CHICAGO ROCKFORD INTERNATIONAL AIRPORT

CHAPTER 3

BASELINE NOISE EXPOSURE

3 Baseline Noise Exposure

The following chapter describes the existing and future baseline noise exposure on communities surrounding the Chicago Rockford International Airport (RFD or Airport). The noise analysis presents the noise exposure for the existing conditions base year 2023 and the future baseline condition year of 2028. Aircraft-related noise exposure is defined through noise contours prepared using the Federal Aviation Administration (FAA) Aviation Environmental Design Tool (AEDT) Version 3e. This noise exposure is presented using the Day-Night Average Sound Level (DNL) metric.

This noise exposure is presented using the day-night average sound level (DNL) metric, which represents the average noise energy for an average-annual day, on the decibel (dB) scale. For the calculation of DNL, an extra penalty of 10 dB is added to nighttime (10:00 pm to 6:59 am) operations. Per federal guidelines, 65 DNL is the level at which noise sensitive land uses are considered incompatible with aircraft noise unless mitigated to reduce interior noise levels below acceptable levels.

The noise exposure patterns in this chapter are presented using noise contours, which are lines that connect areas of equal noise exposure. Noise contours for the 60, 65, 70, and 75 DNL noise contours were prepared. Below the 65 DNL, all land uses are determined to be compatible. However, the Greater Rockford Airport Authority (GRAA) has chosen to show the 60 DNL because it indicates marginal noise impacts and is useful for land use planning purposes. The noise contours are presented on exhibits, and the numbers of persons and housing units that fall within each of the noise contour levels are quantified.

An explanation of the AEDT and the DNL metric, along with a review of the physics of noise, noise impacts on humans, social impacts of noise, and the data required to develop noise exposure contours, is summarized in **Appendix C, *Noise Modeling Methodology***. This information details the operating characteristics in use at the Airport, the number of operations, and the use of flight paths to and from the airport both now and as they are expected to be in 2028.

3.1 Existing (2023) Baseline Noise Contour

The number of operations, runway use, flight track, and trip length data presented in **Appendix C, *Noise Modeling Methodology***, are used as input to the AEDT computer model for calculation of noise exposure for the Existing (2023) and Future (2028) Baseline conditions. **Exhibit 3-1, *Existing (2023) Baseline Noise Contour***, reflects the average annual noise exposure pattern present at the airport during the existing baseline period and **Table 3-1, *Area Within Existing (2023) Baseline Noise Exposure Contour*** summarizes the area within each noise contour level for areas on and off airport property.

The size and shape of the noise exposure contours for RFD are primarily a function of the combination of flight tracks and runway use. Wind direction is a primary factor in determining runway use. Historically, the Airport has operated in west flow, where aircraft are primarily departing from and arriving to Runway 25. Therefore, the Existing (2023) Baseline noise exposure contour is indicative of this current runway use pattern. The noise contours are larger to the west of the airport which is indicative of the types of operations that occur while aircraft are departing from Runway 25. Aircraft are typically louder while departing due to the thrust levels required and typically generate a much wider noise pattern compared to arrivals. To the east of the airport the noise pattern is indicative of arrival operations, this is displayed by the typical narrow arrival spike in the contour.

The DNL 65 DNL of the Existing (2023) Baseline noise contour extends approximately 1.4 miles beyond the west end of Runway 7/25 and approximately 1.1 miles beyond the east end of Runway 7/25. It also extends

approximately 1.3 miles to the south end of Runway 1/19 and 0.3 miles to the north of Runway 1/19. The noise pattern on the south end of Runway 1/19 is attributed to cargo arrivals predominately when the winds are from the north. The noise contour to the north of Runway 1/19 is smaller than all other runway ends due to lack of utilization in order to keep air traffic from operating at low altitudes over the dense residential sectors of the city of Rockford. The contour to the southwest of the primary Runway 7/25 is wider and longer than the contour to the northeast of Runway 7/25, this can be attributed to Runway 7 being the primary departure runway for cargo aircraft.

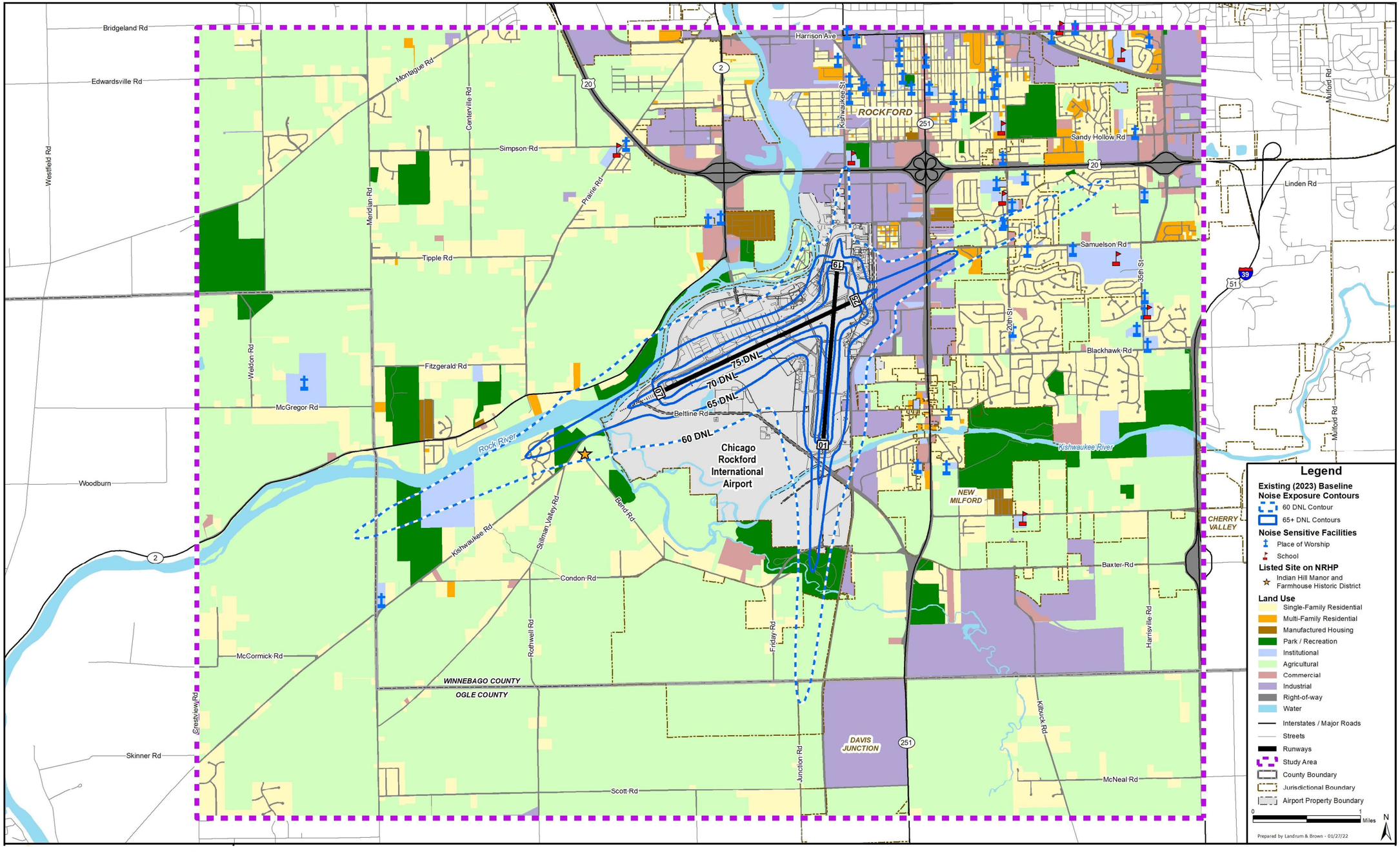
Areas to the north of the airport within the 65 DNL contour are comprised of commercial/industrial land uses. Areas to the west and south of the airport within the 65 DNL are mainly comprised of agricultural land uses with scattered low density and rural residential in-fill. Directly east of the airport the land use is primarily compatible commercial and industrial land uses, however outside of this adjacent area dense single-family and multi-family residential land uses become more prevalent.

TABLE 3-1 | AREA WITHIN EXISTING (2023) BASELINE NOISE EXPOSURE CONTOUR

On/Off Airport Property	Area (Square Miles)				
	60-65 DNL	65-70 DNL	70-75 DNL	75+ DNL	65+ DNL
On Airport Property	1.33	0.98	0.49	0.41	1.88
Off Airport Property	2.10	0.30	0.00	0.00	0.30
Total Area	**3.43**	**1.28**	**0.49**	**0.41**	**2.18**

Note: Totals may not sum due to rounding.
Source: Landrum & Brown analysis, 2023.

EXHIBIT 3-1 | EXISTING (2023) BASELINE NOISE EXPOSURE CONTOUR



Source: Winnebago & Ogle County GIS data, 2021, Landrum & Brown analysis, 2023.

This page intentionally left blank.

3.2 Future (2028) Baseline Noise Contour

The baseline noise exposure contour projected for the year 2028 is presented in **Exhibit 3-2, *Future (2028) Baseline Noise Contour***. This projected contour assumes growth as forecasted in the Forecast Working Paper (FWP)[1] and subsequent updates to account for impacts due to the COVID-19 health emergency.[2] (See **Appendix H**). The use of this forecast as part of the future condition noise modeling was approved by the FAA in August of 2021. **Table 3-2, *Area within Future (2028) Baseline Noise Exposure Contour*** summarizes the area within each contour level for areas on and off airport property. **Table 3-3, *Comparison of Area within Existing (2023) and Future (2028) Baseline Noise Exposure Contours*** provides a comparison of the areas within the Existing (2023) Baseline and Future (2028) Baseline noise contours for each noise level.

TABLE 3-2 | AREA WITHIN FUTURE (2028) BASELINE NOISE EXPOSURE CONTOUR

On/Off Airport Property	Area (Square Miles)				
	60-65 DNL	65-70 DNL	70-75 DNL	75+ DNL	65+ DNL
On Airport Property	1.37	1.14	0.68	0.57	2.39
Off Airport Property	3.78	0.69	0.04	0.00	0.73
Total Area	**5.15**	**1.83**	**0.72**	**0.57**	**3.12**

Note: Totals may not sum due to rounding.
Source: Landrum & Brown analysis, 2023

TABLE 3-3 | COMPARISON OF AREA WITHIN EXISTING (2023) AND FUTURE (2028) BASELINE NOISE EXPOSURE CONTOURS

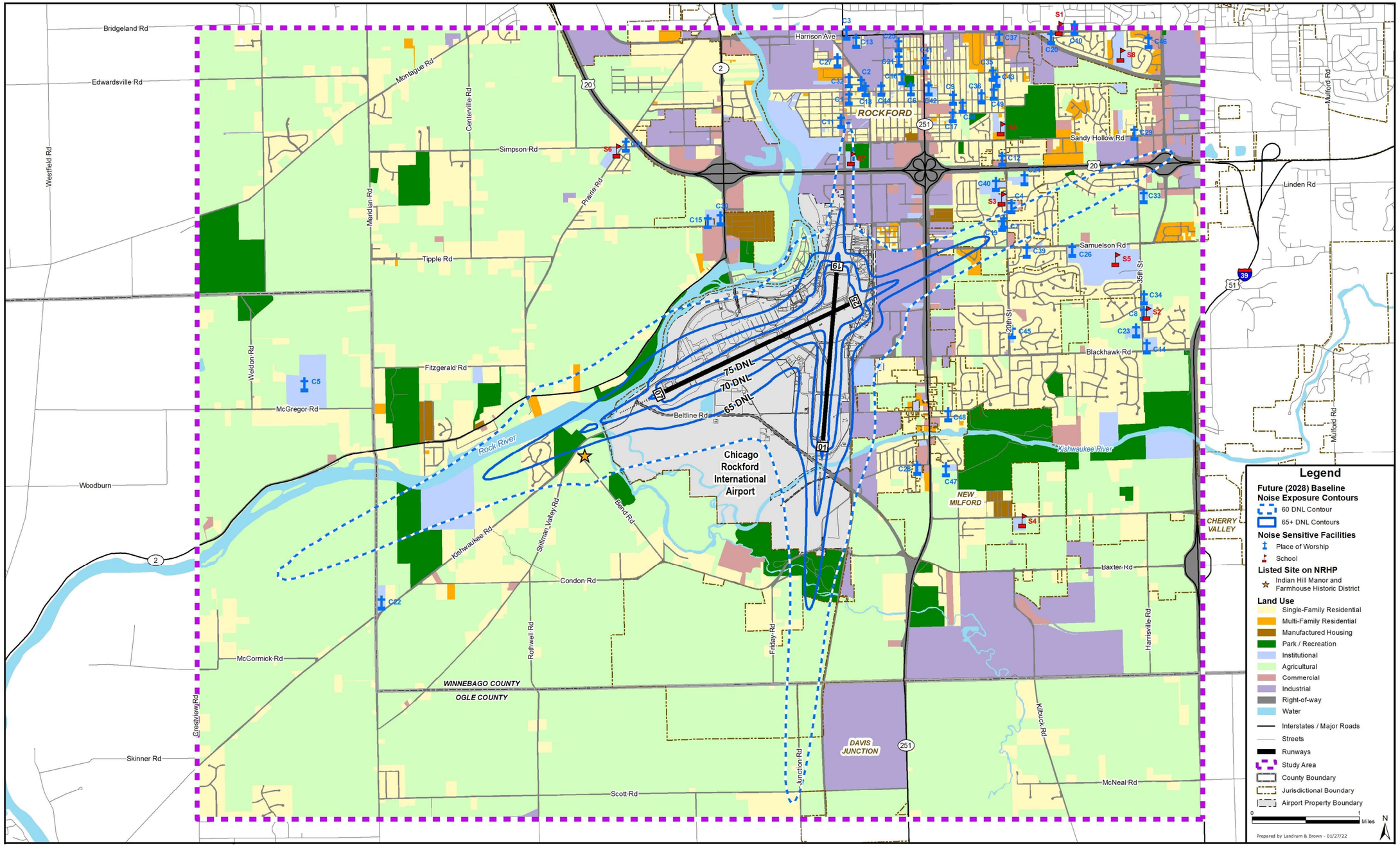
Contour	Area (Square Miles)				
	60-65 DNL	65-70 DNL	70-75 DNL	75+ DNL	65+ DNL
Existing (2023) Baseline	3.43	1.28	0.49	0.41	2.18
Future (2028) Baseline	5.15	1.83	0.72	0.57	3.12
Difference	**+1.72**	**+0.55**	**+0.23**	**+0.16**	**+0.94**

Note: Totals may not sum due to rounding.
Source: Landrum & Brown analysis, 2023.

For the Future (2028) Baseline conditions, operating levels are expected to increase from 117.2 average annual day operations to 170.8 average annual day operations. The Future (2028) Baseline noise contour increases in size compared to the Existing (2023) Baseline noise contour due to the increase in operations projected at the Airport by 2028. The DNL 65 DNL of the Future (2028) Baseline noise contour extends approximately 1.9 miles beyond the west end of Runway 07/25 and approximately 1.4 miles beyond the east end of Runway 07/25. It also extends approximately 1.6 miles to the south end of Runway 01/19 and 0.6 miles to the north of Runway 01/19.The shape of Future (2028) Baseline noise exposure contour remains similar to the Existing (2023) Baseline noise exposure contour because there would be no change in runway use or flight track location and utilization. **Exhibit 3-3, *Existing (2023) vs. Future (2028) Baseline Noise Exposure Contours*** presents a comparison of the 65 DNL for the existing and future baseline conditions.

[1] Development of Northwest Cargo Apron & Midfield Development Program, Forecast Summary, September 2018, Crawford Murphy & Tilly.
[2] Chicago Rockford International (RFD) – 2018 Forecast Working Paper (FWP) Sensitivity Analysis, July 2021, Crawford Murphy & Tilly.

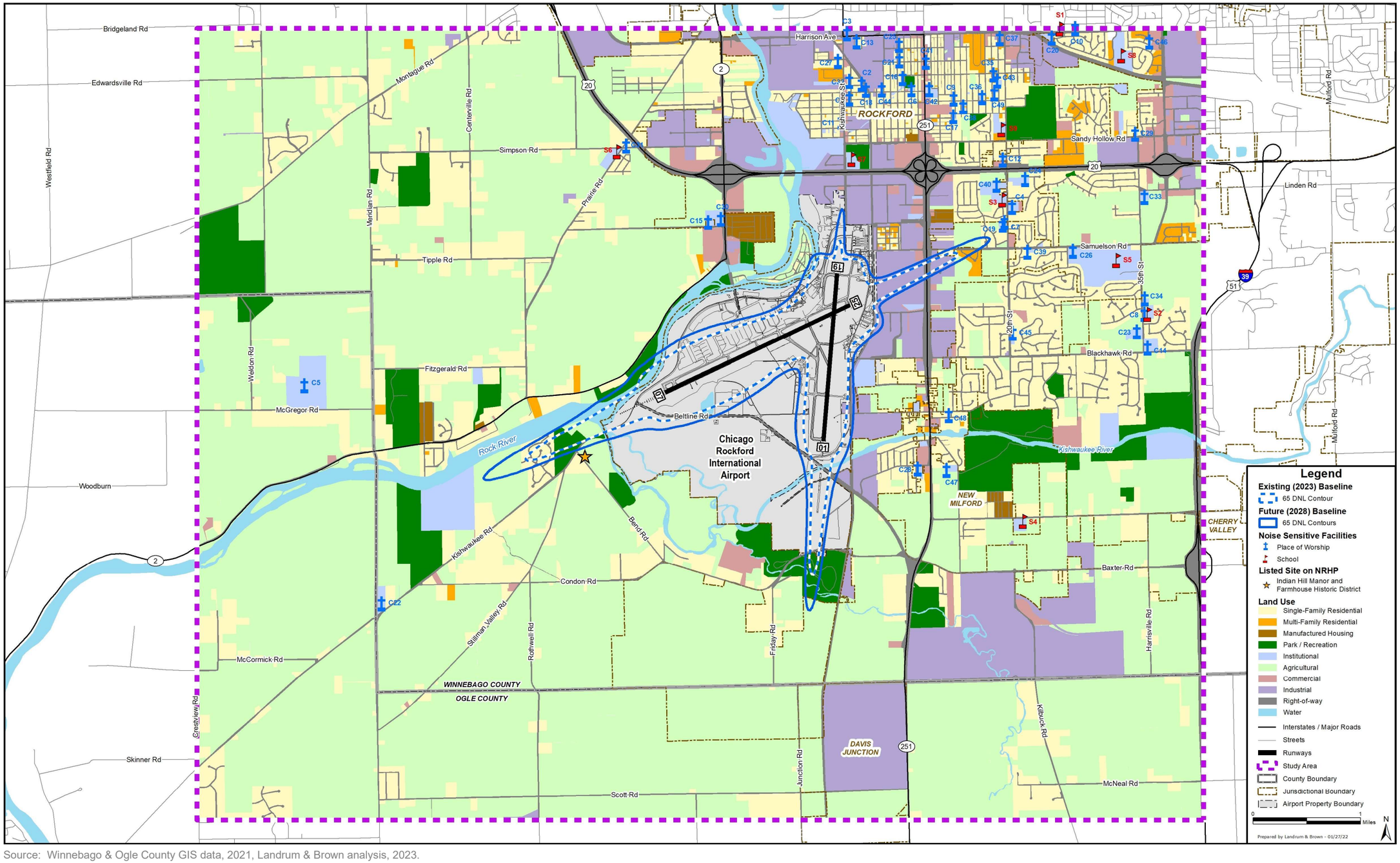
EXHIBIT 3-2 | EXISTING (2028) BASELINE NOISE EXPOSURE CONTOUR



Source: Winnebago & Ogle County GIS data, 2021, Landrum & Brown analysis, 2023.

This page intentionally left blank.

EXHIBIT 3-3 | EXISTING (2023) BASELINE VS FUTURE (2028) BASELINE NOISE EXPOSURE CONTOURS



Source: Winnebago & Ogle County GIS data, 2021, Landrum & Brown analysis, 2023.

This page intentionally left blank.

3.3 Baseline Noise Contour Incompatibilities

Identifying and evaluating all land uses within the detailed study area is necessary to quantify the number of residential and other noise-sensitive land uses that are impacted by aircraft noise. **Chapter Two, *Affected Environment***, and **Appendix E, *Land Use Assessment Methodology***, summarize the land use data collection process. The FAA has created land use compatibility guidelines relating to types of land use and airport sound levels. These guidelines are defined in 14 CFR Part 150, Land Use Compatibility with Yearly Day-Night Average Sound Levels. The compatibility table is reproduced in **Appendix A, *FAA Policies, Guidance, and Regulations***, of this document (see **Table A-1**).

These guidelines show the compatibility parameters for residential, public (schools, churches, nursing homes, hospitals, libraries), commercial, manufacturing and production, and recreational land uses. All land uses exposed to noise levels below the 65 DNL noise contour are generally considered compatible with airport operations. Information about land uses within the 60-65 DNL noise contour band is shown for informational purposes only.

Summaries of the residential population, housing units, and noise-sensitive facilities affected by noise level for the Existing (2023) and Future (2028) Baseline noise contours are provided in **Table 3-4, *Existing (2023) Baseline Land Use Incompatibilities*** and **Table 3-5, *Future (2028) Baseline Land Use Incompatibilities***. A comparison of the impacts for the Existing (2023) and Future (2028) Baseline is provided in **Table 3-6, *Comparison of Existing (2023) to Future (2028) Baseline Land Use Incompatibilities***. These tables show the number of housing units within each noise contour band (e.g. 60-65 DNL, 65-70 DNL)

There are 14 total housing units and an estimated 36 residents located within the 65+ DNL of the Existing (2023) Baseline noise contour. There are no homes or associated population located within the 70+ DNL of the Existing (2023) Baseline noise contour.

There are no noise-sensitive public facilities located within the 65+ DNL of the Existing (2023) Baseline noise contour.

There are 61 total housing units and an estimated 161 residents located within the 65+ DNL of the Future (2028) Baseline noise contour. There are no homes or associated population located within the 70+ DNL of the Future (2028) Baseline noise contour.

There are no noise-sensitive public facilities located within the 65+ DNL of the Future (2028) Baseline noise contour.

TABLE 3-4 | EXISTING (2023) BASELINE LAND USE INCOMPATIBILITIES

Land Use	60 - 65 DNL	65 - 70 DNL	70 - 75 DNL	65+ DNL
Housing Units				
Single-Family Residential	223	14	0	14
Multi-Family Residential	48	0	0	0
Manufactured Homes	4	0	0	0
Total Housing Units	**275**	**14**	**0**	**14**
Population				
Single-Family Residential	606	36	0	36
Multi-Family Residential	133	0	0	0
Manufactured Homes	10	0	0	0
Total Population	**749**	**36**	**0**	**36**
Noise-Sensitive Facilities				
Churches/Places of Worship	2	0	0	0
Schools/Educational Facilities	0	0	0	0
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0

Notes: *In accordance with 14 CFR Part 150 Land Use Compatibility Guidelines, all land uses are compatible with noise levels below 65 DNL. The count of incompatible land uses within the 60-65 DNL noise contour are shown for informational purposes only.
*Noise contours were generated using the FAA's AEDT, Version 3e computer model.
*Housing counts are based on field verification and Winnebago County Assessors data:
*Population numbers are estimated based on the housing counts multiplied by the average household size from the 2000 Census.
Source: Landrum & Brown analysis, 2023.

TABLE 3-5 | FUTURE (2028) BASELINE LAND USE INCOMPATIBILITIES

Jurisdiction	60 - 65 DNL	65 - 70 DNL	70 - 75 DNL	65+ DNL
Housing Units				
Single-Family Residential	509	41	0	41
Multi-Family Residential	46	20	0	20
Manufactured Homes	11	0	0	0
Total Housing Units	**566**	**61**	**0**	**61**
Population				
Single-Family Residential	1,385	106	0	106
Multi-Family Residential	125	55	0	55
Manufactured Homes	28	0	0	0
Total Population	**1,538**	**161**	**0**	**161**
Noise-Sensitive Facilities				
Churches/Places of Worship	2	0	0	0
Schools/Educational Facilities	1	0	0	0
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0

Notes: *In accordance with 14 CFR Part 150 Land Use Compatibility Guidelines, all land uses are compatible with noise levels below 65 DNL. The count of incompatible land uses within the 60-65 DNL noise contour are shown for informational purposes only.
*Noise contours were generated using the FAA's AEDT, Version 3e computer model.
*Housing counts are based on field verification and Winnebago County Assessors data:
*Population numbers are estimated based on the housing counts multiplied by the average household size from the 2000 Census.
Source: Landrum & Brown analysis, 2023.

TABLE 3-6 | COMPARISON OF EXISTING (2023) BASELINE TO FUTURE (2028) BASELINE LAND USE INCOMPATIBILITIES

Category	Existing (2023) Baseline	Future (2028) Baseline
Housing Units		
60 - 65 DNL	275	566
65 - 70 DNL	14	61
70 - 75 DNL	0	0
65+ DNL	14	61
Population		
60 - 65 DNL	749	1,538
65 - 70 DNL	36	161
70 - 75 DNL	0	0
65+ DNL	36	161
Noise Sensitive Facilities (Churches, Schools, Libraries, and Nursing Homes)		
60 - 65 DNL	2	3
65 - 70 DNL	0	0
70 - 75 DNL	0	0
65+ DNL	0	0

Notes: *In accordance with 14 CFR Part 150 Land Use Compatibility Guidelines, all land uses are compatible with noise levels below 65 DNL. The count of incompatible land uses within the 60-65 DNL noise contour are shown for informational purposes only.
*Noise contours were generated using the FAA's AEDT, Version 3e computer model.
*Housing counts are based on field verification and Winnebago County Assessors data:
*Population numbers are estimated based on the housing counts multiplied by the average household size from the 2000 Census.
Source: Landrum & Brown analysis, 2023.