Runway Use

Exhibit 5.5-5



Source: HMMH, Ricondo & Associates, Illinois Geospatial Data Clearinghouse, Cook County Government GIS, DuPage County GIS, Environmental Systems Research Institute

Chicago O'Hare International Airport

Terminal Area Plan and Air Traffic Procedures Environmental Assessment

Interim No Action Departure Runway Use

Exhibit 5.5-6

Modeled flight tracks to and from each runway end were developed and input into the AEDT to represent the flight path routes for each condition. A set of modeled flight tracks represents a flight path route to or from a runway; track-specific flight operations are weighted to represent the dispersion of actual traffic for that route. **Exhibit 5.5-7** presents all the modeled flight tracks for the Interim No Action and displays the arrival and departure tracks to all runways.

5.5.6.2.1 Noise Exposure

Table 5.5-7 provides estimates of the land use area, noise-sensitive sites, population, and number of housing units exposed to aircraft noise of at least 65 DNL for the Interim No Action. The top portion of the table quantifies acreage within each contour band by land use category. The remainder of the table provides the count of noise-sensitive facilities and estimates of population and housing units for each DNL band.

For the Interim No Action, no non-compatible land use is exposed to DNL greater than or equal to 75 DNL. As presented, the area exposed to at least 65 DNL is approximately 11,800 acres. Land exposed to at least 65 DNL includes nearly 1,098 acres of single-family residential use, approximately 115 acres of multi-family residential use, and nearly 566 acres of public parks. This area also includes 48 noise-sensitive sites, including five schools, all of which have been sound-insulated by the CDA.

There were an estimated 23,415 people in 9,359 housing units within the 65 DNL. Of the 9,359 housing units, 4,567 have been sound-insulated by the CDA and 228 are scheduled to be sound-insulated as part of Phase 18 and 19 of the CDA RSIP. Most non-mitigated homes within the Interim No Action 65 DNL are currently not eligible as they are outside the DNL noise contour used for the existing RSIP. Ineligible locations include areas of Itasca and Wood Dale west of Runways 10C and 10L, areas of Norridge and Harwood Heights east of Runways 28C and 28R, and a small area of Rosemont northeast of Runway 27C.

Exhibit 5.5-8 provides the resultant DNL contours for the Interim No Action. In the Interim No Action, the DNL contours extend away from O'Hare on the east and west side in three main lobes (north, central, and south), and in a single lobe on the south side.

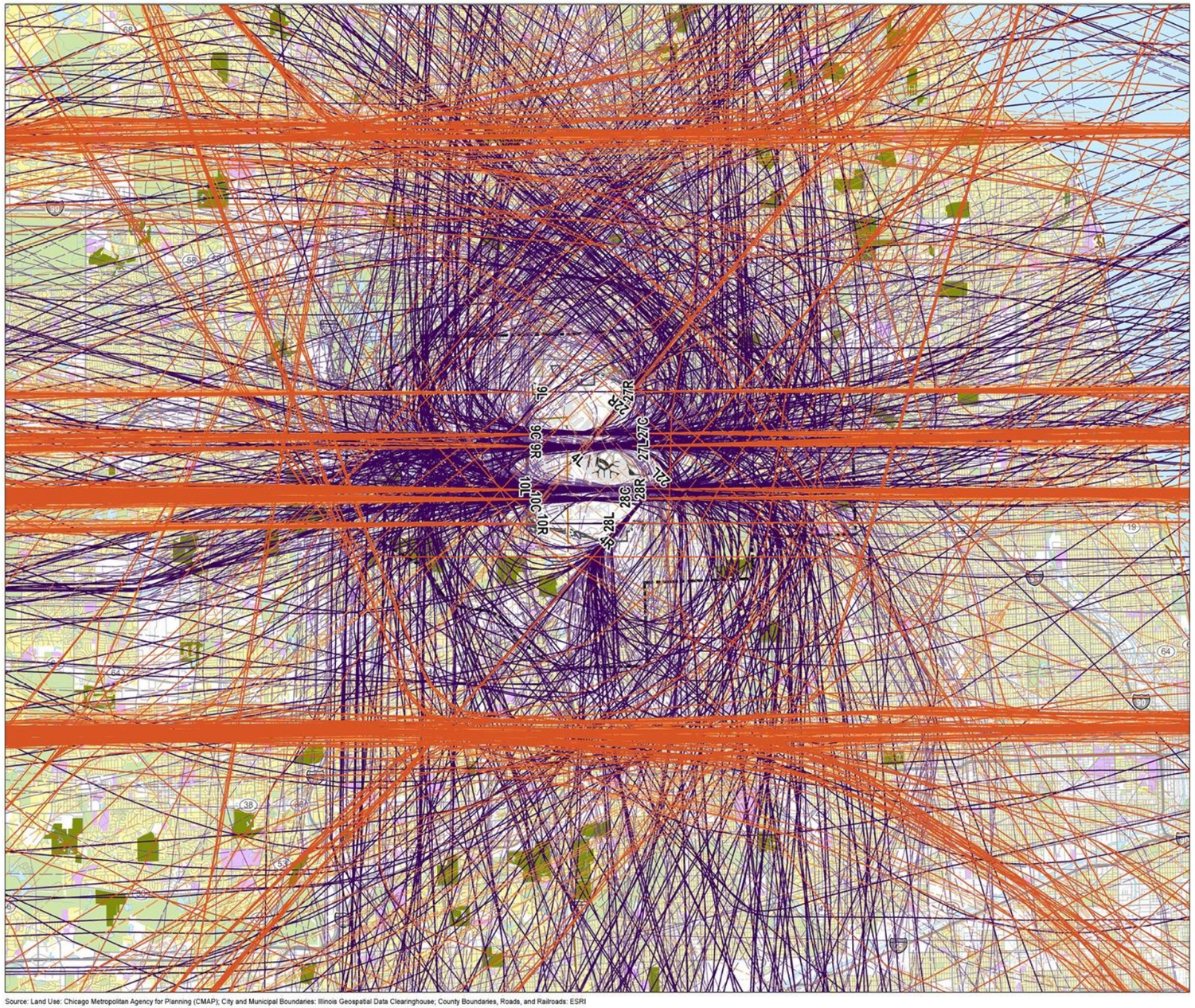
- The north east-west lobe would be due to flight operations to and from Runway 9L/27R. The east lobe of the 65 DNL contour would include residential areas of Des Plaines; it would extend into Chippewa Woods south of West Talcott Road, ending west of South Dee Road. The west lobe of the 65 DNL contour would include mainly commercial industrial parcels west of Busse Road.
- The central east-west lobe would be due to flight operations to and from Runways 9C/27C and 9R/27L. The east lobe of the 65 DNL contour would include residential areas of Rosemont and the southern reaches of Park Ridge extending almost to South Ashland Avenue. The west lobe of the 65 DNL contour would include primarily commercial industrial parcels and residential areas of Bensenville south of State Route 390, extending south of Devon Avenue westward to just east of the Salt Creek Golf Club.
- The south east-west lobe would be due to flight operations to and from Runways 10L/28R and 10C/28C. The east lobe of the 65 DNL contour would include residential areas of Schiller Park, Norridge, and Harwood Heights, ending just west of the Ridgemoor Country Club golf course. The west lobe of the 65 DNL contour would include residential areas of Bensenville, Wood Dale, and Itasca, extending just west of the intersection of Irving Park Road and South Princeton Avenue.
- The south lobe of the 65 DNL contour, due to flight operations to and from Runway 4R/22L, extends over industrial property to I-294.

The 70 DNL contour for the Interim No Action would include residential parcels primarily in three areas: 1) Rosemont just east of Runway 27C, 2) Schiller Park east of Runway 28R, and 3) Bensenville west of Runways 10L and 10C.

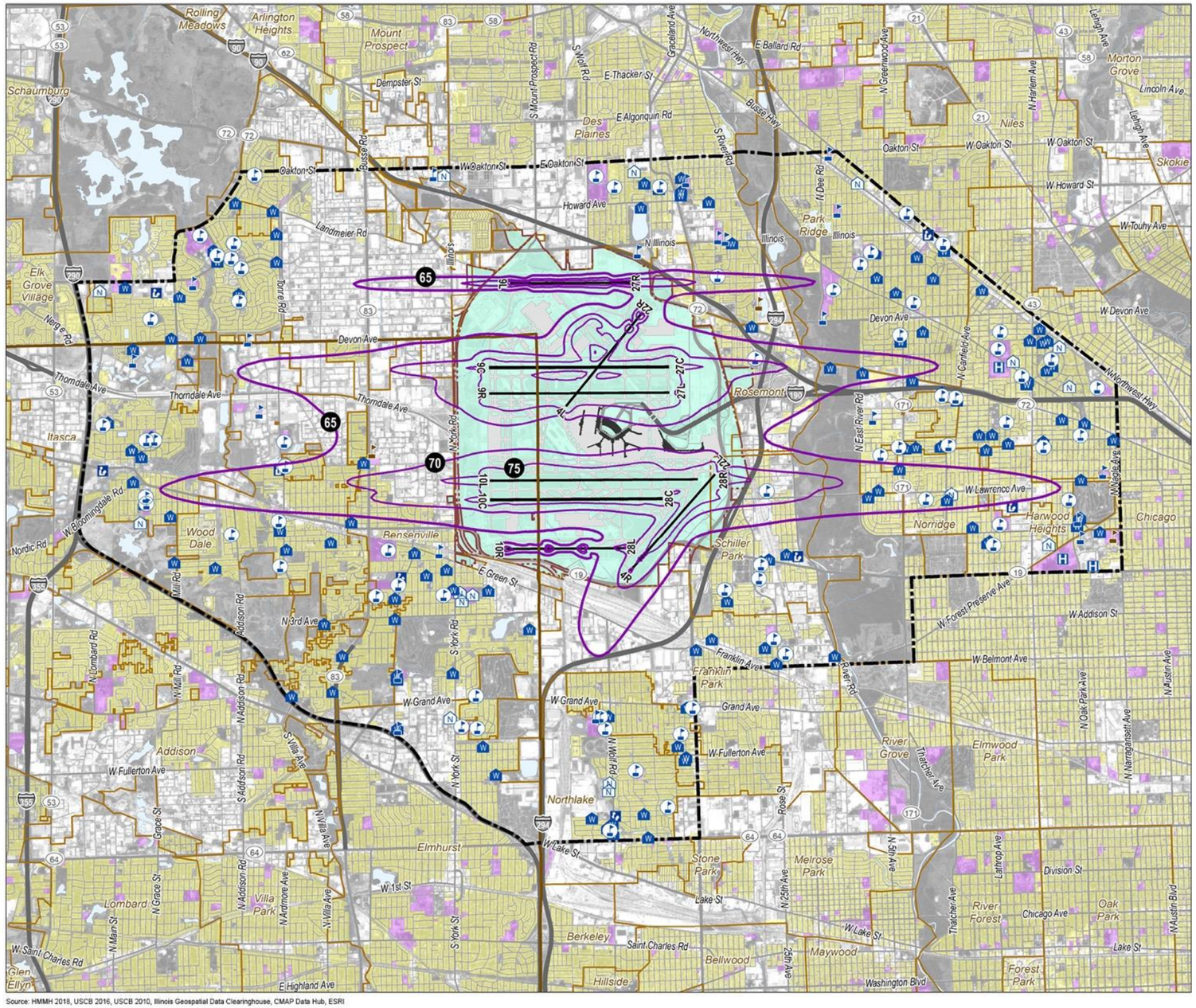
TABLE 5.5-7
NOISE EXPOSURE FOR THE INTERIM NO ACTION

		DNL Contour Band			
	Compatibility	**65-70**	**70-75**	**75+**	**Total (65+)**
Land Use Area (acres)					
Single-Family Residential	Non-compatible	1,032.4	65.6	-	1,098.0
Multi-Family Residential		83.6	31.8	-	115.4
Transient Lodging (residential)		58.1	7.6	-	65.7
Mobile Home		-	-	-	-
School/Education		15.0	4.7	-	19.7
Commercial	Compatible	303.3	15.8	-	319.1
Industrial, Manufacturing, & Production		2,899.3	557.1	16.6	3,473.0
Recreational		491.3	75.0	-	566.3
Public Use (excluding School/Education)[1]		90.7	2.8	-	93.5
Undeveloped		171.1	22.3	0.4	193.8
Airport		2,241.2	1,714.8	1,852.1	5,808.1
Water		18.1	1.7	-	19.8
Subtotal Non-compatible Area (acres)		1,189.1	109.7	-	1,298.8
Subtotal Compatible Area (acres)		6,215.0	2,389.5	1,869.1	10,473.6
Total Area (acres)		**7,404.1**	**2,499.2**	**1,869.1**	**11,772.4**
Off-Airport Total Area (acres)		**5,162.9**	**784.4**	**17.0**	**5,964.3**
Noise-Sensitive Facilities (count)					
Universities		1	-	-	1
Schools		4	1	-	5
Sound-Insulated Schools (Included above)		*4*	*1*	-	*5*
Libraries		1	-	-	1
Hospitals		-	-	-	-
Nursing Homes		1	-	-	1
Places of Worship		7	-	-	7
Parks and 4(f) Lands		26	2	-	28
Historic Properties		4	1	-	5
Total		**44**	**4**	**-**	**48**
Population and Housing (estimated)					
Population		19,964	3,451	-	23,415
Housing Units		8,029	1,330	-	9,359
Non-mitigated single-family housing units (Included above)[2]		*2,668*	*78*	-	*2,746*
Non-mitigated multi-family housing units (Included above)[2]		*2,046*	-	-	*2,046*

		DNL Contour Band			
	Compatibility	**65-70**	**70-75**	**75+**	**Total (65+)**
Land Use Area (acres)					
Sound-insulated single-family housing units (included above)		*3,299*	*1,252*	-	*4,551*
Sound-insulated multi-family housing units (included above)		*16*	-	-	*16*
Note 1: For the purposes of this document, Public Use (excluding School/Education) land use is considered compatible. Note 2: The majority of the non-mitigated housing units (88.8%) are not eligible under the existing ORD RSIP because these units are outside the current RSIP DNL 65 dB contour.					
Sources: ORD Residential Sound Insulation Program, January 2021 database: City of Chicago 2020 U.S. Census Bureau Census Block Population Data Interim No Action Noise Contours, Land Use, Noise-Sensitive Facilities, Population and Housing data: HMMH Analysis, October 2021					



Source: Land Use: Chicago Metropolitan Agency for Planning (CMAP); City and Municipal Boundaries: Illinois Geospatial Data Clearinghouse; County Boundaries, Roads, and Railroads: ESRI



Chicago O'Hare International Airport

Terminal Area Plan and Air Traffic Procedures Environmental Assessment

- Interim No Action DNL Contours (65, 70, 75 dB)
- Primary Study Area
- Airport Boundary
- Runways
- Taxiway / Apron
- County Boundary
- Community Boundary
- Highway
- Primary Roads
- Secondary Roads
- Local Roads
- Railroad Lines
- School
- Library
- Sound Insulated School
- Nursing Home
- College/University
- Hospital
- Place of Worship
- Residential
- Public, Hospital, Institutional
- Compatible
- Water / Stream

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Miles

Noise Exposure Contours for Interim No Action and Noise Sensitive Facilities

▸ Exhibit 5.5-8

5.5.6.3 Build Out No Action

The Build Out No Action Alternative would have the same terminal layout as the Interim No Action.

The Build Out No Action operations were broken down into widebody jets, all other jets, and non-jet categories for the AEDT modeling as shown in **Table 5.5-8**. The 1,013,856 annual operations translate to 2,993 AAD operations.

TABLE 5.5-8
ANNUAL FLIGHT OPERATIONS FOR THE BUILD OUT NO ACTION

Body Category	Arrivals			Departures			Total		
	Day	Night	Total	Day	Night	Total	Day	Night	Total
Widebody Jet	36,469	13,667	50,136	36,525	13,611	50,136	72,994	27,278	100,272
Other Jet	396,228	57,177	453,405	417,341	36,064	453,405	813,569	93,241	906,810
Non-jet	3,048	339	3,387	3,377	10	3,387	6,425	349	6,774
Total	**435,745**	**71,183**	**506,928**	**457,243**	**49,685**	**506,928**	**892,988**	**120,868**	**1,013,856**
Percentage	43%	7%	50%	45%	5%	50%	88%	12%	100%

Note: Totals have been rounded to whole numbers for reporting.
Source: CDA 2020, HMMH analysis, 2021

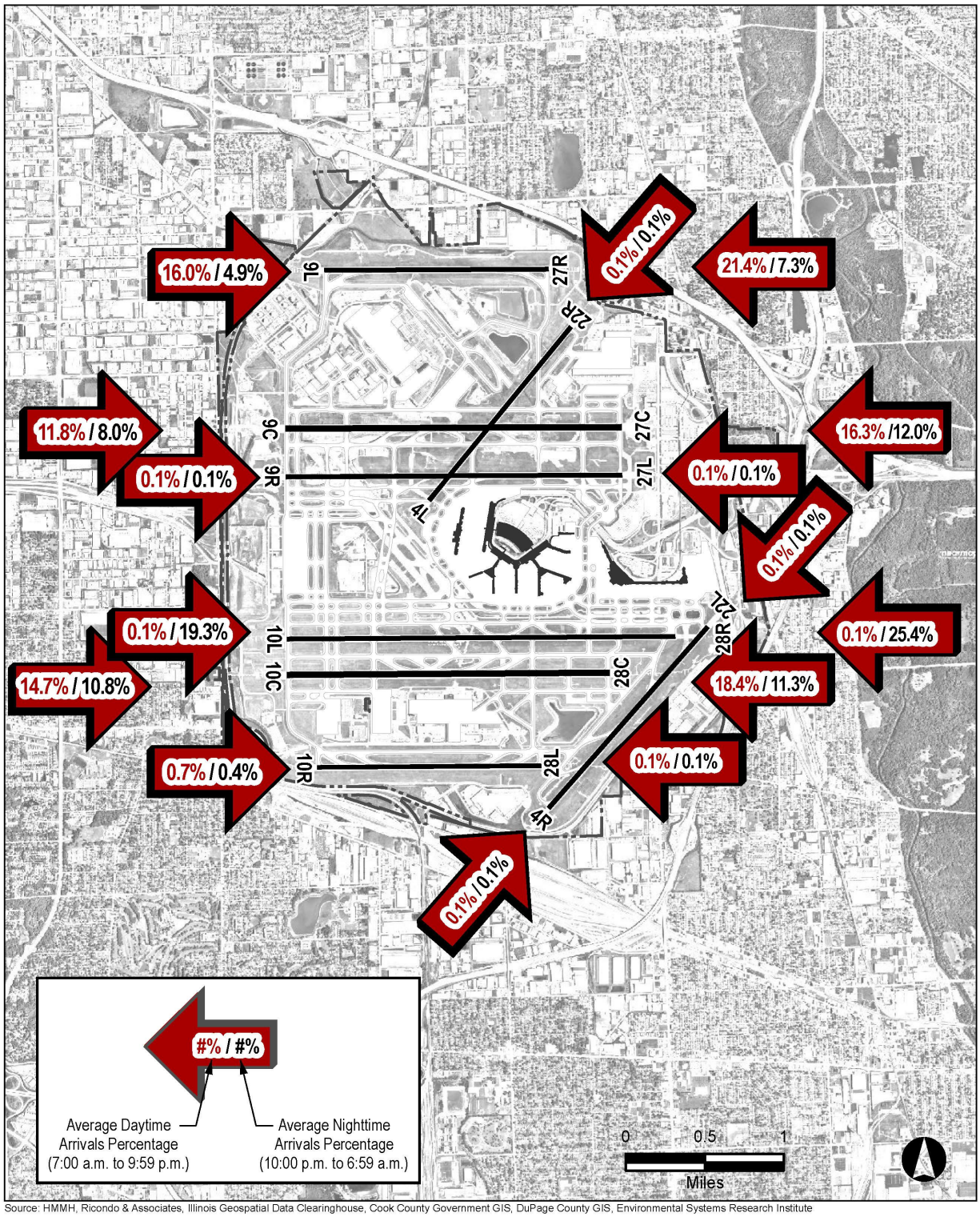
Two "flow" states are considered for O'Hare: east flow, when winds come from the east, and west flow, when winds come from the west. Overall, 56.5 percent of O'Hare's operations for the Build Out No Action were in west flow and 43.5 percent were in east flow.

During the Build Out No Action daytime operations (7:00:00 a.m. to 9:59:59 p.m.), the typical arrival runways used are 9L, 9C, 10C, 27C, 27R, and 28C. At nighttime (10:00:00 p.m. to 6:59:59 a.m.), the typical arrival runways used are 9L, 9C, 10L, 10C, 27C, 27R, 28C, and 28R. For departures during the day, the typical runways used are 9R, 10L, 22L, 27L, and 28R. At night, the typical departure runways used are 4L, 9R, 10L, 22L, 27L, and 28R.

Exhibit 5.5-9 provides the arrival runway use modeled for the Build Out No Action and **Exhibit 5.5-10** provides the departure runway use modeled for the Build Out No Action.

The Build Out No Action would not retain the offset air traffic approaches to Runway 10R and 28L. The final approach segments of arrival tracks to Runways 10R (on the west side of the airport) and to Runway 28L (on the east side of the airport) coincide with their extended runway centerlines (the offset arrival procedures were removed). The southside downwind segments of arrival tracks to all west side runway ends and the southside downwind approach to Runway 28L are parallel to the final approach segments.

Modeled flight tracks to and from each runway end were developed and input into AEDT to represent the flight path routes for each condition. A set of modeled flight tracks represents a flight path route to or from a runway; track-specific flight operations are weighted to represent the dispersion of actual traffic for that route. **Exhibit 5.5-11** presents all the modeled flight tracks for the Build Out No Action and displays the arrival and departure tracks to all runways.



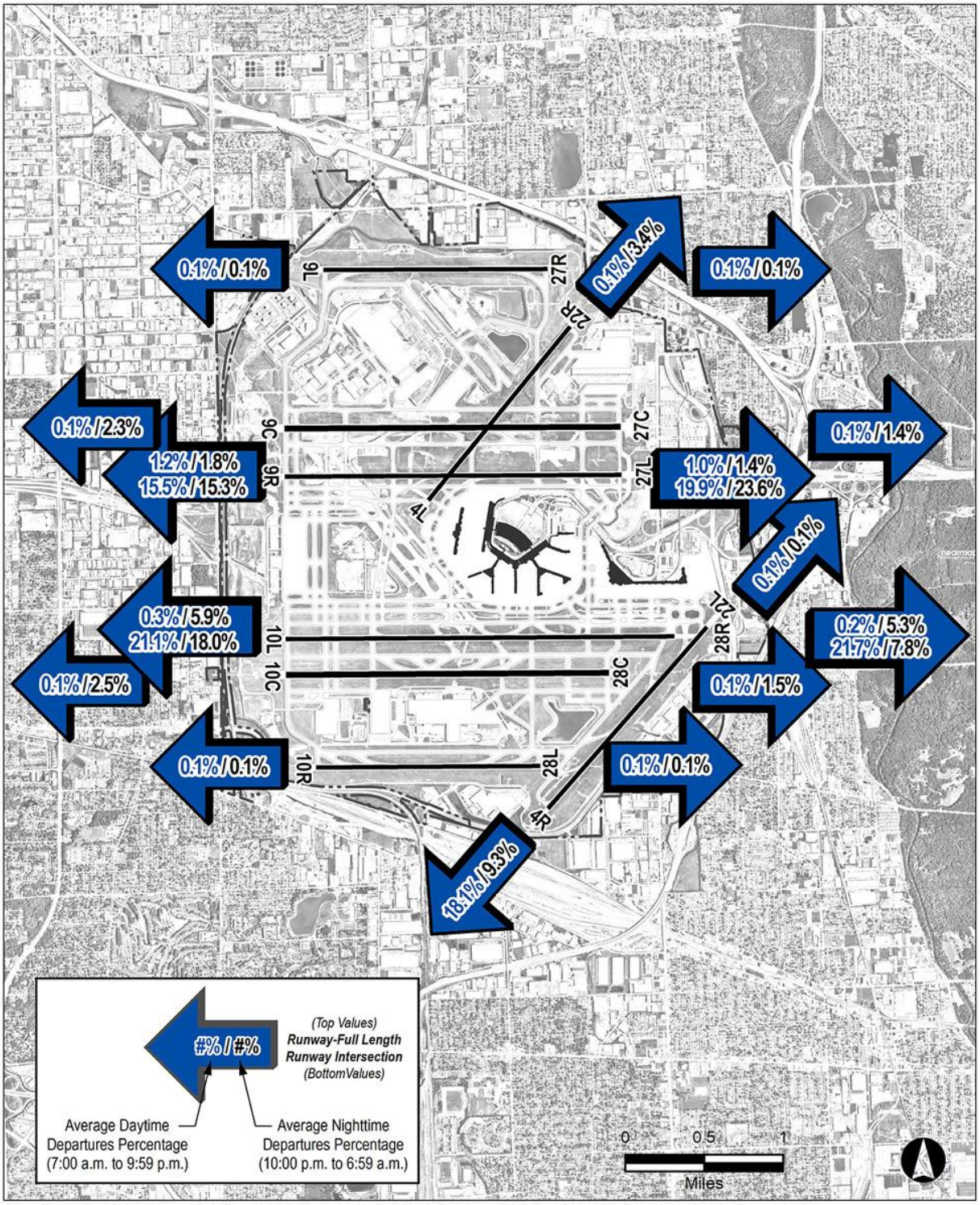
Source: HMMH, Ricondo & Associates, Illinois Geospatial Data Clearinghouse, Cook County Government GIS, DuPage County GIS, Environmental Systems Research Institute

Chicago O'Hare International Airport

Terminal Area Plan and Air Traffic Procedures Environmental Assessment

Build Out No Action Arrival Runway Use

Exhibit 5.5-9



Source: HMMH, Ricondo & Associates, Illinois Geospatial Data Clearinghouse, Cook County Government GIS, DuPage County GIS, Environmental Systems Research Institute

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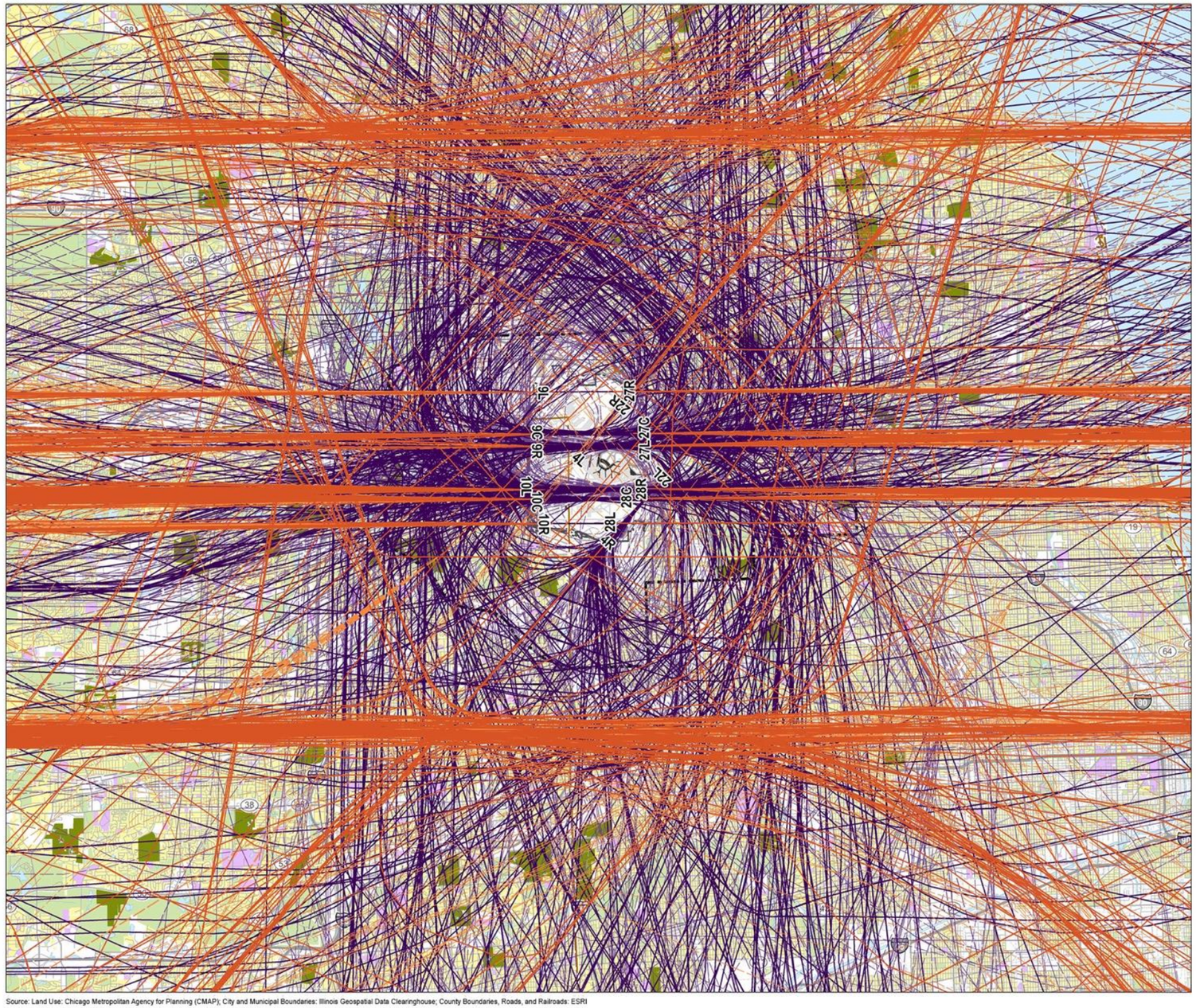
Terminal Area Plan and Air Traffic Procedures Environmental Assessment

Build Out No Action
Departure Runway Use

▶ Exhibit 5.5-10



Source: Land Use: Chicago Metropolitan Agency for Planning (CMAP); City and Municipal Boundaries: Illinois Geospatial Data Clearinghouse; County Boundaries, Roads, and Railroads: ESRI

Chicago O'Hare International Airport

Terminal Area Plan and Air Traffic Procedures Environmental Assessment

- Arrival Backbone Model Track (1,729)
- Arrival Model Subtrack (3,100)
- Departure Backbone Model Track (1,758)
- Departure Model Subtrack (3,866)
- Primary Study Area
- Airport Property Boundary
- Runways
- County Boundary
- Residential
- Public, Hospital, Institutional
- Open Space Recreation
- Golf
- Water / Stream
- Highway
- Primary Roads
- Secondary Roads
- Local Roads
- Railroad

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Miles

Build Out No Action Model Tracks

Exhibit 5.5-11

5.5.6.3.1 Noise Exposure

Table 5.5-9 provides estimates of the land use area, noise-sensitive sites, population, and number of housing units exposed to aircraft noise of at least 65 DNL for the Build Out No Action. The top portion of the table quantifies acreage in each contour band by land use category. The remainder of the table provides the count of noise-sensitive facilities and estimates of population and housing units for each DNL band.

For the Build Out No Action, no non-compatible land use is exposed to DNL greater than or equal to 75 DNL. As presented, the area exposed to at least 65 DNL is approximately 12,800 acres. Land exposed to at least 65 DNL includes nearly 1,317 acres of single-family residential use, approximately 136 acres of multi-family residential use, and nearly 695 acres of public parks. This area also includes 57 noise-sensitive sites, including six schools, all of which have been sound-insulated by the CDA.

There were an estimated 27,783 people in 11,055 housing units within the 65 DNL. Of the 11,055 housing units, 4,884 have been sound-insulated by the CDA and 259 are scheduled to be sound-insulated as part of Phase 18 and 19 of the CDA RSIP. Most non-mitigated homes within the Build Out No Action 65 DNL are currently not eligible as they are outside the DNL noise contour used for the sound insulation program. Ineligible locations include areas of Itasca and Wood Dale west of Runways 10C and 10L, areas of Norridge and Harwood Heights east of Runways 28C and 28R, and a small area of Rosemont northeast of Runway 27C.

Exhibit 5.5-12 provides the resultant DNL contours for the Build Out No Action. In the Build Out No Action, the DNL contours extend away from O'Hare on the east and west side in three main lobes (north, central, and south), and in a single lobe on the south side.

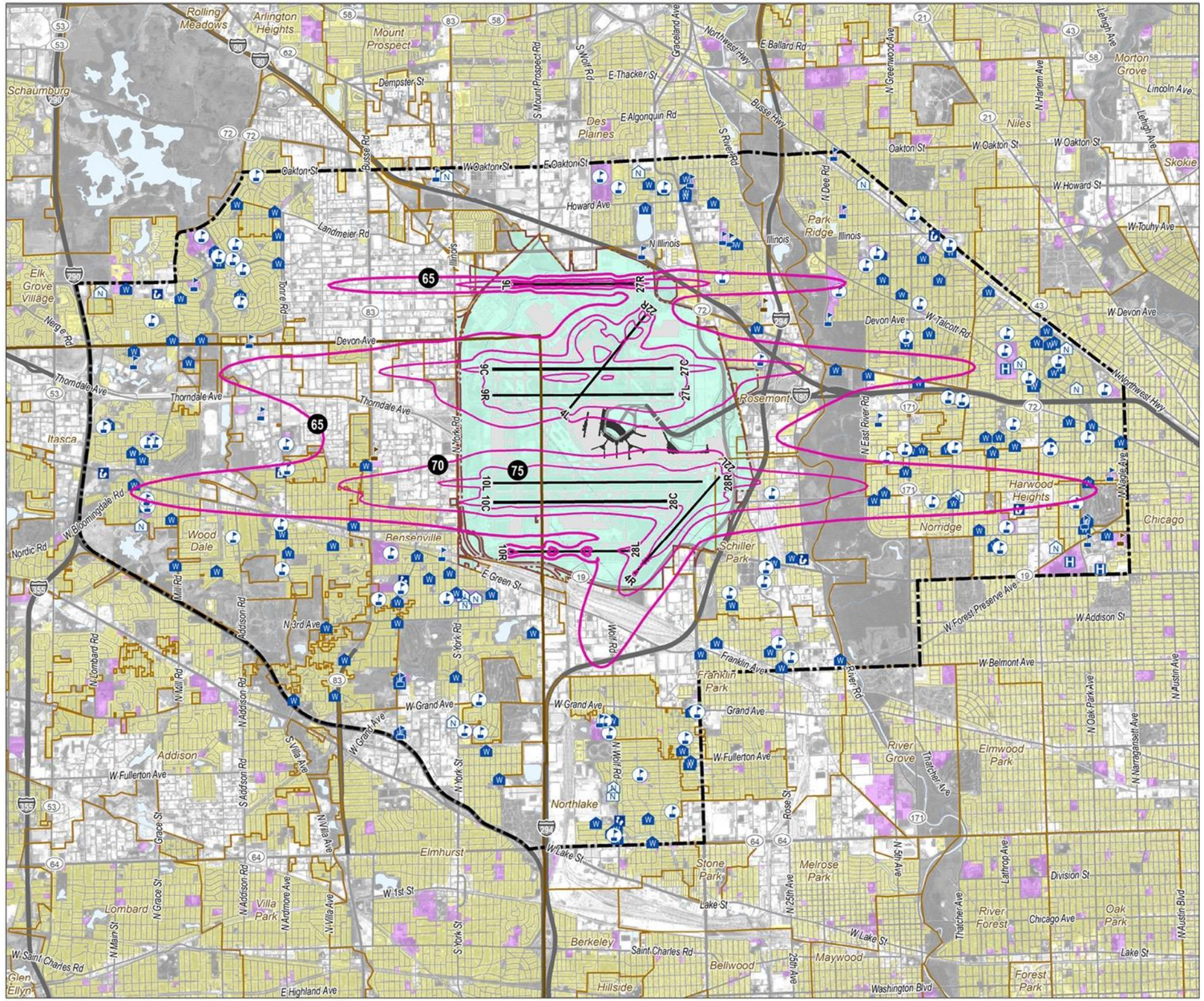
- The north east-west lobe would be due to flight operations to and from Runway 9L/27R. The east lobe of the 65 DNL contour would include residential areas of Des Plaines and extend across South Dee Road ending at South Hamlin Avenue. The west lobe of the 65 DNL contour would include mainly commercial industrial parcels and extend past Busse Road almost to Lively Boulevard.
- The central east-west lobe would be due to flight operations to and from Runways 9C/27C and 9R/27L. The east lobe of the 65 DNL contour would include residential areas of Rosemont and Park Ridge extending about a block past North Canfield Avenue. The west lobe of the 65 DNL contour extends south of Devon Avenue westward to the Salt Creek Golf Club and includes primarily commercial industrial parcels and residential areas of Bensenville south of State Route 390.
- The south east-west lobe would be due to flight operations to and from Runways 10L/28R and 10C/28C. The east lobe of the 65 DNL contour would include residential areas of Schiller Park, Norridge, and Harwood Heights, extending into the Ridgemoor Country Club golf course. The west lobe of the 65 DNL contour would include residential areas of Bensenville, Wood Dale, and Itasca, extending along Irving Park Road to the intersection of West Bloomingdale Road and South Maple Street.
- The south lobe of the 65 DNL contour, due to flight operations to and from Runway 4R/22L, extends over industrial property to just beyond I-294.

The 70 DNL contour for Build Out No Action would include residential parcels, primarily in three areas: 1) Rosemont just east of Runway 27C, 2) Schiller Park east of Runway 28R, and 3) Bensenville west of Runways 10L and 10C.

TABLE 5.5-9
NOISE EXPOSURE FOR THE BUILD OUT NO ACTION

		DNL Contour Band			
	Compatibility	**65-70**	**70-75**	**75+**	**Total (65+)**
Land Use Area (acres)					
Single-Family Residential	Non-compatible	1,220.6	96.6	-	1,317.2
Multi-Family Residential		102.6	33.0	-	135.6
Transient Lodging (residential)		72.2	13.9	-	86.1
Mobile Home		-	-	-	-
School/Education		33.0	5.2	-	38.2
Commercial	Compatible	350.9	18.5	-	369.4
Industrial, Manufacturing, & Production		3,250.7	654.4	24.3	3,929.4
Recreational		573.0	122.2	-	695.2
Public Use (excluding School/Education)[1]		96.2	3.3	-	99.5
Undeveloped		198.8	24.3	0.6	223.7
Airport		2,176.6	1,769.6	1,982.2	5,928.4
Water		20.3	2.7	-	23.0
Subtotal Non-compatible Area (acres)		1,428.4	148.7	-	1,577.1
Subtotal Compatible Area (acres)		6,666.5	2,595.0	2,007.1	11,268.6
Total Area (acres)		**8,094.9**	**2,743.7**	**2,007.1**	**12,845.7**
Off-Airport Total Area (acres)		**5,918.3**	**974.1**	**24.9**	**6,917.3**
Noise-Sensitive Facilities (count)					
Universities		1	-	-	1
Schools		5	1	-	6
Sound-Insulated Schools (Included above)		*5*	*1*	-	*6*
Libraries		1	-	-	1
Hospitals		-	-	-	-
Nursing Homes		1	-	-	1
Places of Worship		7	-	-	7
Parks and 4(f) Lands		33	3	-	36
Historic Properties		4	1	-	5
Total		**52**	**5**	**-**	**57**
Population and Housing (estimated)					
Population		23,890	3,893	-	27,783
Housing Units		9,583	1,472	-	11,055
Non-mitigated single-family housing units (Included above)[2]		*3,586*	*96*	-	*3,682*
Non-mitigated multi-family housing units (Included above)[2]		*2,489*	-	-	*2,489*
Sound-insulated single-family housing units (included above)		*3,492*	*1,376*	-	*4,868*
Sound-insulated multi-family housing units (included above)		*16*	-	-	*16*

		DNL Contour Band
Note 1: For the purposes of this document, Public Use (excluding School/Education) land use is considered compatible. Note 2: The majority of the non-mitigated housing units (89.6%) are not eligible under the existing ORD RSIP because these units are outside the current RSIP DNL 65 dB contour.		
Sources: ORD Residential Sound Insulation Program, January 2021 database: City of Chicago 2020 U.S. Census Bureau Census Block Population Data Build Out No Action Noise Contours, Land Use, Noise-Sensitive Facilities, Population and Housing data: HMMH Analysis, October 2021		



Chicago O'Hare International Airport

Terminal Area Plan and Air Traffic Procedures Environmental Assessment

- Build Out No Action DNL Contours (65, 70, 75 dB)
- Primary Study Area
- Airport Boundary
- Runways
- Taxiway / Apron
- County Boundary
- Community Boundary
- Highway
- Primary Roads
- Secondary Roads
- Local Roads
- Railroad Lines
- School
- Library
- Sound Insulated School
- Nursing Home
- College/University
- Hospital
- Place of Worship
- Residential
- Public, Hospital, Institutional
- Compatible
- Water / Stream

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Miles

Noise Exposure Contours for Build Out No Action and Noise Sensitive Facilities

▸ Exhibit 5.5-12

5.5.6.4 Interim Proposed Action

In the Interim Proposed Action, in addition to the Terminal 3 and 5 changes discussed in the Interim No Action, the taxiway geometry south of Runway 4L would be modified to encompass a construction work area between Taxiway T and Concourse C and Concourse E as shown in **Exhibit 5.5-13**.

The Interim Proposed Action operations were broken down into widebody jets, all other jets, and non-jet categories for the AEDT modeling as shown in **Table 5.5-10**. The 952,489 annual operations translate to 2,610 AAD operations. The total number of flight operations in **Table 5.5-10** is different from the forecast by one annual operation due to rounding.

TABLE 5.5-10
ANNUAL FLIGHT OPERATIONS FOR THE INTERIM PROPOSED ACTION

Body Category	Arrivals			Departures			Total		
	Day	Night	Total	Day	Night	Total	Day	Night	Total
Widebody Jet	33,314	10,266	43,580	33,188	10,392	43,580	66,502	20,658	87,160
Other Jet	372,722	56,565	429,287	395,177	34,110	429,287	767,899	90,675	858,574
Non-jet	3,040	338	3,378	3,378	0	3,378	6,418	338	6,756
Total	**409,076**	**67,169**	**476,245**	**431,743**	**44,502**	**476,245**	**840,819**	**111,671**	**952,490**
Percentage	43%	7%	50%	45%	5%	50%	88%	12%	100%

Note: Values have been rounded to whole numbers for reporting.
Source: CDA 2020, HMMH analysis, 2021

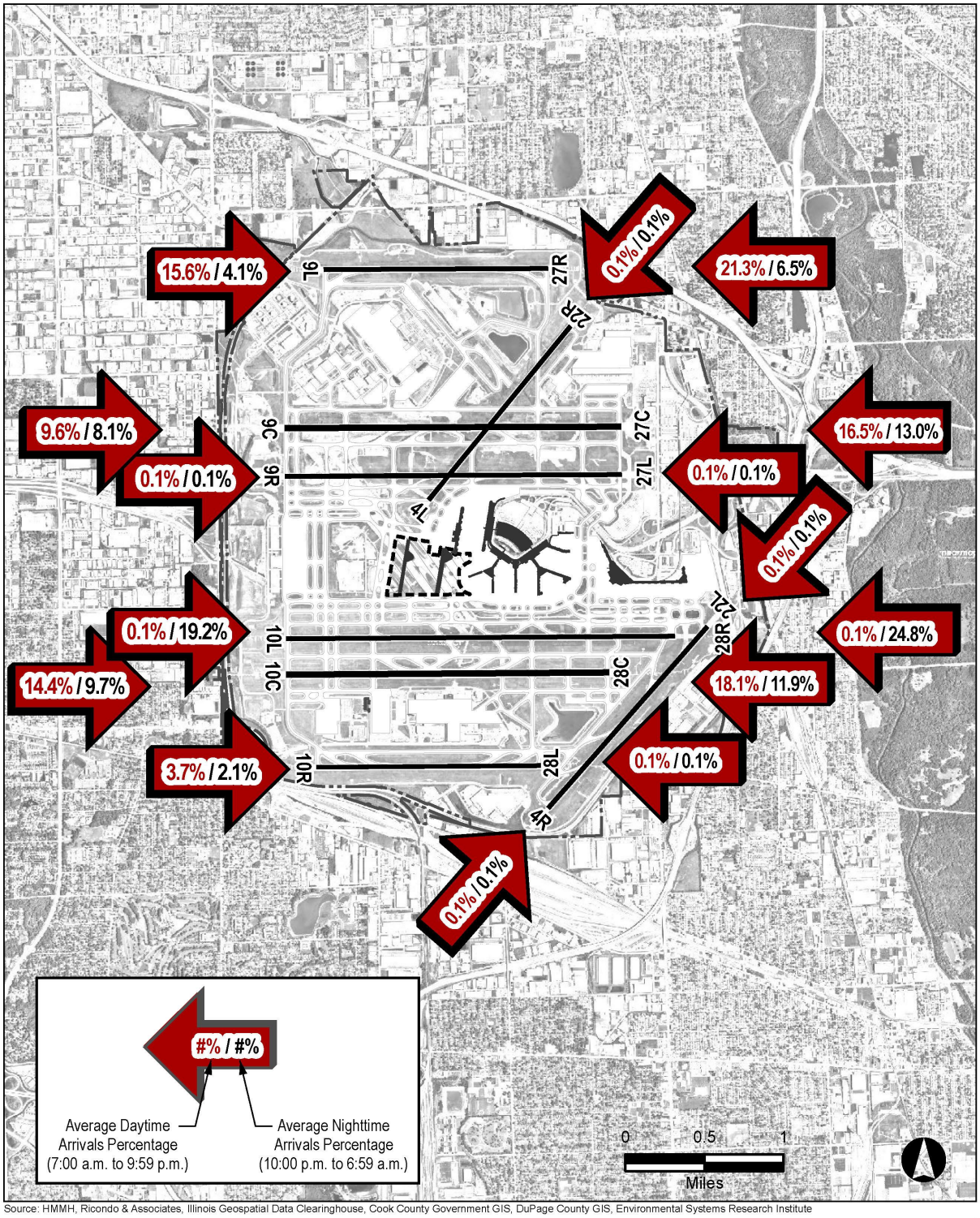
Two "flow" states are considered for O'Hare: east flow, when winds come from the east, and west flow, when winds come from the west. Overall, 56.5 percent of O'Hare's operations for the Interim Proposed Action were in west flow and 43.5 percent in east flow.

During the Interim Proposed Action in the daytime (7:00:00 a.m. to 9:59:59 p.m.), the typical arrival runways used are 9L, 9C, 10C, 10R, 27C, 27R, and 28C. At nighttime (10:00:00 p.m. to 6:59:59 a.m.), the typical arrival runways used are 9L, 9C, 10L, 10C, 27C, 27R, 28C, and 28R. For departures during the day, the typical runways used are 9R, 10L, 22L, 27L, and 28R. At night, the typical departure runways used are 4L, 9R, 10L, 22L, 27L, and 28R.

Exhibit 5.5-13 provides the arrival runway use modeled for the Interim Proposed Action and **Exhibit 5.5-14** provides the departure runway use modeled for the Interim Proposed Action.

The Interim Proposed Action retains the offset air traffic approaches to Runway 10R and 28L, similar to the Existing Condition. The final approach segments of arrival tracks to Runways 10R (on the west side of the airport) and to Runway 28L are offset to the runway centerline. The southside downwind segments of arrival tracks to all west side runway ends and the southside downwind approach to Runway 28L are also offset and parallel to the Runway 10R and 28L final approaches.

Modeled flight tracks to and from each runway end were developed and input into the AEDT to represent the flight path routes for each condition. A set of modeled flight tracks represents a flight path route to or from a runway; track-specific flight operations are weighted to represent the dispersion of actual traffic for that route. **Exhibit 5.5-15** presents all the modeled flight tracks for the Interim Proposed Action and it displays the arrival and departure tracks to all runways.



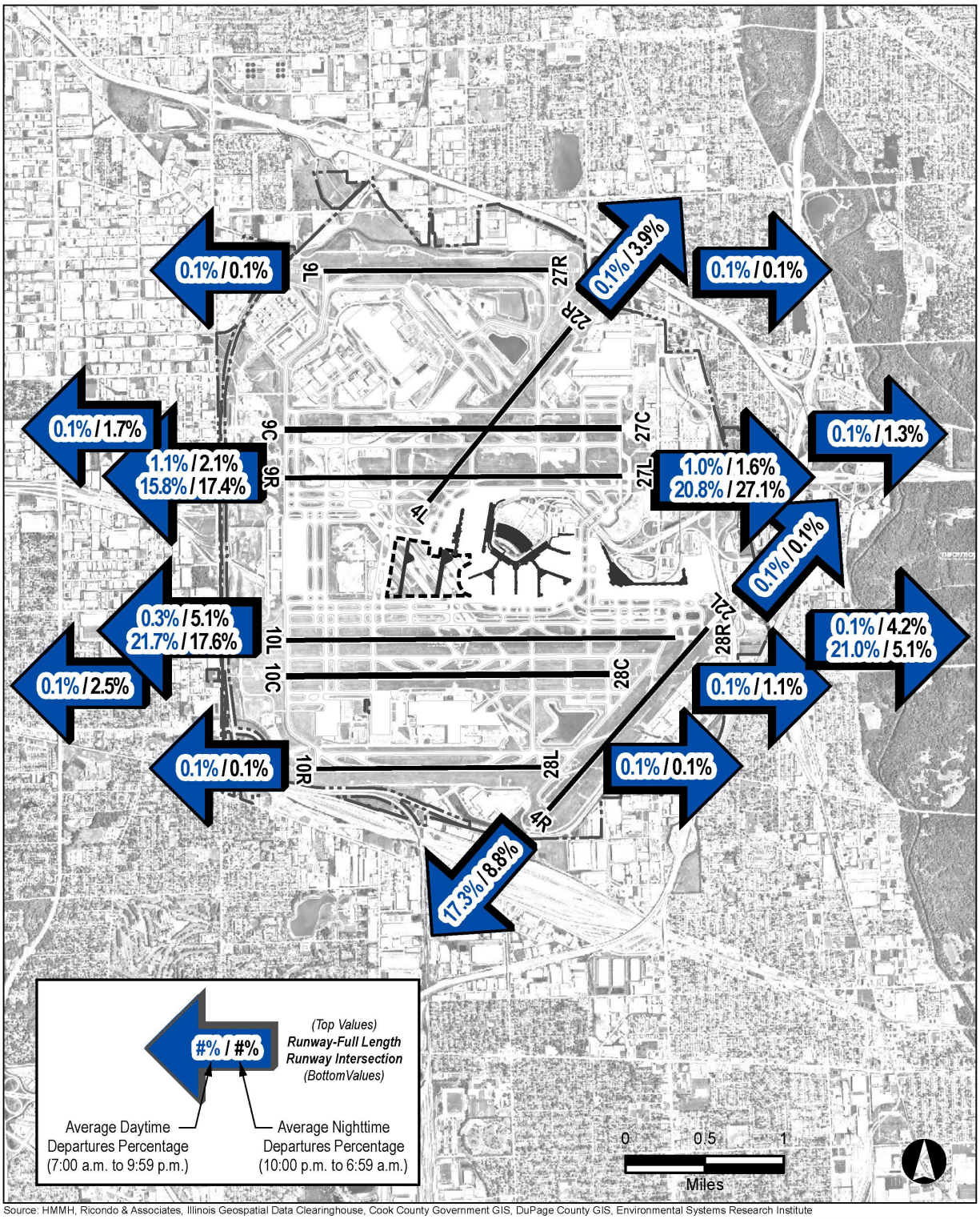
Source: HMMH, Ricondo & Associates, Illinois Geospatial Data Clearinghouse, Cook County Government GIS, DuPage County GIS, Environmental Systems Research Institute

Chicago O'Hare International Airport

Terminal Area Plan and Air Traffic Procedures Environmental Assessment

Interim Proposed Action
Arrival Runway Use

▶ Exhibit 5.5-13



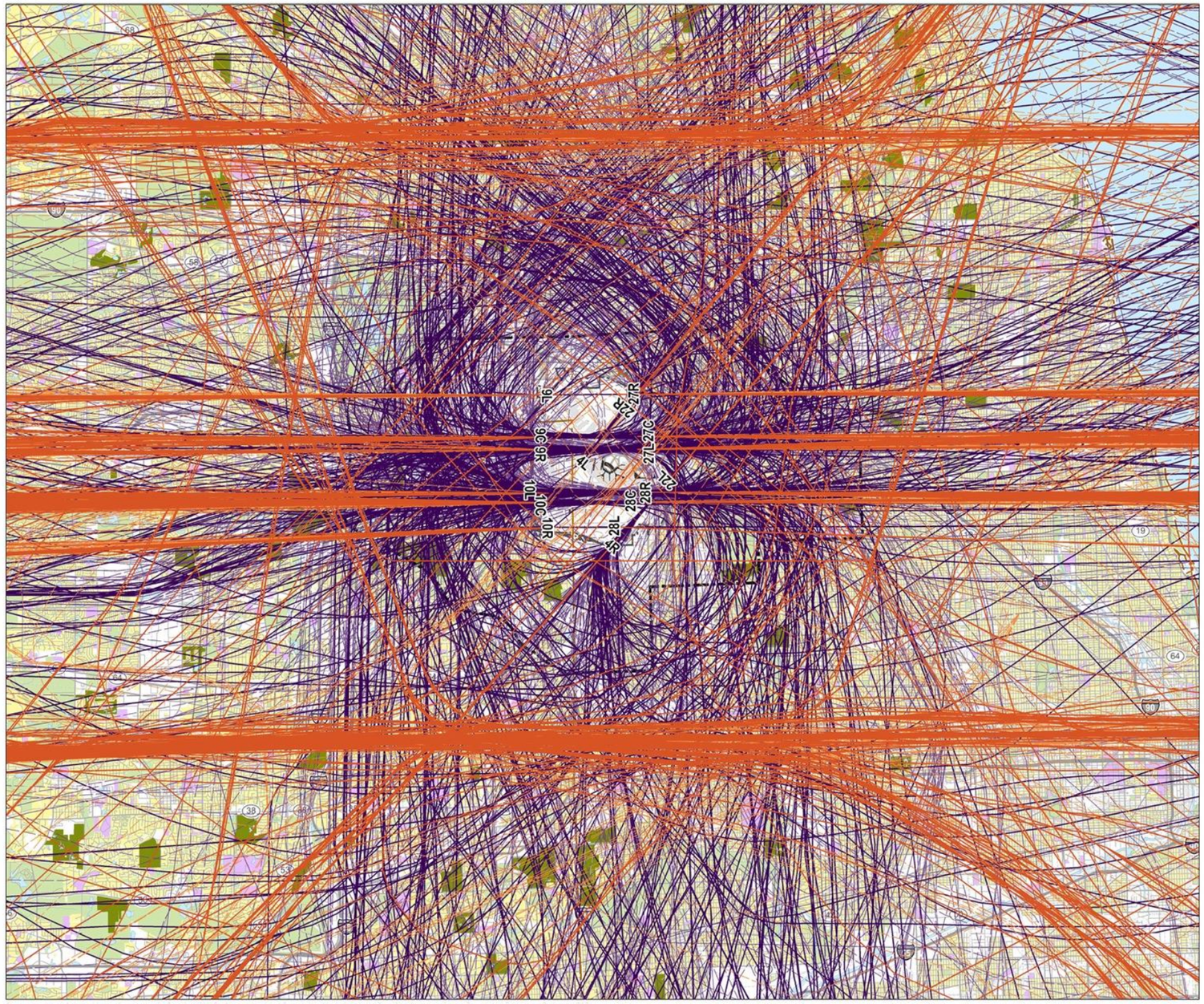
Source: HMMH, Ricondo & Associates, Illinois Geospatial Data Clearinghouse, Cook County Government GIS, DuPage County GIS, Environmental Systems Research Institute

Chicago O'Hare International Airport

Terminal Area Plan and Air Traffic Procedures Environmental Assessment

Interim Proposed Action
Departure Runway Use

▶ Exhibit 5.5-14



Source: Land Use: Chicago Metropolitan Agency for Planning (CMAP); City and Municipal Boundaries: Illinois Geospatial Data Clearinghouse; County Boundaries, Roads, and Railroads: ESRI

Chicago O'Hare International Airport

Terminal Area Plan and Air Traffic Procedures Environmental Assessment

- Arrival Backbone Model Track (1,698)
- Arrival Model Subtrack (3,058)
- Departure Backbone Model Track (921)
- Departure Model Subtrack (1,834)
- Primary Study Area
- Airport Property Boundary
- Runways
- County Boundary
- Residential
- Public, Hospital, Institutional
- Open Space Recreation
- Golf
- Water / Stream
- Highway
- Primary Roads
- Secondary Roads
- Local Roads
- Railroad

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Interim Proposed Action Model Tracks

Exhibit 5.5-15

5.5.6.4.1 Noise Exposure

Table 5.5-11 provides estimates of the land use area, noise sensitive sites, population, and number of housing units exposed to aircraft noise of at least 65 DNL for the Interim Proposed Action. The top portion of the table quantifies acreage in each contour band by land use category. The remainder of the table provides the count of noise-sensitive facilities and estimates of population and housing units for each DNL band.

For the Interim Proposed Action, no non-compatible land use is exposed to DNL greater than or equal to 75 DNL. As presented, the area exposed to least 65 DNL is approximately 11,600 acres. Land exposed to at least 65 DNL includes nearly 1,084 acres of single-family residential use, approximately 114 acres of multi-family residential use, and nearly 546 acres of public parks. This area also includes 47 noise-sensitive sites, including five schools, all of which have been sound-insulated by the CDA.

There were an estimated 22,935 people in 9,156 housing units within the 65 DNL. Of the 9,156 housing units, 4,533 have been sound-insulated by the CDA and 223 are scheduled to be sound-insulated as part of Phase 18 and 19 of the CDA RSIP. Most non-mitigated homes within the Interim Proposed Action 65 DNL are currently not eligible, as they are outside the DNL noise contour used for the sound insulation program. Ineligible locations include areas of Itasca and Wood Dale west of Runways 10C and 10L, areas of Norridge and Harwood Heights east of Runways 28C and 28R, and a small area of Rosemont northeast of Runway 27C. For comparison between the Interim No Action and the Interim Proposed Action, see **Table F-41** in **Appendix F**.

Exhibit 5.5-16 provides the resultant DNL contours for the Interim Proposed Action. In the Interim Proposed Action, the DNL contours extend away from O'Hare on the east and west side in three main lobes (north, central, and south), and in a single lobe on the south side.

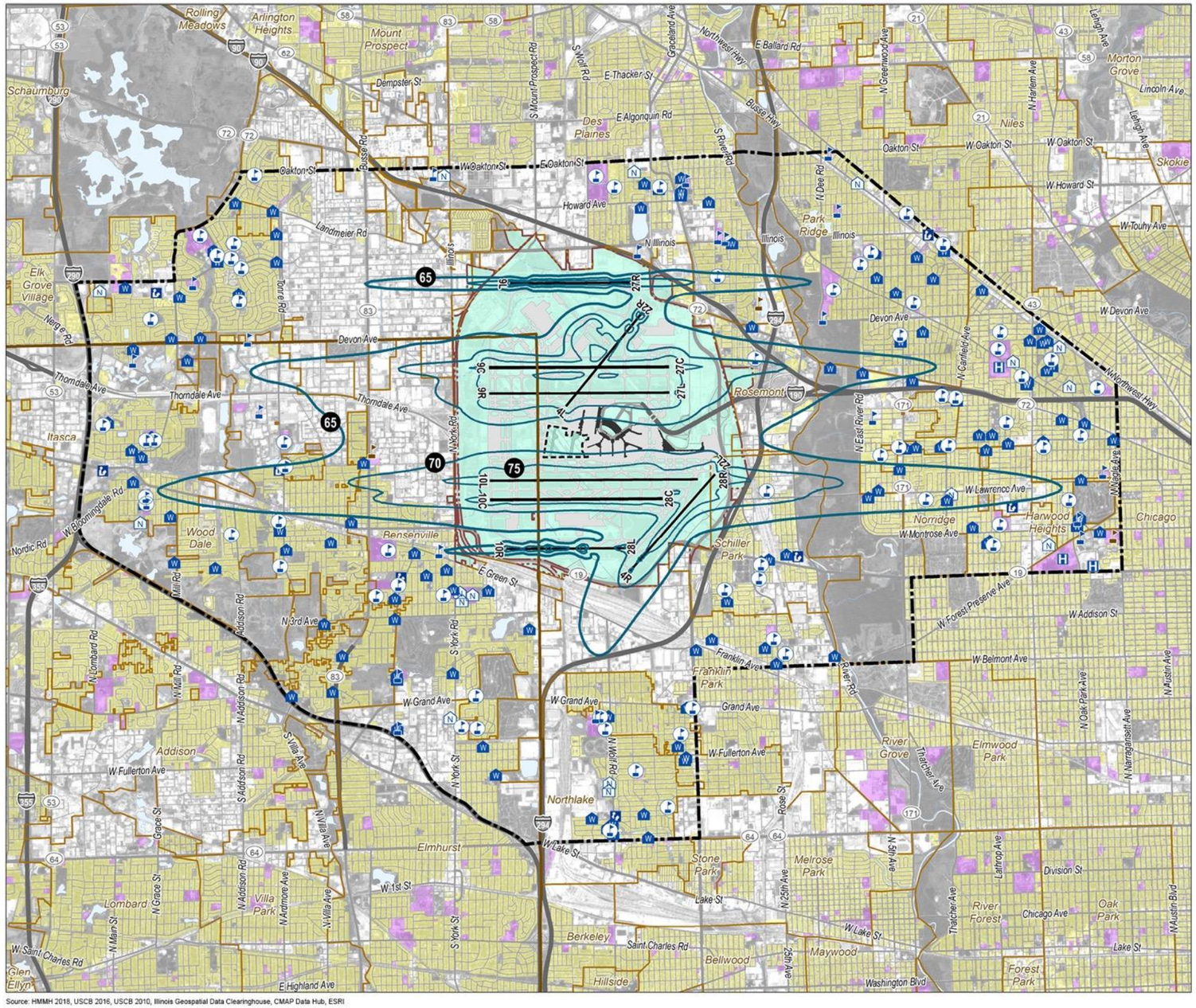
- The north east-west lobe would be due to flight operations to and from Runway 9L/27R. The east lobe of the 65 DNL contour would include residential areas of southern Des Plaines; it would extend into Chippewa Woods south of West Talcott Road ending west of South Dee Road. The west lobe of the 65 DNL contour, consisting mainly of commercial industrial parcels, ends just west of Busse Road.
- The central east-west lobe would be due to flight operations to and from Runways 9C/27C and 9R/27L. The east lobe of the 65 DNL contour would include residential areas of Rosemont and Park Ridge, extending just past Vine Avenue. The west lobe of the 65 DNL contour would extend west to North Mittel Boulevard and include primarily commercial industrial parcels and residential areas of Bensenville south of State Route 390.
- The south east-west lobe would be due to flight operations to and from Runways 10L/28R and 10C/28C. The east lobe of the 65 DNL contour would include residential areas of Schiller Park, Norridge, and Harwood Heights, extending to about two blocks west of the Ridgemoor Country Club golf course. The west lobe of the 65 DNL contour would include residential areas of Bensenville, Wood Dale, and Itasca, extending along Irving Park Road and ending at South Cheery Street.
- A smaller lobe of the 65 DNL contour would extend west from Runway 10R into Bensenville almost to South Addison Street.
- The south lobe of the 65 DNL contour, due to flight operations to and from Runway 4R/22L, extends over industrial property to I-294.

The 70 DNL contour for Interim Proposed Action would include residential parcels, primarily in three areas: 1) Rosemont just east of Runway 27C, 2) Schiller Park east of Runway 28R, and 3) Bensenville west of Runways 10L and 10C.

TABLE 5.5-11
NOISE EXPOSURE FOR THE INTERIM PROPOSED ACTION

		DNL Contour Band			
	Compatibility	**65-70**	**70-75**	**75+**	**Total (65+)**
Land Use Area (acres)					
Single-Family Residential	Non-compatible	1,023.5	60.2	-	1,083.7
Multi-Family Residential		82.9	30.8	-	113.7
Transient Lodging (residential)		56.8	7.1	-	63.9
Mobile Home		-	-	-	-
School/Education		14.6	4.6	-	19.2
Commercial	Compatible	301.7	15.4	-	317.1
Industrial, Manufacturing, & Production		2,813.9	523.5	15.4	3,352.8
Recreational		474.8	71.2	-	546.0
Public Use (excluding School/Education)		89.9	2.5	-	92.4
Undeveloped		163.7	21.3	0.4	185.4
Airport		2,286.1	1,703.0	1,855.6	5,844.7
Water		18.0	1.6	-	19.6
Subtotal Non-compatible Area (acres)		1,177.8	102.7	-	1,280.5
Subtotal Compatible Area (acres)		6,148.1	2,338.5	1,871.4	10,358.0
Total Area (acres)		**7,325.9**	**2,441.2**	**1,871.4**	**11,638.5**
Off-Airport Total Area (acres)		**5,039.8**	**738.2**	**15.8**	**5,793.8**
Noise-Sensitive Facilities (count)					
Universities		1	-	-	1
Schools		4	1	-	5
Sound-Insulated Schools (Included above)[1]		*4*	*1*	-	*5*
Libraries		1	-	-	1
Hospitals		-	-	-	-
Nursing Homes		1	-	-	1
Places of Worship		7	-	-	7
Parks and 4(f) Lands		25	2	-	27
Historic Properties		4	1	-	5
Total		**43**	**4**	**-**	**47**
Population and Housing (estimated)					
Population		19,654	3,281	-	22,935
Housing Units		7,888	1,268	-	9,156
Non-mitigated single-family housing units (Included above)[2]		*2,557*	*78*	-	*2,655*
Non-mitigated multi-family housing units (Included above)[2]		*1,968*	-	-	*1,968*
Sound-insulated single-family housing units (included above)		*3,327*	*1,190*	-	*4,517*
Sound-insulated multi-family housing units (included above)		*16*	-	-	*16*

		DNL Contour Band
Note 1: For the purposes of this document, Institutional land use is considered compatible. Note 2: The majority of the non-mitigated housing units (88.8%) are not eligible under the existing ORD RSIP because these units are outside the current RSIP DNL 65 dB contour.		
Sources: ORD Residential Sound Insulation Program, January 2021 database: City of Chicago 2020 U.S. Census Bureau Census Block Population Data Interim Proposed Action Noise Contours, Land Use, Noise-Sensitive Facilities, Population and Housing data: HMMH Analysis, October 2021		



Chicago O'Hare International Airport

Terminal Area Plan and Air Traffic Procedures Environmental Assessment

- Interim Proposed Action DNL Contours (65, 70, 75 dB)
- Primary Study Area
- Airport Boundary
- Runways
- Taxiway / Apron
- County Boundary
- Community Boundary
- Highway
- Primary Roads
- Secondary Roads
- Local Roads
- Railroad Lines
- School
- Library
- Sound Insulated School
- Nursing Home
- College/University
- Hospital
- Place of Worship
- Residential
- Public, Hospital, Institutional
- Compatible
- Water / Stream

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Noise Exposure Contours for Interim Proposed Action and Noise Sensitive Facilities

▸ Exhibit 5.5-16

5.5.6.5 Build Out Proposed Action

The Build Out Proposed Action includes the Terminal 3 and 5 changes discussed in the Build Out No Action, as well as two high speed taxiway exits that would be added to Runway 9L/27R. The taxiway geometry south of Runway 4L changes to support the new terminal and concourses, and the taxiway configuration south of Terminal 5 near the end of Runway 22L would be modified as shown in **Exhibit 5.5-17**.

The Build Out Proposed Action operations were broken down into widebody jets, all other jets, and non-jet categories for the AEDT modeling as shown in **Table 5.5-12**. The 1,013,856 annual operations translate to 2,778 AAD operations.

TABLE 5.5-12
ANNUAL FLIGHT OPERATIONS FOR THE BUILD OUT PROPOSED ACTION

Body Category	Arrivals			Departures			Total		
	Day	Night	Total	Day	Night	Total	Day	Night	Total
Widebody Jet	36,323	13,813	50,136	37,819	12,317	50,136	74,142	26,130	100,272
Other Jet	395,355	58,050	453,405	417,133	36,272	453,405	812,488	94,322	906,810
Non-jet	3,048	339	3,387	3,387	0	3,387	6,435	339	6,774
Total	**434,726**	**72,202**	**506,928**	**458,339**	**48,589**	**506,928**	**893,065**	**120,791**	**1,013,856**
Percentage	43%	7%	50%	45%	5%	50%	88%	12%	100%

Note: Values have been rounded to whole numbers for reporting.
Source: CDA 2020, HMMH analysis, 2021

Two "flow" states are considered for O'Hare: 1) east flow, when winds come from the east, and 2) west flow, when winds come from the west. Overall, 53.6 percent of O'Hare's operations for the Build Out Proposed Action were in west flow and 46.4 percent in east flow.

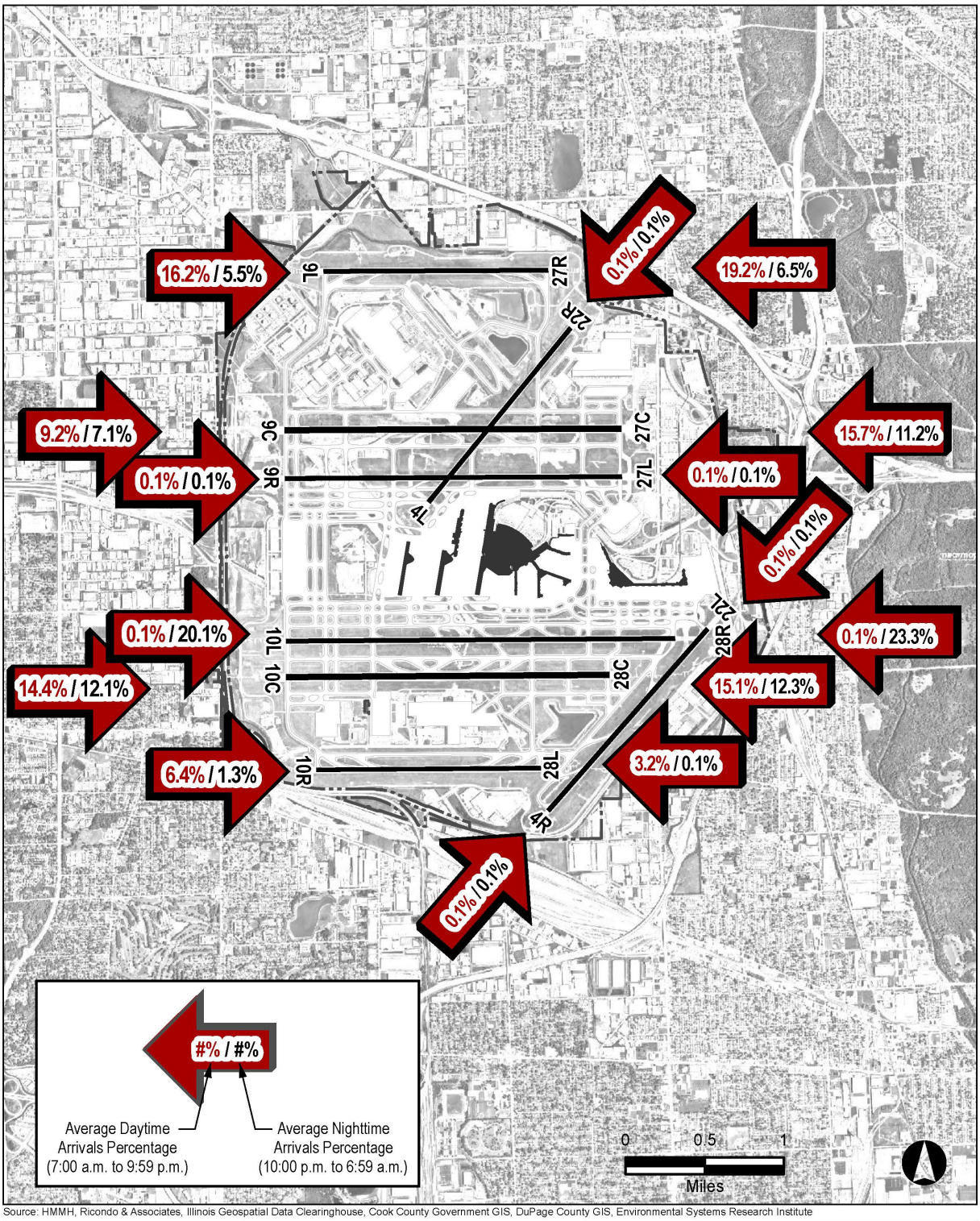
During the Build Out Proposed Action in the daytime (7:00:00 a.m. to 9:59:59 p.m.), the typical arrival runways used are 9L, 9C, 10C, 10R, 27C, 27R, 28L, and 28C. At nighttime (10:00:00 p.m. to 6:59:59 a.m.), the typical arrival runways used are 9L, 9C, 10L, 10C, 27C, 27R, 28C, and 28R. For departures during the day, the typical runways used are 9R, 10L, 22L, 27L, and 28R. At night, the typical departure runways used are 4L, 9R, 10L, 22L, 27L, and 28R.

Exhibit 5.5-17 provides the arrival runway use modeled for the Build Out Proposed Action and **Exhibit 5.5-18** provides the departure runway use modeled for the Build Out Proposed Action.

The Build Out Proposed Action retains the offset air traffic approaches to Runway 10R and 28L, similar to the Existing Condition. The final approach segments of arrival tracks to Runways 10R (on the west side of the airport) and to Runway 28L are offset to the runway centerline. The southside downwind segments of arrival tracks to all west side runway ends, and the southside downwind approach to Runway 28L is also offset and parallels the Runway 10R and 28L final approaches.

Modeled flight tracks to and from each runway end were developed and input into AEDT to represent the flight path routes for each condition. A set of modeled flight tracks represents a flight path route to or from a runway. Track-specific flight operations are weighted to represent the dispersion of actual traffic for that

route. **Exhibit 5.5-19** presents all the modeled flight tracks for the Build Out Proposed Action and displays the arrival and departure tracks to all runways.



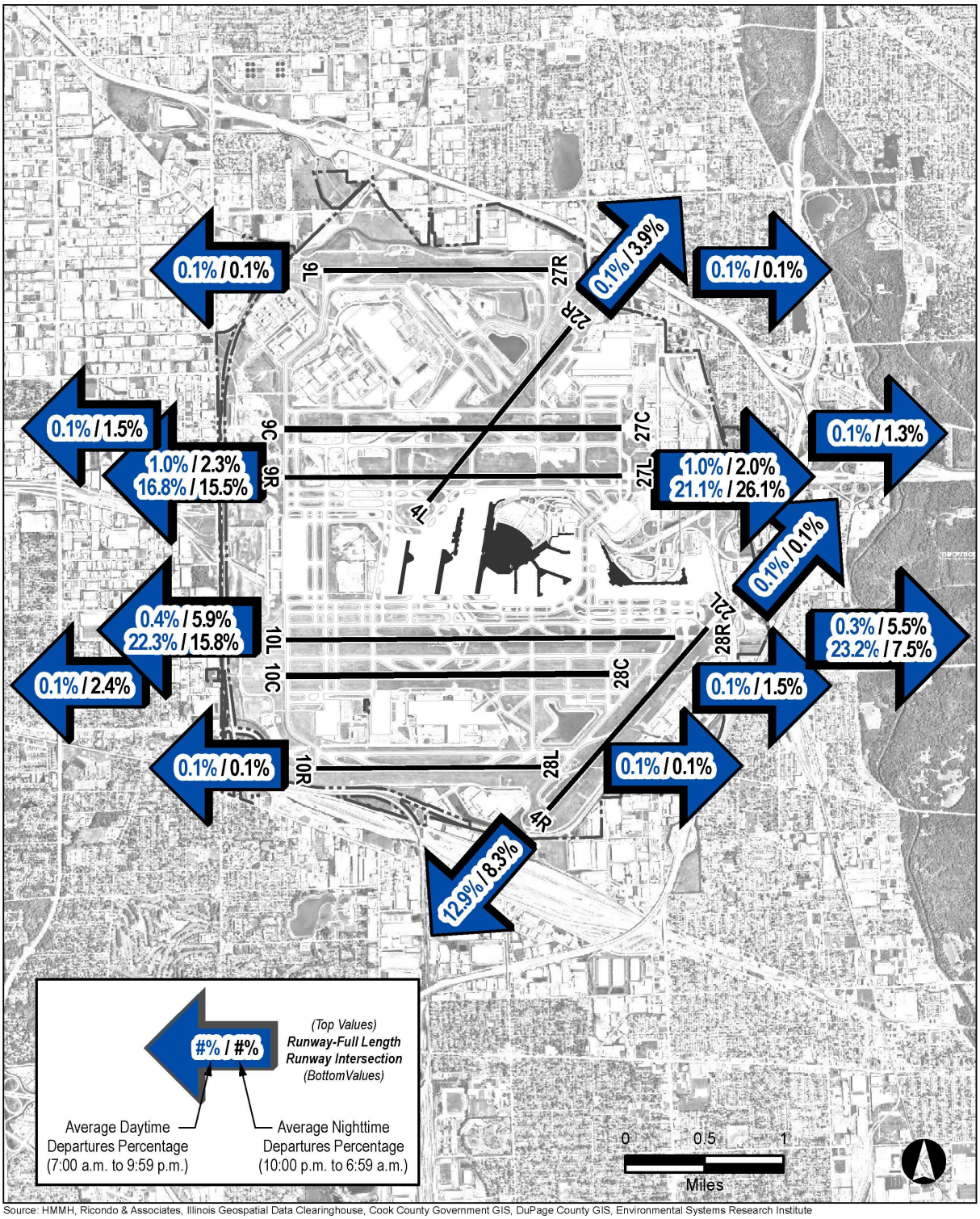
Source: HMMH, Ricondo & Associates, Illinois Geospatial Data Clearinghouse, Cook County Government GIS, DuPage County GIS, Environmental Systems Research Institute

Chicago O'Hare International Airport

Terminal Area Plan and Air Traffic Procedures Environmental Assessment

Build Out Proposed Action
Arrival Runway Use

▶ Exhibit 5.5-17



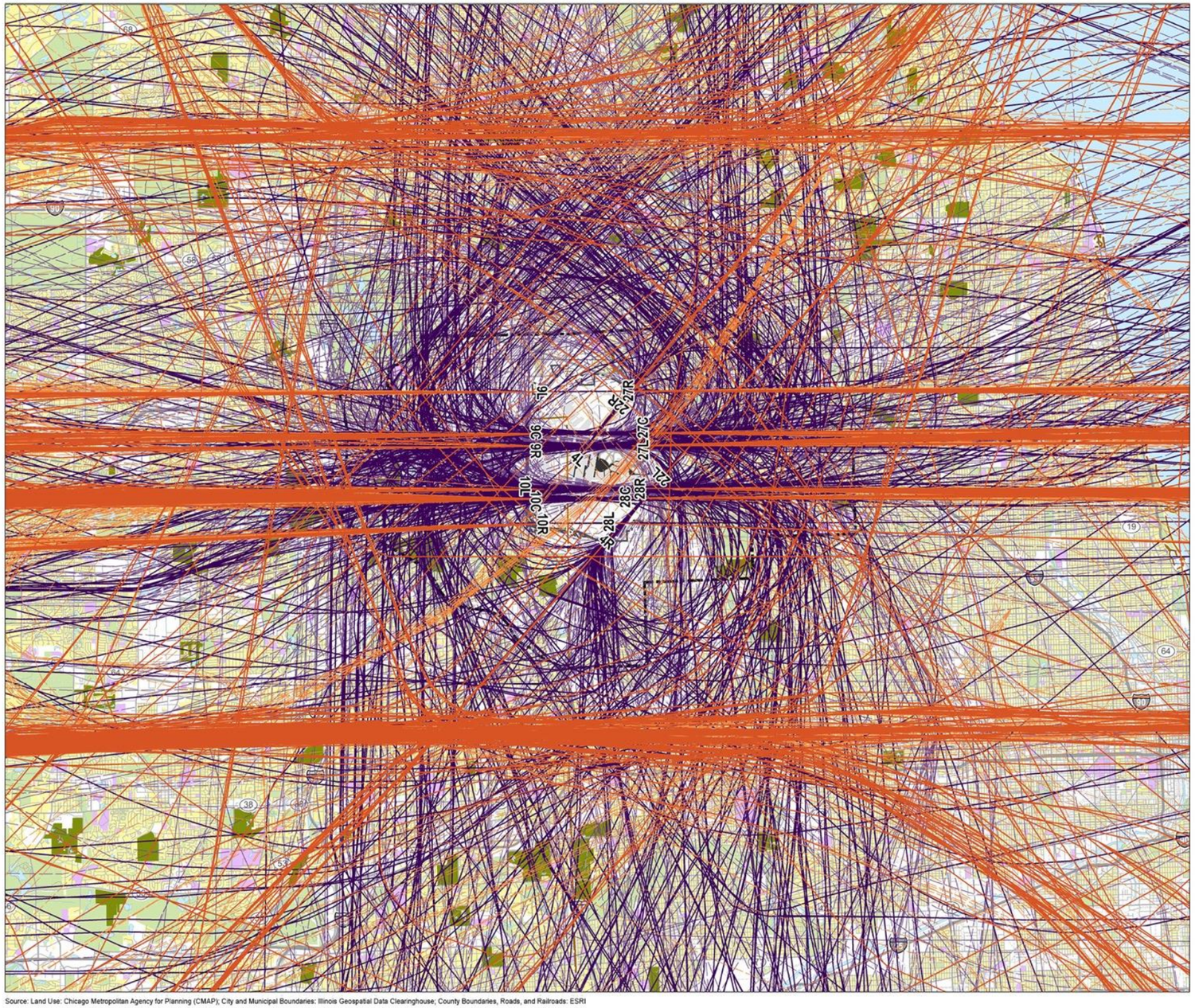
Source: HMMH, Ricondo & Associates, Illinois Geospatial Data Clearinghouse, Cook County Government GIS, DuPage County GIS, Environmental Systems Research Institute

Chicago O'Hare International Airport

Terminal Area Plan and Air Traffic Procedures Environmental Assessment

Build Out Proposed Action
Departure Runway Use

▶ Exhibit 5.5-18



Source: Land Use: Chicago Metropolitan Agency for Planning (CMAP); City and Municipal Boundaries: Illinois Geospatial Data Clearinghouse; County Boundaries, Roads, and Railroads: ESRI

Chicago O'Hare International Airport

Terminal Area Plan and Air Traffic Procedures Environmental Assessment

- Arrival Backbone Model Track (1,798)
- Arrival Model Subtrack (3,208)
- Departure Backbone Model Track (1,582)
- Departure Model Subtrack (3,404)
- Primary Study Area
- Airport Property Boundary
- Runways
- County Boundary
- Residential
- Public, Hospital, Institutional
- Open Space Recreation
- Golf
- Water / Stream
- Highway
- Primary Roads
- Secondary Roads
- Local Roads
- Railroad

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Miles

Build Out Proposed Action Model Tracks

Exhibit 5.5-19

5.5.6.5.1 Noise Exposure

Table 5.5-13 provides estimates of the land use area, noise sensitive sites, population, and number of housing units exposed to aircraft noise of at least 65 DNL for the Build Out Proposed Action. The top portion of the table quantifies acreage in each contour band by land use category. The remainder of the table provides the count of noise-sensitive facilities and estimates of population and housing units for each DNL band.

For the Build Out Proposed Action, no non-compatible land use is exposed to DNL greater than or equal to 75 DNL. As presented, the area exposed to least 65 DNL is approximately 12,600 acres. Land exposed to at least 65 DNL includes nearly 1,335 acres of single-family residential use, approximately 139 acres of multi-family residential use, and nearly 689 acres of public parks. This area also includes 67 noise-sensitive sites including eight schools, seven of which have been sound-insulated by the CDA.

There were an estimated 28,503 people in 11,379 housing units within the 65 DNL. Of the 11,379 housing units, 5,102 have been sound-insulated by the CDA and 266 are scheduled to be sound-insulated as part of Phase 18 and 19 of the CDA RSIP. Most non-mitigated homes within the Build Out Proposed Action 65 DNL have not been sound insulated because they are outside of the DNL noise contour used for CDA's ongoing RSIP. Ineligible locations include areas of Itasca and Wood Dale west of Runways 10C and 10L, areas of Norridge and Harwood Heights east of Runways 28C and 28R, and a small area of Rosemont northeast of Runway 27C. For comparison between the Build Out No Action and the Build Out Proposed Action, see **Table F-64** in **Appendix F**.

Exhibit 5.5-20 provides the resultant DNL contours for the Build Out Proposed Action. In the Build Out Proposed Action, the DNL contours extend away from O'Hare on the east and west side in three main lobes (north, central, and south), and in a single lobe on the south side.

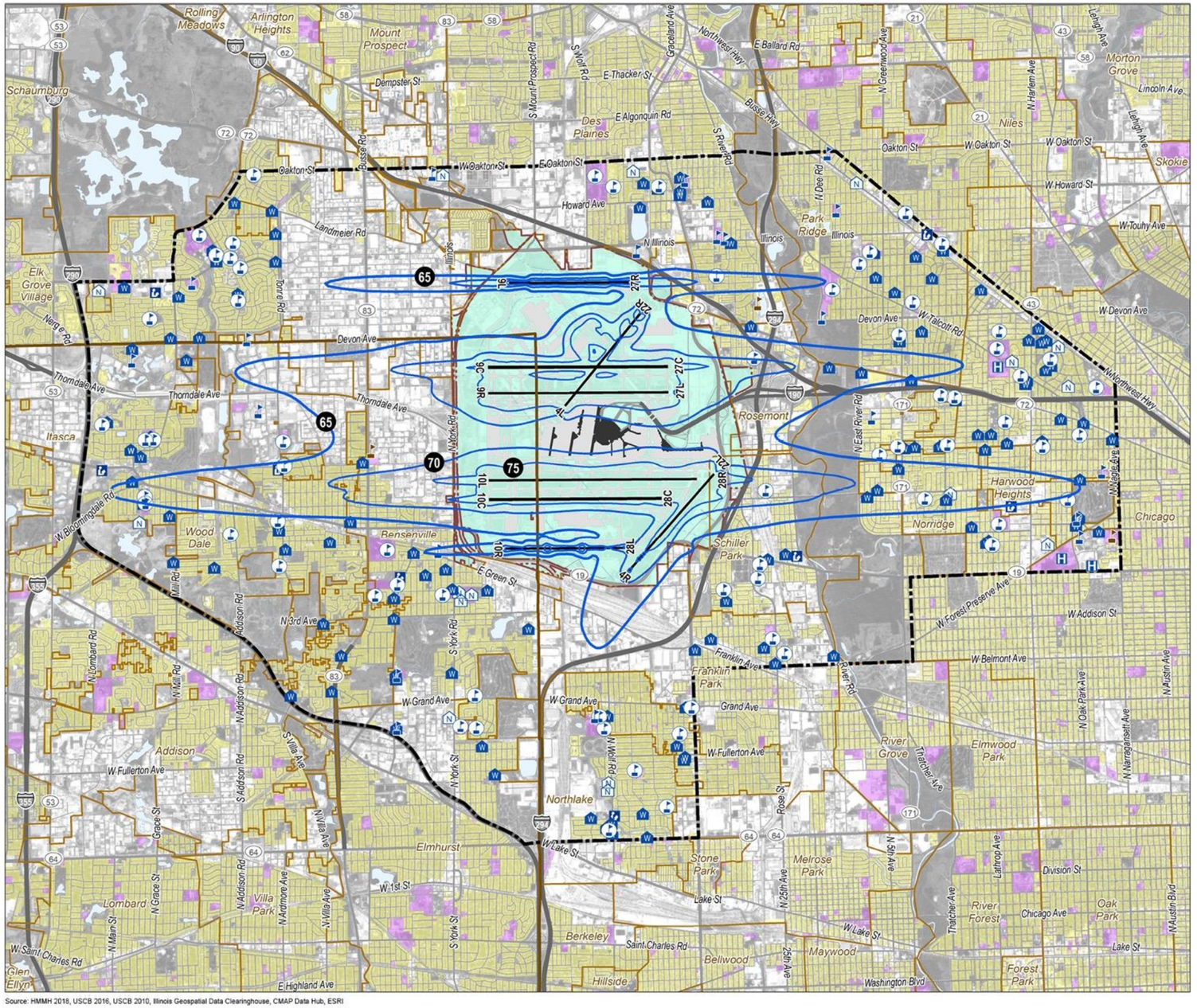
- The north east-west lobe would be due to flight operations to and from Runway 9L/27R. The east lobe of the 65 DNL contour would include residential areas of Des Plaines and extend across South Dee Road into the ballfields of Maine South High School. The west lobe of the 65 DNL contour, which would include mainly commercial industrial parcels, extends past Busse Road almost to Lively Boulevard.
- The central east-west lobe would be due to flight operations to and from Runways 9C/27C and 9R/27L. The east lobe of the 65 DNL contour would include residential areas of Rosemont and Park Ridge extending to North Canfield Avenue. The west lobe of the 65 DNL contour would extend west past North Mittel Boulevard to Salt Creek and include primarily commercial industrial parcels and residential areas of Bensenville south of State Route 390.
- The south east-west lobe would be due to flight operations to and from Runways 10L/28R and 10C/28C. The east lobe of the 65 DNL contour would include residential areas of Schiller Park, Norridge, and Harwood Heights, extending into the Ridgemoor Country Club golf course. The west lobe of the 65 DNL contour would include residential areas of Bensenville, Wood Dale, and Itasca, extending along Irving Park Road almost to the Springbrook Nature Center.
- A smaller lobe of the 65 DNL contour would extend west from Runway 10R into Bensenville to the intersection of West Green Street and Gaylin Court.
- The south lobe of the 65 DNL contour, due to flight operations to and from Runway 4R/22L, extends over industrial property almost to I-294.

The 70 DNL contour for Build Out Proposed Action would include residential parcels, primarily in three areas: 1) Rosemont just east of Runway 27C, 2) Schiller Park east of Runway 28R, and 3) Bensenville west of Runways 10L and 10C.

TABLE 5.5-13
NOISE EXPOSURE FOR THE BUILD OUT PROPOSED ACTION

		DNL Contour Band			
	Compatibility	**65-70**	**70-75**	**75+**	**Total (65+)**
Land Use Area (acres)					
Single-Family Residential	Non-compatible	1,219.6	115.3	-	1,334.9
Multi-Family Residential		105.9	33.2	-	139.1
Transient Lodging (residential)		75.0	11.4	-	86.4
Mobile Home		-	-	-	-
School/Education		23.7	5.2	-	28.9
Commercial	Compatible	365.4	16.9	-	382.3
Industrial, Manufacturing, & Production		3,056.9	625.4	24.6	3,706.9
Recreational		574.4	113.4	-	687.8
Public Use (excluding School/Education)[1]		97.0	3.0	-	100.0
Undeveloped		183.5	23.6	0.6	207.7
Airport		2,229.6	1,780.7	1,915.7	5,926.0
Water		20.2	2.6	-	22.8
Subtotal Non-compatible Area (acres)		1,424.2	165.1	-	1,589.3
Subtotal Compatible Area (acres)		6,527.0	2,565.6	1,940.9	11,033.5
Total Area (acres)		**7,951.2**	**2,730.7**	**1,940.9**	**12,622.8**
Off-Airport Total Area (acres)		**5,721.6**	**950.0**	**25.2**	**6,696.8**
Noise-Sensitive Facilities (count)					
Universities		1	-	-	1
Schools		7	1	-	8
Sound-Insulated Schools (Included above)		*6*	*1*	-	*7*
Libraries		1	-	-	1
Hospitals		-	-	-	-
Nursing Homes		1	-	-	1
Places of Worship		9	-	-	9
Parks and 4(f) Lands		33	4	-	37
Historic Properties		9	1	-	10
Total		**61**	**6**	**-**	**67**
Population and Housing (estimated)					
Population		24,331	4,172	-	28,503
Housing Units		9,815	1,564	-	11,379
Non-mitigated single-family housing units (Included above)[2]		*3,662*	*104*	-	*3,766*
Non-mitigated multi-family housing units (Included above)[2]		*2,511*	-	-	*2,511*

		DNL Contour Band			
	Compatibility	**65-70**	**70-75**	**75+**	**Total (65+)**
Land Use Area (acres)					
Sound-insulated single-family housing units (included above)		*3,626*	*1,460*	-	*5,086*
Sound-insulated multi-family housing units (included above)		*16*	-	-	*16*
Note 1: For the purposes of this document, Institutional land use is considered compatible. Note 2: The majority of the non-mitigated housing units (89.9%) are not eligible under the existing ORD RSIP because these units are outside the current RSIP DNL 65 dB contour.					
Sources: ORD Residential Sound Insulation Program, January 2021 database: City of Chicago 2020 U.S. Census Bureau Census Block Population Data Build Out Proposed Action Noise Contours, Land Use, Noise-Sensitive Facilities, Population and Housing data: HMMH Analysis, October 2021					



Chicago O'Hare International Airport

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- Build Out Proposed Action DNL Contours (65, 70, 75 dB)
- Primary Study Area
- Airport Boundary
- Runways
- Taxiway / Apron
- County Boundary
- Community Boundary
- Highway
- Primary Roads
- Secondary Roads
- Local Roads
- Railroad Lines
- School
- Library
- Sound Insulated School
- Nursing Home
- College/University
- Hospital
- Place of Worship
- Residential
- Public, Hospital, Institutional
- Compatible
- Water / Stream

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Miles

Noise Exposure Contours for Build Out Proposed Action and Noise Sensitive Facilities

▸ Exhibit 5.5-20

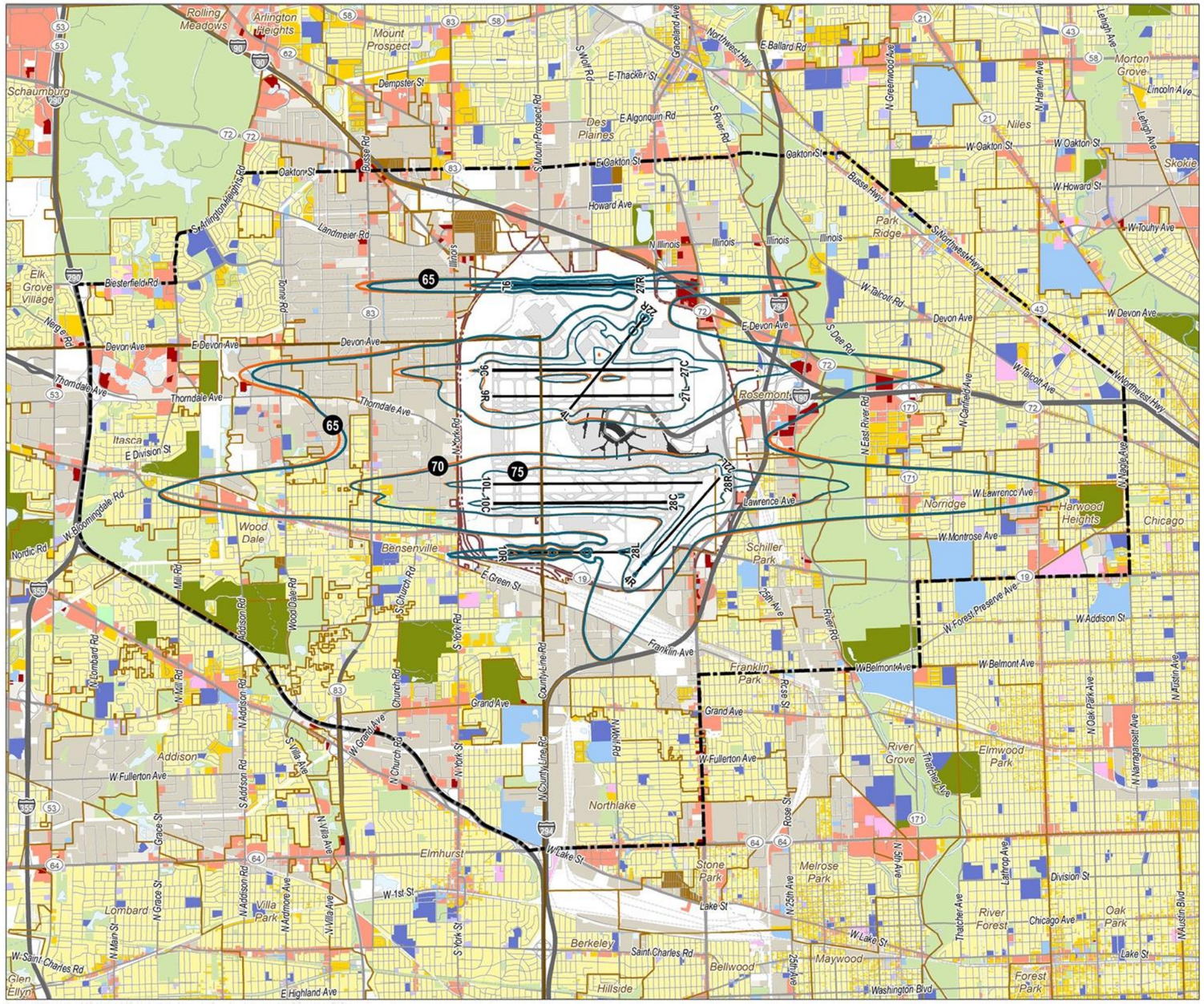
5.5.7 Comparison Between No Action and Proposed Action Alternatives

Exhibits 5.5-21 and **5.5-22** provide a comparison between the Interim No Action and Interim Proposed Action DNL contours for this EA. In addition, the FAA identified changes in noise exposure levels based on grid point modeling. **Exhibit 5.5-22** shows a small area of significant and reportable changes in noise between W. Green St. and the airport boundary in Bensenville. The color-coded dots mark areas of significant noise change within the Interim Proposed Action 65 DNL contour and a small area of three dB reportable noise change between the 60 to 65 DNL relative to the Interim No Action. The areas of significant noise change do not overlay any non-compatible land use, therefore there are no significant noise impacts for the Interim Proposed Action. The reportable noise change area overlays some residential land use just west of South Addison Street in Bensenville. The grid point analysis does not show any areas with a five dB or greater reportable change between the 45 and 60 DNL due to the Proposed Action.

The FAA needs to retain the offset air traffic approach capabilities due to the current requirements for simultaneous independent arrivals while allowing for increased efficiency, especially in poor weather during east flow operations (for the Runway 10R offset). This enables O'Hare to achieve its design operating capability, which results in greater distribution of arrivals to the six east-west runway ends in the Interim Proposed Action. When compared with the Interim No Action, arrivals to Runway 9L and Runway 9C decrease while arrivals to Runway 10C and Runway 10R increase. These changes in runway use result in smaller DNL 65 dB contours west of Runway 9L and Runway 9C and a larger DNL 65 dB contour west of Runway 10C and Runway 10R. The change in noise to the west of Runway 10R results in the small area of significant noise changes off airport property. However, no noise-sensitive land use would be impacted. A small area of reportable noise change between the 60 and 65 DNL in Bensenville is shown in **Exhibit 5.5-22**.

As shown in **Exhibit 5.5-21** and more clearly in **Exhibit 5.5-22**, the Interim Proposed Action would result in no people or housing units significantly impacted by aircraft noise, i.e., the colored dots do not overlap any residential (yellow-shaded) areas. However, the Interim Proposed Action would introduce (newly include) 253 people in 82 housing units to DNL of at least 65 dB and would reduce the exposure of (newly exclude) 734 people in 285 housing units to DNL less than 65 dB.

Exhibits 5.5-23 and **5.5-24** provide a comparison between the Build Out No Action and Build Out Proposed Action contours for this EA. Changes in noise levels relative to the Interim No Action modeling grids were developed and reviewed. **Exhibit 5.5-24** shows areas of significant and reportable changes in noise extending west through Bensenville and Wood Dale. The color-coded dots mark areas of significant noise change within the Build Out Proposed Action 65 DNL contour and a three dB reportable noise change between the 60 and 65 DNL relative to the Build Out No Action. The areas of significant noise change overlay non-compatible land use (residential and one school) in Bensenville, therefore there are potential significant noise impacts for the Build Out Proposed Action. The reportable noise change area extends west and primarily overlays residential land use in Bensenville and Wood Dale. The reportable change area also overlays portions of a high school complex and a place of worship. The grid point analysis does not show any areas with a five dB or greater reportable change between the 45 and 60 DNL due to the Proposed Action.



Chicago O'Hare International Airport

Terminal Area Plan and Air Traffic Procedures Environmental Assessment

- Interim Proposed Action DNL Contours (65, 70, 75 dB)
- Interim No Action DNL Contours (65, 70, 75 dB)
- Primary Study Area
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- County Boundary
- Community Boundary
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- Primary Roads
- Secondary Roads
- Local Roads
- Railroad Lines
- Single Family Residential
- Public Use
- Multi-Family Residential
- Commercial
- Mobile Home
- Industrial
- Transient Lodging
- Agriculture
- School / Education
- Open Space Recreation
- Place of Worship
- Golf
- Hospital / Medical
- Vacant / Undefined
- Water / Stream

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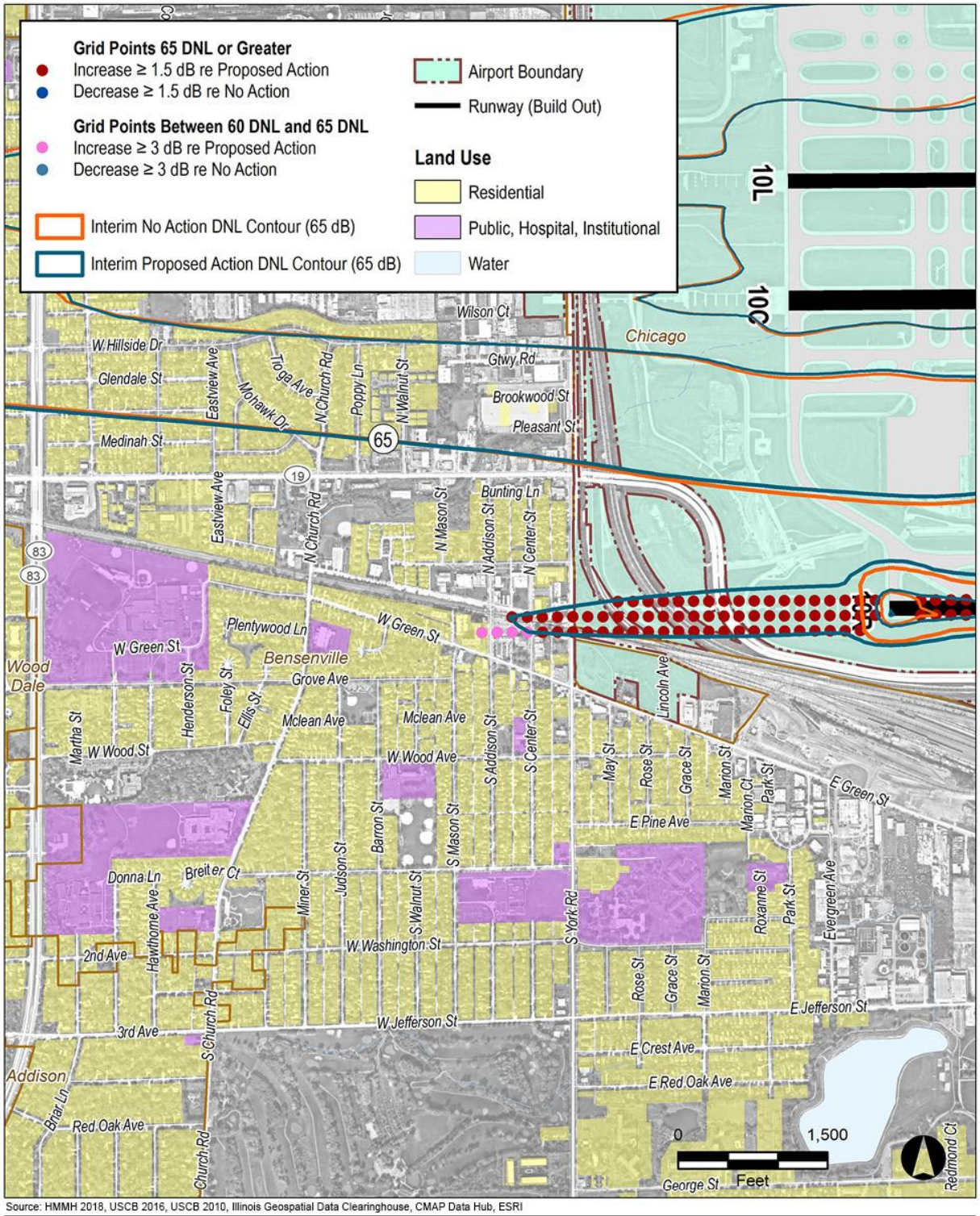
Comparison of Noise Exposure Contours for Interim No Action and Interim Proposed Action

Exhibit 5.5-21



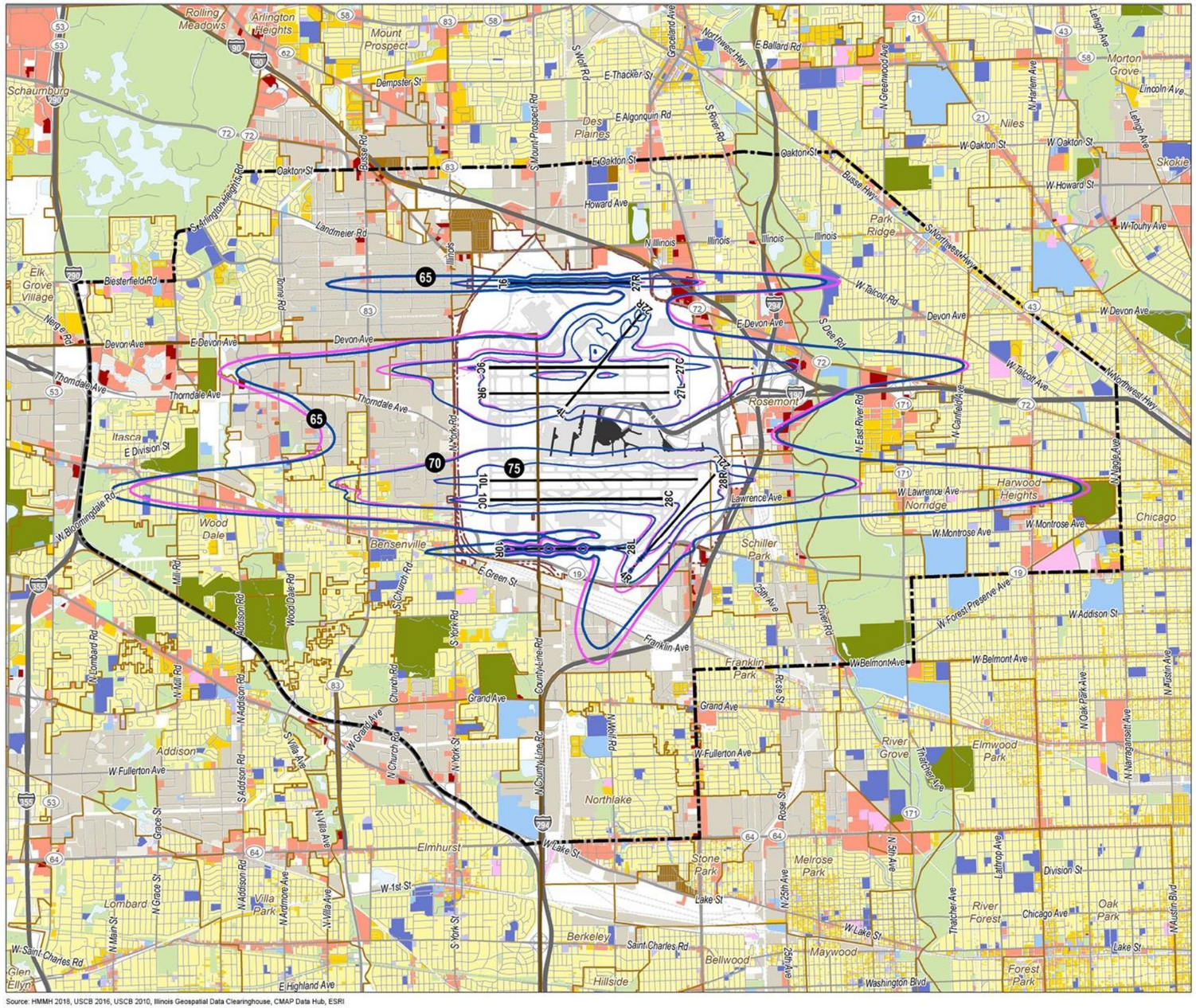
Source: HMMH 2018, USCB 2016, USCB 2010, Illinois Geospatial Data Clearinghouse, CMAP Data Hub, ESRI

Chicago O'Hare International Airport

Terminal Area Plan and Air Traffic Procedures Environmental Assessment

Interim No Action and Interim Proposed Action DNL Change

▶ Exhibit 5.5-22



Source: HMMH 2018, USCB 2016, USCB 2010, Illinois Geospatial Data Clearinghouse, CMAP Data Hub, ESRI

Chicago O'Hare International Airport

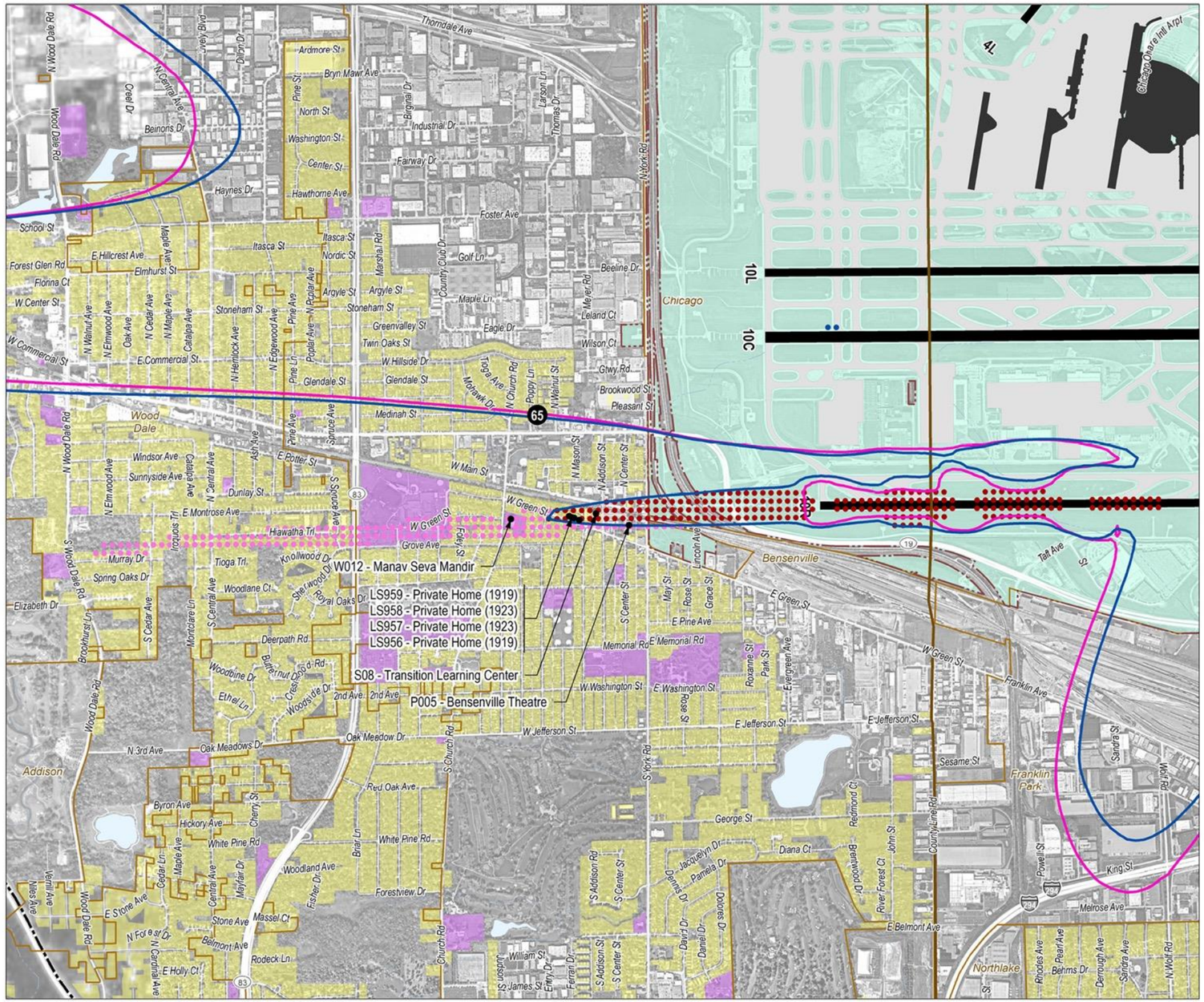
Terminal Area Plan and Air Traffic Procedures Environmental Assessment

- Build Out Proposed Action DNL Contours (65, 70, 75 dB)
- Build Out No Action DNL Contours (65, 70, 75 dB)
- Primary Study Area
- Airport Boundary
- Runways
- Taxiway / Apron
- County Boundary
- Community Boundary
- Highway
- Primary Roads
- Secondary Roads
- Local Roads
- Railroad Lines
- Single Family Residential
- Public Use
- Multi-Family Residential
- Commercial
- Mobile Home
- Industrial
- Transient Lodging
- Agriculture
- School / Education
- Open Space Recreation
- Place of Worship
- Golf
- Hospital / Medical
- Vacant / Undefined
- Water / Stream

0 1 2
Miles

Comparison of Noise Exposure Contours for Build Out No Action and Build Out Proposed Action

▸ Exhibit 5.5-23



Source: HMMH 2018, USCB 2016, USCB 2010, Illinois Geospatial Data Clearinghouse, CMAP Data Hub, ESRI

Chicago O'Hare International Airport

Terminal Area Plan and Air Traffic Procedures Environmental Assessment

- Build Out Proposed Action DNL Contour (65 dB)
- Build Out No Action DNL Contour (65 dB)

Grid Points 65 DNL or Greater
- Increase ≥ 1.5 dB re Proposed Action
- Decrease ≥ 1.5 dB re No Action

Grid Points Between 60 DNL and 65 DNL
- Increase ≥ 3 dB re Proposed Action
- Decrease ≥ 3 dB re No Action

- Airport Boundary
- Runways
- Taxiway / Apron
- County Boundary
- Community Boundary
- Residential
- Public, Hospital, Institutional
- Compatible
- Water / Stream

0 1,000 2,000
Feet

Potential Significant Impact Area Build Out Comparison

Exhibit 5.5-24

The Air Traffic Control working group, discussed in **Chapter 4**, allocated weather conditions and flow using historical crosswind and tailwind information, which applied to all future conditions. The working group also developed a methodology to allocate unassigned observations, which are the same across conditions except for under Instrument Flight Rules (IFR) conditions. Under IFR conditions in the Build Out Proposed Action, east flow is preferred due to proposed project improvements; therefore, east flow was assigned instead of west flow. This results in the Build Out Proposed Action being in east flow three percent more than the Build Out No Action.

The FAA needs to retain the offset approach capabilities due to the current requirements for simultaneous independent arrivals while allowing for increased efficiency, especially in poor weather during east flow operations (for the Runway 10R offset). This enables O'Hare to achieve its design operating capability, which results in greater distribution of arrivals to the six east-west runway ends in the Build Out Proposed Action. Arrivals to Runway 9C decrease overall, while overall arrivals to Runway 10R increase compared with the Build Out No Action. Also, night arrivals to Runway 10C and Runway 10L increase compared with the Build Out No Action. These changes in runway use result in smaller DNL 65 dB contours to the west of Runway 9C and a larger DNL 65 dB contour to the west of Runway 10C and Runway 10R. The increase in noise to the west of Runway 10R results in a small area in Bensenville that would potentially experience significant impacts to residential land use and one school and an extended area to the west that would potentially experience reportable noise increases primarily over residential land use in Bensenville and Wood Dale, as shown in **Exhibit 5.5-24**.

As shown in **Exhibit 5.5-23,** and more clearly in **Exhibit 5.5-24**, the Build Out Proposed Action would result in some residential areas being significantly impacted by aircraft noise, i.e., where the colored dots overlap the yellow-shaded areas to the west of Runway 10R within the Build Out Proposed Action 65 DNL contour. Approximately 2.9 acres of non-compatible land use, 433 people, and 227 housing units would be potentially significantly impacted by aircraft noise. All but three of the 227 housing units have been sound insulated by the CDA. Two of the three remaining residences are scheduled to be completed in 2022 as part of the CDA's ongoing RSIP for the OMP. One residence declined the invitation for sound insulation; therefore, the FAA has determined that the residence is compatible for noise purposes.

As shown in **Exhibit 5.5-24**, one school, a theater, and four historic homes would be exposed to a significant noise increase compared with the Build Out No Action. The school[4] has not been sound insulated previously by the CDA, and it is potentially eligible for mitigation. Eligibility will be determined by the FAA as the school is located on the first floor of a residential apartment building in which all residential units have been sound insulated by the CDA. While the theater will be exposed to a significant noise increase, the facility is compatible for land use purposes (compatible with noise below DNL 75 dB). The four historic homes have all been sound insulated by the CDA; therefore, they are not significantly impacted under the Build Out Proposed Action. Further details on these properties can be found in **Appendix G**. One place of worship in Bensenville will be exposed to a reportable noise increase due to the Build Out Proposed Action as shown in **Exhibit 5.5-24.** However, this property, based on its use, remains compatible with aircraft noise because the DNL levels are below 65 dB.

The Build Out Proposed Action would introduce (newly include) 1,350 people in 571 housing units to a DNL of at least 65 dB and present a reportable increase in DNL to 351 people in 161 housing units. At the same time, the Build Out Proposed Action would reduce the exposure of (newly exclude) 631 people in

[4] The Transitional Learning Center Program serves students ages 18 – 21 years old who are eligible for special education and require an educational environment with intensive programming.

247 housing units to a DNL less than 65 dB. None would experience a significant relief in noise exposure or present a reportable decrease.

Table 5.5-14 compares the operations and results for the Existing Condition along with each future condition and alternative. The top rows provide the number of modeled aircraft operations split out by day and night. While the total operations between the Proposed Action and No Action are the same for each condition, the numbers for day and night operations differ due to the Proposed Action. In both conditions, the Proposed Action has fewer nighttime operations than No Action because the Proposed Action results in reduced adjustments (i.e., flight delays) to the flight schedule compared with the No Action. The summarized noise results are shown for 65 DNL and greater for ease of comparison.

TABLE 5.5-14
OPERATIONS AND NOISE EXPOSURE RESULTS FOR INTERIM AND BUILD OUT CONDITIONS AND ALTERNATIVES

	Interim Condition		Build Out Condition	
	Interim No Action	**Interim Proposed Action**	**Build Out No Action**	**Build Out Proposed Action**
Operations				
Day	840,068	840,819	892,988	893,065
Night	112,422	111,671	120,868	120,791
Total	952,490	952,490	1,013,856	1,013,856
Land Use (Acres)	**65+**	**65+**	**65+**	**65+**
Subtotal Noncompatible Area (acres)	1,298.8	1,280.5	1,577.1	1,589.3
Subtotal Compatible Area (acres)	10,473.6	10,358.0	1,268.6	11,033.5
Total Area (acres)	11,772.4	11,638.5	12,845.7	12,622.8
Off-airport Total Area (acres)	5,964.3	5,793.8	6,917.3	6,696.8
Noise-Sensitive Facilities (count)	**65+**	**65+**	**65+**	**65+**
Universities	1	1	1	1
Schools	5	5	6	8
Sound-Insulated Schools (Included above)	5	5	6	7
Libraries	1	1	1	1
Hospitals	-	-	-	-
Nursing Homes	1	1	1	1
Places of Worship	7	7	7	9
Parks and 4(f) Lands	28	27	36	37
Historic Properties	5	5	5	10
Total	**48**	**47**	**57**	**67**
Population and Housing (count)				
Population	23,415	22,935	27,783	28,503
Housing Units	9,359	9,156	11,055	11,379
Non-mitigated single-family housing units (Included above)	*2,746*	*2,655*	*3,682*	*3,766*
Non-mitigated multi-family housing units (Included above)	*2,046*	*1,968*	*2,489*	*2,511*
Total non-mitigated housing units	***4,792***	***4,623***	***6,171***	***6,277***
Enrolled in Phase 18 or Phase 19 of the existing RSIP (included above)	228	223	259	266
Remaining eligible units under the existing RSIP (Included above)	299	284	370	360

	Interim Condition		Build Out Condition	
	Interim No Action	Interim Proposed Action	Build Out No Action	Build Out Proposed Action
Sound insulated single-family housing units (included above)	*4,551*	*4,517*	*4,868*	*5,086*
Sound insulated multi-family housing units (included above)	*16*	*16*	*16*	*16*
Total Sound Insulated housing units	***4,567***	***4,533***	***4,884***	***5,102***

5.5.8 Construction Impacts

Construction noise would temporarily increase sound levels in the immediate vicinity of construction and land clearing. Pile driving, pavement removal, and grading operations are the noisiest, with such equipment generating noise levels as high as 75 to 95 dB within 50 feet of its operation. Distance rapidly diminishes noise levels, so depending on the distance from each site, area residents would likely experience some increase in noise during construction hours. The potential noise impact associated with the operation of on-site machinery would be temporary and can be reduced using construction timing and staging. To further minimize potential noise, construction equipment would be maintained to meet manufacturers' operating specifications. Five areas at the airport were evaluated including:

- Central Terminal Area
- Runway 9L/27R exit taxiways
- Multimodal Hotel and mixed-use development area along Mannheim Road
- Centralized Distribution and Receiving Facility on the southwest side of the airport
- West Employee Ground Transportation Facility on the west side of the airport

The Central Terminal Area construction is located near the center of the airfield. The nearest residential area (Rosemont) is approximately 1.4 Nautical Miles (NM) away. Due to the distances to the nearest noise-sensitive areas and noise levels associated with airfield operations, there would be a minimal-to-no temporary effect on off-airport noise-sensitive sites.

The Runway 9L/27R exit taxiway construction areas are located near each end of the runway. For the Runway 27R end, the nearest residential area is approximately 0.4 NM away, with commercial and industrial facilities and I-90 between the airport and the nearest residential receptor; this makes elevated construction noise unlikely to occur in the community.

For the Runway 9L end, the nearest residential area is approximately 0.6 NM away, with commercial facilities, railroad tracks, and Route 72 between the airport; this makes it unlikely that elevated construction noise will occur in the community.

The distance between the Multimodal Hotel development area along Mannheim Road and the nearest sensitive area (i.e., residence) is approximately 0.2 NM. However, the O'Hare Rental Car Facility and the Chicago Transit Authority railroad tracks are located between the proposed facility and the nearest residential area. The rental car building will minimize off-airport construction noise, making it unlikely that elevated temporary construction noise will occur in the community.

The Centralized Distribution and Receiving Facility is 0.3 NM from the nearest residential land use on North York Road. However, the elevated rail line runs along the other side of North York Road, which will help reduce temporary construction noise from the proposed facility.

The distance between the West Employee Ground Transportation Facility and the nearest sensitive area (i.e., residence) is approximately 0.5 NM. However, there are commercial and industrial facilities between the airport and the nearest residential receptor, which make it unlikely that elevated construction noise will occur in the community.

Impacts related to the delivery of materials may be minimized by requiring that the contractor use designated haul routes that directly connect to the airport and avoid residential and other noise-sensitive areas. Overall, construction noise is expected to have a minor and temporary impact, and no permanent impact, to noise-sensitive land or facilities.

5.5.9 Mitigation and Minimization

NEPA and CEQ require that FAA consider mitigation of significant adverse impacts that are reasonably foreseeable. In addition, 49 USC 47106 (c)(2)(B) imposes an obligation upon the Agency to document appropriate mitigation in such context. Accordingly, the FAA could require the CDA to take steps to minimize any significant noise impacts resulting from any Build Alternative, if selected.

There are 11,379 existing housing units within the Proposed Action 65 DNL noise contour, and 6,277[5] of those residences have not previously been mitigated by the CDA as they are outside the area of the existing RSIP. There are 227 residential housing units that would be exposed to a significant noise impact with the Proposed Action; 224 have been previously mitigated with sound insulation by the CDA, making them compatible structures. Two of the three remaining residences are scheduled to be completed as part of the CDA's ongoing RSIP for the OMP. One residence declined the invitation for sound insulation; therefore, the FAA has determined that the residence is compatible for noise purposes. The one school (Transition Learning Center) exposed to a significant noise impact is potentially eligible for mitigation; however, the CDA and FAA will need to determine the eligibility of the school since it is located on the first floor of an apartment building.

Other noise minimization measures that the CDA intends to continue are:

- The existing Fly Quiet Program,
- The Airport Noise Management System,
- Working with the O'Hare Noise Compatibility Commission (ONCC), and
- The ground run-up enclosure during engine run-up testing.

[5] This includes 266 units scheduled to be sound insulated under Phase 18 and Phase 19 of the existing RSIP. The existing RSIP is based on the Record of Decision for the OMP EIS, which established the Build Out 65 DNL noise contour for that NEPA documentation.