# 4 DEVELOPMENT OF UPDATED EXISTING AND FORECAST CONDITIONS NOISE EXPOSURE MAPS

The fundamental noise elements of a Noise Exposure Map are DNL contours for existing and forecast conditions (2014 and 2019 in this update) presented over base maps depicting the airport layout, local land use control jurisdictions, major land use categories, discrete noise-sensitive "receptors," and other information required by Part 150.

## 4.1 Development of Noise Contours

Consistent with Part 150 requirements, the consulting team prepared the DNL contours for this study using the most recent release of the FAA's Integrated Noise Model (INM) that was available at outset of the study, "Version 7.0d." Also consistent with FAA requirements, the model application did not include any unauthorized "calibration" or "adjustment."

The INM requires inputs in the following categories:

- Aircraft flight operations
- Aircraft noise and performance characteristics
- Physical description of the airport layout
- Aircraft maintenance runup operations
- Runway utilization rates
- Noise modeling flight track descriptions and utilization rates

Sections 4.2 through 4.7 present this information in order.

## 4.2 Aircraft Flight Operations

Appendix C presents a detailed report prepared by CHA that documents the preparation of draft activity and fleet mix forecasts for 2014 and 2019. The report addresses and summarizes the forecasts by operator category (i.e., scheduled passenger, military, and general aviation), and according to specific aircraft types. Part 150 requires FAA approval of the forecasts. Appendix D provides a copy of the FAA approval letter.

The following two tables present the detailed aircraft modeling fleet mixes for the two years.

- Table 6 Forecast 2014 Average Annual Day Operations
- Table 7 Forecast 2019 Average Annual Day Operations

The tables present fleet mix detail broken down into categories that the INM requires:

- INM database aircraft types (See Section 4.3)
- Type of operation; i.e., departures, arrivals, and "circuits"[22]
- DNL "day" and "night" time periods (as discussed in Section 2.1.6)
- Departure "stage length;" i.e., distance flown, since fuel load generally is the primary factor affecting departure weight and climb performance

[22] Circuits are closed loops that operators generally conduct for training purposes, including fixed-wing "touch-and-go" loops shown on Figure 34 and Ohio Army National Guard (OANG) "pattern work" loops shown on Figure 35. These are the two types of circuits conducted in sufficient numbers to merit modeling at CAK.

**Table 6 Forecast 2014 Average Annual Day Operations**
Source: CHA and HMMH (and FAA approval), 2013

| INM Aircraft Type | Departures (by Stage Length in Nautical Miles) | | | | | | Arrivals | | Circuits (See Notes) | | Total (See Notes) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Day (7 a.m. – 10 p.m.) | | | Night (10 p.m. – 7 a.m.) | | | | | | | | | |
| | 0-500 | 500-1,000 n.m. | 1,000-1,500 n.m. | 0-500 n.m. | 500-1,000 n.m. | 1,000-1,500 n.m. | Day | Night | Day | Night | Day | Night | Total |
| **Scheduled Passenger Operations** | | | | | | | | | | | | | |
| A320-211 | 1.0 | 0.7 | - | 0.4 | - | - | 1.6 | 0.5 | - | - | 3.3 | 1.0 | 4.3 |
| 717200 | 4.8 | 0.7 | - | 1.4 | - | - | 5.2 | 1.6 | - | - | 10.7 | 3.1 | 13.7 |
| 7373B2 | 0.4 | 0.1 | 0.4 | 0.2 | - | - | 0.9 | 0.3 | - | - | 1.9 | 0.5 | 2.4 |
| 737700 | 1.3 | 0.4 | 1.5 | 0.8 | - | - | 3.0 | 0.9 | - | - | 6.2 | 1.8 | 7.9 |
| 737800 | 0.1 | 0.0 | 0.1 | 0.1 | - | - | 0.2 | 0.1 | - | - | 0.5 | 0.1 | 0.6 |
| MD88 | 0.4 | 0.0 | - | 0.1 | - | - | 0.4 | 0.1 | - | - | 0.8 | 0.2 | 1.0 |
| DC95HW | 0.2 | - | - | 0.1 | - | - | 0.2 | 0.1 | - | - | 0.4 | 0.1 | 0.5 |
| EMB145 | 2.9 | - | - | 0.8 | - | - | 2.8 | 0.9 | - | - | 5.7 | 1.6 | 7.4 |
| CLREGJ | 9.7 | - | 0.3 | 2.6 | - | - | 9.6 | 3.0 | - | - | 19.6 | 5.6 | 25.2 |
| CRJ701 | 5.2 | 1.0 | 0.7 | 1.8 | - | - | 6.7 | 2.1 | - | - | 13.6 | 3.9 | 17.5 |
| CRJ900 | 1.5 | 0.2 | 0.3 | 0.5 | - | - | 2.0 | 0.6 | - | - | 4.0 | 1.1 | 5.1 |
| Subtotal | 27.4 | 3.2 | 3.3 | 8.9 | - | - | 32.7 | 10.2 | - | - | 66.7 | 19.1 | 85.8 |
| **Military Operations** | | | | | | | | | | | | | |
| B429 | 0.4 | - | - | 0.2 | - | - | 0.4 | 0.2 | 0.4 | - | 1.6 | 0.3 | 1.9 |
| CH47D | 0.9 | - | - | 0.4 | - | - | 0.9 | 0.4 | 0.9 | - | 3.7 | 0.7 | 4.4 |
| S70 | 0.4 | - | - | - | - | - | 0.4 | - | - | - | 0.7 | - | 0.7 |
| C-130E | 0.0 | - | - | - | - | - | 0.0 | - | - | - | 0.1 | - | 0.1 |
| F16GE | 0.0 | - | - | - | - | - | 0.0 | - | - | - | 0.1 | - | 0.1 |
| Subtotal | 1.7 | - | - | 0.5 | - | - | 1.7 | 0.5 | 1.3 | - | 6.1 | 1.1 | 7.2 |
| **General Aviation Operations** | | | | | | | | | | | | | |
| M20L | 1.6 | - | - | 0.1 | - | - | 1.6 | 0.1 | 0.4 | - | 2.4 | 0.2 | 4.2 |
| BEC50 | 1.1 | - | - | 0.1 | - | - | 1.1 | 0.1 | 0.3 | - | 1.7 | 0.1 | 3.0 |
| BEC33 | 0.3 | - | - | 0.0 | - | - | 0.3 | 0.0 | 0.1 | - | 0.4 | 0.0 | 0.7 |
| BEC45 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | 0.0 | - | 0.1 | 0.0 | 0.1 |
| LA42 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | 0.0 | - | 0.1 | 0.0 | 0.1 |
| CNA172 | 0.9 | - | - | 0.1 | - | - | 0.9 | 0.1 | 0.2 | - | 1.4 | 0.1 | 2.4 |
| CNA177 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | 0.0 | - | 0.1 | 0.0 | 0.1 |
| CNA182 | 1.0 | - | - | 0.1 | - | - | 1.0 | 0.1 | 0.2 | - | 1.5 | 0.1 | 2.6 |
| CNA206 | 0.3 | - | - | 0.0 | - | - | 0.3 | 0.0 | 0.1 | - | 0.4 | 0.0 | 0.7 |
| CNA210 | 0.6 | - | - | 0.0 | - | - | 0.6 | 0.0 | 0.2 | - | 0.9 | 0.1 | 1.6 |
| SR22 | 1.4 | - | - | 0.1 | - | - | 1.4 | 0.1 | 0.3 | - | 2.0 | 0.1 | 3.5 |
| PA32C6 | 4.3 | - | - | 0.2 | - | - | 4.3 | 0.2 | 1.1 | - | 6.5 | 0.5 | 11.3 |
| PA60 | 1.6 | - | - | 0.8 | - | - | 1.6 | 0.8 | - | - | 3.2 | 1.6 | 4.8 |
| BEC55 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 0.1 |
| BEC58 | 0.4 | - | - | 0.2 | - | - | 0.4 | 0.2 | - | - | 0.7 | 0.4 | 1.1 |
| CNA310 | 0.1 | - | - | 0.1 | - | - | 0.1 | 0.1 | - | - | 0.2 | 0.1 | 0.3 |
| CNA340 | 0.2 | - | - | 0.1 | - | - | 0.2 | 0.1 | - | - | 0.3 | 0.2 | 0.5 |
| CNA402 | 0.2 | - | - | 0.1 | - | - | 0.2 | 0.1 | - | - | 0.4 | 0.2 | 0.6 |
| CNA414 | 0.3 | - | - | 0.1 | - | - | 0.3 | 0.1 | - | - | 0.6 | 0.3 | 0.9 |

| INM Aircraft Type | Departures (by Stage Length in Nautical Miles) | | | | | | Arrivals | | Circuits (See Notes) | | Total (See Notes) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Day (7 a.m. – 10 p.m.) | | | Night (10 p.m. – 7 a.m.) | | | | | | | | | |
| | 0-500 | 500-1,000 n.m. | 1,000-1,500 n.m. | 0-500 n.m. | 500-1,000 n.m. | 1,000-1,500 n.m. | Day | Night | Day | Night | Day | Night | Total |
| CNA421 | 0.3 | - | - | 0.1 | - | - | 0.3 | 0.1 | - | - | 0.5 | 0.3 | 0.8 |
| CNA425 | 0.1 | - | - | 0.0 | - | - | 0.1 | 0.0 | - | - | 0.2 | 0.1 | 0.3 |
| DA42 | 0.1 | - | - | 0.1 | - | - | 0.1 | 0.1 | - | - | 0.3 | 0.1 | 0.4 |
| BEC190 | 0.1 | - | - | 0.0 | - | - | 0.1 | 0.0 | - | - | 0.1 | 0.0 | 0.2 |
| BEC95 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 0.0 |
| BEC99 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 0.0 |
| BD100 | 1.1 | - | - | 0.3 | - | - | 1.1 | 0.3 | - | - | 2.2 | 0.7 | 2.9 |
| CNA441 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 0.1 |
| CNA208 | 4.7 | - | - | 1.5 | - | - | 4.7 | 1.5 | - | - | 9.4 | 3.0 | 12.4 |
| AC50 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 0.0 |
| AC95 | 0.2 | - | - | 0.1 | - | - | 0.2 | 0.1 | - | - | 0.4 | 0.1 | 0.5 |
| RWCM12 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 0.0 |
| DHC8 | 0.1 | - | - | 0.0 | - | - | 0.1 | 0.0 | - | - | 0.2 | 0.1 | 0.2 |
| DHC830 | 0.1 | - | - | 0.0 | - | - | 0.1 | 0.0 | - | - | 0.1 | 0.0 | 0.2 |
| DHC6 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 0.0 |
| PC12 | 0.4 | - | - | 0.1 | - | - | 0.4 | 0.1 | - | - | 0.9 | 0.3 | 1.1 |
| EMB110 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 0.0 |
| EMB120 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 0.0 |
| BEC90 | 0.3 | - | - | 0.1 | - | - | 0.3 | 0.1 | - | - | 0.7 | 0.2 | 0.9 |
| BEC100 | 0.1 | - | - | 0.0 | - | - | 0.1 | 0.0 | - | - | 0.1 | 0.0 | 0.2 |
| BAEJ41 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 0.0 |
| MU2 | 0.1 | - | - | 0.0 | - | - | 0.1 | 0.0 | - | - | 0.1 | 0.0 | 0.2 |
| MU300 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 0.0 |
| P180 | 0.6 | - | - | 0.2 | - | - | 0.6 | 0.2 | - | - | 1.2 | 0.4 | 1.6 |
| SD330 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | - | - | 0.1 | 0.0 | 0.1 |
| SD360 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 0.0 |
| BEC200 | 0.8 | - | - | 0.3 | - | - | 0.8 | 0.3 | - | - | 1.6 | 0.5 | 2.2 |
| BEC300 | 1.3 | - | - | 0.4 | - | - | 1.3 | 0.4 | - | - | 2.5 | 0.8 | 3.3 |
| SAMER3 | 0.4 | - | - | 0.1 | - | - | 0.4 | 0.1 | - | - | 0.8 | 0.3 | 1.1 |
| STBM7 | 0.2 | - | - | 0.1 | - | - | 0.2 | 0.1 | - | - | 0.4 | 0.1 | 0.5 |
| IA1124 | 0.2 | - | - | 0.0 | - | - | 0.2 | 0.0 | - | - | 0.4 | 0.0 | 0.4 |
| IA1125 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | - | - | 0.1 | 0.0 | 0.1 |
| G200 | 0.3 | - | - | 0.0 | - | - | 0.3 | 0.0 | - | - | 0.7 | 0.0 | 0.7 |
| BEC400 | 1.9 | - | - | 0.1 | - | - | 1.9 | 0.1 | - | - | 3.8 | 0.3 | 4.0 |
| CL600 | 2.1 | - | - | 0.2 | - | - | 2.1 | 0.2 | - | - | 4.2 | 0.3 | 4.5 |
| CNA500 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 0.0 |
| CNA501 | 0.3 | - | - | 0.0 | - | - | 0.3 | 0.0 | - | - | 0.5 | 0.0 | 0.6 |
| CNA510 | 0.4 | - | - | 0.0 | - | - | 0.4 | 0.0 | - | - | 0.7 | 0.1 | 0.8 |
| CNA525C | 3.3 | - | - | 0.3 | - | - | 3.3 | 0.3 | - | - | 6.7 | 0.5 | 7.2 |
| CNA550 | 1.9 | - | - | 0.1 | - | - | 1.9 | 0.1 | - | - | 3.7 | 0.3 | 4.0 |
| CNA560 | 4.8 | - | - | 0.3 | - | - | 4.8 | 0.3 | - | - | 9.7 | 0.7 | 10.4 |

| INM Aircraft Type | Departures (by Stage Length in Nautical Miles) | | | | | | Arrivals | | Circuits (See Notes) | | Total (See Notes) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Day (7 a.m. – 10 p.m.) | | | Night (10 p.m. – 7 a.m.) | | | | | | | | | |
| | 0-500 | 500-1,000 n.m. | 1,000-1,500 n.m. | 0-500 n.m. | 500-1,000 n.m. | 1,000-1,500 n.m. | Day | Night | Day | Night | Day | Night | Total |
| CNA650 | 0.6 | - | - | 0.0 | - | - | 0.6 | 0.0 | - | - | 1.2 | 0.1 | 1.3 |
| CNA680 | 3.1 | - | - | 0.2 | - | - | 3.1 | 0.2 | - | - | 6.2 | 0.4 | 6.6 |
| CNA750 | 0.6 | - | - | 0.0 | - | - | 0.6 | 0.0 | - | - | 1.3 | 0.1 | 1.4 |
| D328J | 0.7 | - | - | 0.0 | - | - | 0.7 | 0.0 | - | - | 1.3 | 0.1 | 1.4 |
| FAL10 | 0.2 | - | - | 0.0 | - | - | 0.2 | 0.0 | - | - | 0.3 | 0.0 | 0.3 |
| FAL20 | 0.2 | - | - | 0.0 | - | - | 0.2 | 0.0 | - | - | 0.4 | 0.0 | 0.5 |
| FAL50 | 0.2 | - | - | 0.0 | - | - | 0.2 | 0.0 | - | - | 0.4 | 0.0 | 0.5 |
| FAL900 | 0.1 | - | - | 0.0 | - | - | 0.1 | 0.0 | - | - | 0.2 | 0.0 | 0.3 |
| FAL20A | 1.0 | - | - | 0.1 | - | - | 1.0 | 0.1 | - | - | 1.9 | 0.1 | 2.1 |
| GIIB | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | - | - | 0.1 | 0.0 | 0.1 |
| GIV | 0.6 | - | - | 0.0 | - | - | 0.6 | 0.0 | - | - | 1.1 | 0.1 | 1.2 |
| GV | 0.2 | - | - | 0.0 | - | - | 0.2 | 0.0 | - | - | 0.4 | 0.0 | 0.4 |
| G150 | 0.2 | - | - | 0.0 | - | - | 0.2 | 0.0 | - | - | 0.4 | 0.0 | 0.4 |
| R390 | 0.5 | - | - | 0.0 | - | - | 0.5 | 0.0 | - | - | 1.0 | 0.1 | 1.1 |
| HK4000 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 0.0 |
| LEAR25 | 0.3 | - | - | 0.0 | - | - | 0.3 | 0.0 | - | - | 0.6 | 0.0 | 0.7 |
| LEAR35 | 6.3 | - | - | 0.5 | - | - | 6.3 | 0.5 | - | - | 12.5 | 0.9 | 13.4 |
| SABR60 | 0.1 | - | - | 0.0 | - | - | 0.1 | 0.0 | - | - | 0.2 | 0.0 | 0.2 |
| Subtotal | 55.4 | - | - | 7.8 | - | - | 55.4 | 7.8 | 2.9 | - | 105.1 | 15.7 | 132.3 |
| **Operations by All Operator Categories** | | | | | | | | | | | | | |
| Total | 84.6 | 3.2 | 3.3 | 17.3 | - | - | 89.8 | 18.6 | 4.2 | - | 177.9 | 35.9 | 225.3 |

Notes:

1. Totals and subtotals may not match the sum of individual entries exactly due to rounding.
2. Circuits include fixed-wing touch-and-go patterns and Ohio Army National Guard (OANG) helicopter “pattern work” activity.
3. Each circuit includes two operations. Therefore, the day, night, and overall totals in the far-right-hand columns are equal to the sum of arrivals and departures plus two times the number of relevant touch-and-go-circuits

**Table 7 Forecast 2019 Average Annual Day Operations**
Source: CHA and HMMH (and FAA approval), 2013

| INM Aircraft Type | Departures (by Stage Length in Nautical Miles) | | | | | | Arrivals | | Circuits (See Notes) | | Total (See Notes) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Day (7 a.m. – 10 p.m.) | | | Night (10 p.m. – 7 a.m.) | | | | | | | | | |
| | 0-500 | 500-1,000 n.m. | 1,000-1,500 n.m. | 0-500 n.m. | 500-1,000 n.m. | 1,000-1,500 n.m. | Day | Night | Day | Night | Day | Night | Total |
| **Scheduled Passenger Operations** | | | | | | | | | | | | | |
| A320-211 | 1.1 | 0.8 | - | 0.5 | - | - | 1.8 | 0.6 | - | - | 3.6 | 1.0 | 4.7 |
| 717200 | 5.2 | 0.7 | - | 1.6 | - | - | 5.7 | 1.8 | - | - | 11.6 | 3.3 | 14.9 |
| 7373B2 | 0.8 | 0.1 | 0.5 | 0.4 | - | - | 1.4 | 0.4 | - | - | 2.8 | 0.8 | 3.6 |
| 737700 | 2.6 | 0.5 | 1.6 | 1.2 | - | - | 4.5 | 1.4 | - | - | 9.1 | 2.6 | 11.8 |
| 737800 | 0.2 | 0.0 | 0.1 | 0.1 | - | - | 0.4 | 0.1 | - | - | 0.7 | 0.2 | 0.9 |
| MD88 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| DC95HW | - | - | - | - | - | - | - | - | - | - | - | - | - |
| EMB145 | 2.7 | - | - | 0.7 | - | - | 2.6 | 0.8 | - | - | 5.2 | 1.5 | 6.7 |
| CLREGJ | 3.0 | - | - | 0.8 | - | - | 2.8 | 0.9 | - | - | 5.8 | 1.7 | 7.5 |
| CRJ701 | 8.4 | 1.1 | 0.7 | 2.7 | - | - | 9.9 | 3.1 | - | - | 20.2 | 5.8 | 26.0 |
| CRJ900 | 6.0 | 0.2 | 0.7 | 1.8 | - | - | 6.6 | 2.1 | - | - | 13.5 | 3.9 | 17.4 |
| Subtotal | 29.9 | 3.5 | 3.6 | 9.7 | - | - | 35.6 | 11.1 | - | - | 72.6 | 20.8 | 93.4 |
| **Military Operations** | | | | | | | | | | | | | |
| B429 | 0.4 | - | - | 0.2 | - | - | 0.4 | 0.2 | 0.4 | - | 1.6 | 0.3 | 1.9 |
| CH47D | 0.9 | - | - | 0.4 | - | - | 0.9 | 0.4 | 0.9 | - | 3.7 | 0.7 | 4.4 |
| S70 | 0.4 | - | - | - | - | - | 0.4 | - | - | - | 0.7 | - | 0.7 |
| C-130E | 0.0 | - | - | - | - | - | 0.0 | - | - | - | 0.1 | - | 0.1 |
| F16GE | 0.0 | - | - | - | - | - | 0.0 | - | - | - | 0.1 | - | 0.1 |
| Subtotal | 1.7 | - | - | 0.5 | - | - | 1.7 | 0.5 | 1.3 | - | 6.1 | 1.1 | 7.2 |
| **General Aviation Operations** | | | | | | | | | | | | | |
| M20L | 1.6 | - | - | 0.1 | - | - | 1.6 | 0.1 | 0.4 | - | 4.1 | 0.2 | 4.3 |
| BEC50 | 1.2 | - | - | 0.1 | - | - | 1.2 | 0.1 | 0.3 | - | 2.9 | 0.1 | 3.0 |
| BEC33 | 0.3 | - | - | 0.0 | - | - | 0.3 | 0.0 | 0.1 | - | 0.7 | 0.0 | 0.7 |
| BEC45 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | 0.0 | - | 0.1 | 0.0 | 0.1 |
| LA42 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | 0.0 | - | 0.1 | 0.0 | 0.1 |
| CNA172 | 0.9 | - | - | 0.1 | - | - | 0.9 | 0.1 | 0.2 | - | 2.3 | 0.1 | 2.4 |
| CNA177 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | 0.0 | - | 0.1 | 0.0 | 0.1 |
| CNA182 | 1.0 | - | - | 0.1 | - | - | 1.0 | 0.1 | 0.2 | - | 2.5 | 0.1 | 2.7 |
| CNA206 | 0.3 | - | - | 0.0 | - | - | 0.3 | 0.0 | 0.1 | - | 0.7 | 0.0 | 0.7 |
| CNA210 | 0.6 | - | - | 0.0 | - | - | 0.6 | 0.0 | 0.2 | - | 1.6 | 0.1 | 1.6 |
| SR22 | 1.4 | - | - | 0.1 | - | - | 1.4 | 0.1 | 0.3 | - | 3.4 | 0.2 | 3.6 |
| PA32C6 | 4.4 | - | - | 0.2 | - | - | 4.4 | 0.2 | 1.1 | - | 11.0 | 0.5 | 11.5 |
| PA60 | 1.6 | - | - | 0.8 | - | - | 1.6 | 0.8 | - | - | 3.2 | 1.6 | 4.8 |
| BEC55 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 0.1 |
| BEC58 | 0.4 | - | - | 0.2 | - | - | 0.4 | 0.2 | - | - | 0.7 | 0.4 | 1.1 |
| CNA310 | 0.1 | - | - | 0.1 | - | - | 0.1 | 0.1 | - | - | 0.2 | 0.1 | 0.3 |
| CNA340 | 0.2 | - | - | 0.1 | - | - | 0.2 | 0.1 | - | - | 0.3 | 0.2 | 0.5 |
| CNA402 | 0.2 | - | - | 0.1 | - | - | 0.2 | 0.1 | - | - | 0.4 | 0.2 | 0.6 |
| CNA414 | 0.3 | - | - | 0.1 | - | - | 0.3 | 0.1 | - | - | 0.6 | 0.3 | 0.9 |

| INM Aircraft Type | Departures (by Stage Length in Nautical Miles) | | | | | | Arrivals | | Circuits (See Notes) | | Total (See Notes) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Day (7 a.m. – 10 p.m.) | | | Night (10 p.m. – 7 a.m.) | | | | | | | | | |
| | 0-500 | 500-1,000 n.m. | 1,000-1,500 n.m. | 0-500 n.m. | 500-1,000 n.m. | 1,000-1,500 n.m. | Day | Night | Day | Night | Day | Night | Total |
| CNA421 | 0.3 | - | - | 0.1 | - | - | 0.3 | 0.1 | - | - | 0.5 | 0.3 | 0.8 |
| CNA425 | 0.1 | - | - | 0.0 | - | - | 0.1 | 0.0 | - | - | 0.2 | 0.1 | 0.3 |
| DA42 | 0.1 | - | - | 0.1 | - | - | 0.1 | 0.1 | - | - | 0.3 | 0.1 | 0.4 |
| BEC190 | 0.1 | - | - | 0.0 | - | - | 0.1 | 0.0 | - | - | 0.1 | 0.0 | 0.2 |
| BEC95 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 0.0 |
| BEC99 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 0.0 |
| BD100 | 1.1 | - | - | 0.4 | - | - | 1.1 | 0.4 | - | - | 2.2 | 0.7 | 3.0 |
| CNA441 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 0.1 |
| CNA208 | 4.8 | - | - | 1.5 | - | - | 4.8 | 1.5 | - | - | 9.7 | 3.1 | 12.8 |
| AC50 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 0.0 |
| AC95 | 0.2 | - | - | 0.1 | - | - | 0.2 | 0.1 | - | - | 0.4 | 0.1 | 0.5 |
| RWCM12 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 0.0 |
| DHC8 | 0.1 | - | - | 0.0 | - | - | 0.1 | 0.0 | - | - | 0.2 | 0.1 | 0.2 |
| DHC830 | 0.1 | - | - | 0.0 | - | - | 0.1 | 0.0 | - | - | 0.1 | 0.0 | 0.2 |
| DHC6 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 0.0 |
| PC12 | 0.4 | - | - | 0.1 | - | - | 0.4 | 0.1 | - | - | 0.9 | 0.3 | 1.2 |
| EMB110 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 0.0 |
| EMB120 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 0.0 |
| BEC90 | 0.3 | - | - | 0.1 | - | - | 0.3 | 0.1 | - | - | 0.7 | 0.2 | 0.9 |
| BEC100 | 0.1 | - | - | 0.0 | - | - | 0.1 | 0.0 | - | - | 0.1 | 0.0 | 0.2 |
| BAEJ41 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 0.0 |
| MU2 | 0.1 | - | - | 0.0 | - | - | 0.1 | 0.0 | - | - | 0.1 | 0.0 | 0.2 |
| MU300 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 0.0 |
| P180 | 0.6 | - | - | 0.2 | - | - | 0.6 | 0.2 | - | - | 1.2 | 0.4 | 1.6 |
| SD330 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | - | - | 0.1 | 0.0 | 0.1 |
| SD360 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 0.0 |
| BEC200 | 0.8 | - | - | 0.3 | - | - | 0.8 | 0.3 | - | - | 1.7 | 0.5 | 2.2 |
| BEC300 | 1.3 | - | - | 0.4 | - | - | 1.3 | 0.4 | - | - | 2.6 | 0.8 | 3.4 |
| SAMER3 | 0.4 | - | - | 0.1 | - | - | 0.4 | 0.1 | - | - | 0.8 | 0.3 | 1.1 |
| STBM7 | 0.2 | - | - | 0.1 | - | - | 0.2 | 0.1 | - | - | 0.4 | 0.1 | 0.5 |
| IA1124 | 0.2 | - | - | 0.0 | - | - | 0.2 | 0.0 | - | - | 0.4 | 0.0 | 0.4 |
| IA1125 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | - | - | 0.1 | 0.0 | 0.1 |
| G200 | 0.3 | - | - | 0.0 | - | - | 0.3 | 0.0 | - | - | 0.7 | 0.0 | 0.7 |
| BEC400 | 1.9 | - | - | 0.1 | - | - | 1.9 | 0.1 | - | - | 3.9 | 0.3 | 4.1 |
| CL600 | 2.2 | - | - | 0.2 | - | - | 2.2 | 0.2 | - | - | 4.3 | 0.3 | 4.6 |
| CNA500 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 0.0 |
| CNA501 | 0.3 | - | - | 0.0 | - | - | 0.3 | 0.0 | - | - | 0.5 | 0.0 | 0.6 |
| CNA510 | 0.4 | - | - | 0.0 | - | - | 0.4 | 0.0 | - | - | 0.7 | 0.1 | 0.8 |
| CNA525C | 3.4 | - | - | 0.3 | - | - | 3.4 | 0.3 | - | - | 6.9 | 0.6 | 7.4 |
| CNA550 | 1.9 | - | - | 0.1 | - | - | 1.9 | 0.1 | - | - | 3.8 | 0.3 | 4.1 |
| CNA560 | 5.0 | - | - | 0.4 | - | - | 5.0 | 0.4 | - | - | 9.9 | 0.7 | 10.7 |

| INM Aircraft Type | Departures (by Stage Length in Nautical Miles) | | | | | | Arrivals | | Circuits (See Notes) | | Total (See Notes) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Day (7 a.m. – 10 p.m.) | | | Night (10 p.m. – 7 a.m.) | | | | | | | | | |
| | 0-500 | 500-1,000 n.m. | 1,000-1,500 n.m. | 0-500 n.m. | 500-1,000 n.m. | 1,000-1,500 n.m. | Day | Night | Day | Night | Day | Night | Total |
| CNA650 | 0.6 | - | - | 0.0 | - | - | 0.6 | 0.0 | - | - | 1.2 | 0.1 | 1.3 |
| CNA680 | 3.2 | - | - | 0.2 | - | - | 3.2 | 0.2 | - | - | 6.3 | 0.5 | 6.8 |
| CNA750 | 0.7 | - | - | 0.0 | - | - | 0.7 | 0.0 | - | - | 1.3 | 0.1 | 1.4 |
| D328J | 0.7 | - | - | 0.0 | - | - | 0.7 | 0.0 | - | - | 1.4 | 0.1 | 1.5 |
| FAL10 | 0.2 | - | - | 0.0 | - | - | 0.2 | 0.0 | - | - | 0.3 | 0.0 | 0.3 |
| FAL20 | 0.2 | - | - | 0.0 | - | - | 0.2 | 0.0 | - | - | 0.4 | 0.0 | 0.5 |
| FAL50 | 0.2 | - | - | 0.0 | - | - | 0.2 | 0.0 | - | - | 0.4 | 0.0 | 0.5 |
| FAL900 | 0.1 | - | - | 0.0 | - | - | 0.1 | 0.0 | - | - | 0.3 | 0.0 | 0.3 |
| FAL20A | 1.0 | - | - | 0.1 | - | - | 1.0 | 0.1 | - | - | 2.0 | 0.1 | 2.1 |
| GIIB | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | - | - | 0.1 | 0.0 | 0.1 |
| GIV | 0.6 | - | - | 0.0 | - | - | 0.6 | 0.0 | - | - | 1.2 | 0.1 | 1.2 |
| GV | 0.2 | - | - | 0.0 | - | - | 0.2 | 0.0 | - | - | 0.4 | 0.0 | 0.4 |
| G150 | 0.2 | - | - | 0.0 | - | - | 0.2 | 0.0 | - | - | 0.4 | 0.0 | 0.4 |
| R390 | 0.5 | - | - | 0.0 | - | - | 0.5 | 0.0 | - | - | 1.0 | 0.1 | 1.1 |
| HK4000 | 0.0 | - | - | 0.0 | - | - | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 0.0 |
| LEAR25 | 0.3 | - | - | 0.0 | - | - | 0.3 | 0.0 | - | - | 0.7 | 0.0 | 0.7 |
| LEAR35 | 6.4 | - | - | 0.5 | - | - | 6.4 | 0.5 | - | - | 12.8 | 0.9 | 13.8 |
| SABR60 | 0.1 | - | - | 0.0 | - | - | 0.1 | 0.0 | - | - | 0.2 | 0.0 | 0.2 |
| Subtotal | 56.7 | - | - | 8.0 | - | - | 56.7 | 8.0 | 2.9 | - | 119.3 | 16.0 | 135.3 |
| **Operations by All Operator Categories** | | | | | | | | | | | | | |
| Total | 88.4 | 3.5 | 3.6 | 18.2 | - | - | 94.1 | 19.7 | 4.2 | - | 198.0 | 37.9 | 235.9 |

Notes:

1. Totals and subtotals may not match the sum of individual entries exactly due to rounding.
2. Circuits include fixed-wing touch-and-go patterns and Ohio Army National Guard (OANG) helicopter “pattern work” activity.
3. Each circuit includes two operations. Therefore, the day, night, and overall totals in the far-right-hand columns are equal to the sum of arrivals and departures plus two times the number of relevant touch-and-go-circuits

## 4.3 Aircraft Noise and Performance Characteristics

The INM database contains noise and performance data for over one hundred different aircraft types. The program automatically accesses the applicable noise and performance data for operations by those aircraft. Noise data are in the form of SEL (see Section 2.1.4) at a range of distances (from 200 feet to 25,000 feet) from a particular aircraft with engines at a specific thrust level. Performance data include thrust, speed, and altitude profiles for takeoff and landing operations.

The aircraft types listed in the tables in Section 4.2 identify operations according to INM aircraft types. Many of these types represent multiple aircraft models with comparable noise and performance characteristics. For some aircraft models for which the database does not include type-specific data, the FAA has identified "standard" substitutes; i.e., pre-approved surrogates to use from among the types in the database. For models not included in the database and for which there is no standard substitute, the FAA works with the INM user to identify appropriate "non-standard substitutes." Appendix E reproduces correspondence with the FAA for this purpose, including a request for a single determination and the FAA letter identifying the approved substitute; i.e., to use the Bell B429 helicopter as the surrogate for the Ohio Army National Guard UH-72 "Lakota."

## 4.4 Airport Physical Parameters

CAK has two operational paved runways: Runway 1/19 and Runway 5/23.

The INM requires detailed inputs on the runway layout, including runway ends, runway end elevations, start-of-takeoff roll points, landing thresholds, threshold crossing heights, and approach angles. These inputs define starting and ending points of modeled operations in three dimensions.

The INM includes an internal database of airport layout inputs. The consulting team compared the INM data to the most current, official published sources, including:

- "AirNav.com" web page entry for CAK[23]
- FAA "airport diagram" for CAK[24]
- FAA Form 5010-1 "Airport Master Record" for CAK[25]

The consulting team also verified the data with CAK staff.

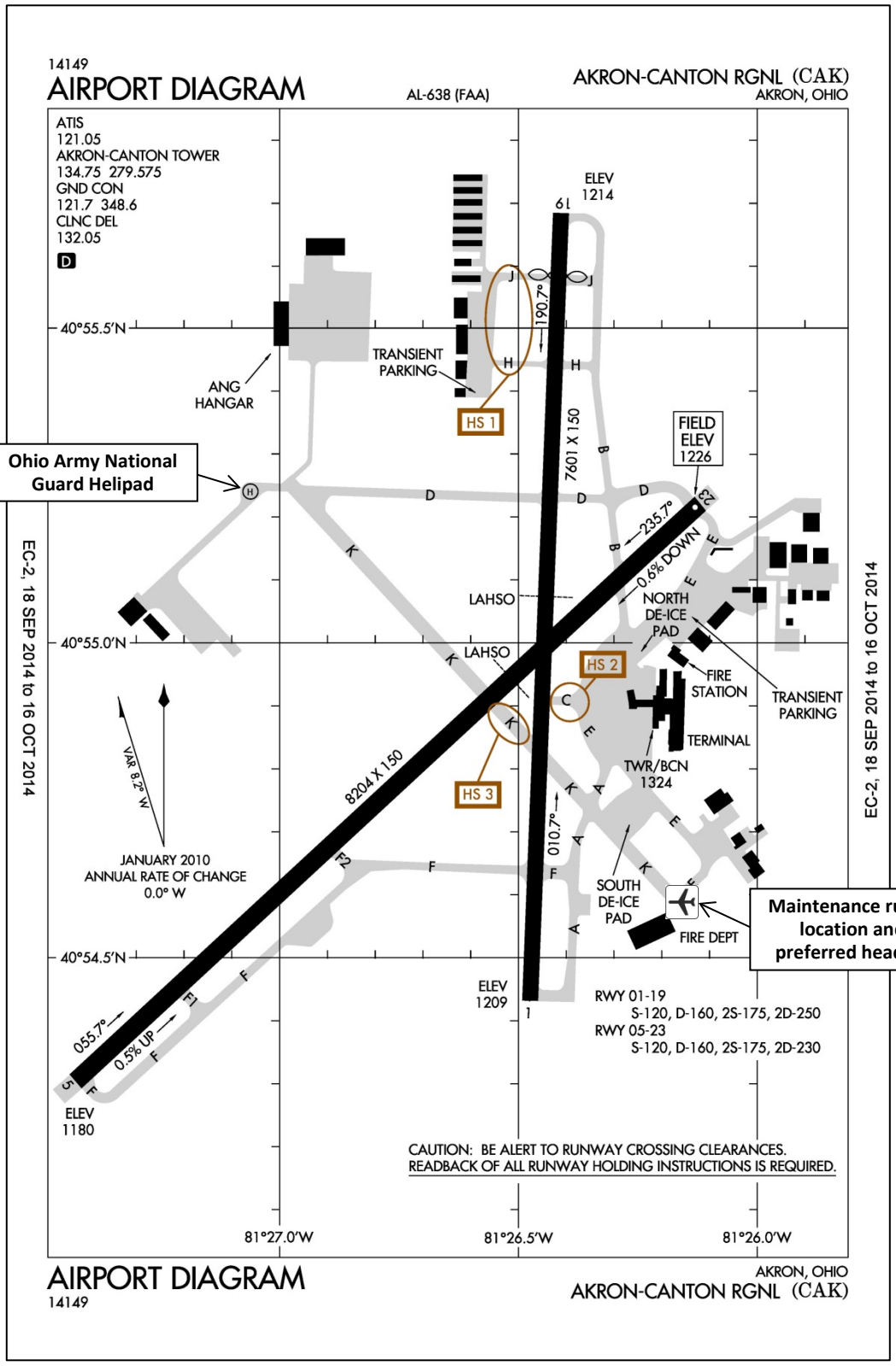
Figure 31 presents the FAA Airport Diagram for CAK, which displays relevant layout data in a graphic format.

[23] AirNav is a private company that is considered a reliable source of airport information, regularly used by pilots to obtain information about an airport prior to operating at it. AirNav obtains the information that it posts on its website from FAA sources. See: www.AirNav.com.

[24] The FAA publishes (electronically and in hard copy) "U.S. Terminal Procedure Publications" that provide charts of "instrument approach procedures," "departure procedures," "standard terminal arrival procedures," "charted visual flight procedures" and "airport diagrams." The airport diagrams are an official source of airport physical dimensions. See: http://www.naco.faa.gov/index.asp?xml=naco/online/d_tpp.

[25] The FAA Form 5010-1, "Airport Master Record," presents comprehensive data on airports. It is maintained for all public use airports by the FAA's National Flight Data Center. It is updated annually for Akron-Canton Airport. See: http://www.faa.gov/airports_airtraffic/airports/airport_safety/airportdata_5010/.

**Figure 31 FAA Airport Diagram for Akron-Canton Airport**
Source: FAA, 2014 (with HMMH helipad and runup location annotations)



## 4.5 Aircraft Maintenance Runup Operations

As discussed in Section 7.4.6, one FAA-approved element of the existing Noise Compatibility Program is a designated maintenance runup location and aircraft orientation, as depicted on Figure 31. To ensure the noise contours properly reflect this concentrated activity, and to permit assessment of the effectiveness of this program element, the modeling included careful attention to maintenance runup operations. The modeling assumptions used activity information assembled from interviews with fixed base operators and other tenants that conduct maintenance runups.

Table 8 summarizes the results of that data assembly as entered into the INM. Based on the inventory results, all runups assume the aircraft are oriented to the specified 270° heading. The modeling assumes that multi-engine aircraft only run one engine up at a time.

**Table 8 Maintenance Runup Modeling Assumptions**
Source: HMMH, based on interviews with airport tenants

| INM Aircraft type | Thrust Setting (Pounds or percent of maximum, as modeled in the INM) | Duration (Seconds) | Runups per Average Annual Day |
|---|---|---|---|
| CNA525C | 3300 lbs. | 120.0 | 0.164384 |
| CNA208 | 1899 lbs. | 120.0 | 0.164384 |
| GASEPV | 100% | 120.0 | 0.164384 |
| MU3001 | 2100 lbs. | 120.0 | 0.164384 |
| MU3001 | 2100 lbs. | 120.0 | 0.164384 |
| CNA441 | 100 lbs. | 120.0 | 0.328767 |
| BEC58P | 100% | 120.0 | 0.328767 |
| CL601 | 6000 lbs. | 120.0 | 0.164384 |
| CNA208 | 1899 lbs. | 120.0 | 0.032877 |
| CNA525C | 3300 lbs. | 120.0 | 0.164384 |
| CNA208 | 1899 lbs. | 120.0 | 0.164384 |

## 4.6 Runway Utilization

At the outset of the inventory phase of the Part 150 Update Study, the consulting team conferred with CAK staff, FAA Airport Traffic Control Tower (ATCT) staff, and FAA Airports District Office (ADO) staff to determine the appropriate source of information on which to base runway use and flight track modeling assumptions. The ADO staff included the personnel who will have primary responsibility for reviewing the Noise Exposure Map submission for compliance with FAA requirements.

The result of those discussions was agreement that it would be appropriate to obtain flight operations ("radar") data from four months in 2012, to represent seasonal variation in activity and operating conditions. The participants in those discussions selected the months of January, April, July, and October 2012 to reflect the four seasons, with consideration given to sampling months without unusual airport operating conditions, such as extended runway closures, that could affect operations significantly.[26]

The source of the data was a commercial operations monitoring installation that Passur Aerospace operates at Cleveland-Hopkins International Airport and that covered the CAK airspace.

The four-month data sample included flight tracks for 11,464 fixed-wing operations – a very significant sample size. Table 9 summarizes the runway use rates from the data. The CAK staff and FAA ATCT staff reviewed and approved these rates for reasonableness.

Helicopter arrival and departure operations, and helicopter pattern activity all operate to and from the point marked "Ⓗ" on the Figure 31 airport diagram (to the southwest of the Ohio Army National Guard hangar (labeled "ANG" on the figure). The flight track figures and utilization tables presented in Section 4.7 provide information on the percentage use of these tracks by direction.

[26] CHA also used the Passur data sample for development of the activity and fleet mix forecasts presented in Appendix C, as summarized Table 6 and Table 7 in Section 4.2 of the body of this report.

**Table 9 Fixed-Wing Runway Use by Major Aircraft Type Category**
Source: HMMH, based on four-month Passur data sample from 2012

| Air Carrier Jets (≥ 90 seats) and All Military Fixed-Wing | Arrival | | | Departure | | | Touch-and-Go | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Day | Night | Total | Day | Night | Total | Day | Night | Total | Day | Night | Total |
| Runway 1 | 11% | 15% | 12% | 24% | 23% | 24% | Not applicable | | | 19% | 19% | 19% |
| Runway 5 | 15% | 32% | 19% | 4% | 2% | 3% | | | | 8% | 18% | 10% |
| Runway 19 | 26% | 21% | 25% | 11% | 9% | 11% | | | | 17% | 15% | 17% |
| Runway 23 | 48% | 32% | 44% | 62% | 67% | 62% | | | | 56% | 48% | 54% |
| Total | 100% | 100% | 100% | 100% | 100% | 100% | | | | 100% | 100% | 100% |

| Regional Jets (< 90 seats) | Arrival | | | Departure | | | Touch-and-Go | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Day | Night | Total | Day | Night | Total | Day | Night | Total | Day | Night | Total |
| Runway 1 | 16% | 24% | 18% | 25% | 25% | 25% | Not applicable | | | 21% | 25% | 22% |
| Runway 5 | 12% | 23% | 14% | 3% | 1% | 3% | | | | 7% | 9% | 7% |
| Runway 19 | 29% | 17% | 27% | 13% | 11% | 12% | | | | 19% | 13% | 18% |
| Runway 23 | 42% | 36% | 41% | 60% | 63% | 60% | | | | 52% | 54% | 53% |
| Total | 100% | 100% | 100% | 100% | 100% | 100% | | | | 100% | 100% | 100% |

| General Aviation Jets | Arrival | | | Departure | | | Touch-and-Go | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Day | Night | Total | Day | Night | Total | Day | Night | Total | Day | Night | Total |
| Runway 1 | 14% | 14% | 14% | 25% | 25% | 25% | Not applicable | | | 21% | 22% | 21% |
| Runway 5 | 16% | 17% | 16% | 1% | 0% | 1% | | | | 7% | 5% | 7% |
| Runway 19 | 26% | 28% | 26% | 17% | 11% | 16% | | | | 20% | 16% | 20% |
| Runway 23 | 45% | 41% | 44% | 57% | 63% | 58% | | | | 52% | 57% | 53% |
| Total | 100% | 100% | 100% | 100% | 100% | 100% | | | | 100% | 100% | 100% |

| Turbo-Propeller Aircraft | Arrival | | | Departure | | | Touch-and-Go | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Day | Night | Total | Day | Night | Total | Day | Night | Total | Day | Night | Total |
| Runway 1 | 11% | 4% | 8% | 19% | 16% | 19% | Not applicable | | | 16% | 6% | 14% |
| Runway 5 | 14% | 2% | 8% | 4% | 3% | 4% | | | | 7% | 3% | 6% |
| Runway 19 | 28% | 22% | 25% | 19% | 13% | 19% | | | | 22% | 20% | 21% |
| Runway 23 | 47% | 72% | 59% | 58% | 68% | 59% | | | | 55% | 72% | 59% |
| Total | 100% | 100% | 100% | 100% | 100% | 100% | | | | 100% | 100% | 100% |

| Piston-Propeller Aircraft | Arrival | | | Departure | | | Touch-and-Go | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Day | Night | Total | Day | Night | Total | Day | Night | Total | Day | Night | Total |
| Runway 1 | 7% | 8% | 7% | 23% | 4% | 20% | 0% | 0% | 0% | 16% | 5% | 14% |
| Runway 5 | 15% | 38% | 18% | 5% | 4% | 5% | 0% | 0% | 0% | 10% | 14% | 10% |
| Runway 19 | 49% | 29% | 47% | 20% | 21% | 20% | 75% | 0% | 75% | 33% | 24% | 32% |
| Runway 23 | 29% | 25% | 28% | 52% | 71% | 55% | 25% | 0% | 25% | 42% | 57% | 44% |
| Total | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 0% | 100% | 100% | 100% | 100% |

## 4.7 Flight Track Geometry and Utilization

The Passur data discussed in the preceding section also provided the primary basis for development of fixed-wing modeling flight tracks. Since the sample included very few tracks for Ohio Army National Guard (OANG) helicopter operations, HMMH interviewed OANG representatives to develop those tracks.

### 4.7.1 *Flight Track Geometry*

The following four figures present the modeling flight tracks developed for the following combinations of aircraft type and operations type:

- Figure 32 Fixed-Wing Departure Modeling Flight Tracks
- Figure 33 Fixed-Wing Arrival Modeling Flight Tracks
- Figure 34 Fixed-Wing Touch-and-Go Modeling Flight Tracks
- Figure 35 Helicopter Modeling Flight Tracks

For clarity, these figures cover the Advisory Committee defined study area, at the scale of 1" to 8,000'. The flight track figures depict "backbone" modeling tracks with bold lines. There are two "dispersion" tracks on either side of each backbone, depicted using shaded lines.

Part 150 requires formal Noise Exposure Map submissions to depict tracks out to at least 30,000 feet at a scale of at least 1" to 2,000'. FAA guidelines permit airports to present the flight tracks covering this scope and scale on separate, unbound figures at this scale accompanying the Noise Exposure Map document. Based on discussion with the FAA Airports District Office (ADO) staff, the final version of this report that the Authority submits to the FAA will include figures at that scale folded up and inserted into a sleeve inside the rear cover.

### 4.7.2 *Flight Track Utilization*

Four tables following the flight track figures present the following modeling assumptions:

- Table 10 Fixed-Wing Backbone Departure Flight Track Utilization Rates
- Table 11 Fixed-Wing Backbone Arrival Flight Track Utilization Rates
- Table 12 Civil Fixed-Wing Touch-and-Go Flight Track Utilization Rates
- Table 13 Ohio Army National Guard Helicopter Flight Track Utilization Rates

The INM uses "backbone" tracks with two associated "dispersion" tracks on either side of the backbone. The arrival and departure utilization rates presented in the tables are for the operations assigned to each backbone track and its associated dispersion tracks. The INM distributes operations among these five tracks using a "normal" distribution (e.g., a "bell-shaped" curve) as follows:

- Outer-left dispersion track: 6.3%
- Inner-left dispersion track: 24.4%
- Backbone track: 38.6%
- Inner-right dispersion track: 24.4%
- Outer-right dispersion track: 6.3%

There is one fixed-wing touch-and-go track for each of the four runway ends; 100% of the touch-and-go operations on each runway are on the associated circuit. There are no dispersion tracks for these circuits. There are two OANG helicopter circuit tracks to the northwest of the airport and one to the southwest. The OANG helicopters use the northwest tracks on a 50/50% basis when Runway 5/23 is in use and the southwest track when Runways 01/19 is in use. There are no dispersion tracks for these circuits either.

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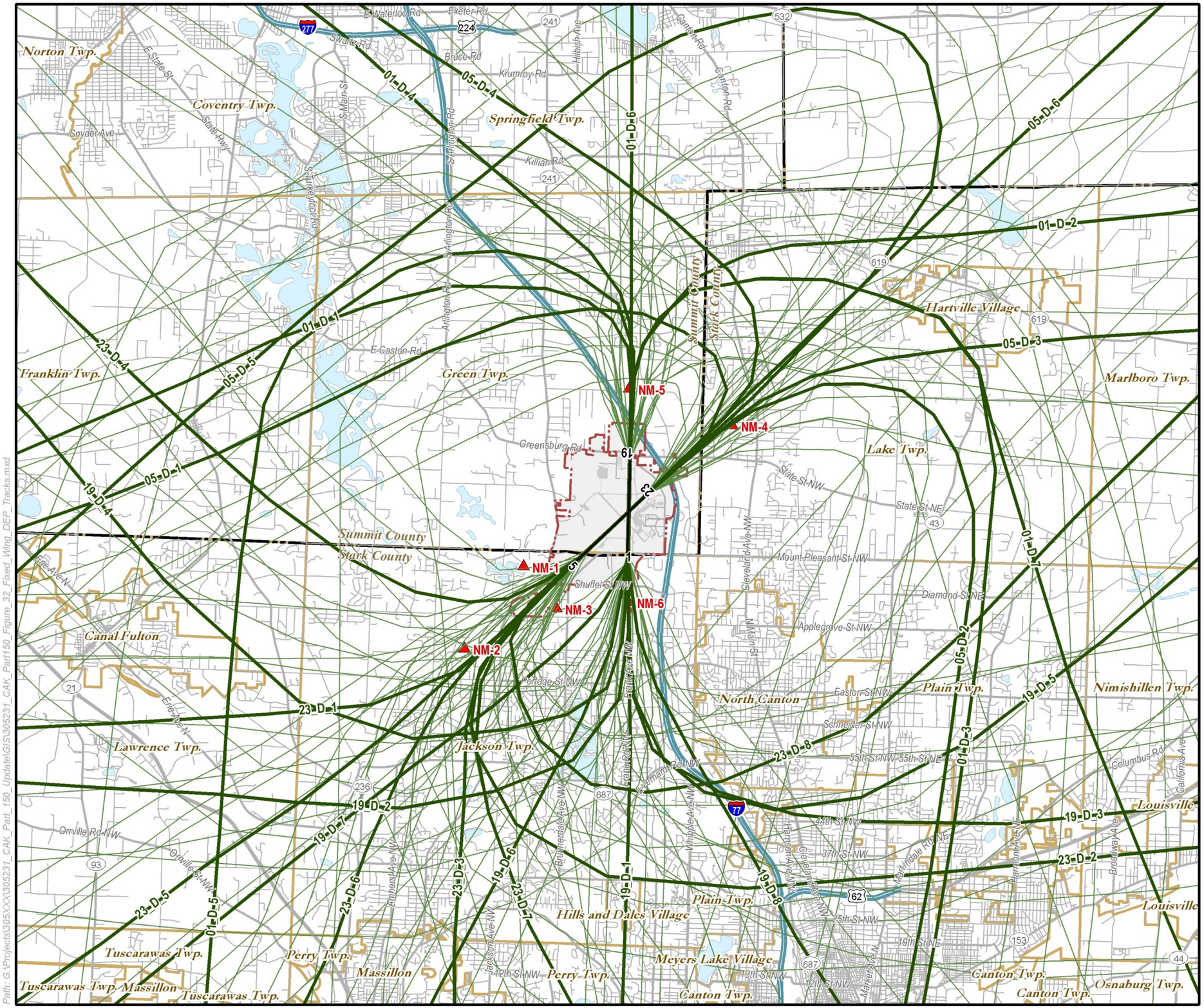


AKRON-CANTON AIRPORT

**Figure 32**
**Fixed-Wing Departure Modeling Flight Tracks**
14 CFR Part 150 Update

- Airport Property Boundary
- Airport Runway
- Backbone Model Track
- Dispersed Track
- NM-# Portable Noise Monitoring Sites
- County Boundary
- Township Boundary
- Interstate Highways
- Primary Roads
- Local Roads
- Water Bodies

North

0 8,000 16,000 Feet

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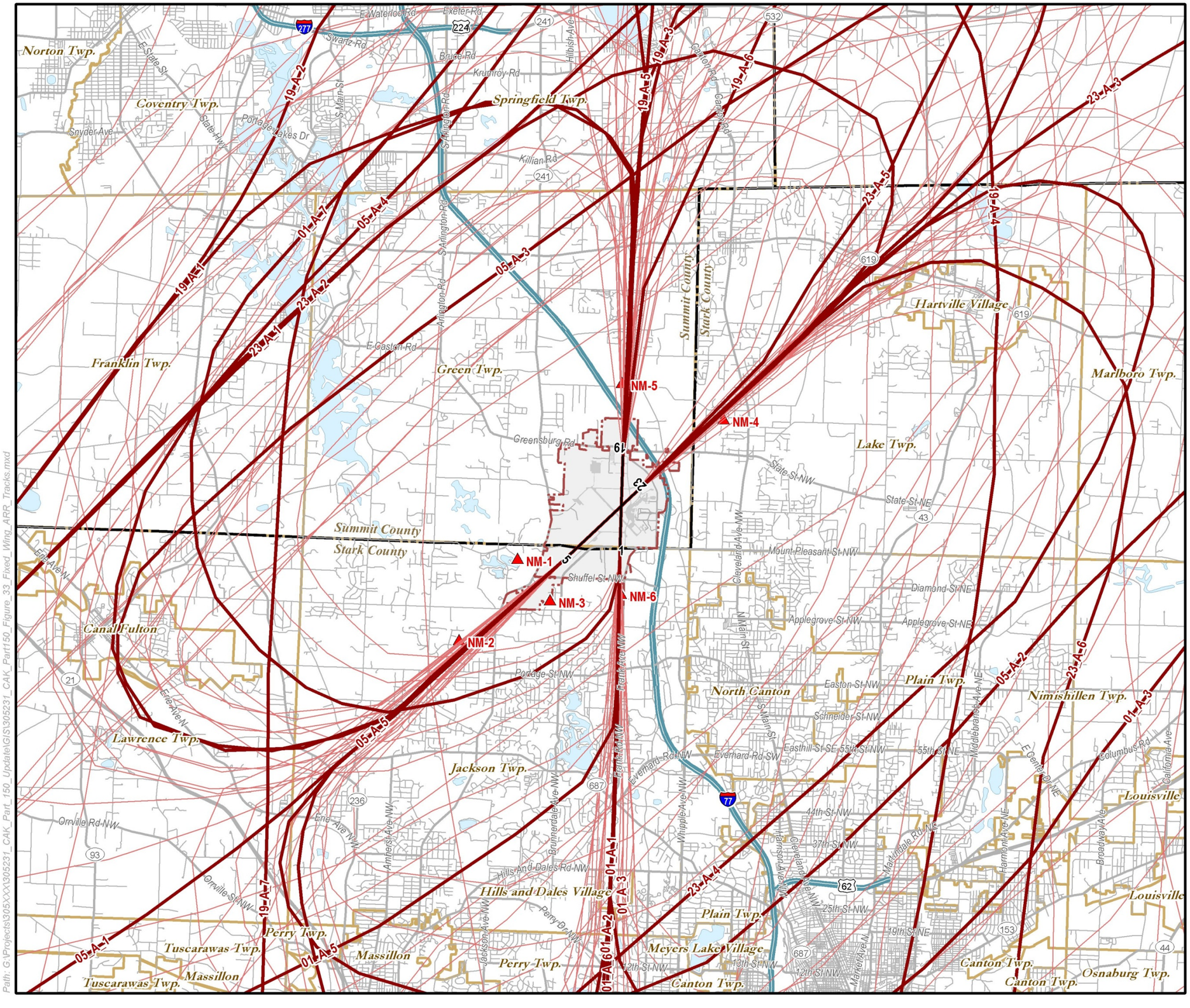


AKRON-CANTON AIRPORT

# Figure 33
# Fixed-Wing Arrival Modeling Flight Tracks
14 CFR Part 150 Update

- Airport Property Boundary
- Airport Runway
- Backbone Model Track
- Dispersed Track
- NM-# Portable Noise Monitoring Sites
- County Boundary
- Township Boundary
- Interstate Highways
- Primary Roads
- Local Roads
- Water Bodies

North

0 8,000 16,000 Feet

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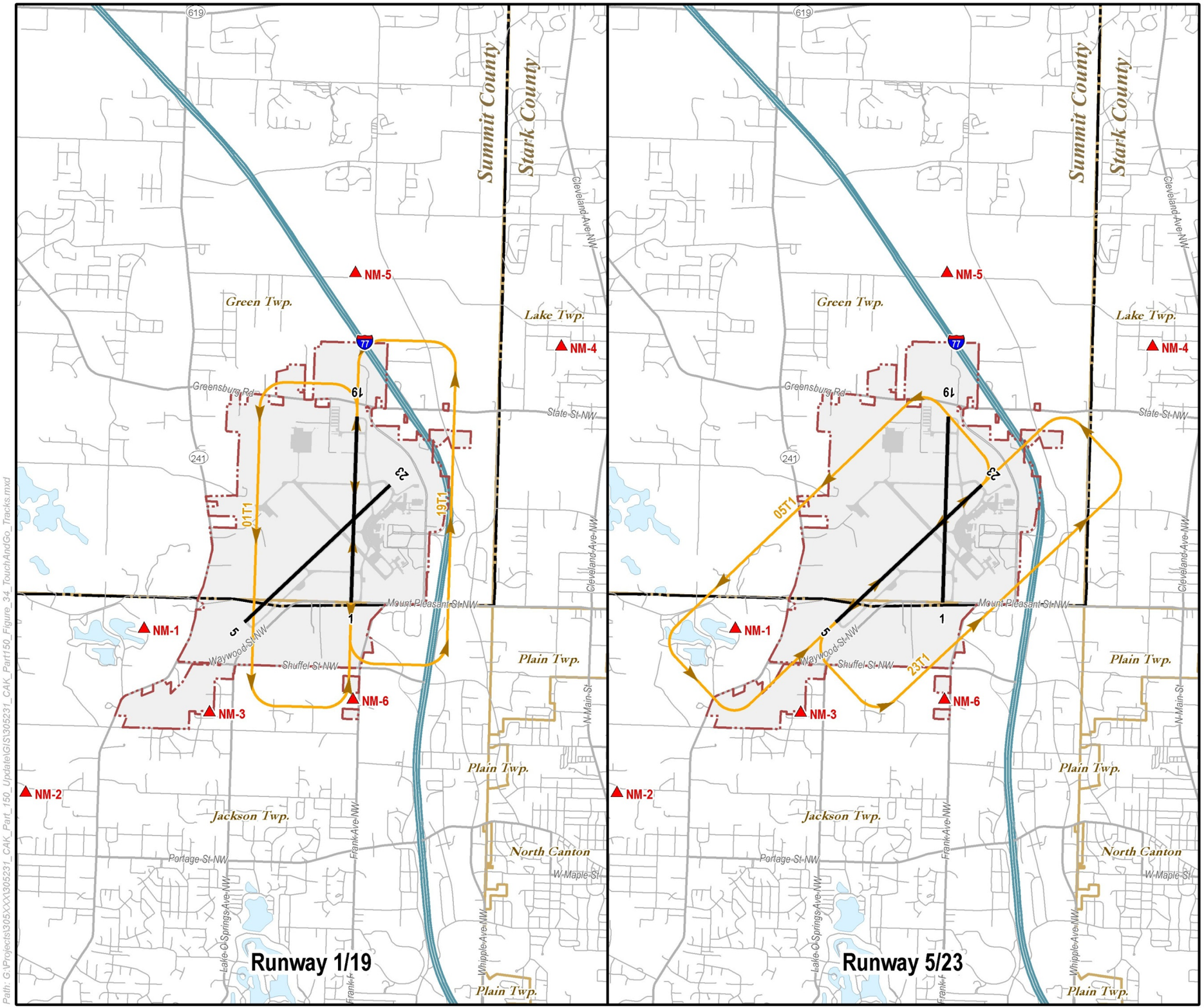


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AKRON-CANTON AIRPORT

**Figure 34**
**Fixed-Wing Touch-and-Go Modeling Flight Tracks**
14 CFR Part 150 Update

- Airport Property Boundary
- Airport Runway
- Touch and Go Track
- NM-# Portable Noise Monitoring Sites
- County Boundary
- Township Boundary
- Interstate Highways
- Primary Roads
- Local Roads
- Water Bodies

North

0 4,000 8,000 Feet

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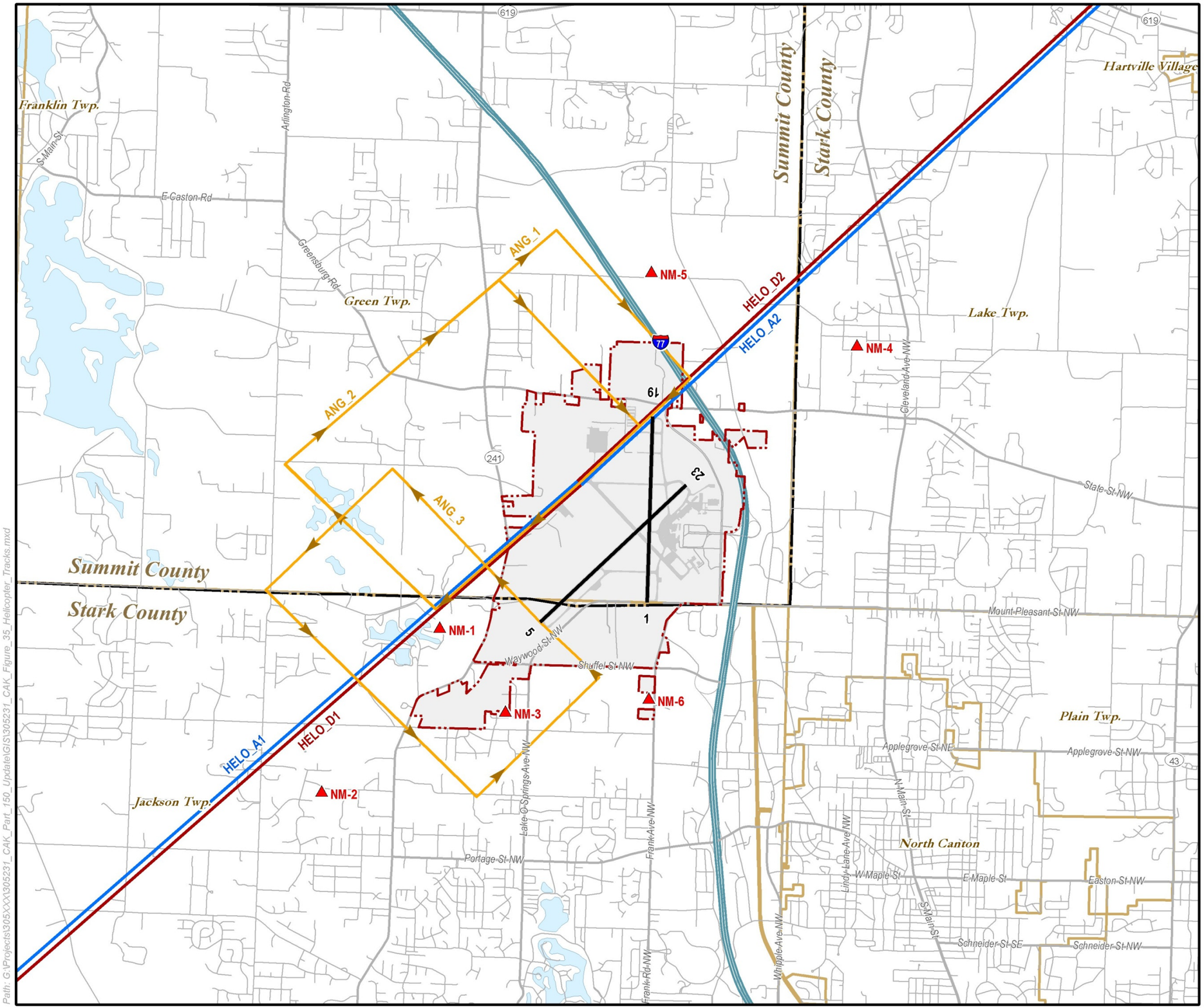


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AKRON-CANTON AIRPORT

# Figure 35
## Helicopter Modeling Flight Tracks
14 CFR Part 150 Update

- Airport Property Boundary
- Airport Runway
- Helicopter Arrival Track
- Helicopter Departure Track
- OANG Pattern Work
- NM-# Portable Noise Monitoring Sites
- County Boundary
- Township Boundary
- Interstate Highways
- Primary Roads
- Local Roads
- Water Bodies

North

0 4,000 8,000 Feet

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**Table 10 Fixed-Wing Backbone Departure Flight Track Utilization Rates, by Runway End**
Source: HMMH, 2013

| Runway | Track Name | Air Carrier Jets and Fixed-Wing Military | | Regional Jets | | General Aviation Jets | | Non-Jet Civil Aircraft | |
|---|---|---|---|---|---|---|---|---|---|
| | | Day | Night | Day | Night | Day | Night | Day | Night |
| 1 | 01_D_1 | 24% | 24% | 20% | 20% | 31% | 31% | 25% | 25% |
| 1 | 01_D_2 | 23% | 23% | 16% | 16% | 22% | 22% | 25% | 25% |
| 1 | 01_D_3 | 51% | 51% | 38% | 38% | 33% | 33% | 18% | 18% |
| 1 | 01_D_4 | - | - | 18% | 18% | 10% | 10% | 11% | 11% |
| 1 | 01_D_5 | 2% | 2% | 4% | 4% | 4% | 4% | 9% | 9% |
| 1 | 01_D_6 | - | - | - | - | - | - | 13% | 13% |
| 1 | 01_D_7 | - | - | 4% | 4% | - | - | - | - |
| 5 | 05_D_1 | 23% | 23% | 23% | 23% | - | - | 52% | 52% |
| 5 | 05_D_2 | 50% | 50% | 46% | 46% | - | - | 19% | 19% |
| 5 | 05_D_3 | 27% | 27% | 15% | 15% | 29% | 29% | - | - |
| 5 | 05_D_4 | - | - | 15% | 15% | - | - | - | - |
| 5 | 05_D_5 | - | - | - | - | 71% | 71% | - | - |
| 5 | 05_D_6 | - | - | - | - | - | - | 29% | 29% |
| 19 | 19_D_1 | 48% | 48% | 39% | 39% | 21% | 21% | 21% | 21% |
| 19 | 19_D_2 | 21% | 21% | 5% | 5% | 27% | 27% | 21% | 21% |
| 19 | 19_D_3 | 25% | 25% | 9% | 9% | 11% | 11% | 12% | 12% |
| 19 | 19_D_4 | - | - | 12% | 12% | 9% | 9% | - | - |
| 19 | 19_D_5 | - | - | 7% | 7% | 12% | 12% | 7% | 7% |
| 19 | 19_D_6 | 3% | 3% | 8% | 8% | 12% | 12% | 14% | 14% |
| 19 | 19_D_7 | 3% | 3% | 16% | 16% | - | - | 15% | 15% |
| 19 | 19_D_8 | - | - | 5% | 5% | 9% | 9% | 9% | 9% |
| 23 | 23_D_1 | 24% | 24% | 19% | 19% | 22% | 22% | 31% | 31% |
| 23 | 23_D_2 | 23% | 23% | 12% | 12% | 14% | 14% | 6% | 6% |
| 23 | 23_D_3 | 51% | 51% | 35% | 35% | 15% | 15% | 7% | 7% |
| 23 | 23_D_4 | 1% | 1% | 17% | 17% | 8% | 8% | 16% | 16% |
| 23 | 23_D_5 | - | - | 7% | 7% | 10% | 10% | 15% | 15% |
| 23 | 23_D_6 | 1% | 1% | 2% | 2% | 11% | 11% | 6% | 6% |
| 23 | 23_D_7 | - | - | 6% | 6% | 9% | 9% | 9% | 9% |
| 23 | 23_D_8 | 1% | 1% | 1% | 1% | 9% | 9% | 8% | 8% |

**Table 11 Fixed-Wing Backbone Arrival Flight Track Utilization Rates, by Runway End**
Source: HMMH, 2013

| Runway | Track Name | Air Carrier Jets and Fixed-Wing Military | | Regional Jets | | General Aviation Jets | | Non-Jet Civil Aircraft | |
|---|---|---|---|---|---|---|---|---|---|
| | | Day | Night | Day | Night | Day | Night | Day | Night |
| 1 | 01_A_1 | 39% | 39% | 12% | 12% | 31% | 31% | 24% | 24% |
| 1 | 01_A_2 | 37% | 37% | 58% | 58% | 27% | 27% | 38% | 38% |
| 1 | 01_A_3 | 14% | 14% | 7% | 7% | 9% | 9% | 10% | 10% |
| 1 | 01_A_5 | 10% | 10% | 7% | 7% | 13% | 13% | 19% | 19% |
| 1 | 01_A_6 | - | - | 10% | 10% | 19% | 19% | 10% | 10% |
| 1 | 01_A_7 | - | - | 5% | 5% | - | - | - | - |
| 5 | 05_A_1 | 91% | 91% | 79% | 79% | 90% | 90% | 84% | 84% |
| 5 | 05_A_2 | 6% | 6% | 3% | 3% | 10% | 10% | - | - |
| 5 | 05_A_3 | 3% | 3% | - | - | - | - | - | - |
| 5 | 05_A_4 | - | - | 10% | 10% | - | - | 16% | 16% |
| 5 | 05_A_5 | - | - | 8% | 8% | - | - | - | - |
| 19 | 19_A_1 | 41% | 41% | 26% | 26% | 45% | 45% | 35% | 35% |
| 19 | 19_A_2 | 32% | 32% | 14% | 14% | 19% | 19% | 20% | 20% |
| 19 | 19_A_3 | 12% | 12% | 10% | 10% | 13% | 13% | 10% | 10% |
| 19 | 19_A_4 | 6% | 6% | 13% | 13% | 10% | 10% | 6% | 6% |
| 19 | 19_A_5 | - | - | 24% | 24% | 13% | 13% | 29% | 29% |
| 19 | 19_A_6 | - | - | 12% | 12% | - | - | - | - |
| 19 | 19_A_7 | 9% | 9% | - | - | - | - | - | - |
| 23 | 23_A_1 | 31% | 31% | 15% | 15% | 36% | 36% | 45% | 45% |
| 23 | 23_A_2 | 36% | 36% | 18% | 18% | 17% | 17% | 14% | 14% |
| 23 | 23_A_3 | 28% | 28% | 24% | 24% | 30% | 30% | 27% | 27% |
| 23 | 23_A_4 | 5% | 5% | 2% | 2% | - | - | - | - |
| 23 | 23_A_5 | - | - | 34% | 34% | 8% | 8% | 14% | 14% |
| 23 | 23_A_6 | - | - | 8% | 8% | 9% | 9% | - | - |

**Table 12 Civil Fixed-Wing Touch-and-Go Flight Track Utilization Rates, by Runway End**
Source: HMMH, 2013

| Runway | Track Name | Circuits | |
|---|---|---|---|
| | | Day | Night |
| 1 | 01T1 | 100% | 100% |
| 19 | 19T1 | 100% | 100% |
| 5 | 05T1 | 100% | 100% |
| 23 | 23T1 | 100% | 100% |

**Table 13 Ohio Army National Guard Helicopter Flight Track Utilization Rates**
Source: HMMH, 2013

| Track Name | Departures | | Arrivals | | Pattern Work Circuits | |
|---|---|---|---|---|---|---|
| | Day | Night | Day | Night | Day | Night |
| Helo_D1 | 21% | - | - | - | Not Applicable | |
| Helo_D2 | 79% | 100% | - | - | | |
| Helo_A1 | - | - | 21% | - | | |
| Helo_A2 | - | - | 79% | 100% | | |
| ANG_1 | Not Applicable | | | | 30% | 30% |
| ANG_2 | | | | | 30% | 30% |
| ANG_3 | | | | | 41% | 41% |

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