7 IDENTIFICATION AND ANALYSIS OF EXISTING AND POTENTIAL NOISE ABATEMENT MEASURES

A series of Advisory Committee meetings, with associated pre- and post-meeting working papers, was the organizational hub for the noise abatement analyses. Other potentially interested stakeholders could follow the process and provide input by reviewing and commenting on the working papers on the study website, and by participating in three public workshops.

7.1 Noise Abatement Alternatives Recommended for Consideration by the Advisory Committee or Other Stakeholders

As discussed in Section 11, the study process included an extensive public outreach and consultation program that included six Advisory Committee meetings, three public workshops, a final public hearing, a continuously maintained website, and three newsletters. This outreach and consultation program was the primary basis for soliciting proposals for new or revised Noise Compatibility Program measures, and led to requests for consideration of the following abatement alternatives:

- Preferential use of Runway 1-19 over 5-23 for jets – general aviation jets in particular – and for nighttime operations. Several Advisory Committee members requested consideration of this category of alternatives. Section 7.3 of this report addresses this topic.
- Displace Runway 5 start-of-takeoff-roll point 1,250' to the northeast. An Advisory Committee member made the proposal. Section 7.5.1 addresses this request.
- Reduce flight track dispersion for Runway 1 departures and Runway 19 arrivals. This proposal was from a member of the public who attended two workshops and provided comments at the final hearing. Section 7.6.4 addresses this request.
- Noise barriers along I-77 north of the airport to Wise Road. Section 7.6.5 of this memorandum addresses this request. The same member of the public who proposed the preceding alternative submitted this request. He passed along correspondence that supported his request. Appendix F provides the related written input.
- Military aircraft to fly higher over residences. Section 7.6.8 addresses this request. Appendix F presents related written input.
- Regulate flight times. Section 7.6.9 addresses this request. Appendix F presents related written input.
- Regulate flight patterns. Section 7.6.10 addresses this request. Appendix F presents related written input.
- Sound-insulate homes most near the airport Sections 7.6.11 and 8.2.2 addresses this request. Appendix F presents related written input.

7.2 Other Noise Abatement Analysis Steps

In response to committee and public input, and to Part 150 requirements, guidelines, and accepted practices, the noise abatement analysis also included the following steps:

- Review of the implementation and effectiveness of the existing noise abatement measures. Section 7.4 summarizes this step and its results.

- Consideration of Part 150 noise abatement alternative analysis requirements. Section 7.5 summarizes this step and its results.
- Consideration of combinations of alternatives suggested by the Advisory Committee. Section 7.7 summarizes this step and its results.
- Comparison of noise benefits. Section 7.8 summarizes this step.
- Consideration of feedback from the FAA Manager of the CAK Air Traffic Control Tower (ATCT) at CAK. Section 7.9 summarizes this feedback.

To maintain comparability with interim study documentation, other publicly distributed materials, and presentations at committee meetings, workshops, and the final public hearing, this section follows this same order and maintains the numbering of the alternatives used in those prior steps.

7.3 Preferential Use of Runway 1-19 over 5-23

At the request of the Advisory Committee, a runway use "sensitivity analysis" was a primary focus of the noise abatement alternative analysis. The population impacts by runway end presented in Section 5.2 support the committee's interest in preferential runway use, in particular seeking runway use options that could reduce exposure off the southwest end of Runway 5/23, which is primarily associated with noise from Runway 23 departures.

The Advisory Committee acknowledged the following from the outset: *While FAA Airport Traffic Control Tower (ATCT) personnel identify the active runway at any point in time; the pilot-in-command of each aircraft retains ultimate decision-making authority regarding which runway will be used for any given operation (chosen from among all open runways).*

Table 9 presents existing fixed-wing runway use by major aircraft type categories, which shows that for any given aircraft category, arrival and departure runway use differ from each other during both the day and night, and on a 24-hour basis. The differences may arise from a variety of factors, such as selection of a runway to reduce taxi time, avoid take-off queues, minimize flight distances, etc.

These differences reflect the flexibility that pilots have to safely operate aircraft on differing runways under identical operating conditions, and offer a basis for considering the potential benefits that might result from pilots voluntarily complying with a recommended runway selection priority.

Advisory Committee input led to eight preferential runway use alternatives ("1 – 6," and "1A" and "5A") to test the potential benefits of varying nighttime, daytime, and 24-hour runway use priorities.

- Alternative 1: Night Departure Runway Use Changed to Match Night Arrival Use
- Alternative 1A: South-Flow Night Runway Use Changed to Shift Runway 23 Departures to 19
- Alternative 2: Night Arrival Runway Use Changed to Match Night Departure Use
- Alternative 3: Day Departure Runway Use Changed to Match Day Arrival Use
- Alternative 4: Day Arrival Runway Use Changed to Match Day Departure Use
- Alternative 5: All Departure Runway Use Changed to Match All Arrival Use
- Alternative 5A: All South-Flow Runway Use Changed to Shift Departures from Runway 23 to 19
- Alternative 6: All Arrival Runway Use Changed to Match All Departure Use

For each alternative, the following pages describe the adjusted runway use, present comparative contours, and summarize changes in encompassed dwelling units and residents. At the request of the Advisory Committee, the analyses used the 2014 contour, since it includes more residents than the more speculative 2019 forecast.

Section 7.3.9 summarizes the noise benefits of each runway use alternative, and compares the benefits to the numbers of operations affected.

7.3.1 *Alternative 1: Night Departure Runway Use Changed to Match Night Arrival Use*

This alternative addresses interest in reducing night departures on Runway 23, which overfly the area southwest of the airport with the most residents within the 60 dB DNL contour. Under existing conditions, night departure use of Runway 23 is substantially higher than other runways, whereas night arrival use is more even. This alternative tests the effect of adjusting night departure use to equal night arrival use as shown below, *reducing night departures to the southwest.*

Table 17 Alternative 1: Night Departure Runway Use Changed to Match Night Arrival Use
Runway use revised from existing condition runway use highlighted in bold.

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%	**15%**	22%	Not applicable			19%	**15%**	18%
Runway 5	15%	32%	19%	4%	**32%**	8%				8%	**32%**	13%
Runway 19	26%	21%	25%	11%	**21%**	13%				17%	**21%**	18%
Runway 23	48%	32%	44%	62%	**32%**	57%				56%	**32%**	51%
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%	**24%**	25%	Not applicable			21%	**24%**	22%
Runway 5	12%	23%	14%	3%	**23%**	6%				7%	**23%**	9%
Runway 19	29%	17%	27%	13%	**17%**	13%				19%	**17%**	19%
Runway 23	42%	36%	41%	60%	**36%**	56%				52%	**36%**	50%
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%	**14%**	24%	Not applicable			21%	**14%**	20%
Runway 5	16%	17%	16%	1%	**17%**	3%				7%	**17%**	8%
Runway 19	26%	28%	26%	17%	**28%**	17%				20%	**28%**	21%
Runway 23	45%	41%	44%	57%	**41%**	56%				52%	**41%**	51%
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%	**4%**	18%	Not applicable			16%	**4%**	13%
Runway 5	14%	2%	8%	4%	**2%**	4%				7%	**2%**	6%
Runway 19	28%	22%	25%	19%	**22%**	19%				22%	**22%**	22%
Runway 23	47%	72%	59%	58%	**72%**	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%	**8%**	21%	0%	0%	0%	16%	**8%**	15%
Runway 5	15%	38%	18%	5%	**38%**	10%	0%	0%	0%	10%	**38%**	13%
Runway 19	49%	29%	47%	20%	**29%**	21%	75%	0%	75%	33%	**29%**	33%
Runway 23	29%	25%	28%	52%	**25%**	48%	25%	0%	25%	42%	**25%**	40%
Total	100%	100%	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%

Several operational considerations support the feasibility of this alternative:

- It is based on actual runway use. The night departure use of each aircraft type category is adjusted to match the night arrival use for that same aircraft type. The matching operational conditions strongly support the feasibility of the change.
- Information provided by FAA tower personnel and aircraft operators indicates that the preference for departing on Runway 23 rather than Runway 19 when operating in the south flow is often related to the shorter taxi times, not aircraft operational considerations.
- While night hours (10 p.m. – 7 a.m.) represent approximately 38% of the 24-hour day, only approximately 16% of all departures – 17 to 18 per night on average – occur during that interval.
- There are approximately two departures per hour at night on the average, compared to approximately seven per hour during daytime hours.
- The lower overall activity levels at night and the lower hourly rate of operations minimize potential effects on aircraft operators associated with slightly longer taxi distances and times associated with using Runway 19 rather than Runway 23 for departure.
- The lower overall activity levels and the lower hourly rate of operations at night mitigate potential effects on air traffic control workload.

The following table compares the residential land uses within the 65-65 dB DNL contour – by runway end – for this case to that for the 2014 existing conditions case.

Table 18 Residential Land Uses within 2014 60-65 dB DNL Contours by Runway End for Alternative 1
Source: HMMH, 2014

Case	Metric	North – off Rwy 19 approach / Rwy 1 departure end	Northeast – off Rwy 23 appr. / Rwy 5 depart. end	South – off Rwy 1 approach / Rwy 19 departure end	Southwest – off Rwy 5 appr. / Rwy 23 depart. end	TOTAL
Alternative 1	Residents	0	10	5	17	32
	Dwelling Units	0	4	3	9	16
2014 Existing Conditions	Residents	0	2	4	56	62
	Dwelling Units	0	1	2	24	27

This alternative nearly cuts the population within the 60 dB DNL contour by 50%, while affecting only approximately eight percent of all operations (17 to 18 out of 236 per day). However, as shown in the figure and Table 4, the benefit of this alternative is diluted slightly by the increased use of Runway 5 for departures, which extends the noise contour off the northeast end of Runway 5-23. To address this issue, the following section presents a variant of the alternative ("Alternative 1A") that only adjusts nighttime departure runway use in the south flow; i.e., shifting departures from 23 to 19.

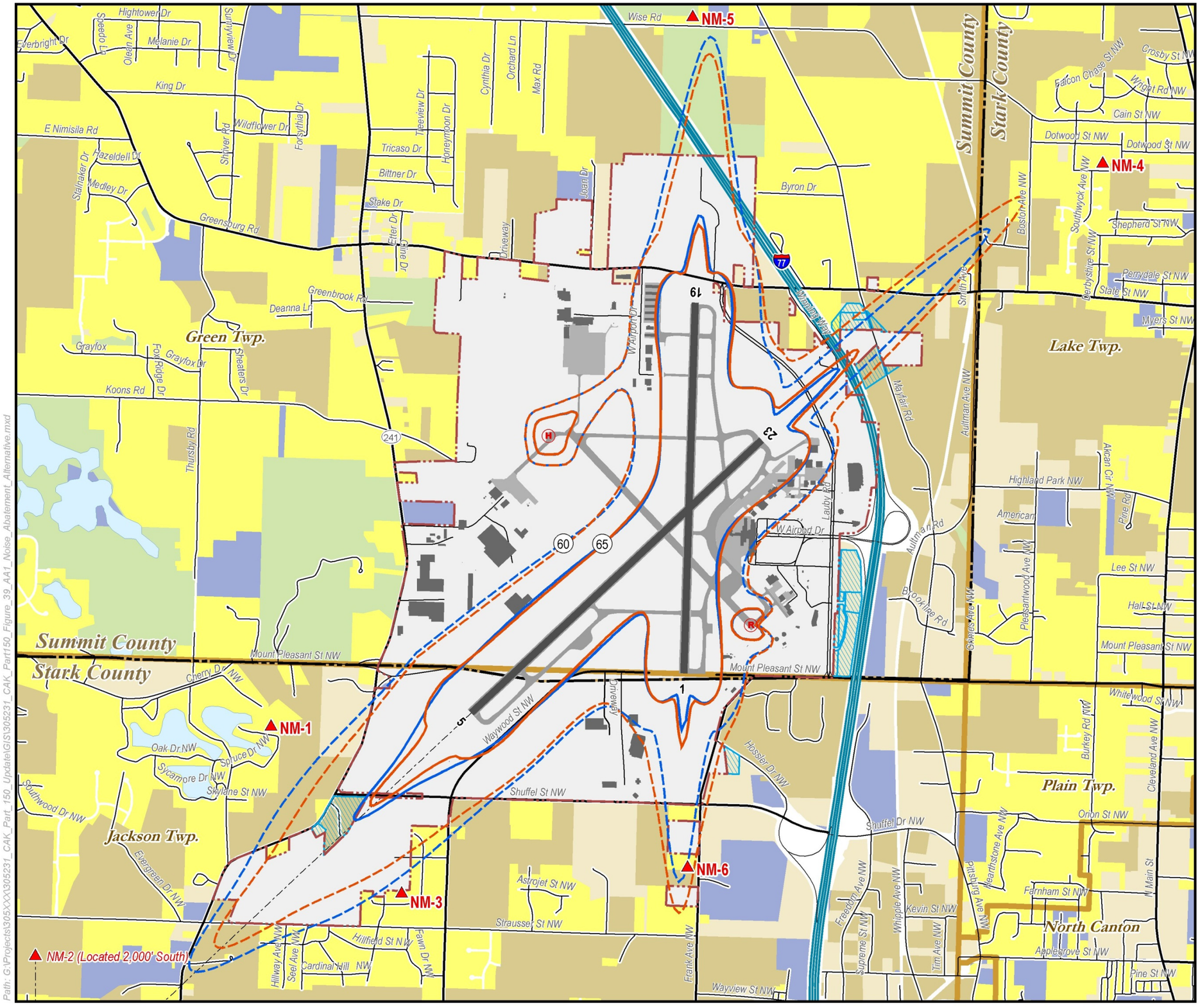

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Figure 39
Alternative 1: 2014 DNL with Night Departure Runway Use Changed to Match Night Arrival Use, Compared to 2014 Existing Conditions
14 CFR Part 150 Update

- Noise Abatement DNL Contour (65 dB)
- Noise Abatement DNL Contour (60 dB, for informational purposes only)
- 2014 DNL Contour (65 dB)
- 2014 DNL Contour (60 dB, for informational purposes only)
- Airport Property Boundary
- Avigation Easement
- Airport Runway
- NM-# Portable Noise Monitoring Sites
- (H) OANG Helipad
- (R) Designated Runup Location
- County Boundary
- Township Boundary

Land Use (Actual use, or zoned use where undeveloped.)

- Residential Use
- Public Use
- Commercial Use
- Manufacturing and Production
- Recreational and Open Space
- Interstate Highways
- Primary Roads
- Local Roads
- Water Bodies

Notes:
Part 150 Sec. A150.101, Table 1 presents FAA land use compatibility guidelines as a function of yearly DNL. Under those guidelines, all land uses are considered compatible with noise exposure outside 65 DNL.

Portable Noise Monitoring Site NM-2 (Not Shown) is located southwest 11,327' along runway 5 extended centerline, offset northwest 1,031'

North

0 2,000 4,000 Feet

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7.3.2 *Alternative 1A: South-Flow Nighttime Runway Use Changed to Shift Departures from Runway 23 to Runway 19*

This alternative is a slightly less aggressive variant of Alternative 1, which changes only south-flow nighttime departure runway use, to shift departures from Runway 23 to 19, without increasing departures on either Runway 1 or 5, as indicated in the following table. *It focusses on public interest in minimizing night departures on Runway 23 that overfly the most affected area southwest of the airport.*

Table 19 Alt. 1A: South-Flow Night Runway Use Changed to Shift Departures from Runway 23 to 19
Runway use revised from existing condition runway use highlighted in bold.

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%				19%	19%	19%
Runway 5	15%	32%	19%	4%	2%	3%				8%	18%	10%
Runway 19	26%	21%	25%	11%	**30%**	14%	Not applicable			17%	**25%**	19%
Runway 23	48%	32%	44%	62%	**46%**	59%				56%	**38%**	52%
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%				21%	25%	22%
Runway 5	12%	23%	14%	3%	1%	3%				7%	9%	7%
Runway 19	29%	17%	27%	13%	**24%**	15%	Not applicable			19%	**21%**	20%
Runway 23	42%	36%	41%	60%	**51%**	58%				52%	**45%**	51%
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%				21%	22%	21%
Runway 5	16%	17%	16%	1%	0%	1%				7%	5%	7%
Runway 19	26%	28%	26%	17%	**30%**	18%	Not applicable			20%	**29%**	21%
Runway 23	45%	41%	44%	57%	**45%**	56%				52%	**44%**	52%
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%				16%	6%	14%
Runway 5	14%	2%	8%	4%	3%	4%				7%	3%	6%
Runway 19	28%	22%	25%	19%	**19%**	19%	Not applicable			22%	**21%**	22%
Runway 23	47%	72%	59%	58%	**62%**	59%				55%	**71%**	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%	**50%**	24%	75%	0%	75%	33%	**43%**	34%
Runway 23	29%	25%	28%	52%	**43%**	51%	25%	0%	25%	42%	**37%**	41%
Total	100%	100%	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%

Several operational considerations support the feasibility of this alternative:

- It is based on actual runway use. The night departure use of each aircraft type category is adjusted to match the night arrival use for that same aircraft type. The matching operational conditions strongly support the feasibility of the change.
- Information provided by FAA tower personnel and aircraft operators indicates that the preference for departing on Runway 23 rather than Runway 19 when operating in the south flow is often related to the shorter taxi times, not aircraft operational considerations.
- While night hours (10 p.m. – 7 a.m.) represent approximately 38% of the 24-hour day, only approximately 16% of all departures – 17 to 18 per night on average – occur during that interval. Moreover, only night departures on Runway 23 would be affected.
- There are approximately two departures per hour at night on the average, compared to approximately seven per hour during daytime hours.
- The lower overall activity levels at night and the lower hourly rate of operations minimize potential effects on aircraft operators associated with slightly longer taxi distances and times associated with using Runway 19 rather than Runway 23 for departure.
- The lower overall activity levels and the lower hourly rate of operations at night mitigate potential effects on air traffic control workload.

The following table compares the residential land uses within the 65-65 dB DNL contour – by runway end – for this case to that for the 2014 existing conditions and also to Alternative 1, because of its close relationship.

Table 20 Residential Land Uses within 2014 60-65 dB DNL Contours by Runway End for Alternative 1A
Source: HMMH, 2014

Case	Metric	North – off Rwy 19 approach / Rwy 1 departure end	Northeast – off Rwy 23 appr. / Rwy 5 depart. end	South – off Rwy 1 approach / Rwy 19 departure end	Southwest – off Rwy 5 appr. / Rwy 23 depart. end	TOTAL
Alternative 1A	Residents	0	2	5	25	32
	Dwelling Units	0	1	2	12	15
Alternative 1	Residents	0	10	5	17	32
	Dwelling Units	0	4	3	9	16
2014 Existing Conditions	Residents	0	2	4	56	62
	Dwelling Units	0	1	2	24	27

This alternative affects far fewer operations than Alternative 1, but results in the same number of residents within the 60 dB DNL contour, although in different quadrants. It does not reduce exposure to the southwest as significantly, but avoids increasing exposure to the northeast and minimizes the increase to the south.

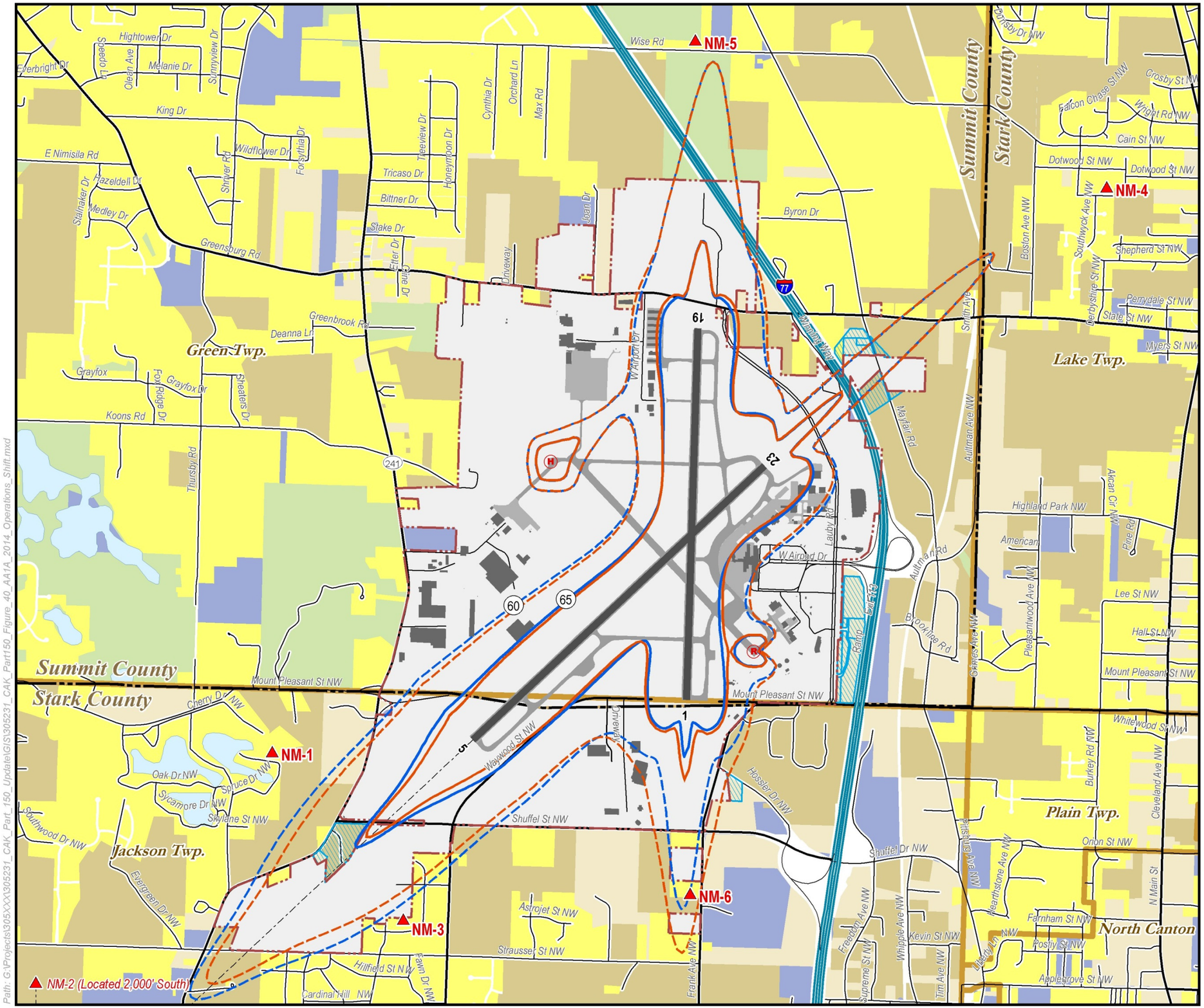

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Figure 40 - Alternative 1A: 2014 DNL with South-Flow Night Runway Use Changed to Shift Departures from Runway 23 to 19, Compared to 2014 Existing Conditions

14 CFR Part 150 Update

- 2014 Noise Abatement DNL Contour (65 dB)
- 2014 Noise Abatement DNL Contour (60 dB, for informational purposes only)
- 2014 DNL Contour (65-75 dB)
- 2014 DNL Contour (60 dB, for informational purposes only)
- Airport Property Boundary
- Avigation Easement
- Airport Runway
- NM-# Portable Noise Monitoring Sites
- OANG Helipad
- Designated Runup Location
- County Boundary
- Township Boundary

Land Use (Actual use, or zoned use where undeveloped.)

- Residential Use
- Public Use
- Commercial Use
- Manufacturing and Production
- Recreational and Open Space
- Interstate Highways
- Primary Roads
- Local Roads
- Water Bodies

Notes:
Part 150 Sec. A150.101, Table 1 presents FAA land use compatibility guidelines as a function of yearly DNL. Under those guidelines, all land uses are considered compatible with noise exposure outside 65 DNL.

Portable Noise Monitoring Site NM-2 (Not Shown) is located southwest 11,327' along runway 5 extended centerline, offset northwest 1,031'

North

0 2,000 4,000 Feet

HARRIS MILLER MILLER & HANSON INC.

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7.3.3 *Alternative 2: Night Arrival Runway Use Changed to Match Night Departure Use*

This alternative reverses the approach taken in Alternative 1 to reduce night operations over the most affected area to the southwest, by adjusting night arrival use to equal night departure use. Since under existing conditions, night use of Runway 5 for departures is the lowest of any runway end, *this case minimizes night arrivals over the most affected area southwest of the airport*, rather than departures, as in Alternative 1.

Table 21 Alternative 2: Night Arrival Runway Use Changed to Match Night Departure Use
Runway use revised from existing condition runway use highlighted in bold.

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%	**23%**	14%	24%	23%	24%				19%	**23%**	19%
Runway 5	15%	**2%**	12%	4%	2%	3%				8%	**2%**	7%
Runway 19	26%	**9%**	22%	11%	9%	11%	Not applicable			17%	**9%**	15%
Runway 23	48%	**67%**	52%	62%	67%	62%				56%	**67%**	58%
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%	**25%**	18%	25%	25%	25%				21%	**25%**	22%
Runway 5	12%	**1%**	11%	3%	1%	3%				7%	**1%**	6%
Runway 19	29%	**11%**	26%	13%	11%	12%	Not applicable			19%	**11%**	18%
Runway 23	42%	**63%**	45%	60%	63%	60%				52%	**63%**	54%
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%	**25%**	14%	25%	25%	25%				21%	**25%**	21%
Runway 5	16%	**0%**	15%	1%	0%	1%				7%	**0%**	6%
Runway 19	26%	**11%**	25%	17%	11%	16%	Not applicable			20%	**11%**	20%
Runway 23	45%	**63%**	45%	57%	63%	58%				52%	**63%**	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%	**16%**	14%	19%	16%	19%				16%	**16%**	16%
Runway 5	14%	**3%**	9%	4%	3%	4%				7%	**3%**	6%
Runway 19	28%	**13%**	21%	19%	13%	19%	Not applicable			22%	**13%**	20%
Runway 23	47%	**68%**	57%	58%	68%	59%				55%	**68%**	58%
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%	**4%**	7%	23%	4%	20%	0%	0%	0%	16%	**4%**	14%
Runway 5	15%	**4%**	14%	5%	4%	5%	0%	0%	0%	10%	**4%**	9%
Runway 19	49%	**21%**	46%	20%	21%	20%	75%	0%	75%	33%	**21%**	32%
Runway 23	29%	**71%**	33%	52%	71%	55%	25%	0%	25%	42%	**71%**	45%
Total	100%	100%	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%

Several operational considerations support the feasibility of this alternative:

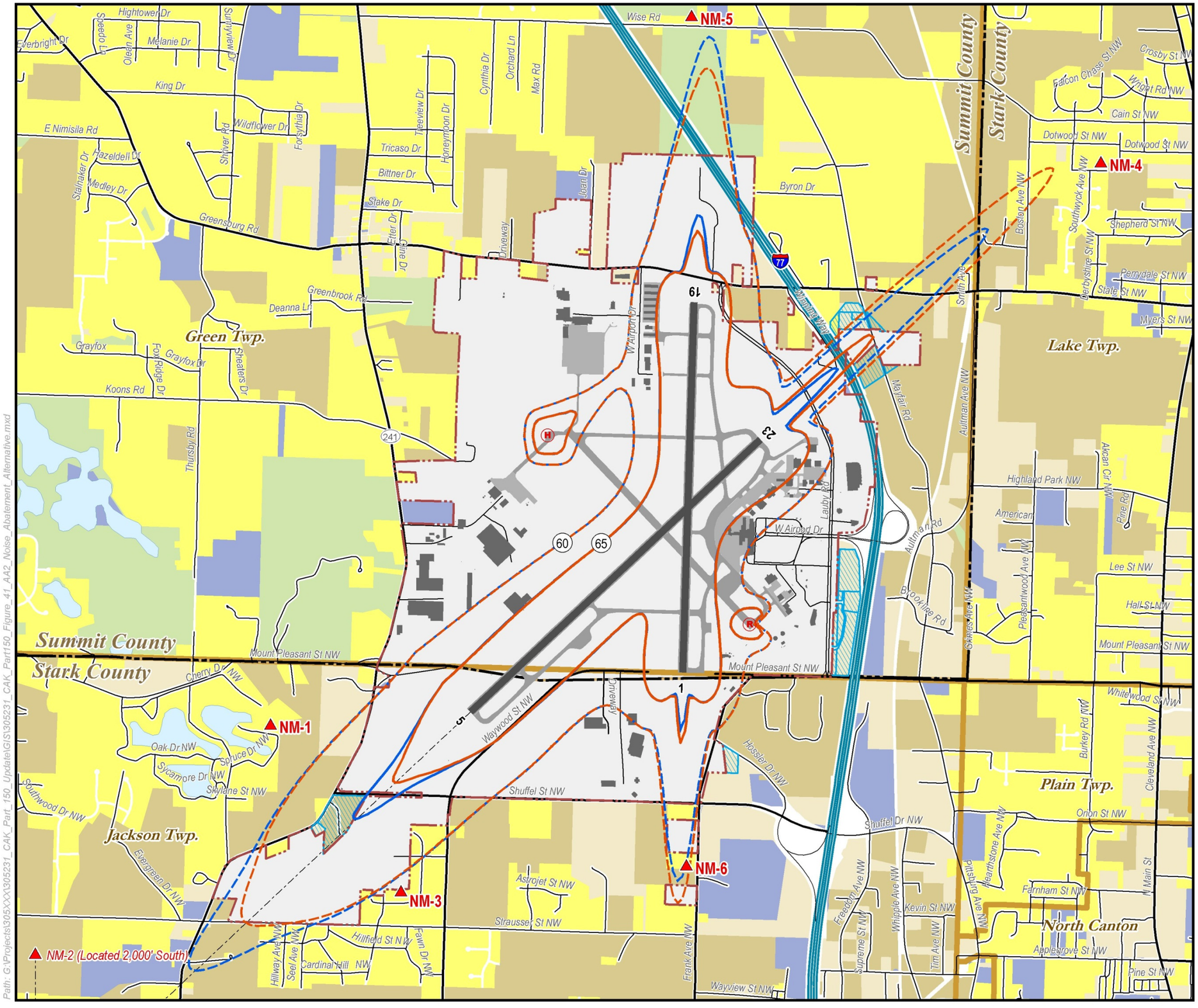
- It is based on actual runway use. The night arrival use of each aircraft type category is adjusted to match the night departure use for that same aircraft type. The matching operational conditions strongly support the feasibility of the change.
- Information provided by FAA tower personnel and aircraft operators indicates that the preference for departing on Runway 1 and arriving on Runway 5 when operating in the north flow is often related to the shorter taxi times, not aircraft operational considerations.
- The lower overall activity levels at night and the lower hourly rate of operations minimize potential effects on aircraft operators associated with slightly longer taxi distances and associated with slightly longer arrival taxi distances and times associated with arriving on Runway 1 and 23, rather than 5 and 19.
- The lower overall activity levels and the lower hourly rate of operations at night also mitigate potential effects on air traffic control workload.

The following table compares the residential land uses within the 65-65 dB DNL contour – by runway end – for this case to that for the 2014 existing conditions case.

Table 22 Residential Land Uses within 2014 60-65 dB DNL Contours by Runway End for Alternative 2
Source: HMMH, 2014

Case	Metric	North – off Rwy 19 approach / Rwy 1 departure end	Northeast – off Rwy 23 appr. / Rwy 5 depart. end	South – off Rwy 1 approach / Rwy 19 departure end	Southwest – off Rwy 5 appr. / Rwy 23 depart. end	TOTAL
Alternative 2	Residents	0	38	5	37	80
	Dwelling Units	0	14	3	15	32
2014 Existing Conditions	Residents	0	2	4	56	62
	Dwelling Units	0	1	2	24	27

This alternative *increases* population within the 60 dB DNL contour by approximately 35%, by increasing arrival use on Runway 23 and extending the associated contour off the northeast end of Runway 5-23 into a relatively densely developed subdivision under the Runway 23 final approach. It reduces the population to the southwest of the airport affected by Runway 5 arrivals, but not enough to offset this increase. The Alternative 1 focus on minimizing night departures over that area is clearly more effective.



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AKRON-CANTON AIRPORT

Figure 41
Alternative 2: 2014 DNL with Night Arrival Runway Use Changed to Match Night Departure Use, Compared to 2014 Existing Conditions
14 CFR Part 150 Update

- Noise Abatement DNL Contour (65 dB)
- Noise Abatement DNL Contour (60 dB, for informational purposes only)
- 2014 DNL Contour (65 dB)
- 2014 DNL Contour (60 dB, for informational purposes only)
- Airport Property Boundary
- Avigation Easement
- Airport Runway
- NM-# Portable Noise Monitoring Sites
- (H) OANG Helipad
- (R) Designated Runup Location
- County Boundary
- Township Boundary

Land Use (Actual use, or zoned use where undeveloped.)

- Residential Use
- Public Use
- Commercial Use
- Manufacturing and Production
- Recreational and Open Space
- Interstate Highways
- Primary Roads
- Local Roads
- Water Bodies

Notes:
Part 150 Sec. A150.101, Table 1 presents FAA land use compatibility guidelines as a function of yearly DNL. Under those guidelines, all land uses are considered compatible with noise exposure outside 65 DNL.

Portable Noise Monitoring Site NM-2 (Not Shown) is located southwest 11,327' along runway 5 extended centerline, offset northwest 1,031'

North

0 2,000 4,000 Feet

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7.3.4 *Alternative 3: Day Departure Runway Use Changed to Match Day Arrival Use*

This alternative addresses overflights of the most affected area southwest of the airport by *reducing daytime departures on Runway 23*. Under existing conditions, day departure use of Runway 23 is substantially higher than other runways, whereas arrival use is more even. This alternative tests the effect of adjusting day departure use to equal arrival use as shown below, reducing day departures to the southwest.

Table 23 Alternative 3: Day Departure Runway Use Changed to Match Day Arrival Use
Runway use revised from existing condition runway use highlighted in bold.

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%	**11%**	23%	13%	Not applicable			**11%**	19%	13%
Runway 5	15%	32%	19%	**15%**	2%	13%				**15%**	18%	16%
Runway 19	26%	21%	25%	**26%**	9%	23%				**26%**	15%	24%
Runway 23	48%	32%	44%	**48%**	67%	51%				**48%**	48%	48%
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%	**16%**	25%	18%	Not applicable			**16%**	25%	18%
Runway 5	12%	23%	14%	**12%**	1%	10%				**12%**	9%	12%
Runway 19	29%	17%	27%	**29%**	11%	26%				**29%**	13%	26%
Runway 23	42%	36%	41%	**42%**	63%	46%				**42%**	54%	44%
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%	**14%**	25%	15%	Not applicable			**14%**	22%	14%
Runway 5	16%	17%	16%	**16%**	0%	14%				**16%**	5%	15%
Runway 19	26%	28%	26%	**26%**	11%	25%				**26%**	16%	25%
Runway 23	45%	41%	44%	**45%**	63%	46%				**45%**	57%	45%
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%	**11%**	16%	11%	Not applicable			**11%**	6%	10%
Runway 5	14%	2%	8%	**14%**	3%	13%				**14%**	3%	11%
Runway 19	28%	22%	25%	**28%**	13%	27%				**28%**	20%	26%
Runway 23	47%	72%	59%	**47%**	68%	48%				**47%**	72%	53%
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%	**7%**	4%	6%	0%	0%	0%	**7%**	5%	7%
Runway 5	15%	38%	18%	**15%**	4%	14%	0%	0%	0%	**15%**	14%	15%
Runway 19	49%	29%	47%	**49%**	21%	45%	75%	0%	75%	**49%**	24%	46%
Runway 23	29%	25%	28%	**29%**	71%	35%	25%	0%	25%	**29%**	57%	32%
Total	100%	100%	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%

Several operational considerations support the feasibility of this alternative:

- It is based on actual runway use. The day departure use of each aircraft type category is adjusted to match the day arrival use for that same aircraft type. The matching operational conditions strongly support the feasibility of the change.
- Information provided by FAA tower personnel and aircraft operators indicates that the preference for departing on Runway 23 and arriving on Runway 19 when operating in the south flow is often related to the shorter taxi times, not aircraft operational considerations.

On the other hand, it is worth noting that this alternative has operational *drawbacks* compared to Alternatives 1 and 2, which only affect night operations:

- Overall activity levels and the average rate of operations per hour are significantly higher during the day than during the night, so effects on air traffic control workload could be increased.
- Higher day activity levels will increase potential effects on aircraft operators associated with slightly longer taxi distances and times.

The following table compares the residential land uses within the 65-65 dB DNL contour – by runway end – for this case to that for the 2014 existing conditions case.

Table 24 Residential Land Uses within 2014 60-65 dB DNL Contours by Runway End for Alternative 3
Source: HMMH, 2014

Case	Metric	North – off Rwy 19 approach / Rwy 1 departure end	Northeast – off Rwy 23 appr. / Rwy 5 depart. end	South – off Rwy 1 approach / Rwy 19 departure end	Southwest – off Rwy 5 appr. / Rwy 23 depart. end	TOTAL
Alternative 3	Residents	0	2	5	34	41
	Dwelling Units	0	1	3	15	19
2014 Existing Conditions	Residents	0	2	4	56	62
	Dwelling Units	0	1	2	24	27

This alternative cuts the population within the 60 dB DNL contour by approximately 30%. However, this benefit requires affecting approximately 84% of all departures. Alternative 1 achieved a far greater 50% reduction in the encompassed population, while potentially affecting only approximately 16% of total daily departures (approximately 18 at night versus 96 during the day).

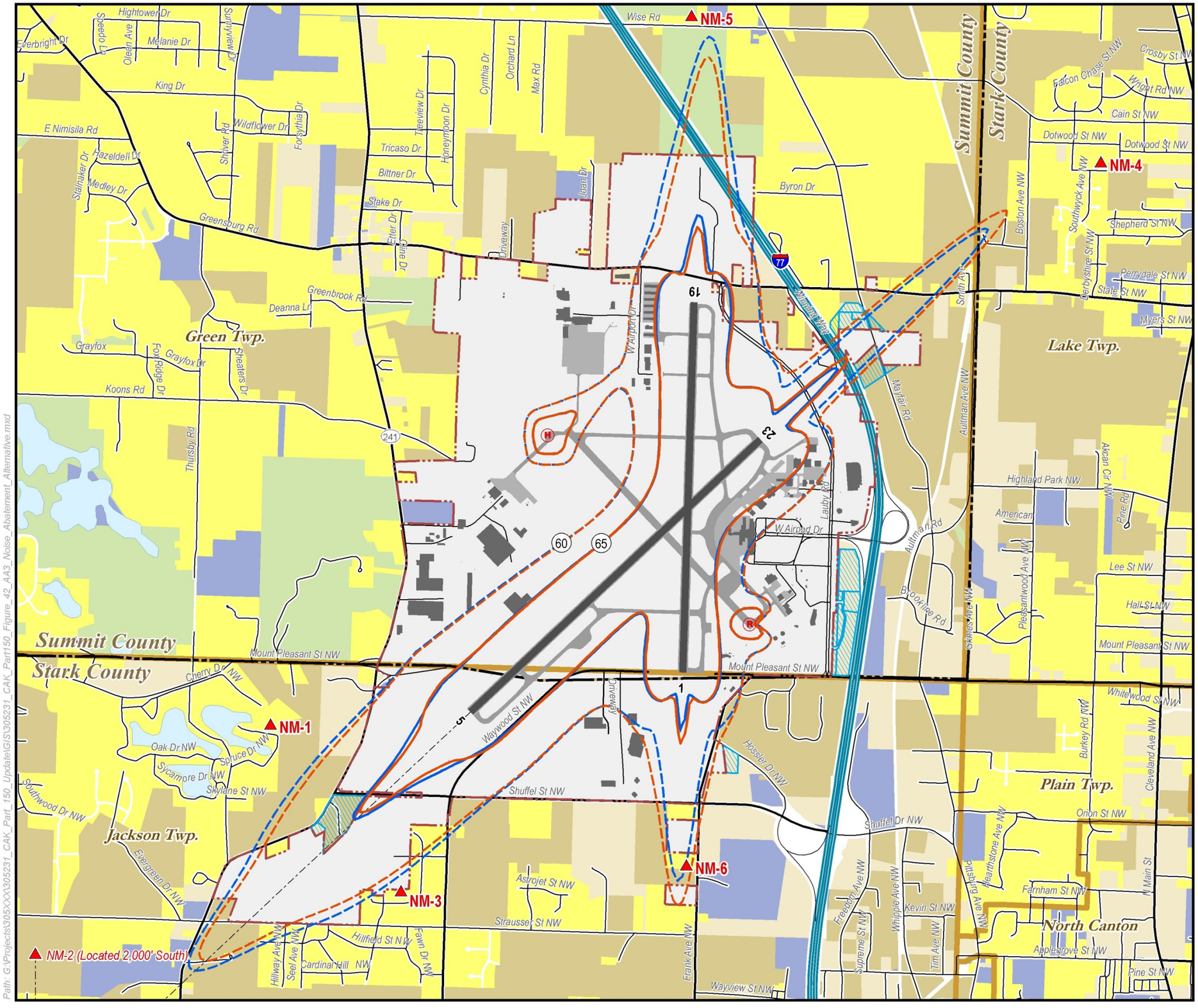

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Figure 42
Alternative 3: 2014 DNL with Day Departure Runway Use Changed to Match Day Arrival Use, Compared to 2014 Existing Conditions
14 CFR Part 150 Update

- Noise Abatement DNL Contour (65 dB)
- Noise Abatement DNL Contour (60 dB, for informational purposes only)
- 2014 DNL Contour (65 dB)
- 2014 DNL Contour (60 dB, for informational purposes only)
- Airport Property Boundary
- Avigation Easement
- Airport Runway
- NM-# Portable Noise Monitoring Sites
- OANG Helipad
- Designated Runup Location
- County Boundary
- Township Boundary

Land Use (Actual use, or zoned use where undeveloped.)

- Residential Use
- Public Use
- Commercial Use
- Manufacturing and Production
- Recreational and Open Space
- Interstate Highways
- Primary Roads
- Local Roads
- Water Bodies

Notes:
Part 150 Sec. A150.101, Table 1 presents FAA land use compatibility guidelines as a function of yearly DNL. Under those guidelines, all land uses are considered compatible with noise exposure outside 65 DNL.

Portable Noise Monitoring Site NM-2 (Not Shown) is located southwest 11,327' along runway 5 extended centerline, offset northwest 1,031'

North

0 2,000 4,000 Feet

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7.3.5 *Alternative 4: Day Arrival Runway Use Changed to Match Day Departure Use*

This alternative addresses interest in reducing overflights of the most affected area southwest of the airport by reducing *daytime arrivals on Runway 5*. Under existing conditions, day departure use of Runway 5 is the lowest of all runways and less than one-third as high as day arrival use. This alternative tests the effect of adjusting day arrival use to equal day departure use to take advantage of that situation, as shown below.

Table 25 Alternative 4: Day Arrival Runway Use Changed to Match Day Departure Use
Runway use revised from existing condition runway use highlighted in bold.

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	**24%**	15%	22%	24%	23%	24%	Not applicable			**24%**	19%	23%
Runway 5	**4%**	32%	11%	4%	2%	3%				**4%**	18%	6%
Runway 19	**11%**	21%	13%	11%	9%	11%				**11%**	15%	12%
Runway 23	**62%**	32%	54%	62%	67%	62%				**62%**	48%	59%
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	**25%**	24%	25%	25%	25%	25%	Not applicable			**25%**	25%	25%
Runway 5	**3%**	23%	6%	3%	1%	3%				**3%**	9%	4%
Runway 19	**13%**	17%	13%	13%	11%	12%				**13%**	13%	13%
Runway 23	**60%**	36%	56%	60%	63%	60%				**60%**	54%	59%
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	**25%**	14%	24%	25%	25%	25%	Not applicable			**25%**	22%	25%
Runway 5	**1%**	17%	2%	1%	0%	1%				**1%**	5%	2%
Runway 19	**17%**	28%	17%	17%	11%	16%				**17%**	16%	17%
Runway 23	**57%**	41%	56%	57%	63%	58%				**57%**	57%	57%
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	**19%**	4%	11%	19%	16%	19%	Not applicable			**19%**	6%	15%
Runway 5	**4%**	2%	3%	4%	3%	4%				**4%**	3%	3%
Runway 19	**19%**	22%	20%	19%	13%	19%				**19%**	20%	19%
Runway 23	**58%**	72%	65%	58%	68%	59%				**58%**	72%	62%
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	**23%**	8%	21%	23%	4%	20%	0%	0%	0%	**23%**	5%	20%
Runway 5	**5%**	38%	8%	5%	4%	5%	0%	0%	0%	**5%**	14%	6%
Runway 19	**20%**	29%	21%	20%	21%	20%	75%	0%	75%	**20%**	24%	21%
Runway 23	**52%**	25%	50%	52%	71%	55%	25%	0%	25%	**52%**	57%	53%
Total	100%	100%	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%

Several operational considerations support the feasibility of this alternative:

- It is based on actual runway use. The day arrival use of each aircraft type category is adjusted to match the day departure use for that same aircraft type. The matching operational conditions strongly support the feasibility of the change.
- Information provided by FAA tower personnel and aircraft operators indicates that the preference for departing on Runway 1 and arriving on Runway 5 when operating in the north flow is often related to the shorter taxi times, not aircraft operational considerations.

On the other hand, it is worth noting that – like Alternative 3 – this alternative has operational drawbacks compared to Alternatives 1 and 2, which only affect night operations:

- Overall activity levels and the average rate of operations per hour are significantly higher during the day than during the night, so effects on air traffic control workload could be increased.
- Higher day activity levels will increase potential effects on aircraft operators associated with slightly longer taxi distances and times.

The following table compares the residential land uses within the 65-65 dB DNL contour – by runway end – for this case to that for the 2014 existing conditions case.

Table 26 Residential Land Uses within 2014 60-65 dB DNL Contours by Runway End for Alternative 4
Source: HMMH, 2014

Case	Metric	North – off Rwy 19 approach / Rwy 1 departure end	Northeast – off Rwy 23 appr. / Rwy 5 depart. end	South – off Rwy 1 approach / Rwy 19 departure end	Southwest – off Rwy 5 appr. / Rwy 23 depart. end	TOTAL
Alternative 6	Residents	0	2	4	51	57
	Dwelling Units	0	1	3	23	27
2014 Existing Conditions	Residents	0	2	4	56	62
	Dwelling Units	0	1	2	24	27

This alternative reduces population within the 60 dB DNL contour by less than 10%. Achieving that very modest improvement requires affecting approximately 84% of all arrivals. Once again, the 50% reduction in population achieved by Alternative 1 significantly exceeds the benefit of this alternative, while potentially affecting only approximately 16% of total daily departures.

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Figure 43
Alternative 4: 2014 DNL with Day Arrival Runway Use Changed to Match Day Departure Use, Compared to 2014 Existing Conditions
14 CFR Part 150 Update

- Noise Abatement DNL Contour (65 dB)
- Noise Abatement DNL Contour (60 dB, for informational purposes only)
- 2014 DNL Contour (65 dB)
- 2014 DNL Contour (60 dB, for informational purposes only)
- Airport Property Boundary
- Avigation Easement
- Airport Runway
- NM-# Portable Noise Monitoring Sites
- OANG Helipad
- Designated Runup Location
- County Boundary
- Township Boundary

Land Use (Actual use, or zoned use where undeveloped.)

- Residential Use
- Public Use
- Commercial Use
- Manufacturing and Production
- Recreational and Open Space
- Interstate Highways
- Primary Roads
- Local Roads
- Water Bodies

Notes:
Part 150 Sec. A150.101, Table 1 presents FAA land use compatibility guidelines as a function of yearly DNL. Under those guidelines, all land uses are considered compatible with noise exposure outside 65 DNL.

Portable Noise Monitoring Site NM-2 (Not Shown) is located southwest 11,327' along runway 5 extended centerline, offset northwest 1,031'

North

0 2,000 4,000 Feet

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7.3.6 *Alternative 5: All Departure Runway Use Changed to Match All Arrival Use*

This alternative *reduces Runway 23 departures over the area southwest of the airport on a 24-hour basis*, by combining the runway use changes assessed in Alternatives 1 and 3; i.e., changing night departure use to match night arrival use and changing day departure use to match day arrival use, as shown in the following table.

Table 27 Alternative 5: All Departure Runway Use Changed to Match All Arrival Use
Runway use revised from existing condition runway use highlighted in bold.

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%	**11%**	**15%**	**12%**				**11%**	**15%**	**12%**
Runway 5	15%	32%	19%	**15%**	**32%**	**18%**				**15%**	**32%**	**19%**
Runway 19	26%	21%	25%	**26%**	**21%**	**25%**	Not applicable			**26%**	**21%**	**25%**
Runway 23	48%	32%	44%	**48%**	**32%**	**45%**				**48%**	**32%**	**45%**
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%	**16%**	**24%**	**18%**				**16%**	**24%**	**18%**
Runway 5	12%	23%	14%	**12%**	**23%**	**14%**				**12%**	**23%**	**14%**
Runway 19	29%	17%	27%	**29%**	**17%**	**27%**	Not applicable			**29%**	**17%**	**27%**
Runway 23	42%	36%	41%	**42%**	**36%**	**41%**				**42%**	**36%**	**41%**
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%	**14%**	**14%**	**14%**				**14%**	**14%**	**14%**
Runway 5	16%	17%	16%	**16%**	**17%**	**16%**				**16%**	**17%**	**16%**
Runway 19	26%	28%	26%	**26%**	**28%**	**26%**	Not applicable			**26%**	**28%**	**26%**
Runway 23	45%	41%	44%	**45%**	**41%**	**44%**				**45%**	**41%**	**44%**
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	Day	Night
Runway 1	11%	4%	8%	**11%**	**4%**	**11%**				**11%**	**4%**	**9%**
Runway 5	14%	2%	8%	**14%**	**2%**	**13%**				**14%**	**2%**	**11%**
Runway 19	28%	22%	25%	**28%**	**22%**	**28%**	Not applicable			**28%**	**22%**	**26%**
Runway 23	47%	72%	59%	**47%**	**72%**	**49%**				**47%**	**72%**	**53%**
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%	**7%**	**8%**	**7%**	0%	0%	0%	**7%**	**8%**	**7%**
Runway 5	15%	38%	18%	**15%**	**38%**	**19%**	0%	0%	0%	**15%**	**38%**	**18%**
Runway 19	49%	29%	47%	**49%**	**29%**	**46%**	75%	0%	75%	**49%**	**29%**	**47%**
Runway 23	29%	25%	28%	**29%**	**25%**	**28%**	25%	0%	25%	**29%**	**25%**	**28%**
Total	100%	100%	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%

Several operational considerations support the feasibility of this alternative:

- It is based on actual runway use. The day and night departure use of each aircraft type category is adjusted to match the day and night arrival use for that same aircraft type. The matching operational conditions strongly support the feasibility of the change.
- Information provided by FAA tower personnel and aircraft operators indicates that the preferences for departing on Runway 23 and arriving on Runway 19 when operating in the south flow, and for departing on Runway 1 and arriving on Runway 5 when operating in the north flow are often related to the shorter taxi times, not aircraft operational considerations.

On the other hand, this alternative shares the daytime operational drawbacks of Alternative 3 and 4, compared to Alternatives 1 and 2, which only affect night operations:

- Overall activity levels and the average rate of operations per hour are significantly higher during the day than during the night, so effects on air traffic control workload could be increased.
- Higher day activity levels will increase potential effects on aircraft operators associated with slightly longer taxi distances and times.

The following table compares the residential land uses within the 65-65 dB DNL contour – by runway end – for this case to that for the 2014 existing conditions case.

Table 28 Residential Land Uses within 2014 60-65 dB DNL Contours by Runway End for Alternative 5
Source: HMMH, 2014

Case	Metric	North – off Rwy 19 approach / Rwy 1 departure end	Northeast – off Rwy 23 appr. / Rwy 5 depart. end	South – off Rwy 1 approach / Rwy 19 departure end	Southwest – off Rwy 5 appr. / Rwy 23 depart. end	TOTAL
Alternative 6	Residents	0	29	7	9	45
	Dwelling Units	0	14	4	4	22
2014 Existing Conditions	Residents	0	2	4	56	62
	Dwelling Units	0	1	2	24	27

This alternative reduces the population within the 60 dB DNL contour by approximately 25%. This benefit is only half as much as Alternative 1, despite the fact that Alternative 1 affected only 16% of all operations, whereas this alternative might affect as many as 50% of all operations. The reduced benefit is associated with increased departure use on Runway 5, which extends the associated contour off the northeast end of Runway 5-23 into a relatively densely developed subdivision. This result is a clear illustration of the higher benefit-cost ratio achieved when a noise abatement measure is directed at nighttime operations alone.

To address this issue, the following section presents a variant of the alternative ("Alternative 5A") that only adjusts departure runway use in the south flow; i.e., shifting departures from 23 to 19. This variant is similar to the Alternative 1A, which was a less-aggressive version of Alternative 1.

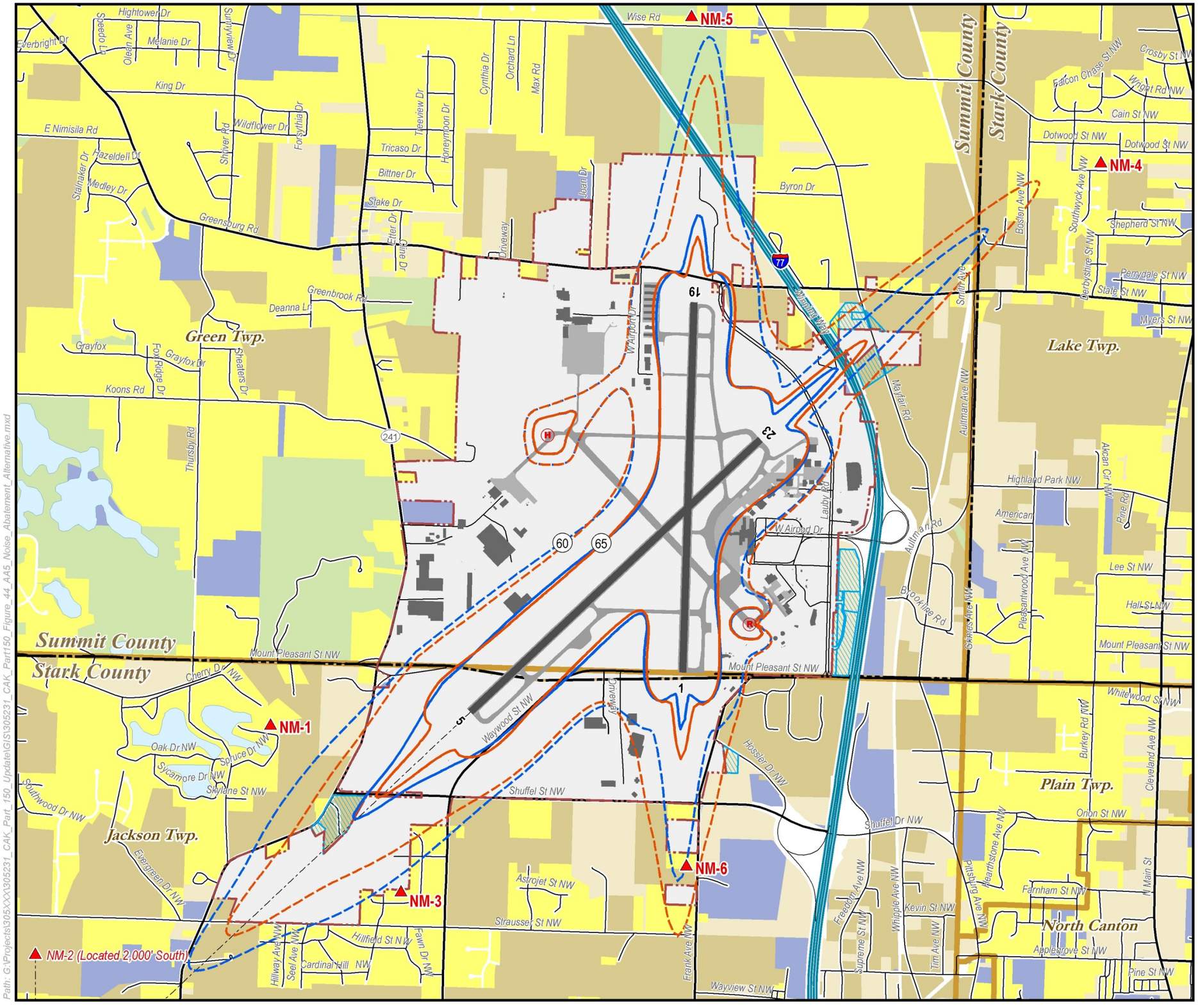

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Figure 44
Alternative 5: 2014 DNL with All Departure Runway Use Changed to Match All Arrival Use, Compared to 2014 Existing Conditions
14 CFR Part 150 Update

- Noise Abatement DNL Contour (65 dB)
- Noise Abatement DNL Contour (60 dB, for informational purposes only)
- 2014 DNL Contour (65 dB)
- 2014 DNL Contour (60 dB, for informational purposes only)
- Airport Property Boundary
- Avigation Easement
- Airport Runway
- NM-# Portable Noise Monitoring Sites
- (H) OANG Helipad
- (R) Designated Runup Location
- County Boundary
- Township Boundary

Land Use (Actual use, or zoned use where undeveloped.)

- Residential Use
- Public Use
- Commercial Use
- Manufacturing and Production
- Recreational and Open Space
- Interstate Highways
- Primary Roads
- Local Roads
- Water Bodies

Notes:
Part 150 Sec. A150.101, Table 1 presents FAA land use compatibility guidelines as a function of yearly DNL. Under those guidelines, all land uses are considered compatible with noise exposure outside 65 DNL.

Portable Noise Monitoring Site NM-2 (Not Shown) is located southwest 11,327' along runway 5 extended centerline, offset northwest 1,031'

North

0 2,000 4,000 Feet

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7.3.7 *Alternative 5A: All South-Flow Runway Use Changed to Shift Departures from Runway 23 to Runway 19 on a 24-Hour Basis*

This alternative is a slightly less aggressive variant of Alternative 5. It adjusts only south-flow departure runway use, to reduce departures on Runway 23, which overfly the most affected area southwest of the airport. It shifts departures from Runway 23 to 19 on a 24-hour basis, without increasing departures on either Runway 1 or 5, as indicated in the following table. It essentially is a 24-hour version of Alternative 1A.

Table 29 Alternative 5A: All South-Flow Departure Runway Use Changed to Shift Departures from Runways 23 to 19

Runway use revised from existing condition runway use highlighted in bold.

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%				19%	19%	19%
Runway 5	15%	32%	19%	4%	2%	3%				8%	18%	10%
Runway 19	26%	21%	25%	**25%**	**30%**	**26%**	Not applicable			**26%**	**25%**	**25%**
Runway 23	48%	32%	44%	**47%**	**46%**	**47%**				**47%**	**38%**	**45%**
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%				21%	25%	22%
Runway 5	12%	23%	14%	3%	1%	3%				7%	9%	7%
Runway 19	29%	17%	27%	**29%**	**24%**	**28%**	Not applicable			**29%**	**21%**	**28%**
Runway 23	42%	36%	41%	**43%**	**51%**	**44%**				**43%**	**45%**	**43%**
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%				21%	22%	21%
Runway 5	16%	17%	16%	1%	0%	1%				7%	5%	7%
Runway 19	26%	28%	26%	**27%**	**30%**	**27%**	Not applicable			**27%**	**29%**	**27%**
Runway 23	45%	41%	44%	**46%**	**45%**	**46%**				**46%**	**44%**	**46%**
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%				16%	6%	14%
Runway 5	14%	2%	8%	4%	3%	4%				7%	3%	6%
Runway 19	28%	22%	25%	**29%**	**19%**	**28%**	Not applicable			**29%**	**21%**	**27%**
Runway 23	47%	72%	59%	**49%**	**62%**	**50%**				**48%**	**71%**	**54%**
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%	**45%**	**50%**	**46%**	75%	0%	75%	**47%**	**43%**	**47%**
Runway 23	29%	25%	28%	**27%**	**43%**	**29%**	25%	0%	25%	**28%**	**37%**	**29%**
Total	100%	100%	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%

Several operational considerations support the feasibility of this alternative:

- It is based on actual runway use. The day and night departure use of each aircraft type category is adjusted to match the day and night arrival use for that same aircraft type. The matching operational conditions strongly support the feasibility of the change.
- Information provided by FAA tower personnel and aircraft operators indicates that the preferences for departing on Runway 23 and arriving on Runway 19 when operating in the south flow, and for departing on Runway 1 and arriving on Runway 5 when operating in the north flow are often related to the shorter taxi times, not aircraft operational considerations.

This alternative shares the daytime operational drawbacks of Alternative 3, 4, and 5, compared to Alternatives 1 and 2, which only affect night operations:

- Overall activity levels and the average rate of operations per hour are significantly higher during the day than during the night, so effects on air traffic control workload could be increased.
- Higher day activity levels will increase potential effects on aircraft operators associated with slightly longer taxi distances and times.

On the other hand, this alternative affects fewer operations than Alternative 5, because it only applies to south-flow departures.

The following table compares the residential land uses within the 60-65 dB DNL contour – by runway end – for this case to that for the 2014 existing conditions and also to Alternative 5, because of its close relationship.

Table 30 Residential Land Uses within 2014 60-65 dB DNL Contours by Runway End for Alternative 5A
Source: HMMH, 2014

Case	Metric	North – off Rwy 19 approach / Rwy 1 departure end	Northeast – off Rwy 23 appr. / Rwy 5 depart. end	South – off Rwy 1 approach / Rwy 19 departure end	Southwest – off Rwy 5 appr. / Rwy 23 depart. end	TOTAL
Alternative 5A	Residents	0	2	7	8	17
	Dwelling Units	0	1	3	4	8
Alternative 5	Residents	0	29	7	9	45
	Dwelling Units	0	14	4	4	22
2014 Existing Conditions	Residents	0	2	4	56	62
	Dwelling Units	0	1	2	24	27

This alternative reduces the population within the 60 dB DNL contour by approximately 75% over 2014 baseline conditions. Despite affecting fewer operations than Alternative 5, it represents approximately a 60% improvement in benefits. Moreover, it makes this improvement with only a modest increase in exposure in one quadrant – to the south. By only addressing operations in the south flow, it limits the number of operations potentially affected – although the number affected are still relatively high compared to Alternatives 1, 1A, and 2, which only affect night operations.

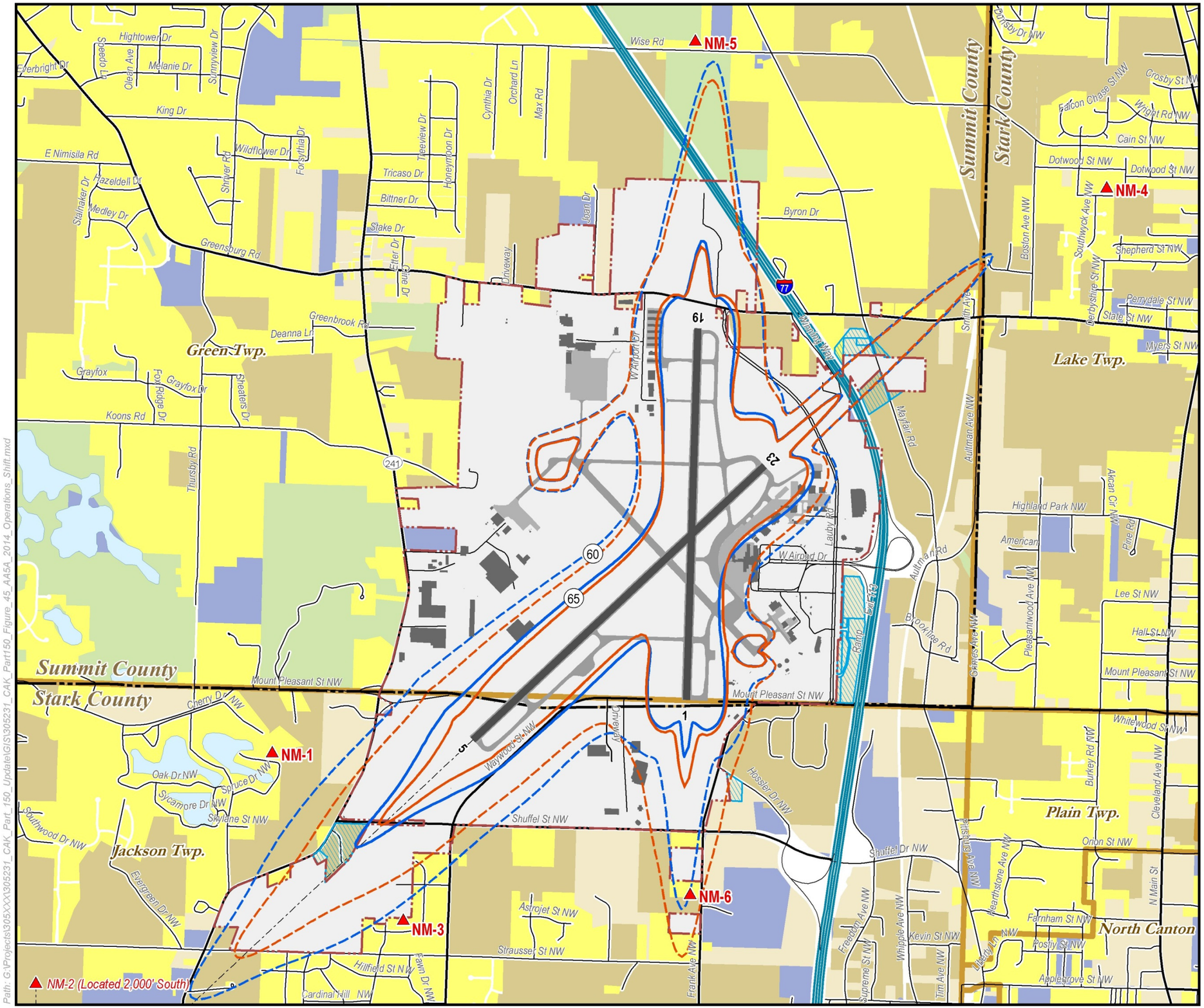

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Figure 45 - Alternative 5A: 2014 DNL with All South-Flow Runway Use Changed to Shift Departures from Runways 23 to 19, Compared to 2014 Existing Conditions

14 CFR Part 150 Update

- 2014 Noise Abatement DNL Contour (65 dB)
- 2014 Noise Abatement DNL Contour (60 dB, for informational purposes only)
- 2014 DNL Contour (65-75 dB)
- 2014 DNL Contour (60 dB, for informational purposes only)
- Airport Property Boundary
- Avigation Easement
- Airport Runway
- NM-# Portable Noise Monitoring Sites
- OANG Helipad
- Designated Runup Location
- County Boundary
- Township Boundary

Land Use (Actual use, or zoned use where undeveloped.)

- Residential Use
- Public Use
- Commercial Use
- Manufacturing and Production
- Recreational and Open Space

- Interstate Highways
- Primary Roads
- Local Roads
- Water Bodies

Notes:
Part 150 Sec. A150.101, Table 1 presents FAA land use compatibility guidelines as a function of yearly DNL. Under those guidelines, all land uses are considered compatible with noise exposure outside 65 DNL.

Portable Noise Monitoring Site NM-2 (Not Shown) is located southwest 11,327' along runway 5 extended centerline, offset northwest 1,031'

North

0 2,000 4,000 Feet

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7.3.8 *Alternative 6: All Arrival Runway Use Changed to Match All Departure Use*

This alternative *maximizes the reduction in Runway 5 arrivals over the area southwest of the airport*, by combining the runway use changes assessed in Alternatives 2 and 4; i.e., changing night arrival use to match night departure use and changing day arrival use to match day departure use, as shown in the following table.

Table 31 Alternative 6: All Arrival Runway Use Changed to Match All Departure Use
Runway use revised from existing condition runway use highlighted in bold.

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	**24%**	**23%**	**24%**	24%	23%	24%	Not applicable			**24%**	**23%**	**24%**
Runway 5	**4%**	**2%**	**3%**	4%	2%	3%				**4%**	**2%**	**3%**
Runway 19	**11%**	**9%**	**10%**	11%	9%	11%				**11%**	**9%**	**10%**
Runway 23	**62%**	**67%**	**63%**	62%	67%	62%				**62%**	**67%**	**63%**
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	**25%**	**25%**	**25%**	25%	25%	25%	Not applicable			**25%**	**25%**	**25%**
Runway 5	**3%**	**1%**	**3%**	3%	1%	3%				**3%**	**1%**	**3%**
Runway 19	**13%**	**11%**	**12%**	13%	11%	12%				**13%**	**11%**	**12%**
Runway 23	**60%**	**63%**	**60%**	60%	63%	60%				**60%**	**63%**	**60%**
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	**25%**	**25%**	**25%**	25%	25%	25%	Not applicable			**25%**	**25%**	**25%**
Runway 5	**1%**	**0%**	**1%**	1%	0%	1%				**1%**	**0%**	**1%**
Runway 19	**17%**	**11%**	**16%**	17%	11%	16%				**17%**	**11%**	**16%**
Runway 23	**57%**	**63%**	**57%**	57%	63%	58%				**57%**	**63%**	**57%**
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	**19%**	**16%**	**17%**	19%	16%	19%	Not applicable			**19%**	**16%**	**18%**
Runway 5	**4%**	**3%**	**3%**	4%	3%	4%				**4%**	**3%**	**3%**
Runway 19	**19%**	**13%**	**16%**	19%	13%	19%				**19%**	**13%**	**18%**
Runway 23	**58%**	**68%**	**63%**	58%	68%	59%				**58%**	**68%**	**61%**
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	**23%**	**4%**	**21%**	23%	4%	20%	0%	0%	0%	**23%**	**4%**	**20%**
Runway 5	**5%**	**4%**	**5%**	5%	4%	5%	0%	0%	0%	**5%**	**4%**	**5%**
Runway 19	**20%**	**21%**	**20%**	20%	21%	20%	75%	0%	75%	**20%**	**21%**	**21%**
Runway 23	**52%**	**71%**	**54%**	52%	71%	55%	25%	0%	25%	**52%**	**71%**	**54%**
Total	100%	100%	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%

Several operational considerations support the feasibility of this alternative:

- It is based on actual runway use. The night departure use of each aircraft type category is adjusted to match the night arrival use for that same aircraft type. The matching operational conditions strongly support the feasibility of the change.
- Information provided by FAA tower personnel and aircraft operators indicates that the preference for departing on Runway 23 and arriving on Runway 19 when operating in the south flow is often related to the shorter taxi times, not aircraft operational considerations.

On the other hand, this alternative shares the daytime operational drawbacks of Alternative 3 and 4, compared to Alternatives 1 and 2, which only affect night operations:

- Overall activity levels and the average rate of operations per hour are significantly higher during the day than during the night, so effects on air traffic control workload could be increased.
- Higher day activity levels will increase potential effects on aircraft operators associated with slightly longer taxi distances and times.

The following table compares the residential land uses within the 65-65 dB DNL contour – by runway end – for this case to that for the 2014 existing conditions case.

Table 32 Residential Land Uses within 2014 60-65 dB DNL Contours by Runway End for Alternative 6
Source: HMMH, 2014

Case	Metric	North – off Rwy 19 approach / Rwy 1 departure end	Northeast – off Rwy 23 appr. / Rwy 5 depart. end	South – off Rwy 1 approach / Rwy 19 departure end	Southwest – off Rwy 5 appr. / Rwy 23 depart. end	TOTAL
Alternative 6	Residents	0	58	5	35	98
	Dwelling Units	0	22	3	15	40
2014 Existing Conditions	Residents	0	2	4	56	62
	Dwelling Units	0	1	2	24	27

Similar to Alternative 2, this alternative *increases* the population within 60 dB DNL, in this case by nearly 60%, by increasing arrival use on Runway 23 and extending the associated contour off the northeast end of Runway 5-23 into a relatively densely developed subdivision under the Runway 23 final approach. It reduces the population to the southwest of the airport affected by Runway 5 arrivals, but not enough to offset this increase. As in the case of Alternative 5, this result illustrates how focusing a noise abatement measure on nighttime operations increases its benefit-cost ratio.

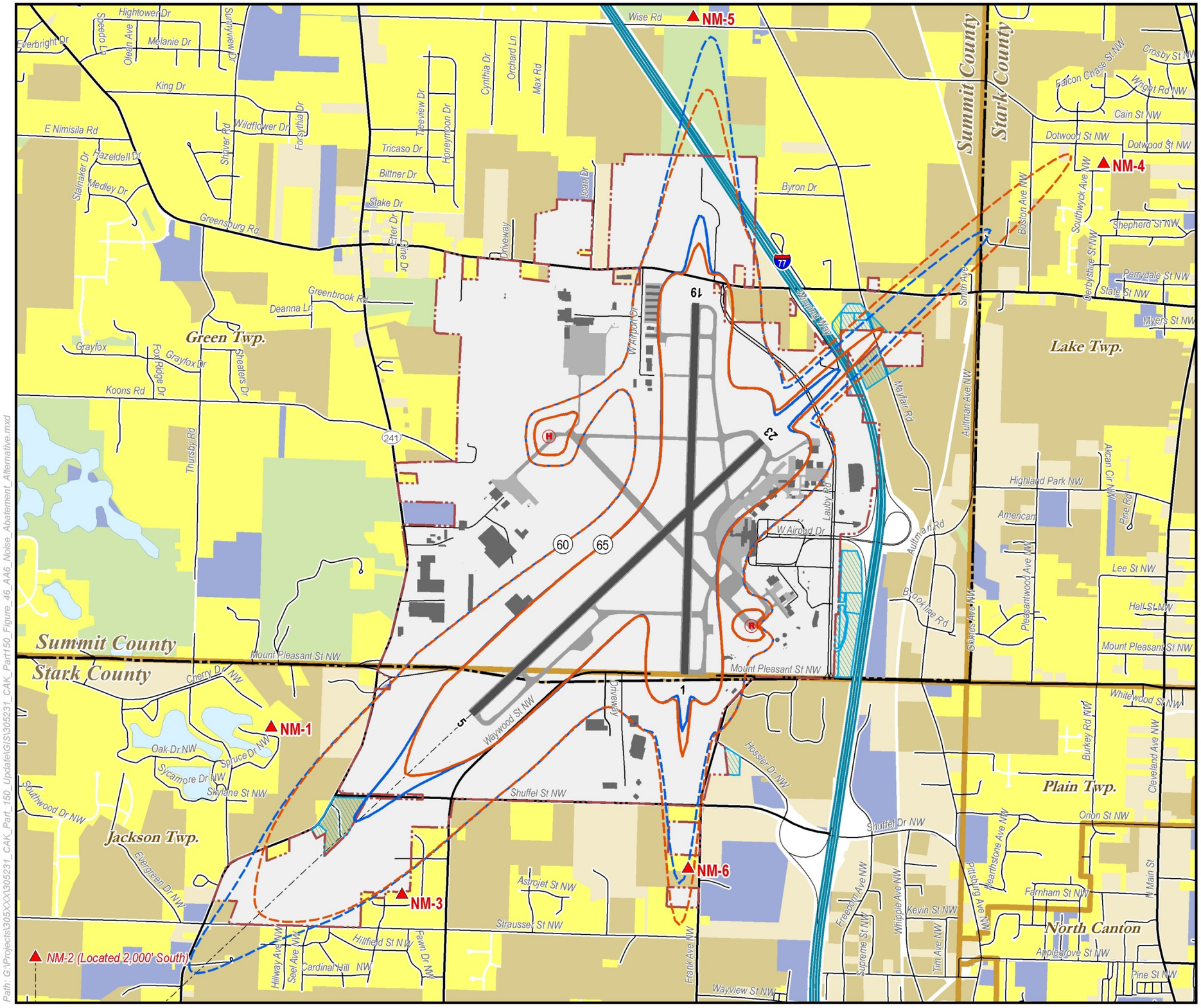

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Figure 46 - Alternative 6: 2014 DNL with All Arrival Runway Use Changed to Match All Departure Use, Compared to 2014 Existing Conditions

14 CFR Part 150 Update

- Noise Abatement DNL Contour (65 dB)
- Noise Abatement DNL Contour (60 dB, for informational purposes only)
- 2014 DNL Contour (65 dB)
- 2014 DNL Contour (60 dB, for informational purposes only)
- Airport Property Boundary
- Avigation Easement
- Airport Runway
- NM-# Portable Noise Monitoring Sites
- OANG Helipad
- Designated Runup Location
- County Boundary
- Township Boundary

Land Use (Actual use, or zoned use where undeveloped.)

- Residential Use
- Public Use
- Commercial Use
- Manufacturing and Production
- Recreational and Open Space
- Interstate Highways
- Primary Roads
- Local Roads
- Water Bodies

Notes:
Part 150 Sec. A150.101, Table 1 presents FAA land use compatibility guidelines as a function of yearly DNL. Under those guidelines, all land uses are considered compatible with noise exposure outside 65 DNL.

Portable Noise Monitoring Site NM-2 (Not Shown) is located southwest 11,327' along runway 5 extended centerline, offset northwest 1,031'

North

0 2,000 4,000 Feet

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7.3.9 *Summary of Preferential Runway Use Analyses*

Table 19 summarizes the "benefits" of the eight preferential runway alternatives; i.e. the numbers of residents and dwelling units removed from the 2014 60 dB DNL contour. The table also shows the number of fixed-wing operations potentially affected, based on the average annual day number of arrivals and departures by all aircraft types, weighted for changes in runway use. Note that the (negative) changes in residents shown for Alternatives 2 and 6 represent ***increases*** in noise exposure.

Table 33 Summary of the Benefits and Costs of Eight Preferential Runway Use Alternatives, Compared to 2014 Existing Conditions Noise Exposure Map
Source: HMMH, 2014

Case	Residents within 60 dB DNL					Population Reduction (Increase)	Operations Affected	Population Reduction (Increase) Per Operation
	North	Northeast	South	Southwest	Total			
2014 Existing	0	2	4	56	62	n.a.	n.a.	n.a.
Alternative 1	0	10	5	17	32	30	6	5.0
Alternative 1A	0	2	5	25	32	30	3	10.0
Alternative 2	0	38	5	37	80	(18)	6	(3.0)
Alternative 3	0	2	5	34	41	21	24	0.9
Alternative 4	0	2	4	51	57	5	24	0.2
Alternative 5	0	29	7	9	45	17	30	0.6
Alternative 5A	0	2	7	8	17	45	17	2.6
Alternative 6	0	58	5	35	98	(36)	30	(1.2)

These analyses strongly support considering promotion of Alternative 1A, which affects a very small number of operations, but provides a relatively large benefit. However, since the measure does not reduce population within the 65 dB DNL contour, this measure can only be proposed on a "voluntary" basis, as an "informal runway use program" in FAA terminology, as defined under FAA Order 8400.9, "National Safety and Operational Criteria for Runway Use Programs."[33]

7.4 Implementation and Effectiveness of Existing Noise Abatement Measures

As discussed in Section 6, in its ROA for the 1998 Noise Compatibility Program, the FAA fully or partially approved eight noise abatement measures (NA-1 through NA-8).[34] Table 16 in that section listed the FAA approval status of each measure. This section discusses each of the eight measures. It summarizes their implementation status and noise related benefits, to determine whether they merit continued pursuit and whether any revisions might enhance their effectiveness. [35]

7.4.1 *Existing Measure NA-1: Noise Abatement Departure Profiles / Procedures*

The ROA approved voluntary implementation of a procedure described as follows:

[33] Appendix G of this document presents a copy of Order 8400.9.

[34] As noted in Section 6, the lead FAA contact for this study requested that CAK retain this numbering scheme.

[35] The wording of each measure has been edited slightly from the ROA to adjust to reflect current conditions (e.g., in measures NA-1, the former "National Business Aircraft Association" is now the "National Business Aviation Association"), to correct typographical errors, and to shorten the descriptions by eliminating lengthy references to sections of the NCP document. Appendix B provides the full original ROA wording.

NA-1: CAK recommends that pilots of all turbojet aircraft voluntarily use noise abatement departure profiles / procedures (NAPDs) described in FAA Advisory Circular (AC) 91-53A "Noise Abatement Departure Profiles" and National Business Aviation Association (NBAA) publication "Noise Abatement Procedures for Turbojet Business Aircraft." The NADPs would apply to all turbojet departures.

The NCP recommends that the "standard" NBAA procedure be used at CAK, since it is designed for airports where most jet departures are on runways where the first residences are at least 10,000 feet from the brake release point. This is the case at CAK. For civil turbojet aircraft over 75,000 pounds, FAA AC 91-53A defines a "close-in" NADP to provide noise reduction for noise sensitive land uses in close proximity to the departure end of an airport runway, and a "distant" NADP to provide noise reduction for all other noise-sensitive areas. Since most residential areas around the airport are located within one or two miles of the runway ends, the NCP recommends the use of the "close-in" procedure.

The intent of the above procedures is to reduce the single event noise levels from turbojet departures.

The land use conditions described in the FAA summary, on which it based its approval of this voluntary measure, have not changed. Citizen input at Advisory Committee meetings and the first public workshop indicated that the greatest noise concerns are single event takeoff levels in the same residential areas that the recommended NADPs address. This feedback supports continued voluntary use of these procedures. Since decisions regarding use of these procedures is within the operating authority of individual pilots and does not affect air traffic control or any other FAA duties or responsibilities, airports have the authority to request voluntary implementation outside of a Part 150 process and without obtaining FAA approval. Nevertheless, it is valuable to continue to include the measure in the Noise Compatibility Program, to make the program as comprehensive as possible, and to enhance communication.

Based on these considerations, the Advisory Committee reached consensus that this measure merits continued implementation on a voluntary basis, to reduce single event noise levels.

7.4.2 *Existing Measure NA-2: Maximum Climb Departures for Helicopters*

The ROA approved voluntary implementation of a procedure described as follows:

NA-2: CAK recommends that helicopters from the Ohio Army Air National Guard (OANG) be cleared to 4,000 feet MSL (2,800 feet AGL) or the requested altitude, whichever is lower (usually 2,500 feet MSL or 1,300 feet AGL) immediately after takeoff.

The original Part 150 NCP recommended that helicopters be cleared to 2,500 feet MSL (1,300 feet AGL) immediately after takeoff. The FAA approved this measure. The local air traffic control tower implemented the measure by clearing helicopters to 4,000 feet MSL, or the requested altitude, whichever is lower, immediately after takeoff. Since the implementation of this measure, single event noise levels from helicopter overflights have been reduced.

CAK requested that this measure be reapproved for implementation on a voluntary, cooperative, departure-by-departure basis. This measure benefits residents by reducing single event noise levels on local residents.

The 2014 and 2019 Noise Exposure Map with the existing Noise Compatibility program (Figure 36 and Figure 37, respectively) depict the annual average day exposure associated with all OANG helicopter operations quite clearly. That effect is shown by the small “teardrop-shaped” contour centered on the “H” in the northwestern area of the airfield. That H is the location of an airfield

facility called the "turnaround button." OANG helicopter pilots generally operate to and from that location when conducting departures, arrivals, and training patterns.

The small size of the OANG-related DNL contour is a result of the relatively small number of operations that occur, as well as the maximum climb departure procedure.

The Advisory Committee noted it is reasonable for citizens to cite the noise of OANG helicopter operations, for at least three reasons. First, the pattern activity tends to occur on a repeated basis in concentrated periods. Second, helicopters use flight paths that are separate from fixed-wing aircraft, so they affect different areas. Third, helicopters have a distinctive sound character, in particular low-frequency noise and the "whop-whop" sound associated with "blade slap."

However, given that the Noise Exposure Maps reveal that the noise contours associated with helicopter operations do not leave the airport property, the Advisory Committee reached consensus that there is no basis for requesting any change to this existing approved measure. The Committee recommended continuing its current implementation on a voluntary, cooperative, departure-by-departure basis.

7.4.3 *Existing Measure NA-3: Voluntary Turbojet Restriction of Reverse Thrust at Night*

The ROA approved voluntary implementation of a procedure described as follows:

> NA-3: Pilots of all turbojet aircraft may voluntarily restrict the use of reverse thrust activity at night (10:00 p.m. - 7:00 a.m.). (NCP Table 3.2, Page 20; Section 3.2.3, Page 22; Table 3.5, Page 36; Section 5.7.6, Pages 57-58).
>
> The Akron-Canton Regional Airport Authority recommends that pilots of all turbojet aircraft voluntarily restrict the use of reverse thrust activity at night (between the hours of 10:00 p.m. - 7:00 a.m.). The procedure would only apply to dry runway conditions. With wet or snow covered runways, full use of reverse thrust would be encouraged at all times.
>
> The intent of this procedure is to minimize the use of reverse thrust at night. Several residents in close proximity to the airport have expressed concern regarding the noise associated with the use of reverse thrust from turbojet aircraft at night. Any policy that would reduce the use of reverse thrust could have a significant noise benefit. Use of reverse thrust is dependent upon aircraft type, aircraft weight, runway length, and runway surface condition.
>
> This voluntary procedure may be communicated to pilots with informational handouts or signs in the local FBO offices for local pilots. Itinerant pilots may be notified through use of a Letter to Airmen.
>
> This measure would benefit residents by reducing single event noise levels on local residents during nighttime periods. This is a new measure.

Once again, given that the noise analysis reveals that the noise contour area associated with thrust reverse (along the mid-section of the runways) does not leave the airport property, the Advisory Committee reached consensus that there is no basis for requesting any change to this measure from its current implementation on a voluntary, cooperative, departure-by-departure basis.

7.4.4 *Existing Measure NA-4: Runway 23 Turbojet Departures Maintain Runway Heading (Alternative 7)*

The ROA approved voluntary implementation of a procedure described as follows:

NA-4: All eastbound turbojet aircraft departing on Runway 23 maintain runway heading until 3 nautical miles from the radar, or until the aircraft is at 2,500 feet MSL (1,300 feet AGL). (NCP Table 3.2, Page 20; Section 3.2.4, Pages 22-23; Table 3.5, Page 36; Section 5.8.1, Page 59).

The Akron-Canton Regional Airport Authority recommends that all eastbound turbojet aircraft departing on Runway 23 maintain runway heading until 3 nautical miles from the radar, or until the aircraft is at 2,500 feet MSL (1,300 feet AGL).

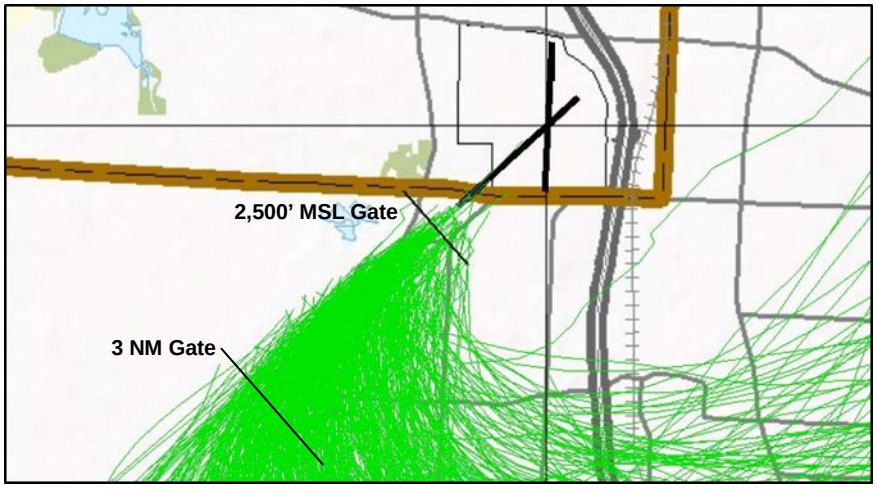
The original NCP called for the implementation of a noise abatement procedure for turbojet aircraft departing on Runway 23. The measure was implemented in a modified form following the approval of the original NCP. The procedure as originally proposed, requires all turbojet aircraft departing on Runway 23 to maintain runway heading until 4 nautical miles from the radar. As implemented, the procedure requires all eastbound turbojet aircraft departing on Runway 23 to maintain runway heading until 3 nautical miles from the radar, or until the aircraft is at 2,500 feet MSL (1,300 feet AGL).

This straight-out procedure for eastbound turbojet aircraft would avoid overflights of the residential area that straddles Strausser Street, just south of the extended centerline of Runway 23. Continued implementation would reduce noise levels from single event overflights on this residential area.

Radar analyses of Runway 23 departures conducted for development of the 2014 existing conditions contours provide a detailed objective basis for assessing the implementation of this alternative. The assessment requires considering a two–part question: Do Runway 23 departures maintain runway heading until they are either (1) three nautical miles from the radar or (2) at 2,500 feet MSL (1,300 feet AGL)?

The following figure considers the first part of this question. It is a plot of all Runway 23 eastbound departures obtained in the radar data sample obtained for the months of January, April, July, and October 2012 for use in developing modeling inputs, as discussed in Section 4.6.

Figure 47 Runway 23 Eastbound Jet Departures Relative to Existing NA-4 Turn Criteria
Source: HMMH 2014, based on 2012 Passur Radar Data

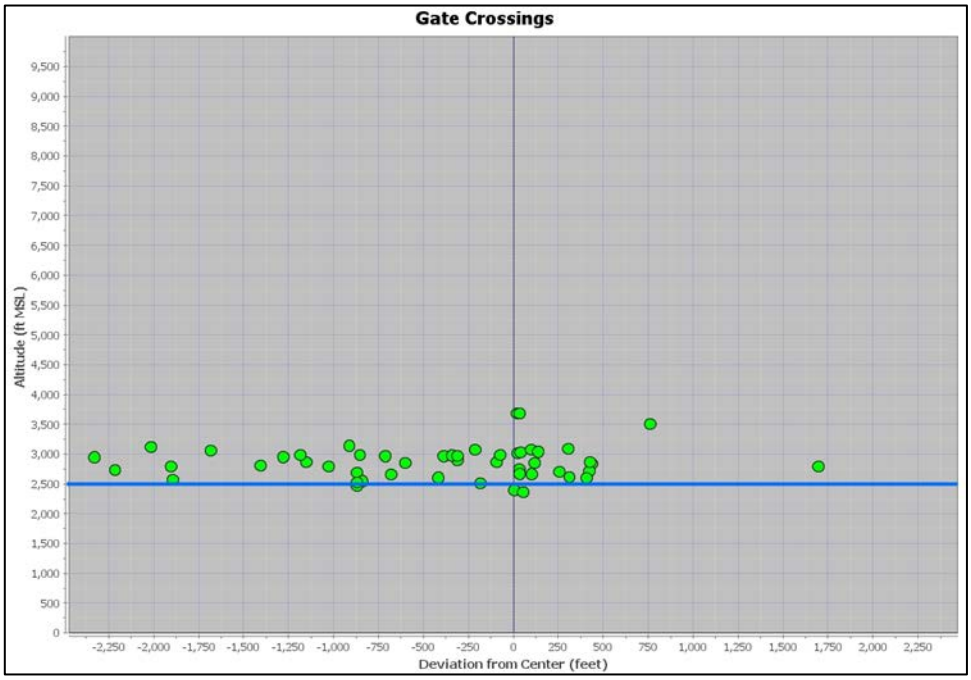


The plot includes two lines perpendicular to the extended runway centerline. The outermost line ("3 NM Gate") is drawn to intersect the extended runway approximately three nautical miles from the radar. Clearly many turbojet departures are initiating turns prior to the three-nautical-mile limit.

However, this observation does not necessarily mean the aircraft are out of compliance with the procedure, since it permits aircraft to turn at any point once they are above 2,500 feet MSL.

To investigate this second turn criterion, the inner line, (labeled "2,500' MSL gate") is drawn perpendicular to the runway centerline at the point where the radar data indicate most aircraft have reached 2,500' MSL. The following figure is a vertical plot of the points at which turbojet departures on Runway 23 cross the 2,500' MSL gate (looking out from the airport toward the southwest). The plot shows fewer operations than the preceding figure, because most of the tracks begin past it. However, this figure shows that the great majority of the departures are above 2,500 MSL, and that most of those below that altitude are on runway centerline, as requested.

Figure 48 Vertical Plot of Points at Which Runway 23 Turbojet Departures Pass Three Nautical Miles form the Radar (Looking Out from the Airport)
Source: HMMH 2014, based on 2012 Passur Radar Data



Based on this analysis, it appears the minimum altitude turn criterion may be reducing the effectiveness of the existing procedure, by permitting some faster-climbing aircraft to turn relatively close to the airport and overfly residential areas to either side of the runway centerline. As both figures show, most of the early turns are to the south (left-hand turns), resulting in overflight of the residential area south of Strausser Street.

To address this issue, a seventh abatement alternative was prepared to test a revised version of the existing procedure. This alternative eliminates the altitude condition and requires that all eastbound turbojets maintain runway heading until past three nautical miles, thereby requiring some fast-climbing aircraft to fly straight out farther.

The following figure depicts this "Alternative 7." As in the preceding figures for the preferential runway alternatives, the figure compares the 60 and 65 dB DNL contour for the abatement case to the 2014 existing conditions. The figure also shows the relatively widely dispersed tracks modelled in the existing conditions case and the narrower spread of tracks modelled for the alternative.

The figure shows relatively little change in the 60 dB DNL contour.

Table 34 compares the residential land uses within the 65-65 dB DNL contour – by runway end – for this case to that for the 2014 existing conditions case. The alternative reduces the encompassed population by two residents.

Table 34 Residential Land Uses within 2014 60-65 dB DNL Contours by Runway End with All Eastbound Jet Departures on Runway 23 Flying Runway Heading Until Three Nautical Miles from the Radar, Compared to 2014 Existing Conditions
Source: HMMH, 2014

Case	Metric	North – off Runway 19 approach / 1 departure end	Northeast – off Runway 23 approach / 5 departure end	South – off Runway 1 approach / 19 departure end	Southwest – off Runway 5 approach / 23 departure end	Total
Alternative 7	Residents	0	2	4	54	60
	Dwellings	0	1	2	23	26
2014 Existing Conditions	Residents	0	2	4	56	62
	Dwellings	0	1	2	24	27

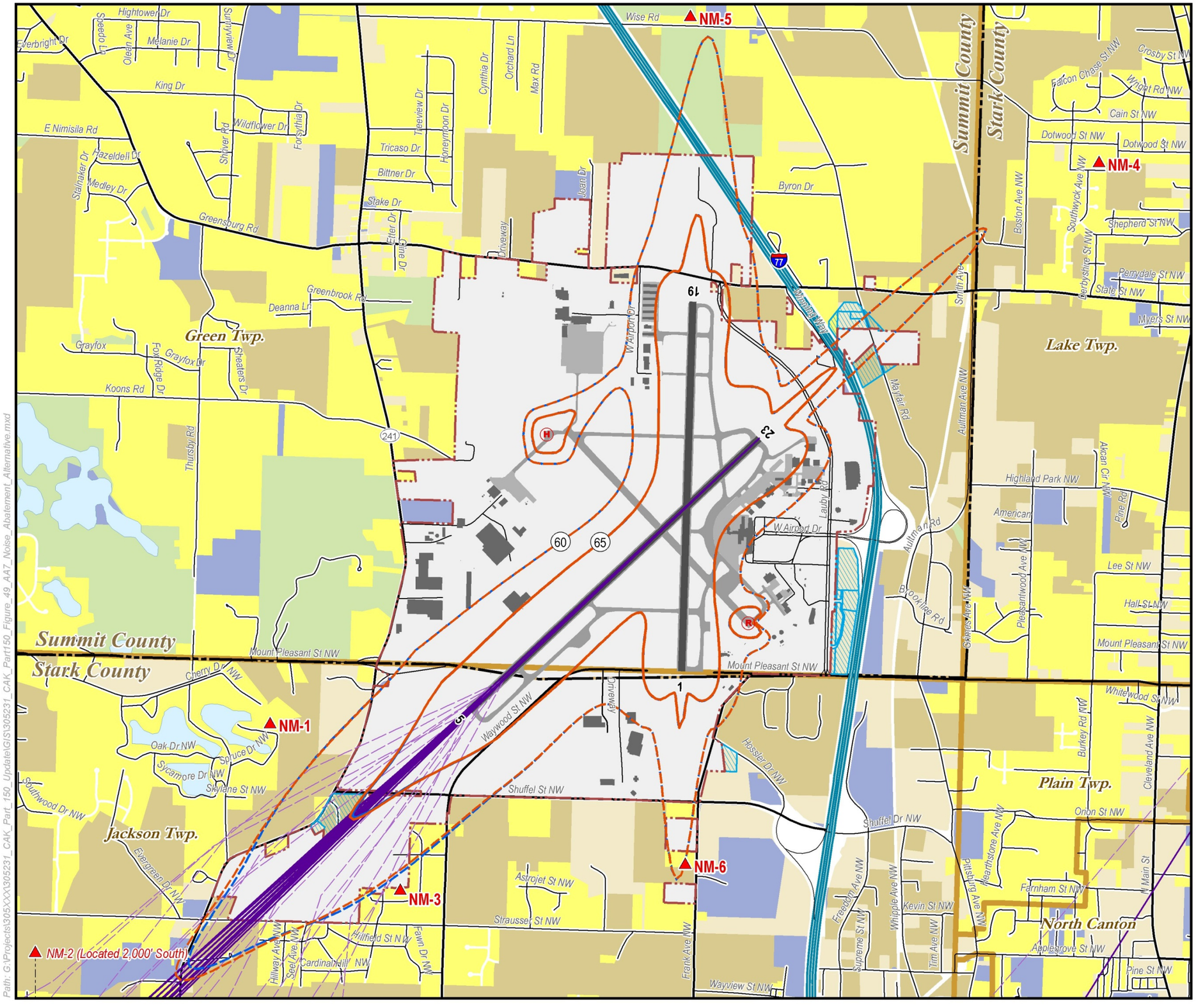


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Figure 49 - Alternative 7: 2014 DNL with All Eastbound Jet Departures on Runway 23 Flying Runway Heading Until 3 Nautical Miles from Radar, Compared to 2014 Exist. Conditions

14 CFR Part 150 Update

- Noise Abatement DNL Contour (65 dB)
- Noise Abatement DNL Contour (60 dB, for informational purposes only)
- 2014 DNL Contour (65 dB)
- 2014 DNL Contour (60 dB, for informational purposes only)
- Existing Flight Track
- Compliant Flight Track
- Airport Property Boundary
- Avigation Easement
- Airport Runway
- NM-# Portable Noise Monitoring Sites
- (H) OANG Helipad
- (R) Designated Runup Location
- County Boundary
- Township Boundary

Land Use (Actual use, or zoned use where undeveloped.)

- Residential Use
- Public Use
- Commercial Use
- Manufacturing and Production
- Recreational and Open Space
- Interstate Highways
- Primary Roads
- Local Roads
- Water Bodies

Notes:
Part 150 Sec. A150.101, Table 1 presents FAA land use compatibility guidelines as a function of yearly DNL. Under those guidelines, all land uses are considered compatible with noise exposure outside 65 DNL.

Portable Noise Monitoring Site NM-2 (Not Shown) is located southwest 11,327' along runway 5 extended centerline, offset northwest 1,031'

North

0 2,000 4,000 Feet

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7.4.5 *Existing Measure NA-5: Runway 19 Departure Turn to 160° at One Nautical Mile (Alternative 8)*

The purpose of this measure was to revise a similar measure that the FAA approved at the conclusion of the first Part 150 study, which called for eastbound Runway 19 departures to turn to a heading of 160 degrees at two nautical miles from the radar and to maintain that heading until reaching four nautical miles. The second Part 150 recommended changing the procedure to start at one nautical mile. The FAA disapproved this change, but approved continued voluntary implementation of the original procedure, as approved in the 1989 ROA:[36]

> NA-5: All eastbound and southbound turbojet aircraft departing on Runway 19 initiate a turn to a heading of 160 degrees at 1 nautical mile from the radar and maintain that heading until 4 nautical miles. (NCP Table 3.2, Page 20; Section 3.2.5, Page 23; Table 3.5, Page 36; Section 5.8.2, Pages 59, 63).
>
> The Akron-Canton Regional Airport Authority recommends that the departure procedure developed for Runway 19 in the original Part 150 study be implemented in full to minimize overflights on residential areas south. Although this has been implemented in some fashion by FAA for several years, having a formal procedure in place will help minimize the impact of the runway extension. In addition, it is recommended that the turn to 160 degrees be initiated at 1 nautical mile instead of the 2 nautical miles recommended in the original Part 150 study.
>
> The original NCP called for the implementation of a noise abatement turn for turbojet aircraft departing on Runway 19 to a heading of 160 degrees at 2 nautical miles from the radar and maintain until 4 nautical miles. In the original Part 150, this procedure assumed that Runway 1-19 would be extended to the south and that operations would increase considerably on that runway. That extension is now planned within the next 10 years. The procedure has not been implemented although departures are routinely turned to avoid the residential areas to the south.
>
> One home is within the 5-year 65 DNL contour (area C). Approval of this revised procedure does not eliminate this home from the contour. However, it would eliminate residentially zoned vacant land and would reduce noise from overflights of the residential area south of the airport and west of Frank Avenue.
>
> DISAPPROVED. The FAA will continue the current voluntary procedure to turn at 2 nautical miles. One nautical mile from the radar site is approximately over the departure end of the runway. Flights will be very low to the ground and at relatively slow airspeed. Crews should not be required or requested to initiate turns at this critical phase of the flight.

"Alternative 8" tests whether there is an objective basis for reapplying for the one nautical mile turn limit. Figure 50 depicts the existing conditions and abatement flight tracks, with the dispersed abatement tracks initiating turns when one nautical mile from the radar. The figure also overlays noise contours for Alternative 8 on those for 2014 existing conditions. Once again, the figure shows very little change in the 60 dB DNL contour, even though it represents a highly idealized set of assumptions regarding compliance with this voluntary procedure.

[36]The Runway 19 departure turn that the FAA approved in the 1989 ROA (reproduced in Appendix A) copy applies only to eastbound departures. Therefore, the existing FAA Air Traffic Control Tower protocols implement the measure in that approved form.

The following table compares the residential land uses within the 65-65 dB DNL contour – by runway end – for this case to that for the 2014 existing conditions case. The alternative reduces the encompassed population by just a single resident. Based on this analysis, the Advisory Committee reached consensus that pursuing this alternative, which the FAA has already disapproved, does not appear to be justified.

Table 21 Residential Land Uses within 2014 60-65 dB DNL Contours by Runway End with All East- and Southbound Jet Departures on Runway 19 Initiating a Turn to 160° at One Nautical Mile from the Radar, Compared to 2014 Existing Conditions
Source: HMMH, 2014

Case	Metric	North – off Runway 19 approach / 1 departure end	Northeast – off Runway 23 approach / 5 departure end	South – off Runway 1 approach / 19 departure end	Southwest – off Runway 5 approach / 23 departure end	Total
Alternative 8	Residents	0	2	3	56	61
	Dwellings	0	1	2	24	27
2014 Existing Conditions	Residents	0	2	4	56	62
	Dwellings	0	1	2	24	27

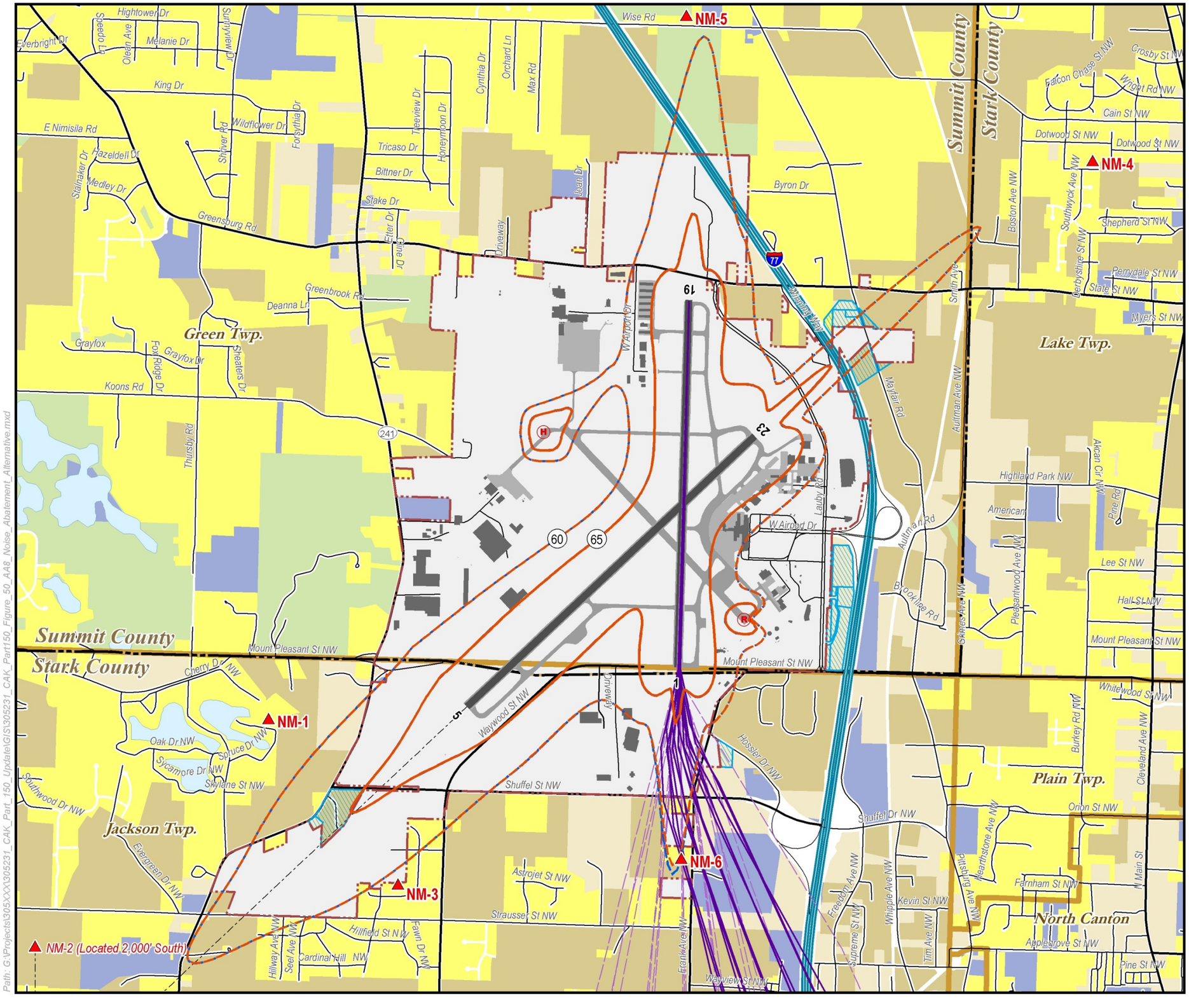

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Figure 50 - Alternative 8: 2014 DNL with All East- and Southbound Jet Departures on Runway 19 initiating a Turn to 160° at 1 Nautical Mile from the Radar, Compared to 2014 Exist. Conditions

14 CFR Part 150 Update

- Noise Abatement DNL Contour (65 dB)
- Noise Abatement DNL Contour (60 dB, for informational purposes only)
- 2014 DNL Contour (65 dB)
- 2014 DNL Contour (60 dB, for informational purposes only)
- Existing Flight Track
- Compliant Flight Track
- Airport Property Boundary
- Avigation Easement
- Airport Runway
- NM-# Portable Noise Monitoring Sites
- OANG Helipad
- Designated Runup Location
- County Boundary
- Township Boundary

Land Use (Actual use, or zoned use where undeveloped.)

- Residential Use
- Public Use
- Commercial Use
- Manufacturing and Production
- Recreational and Open Space
- Interstate Highways
- Primary Roads
- Local Roads
- Water Bodies

Notes:
Part 150 Sec. A150.101, Table 1 presents FAA land use compatibility guidelines as a function of yearly DNL. Under those guidelines, all land uses are considered compatible with noise exposure outside 65 DNL.

Portable Noise Monitoring Site NM-2 (Not Shown) is located southwest 11,327' along runway 5 extended centerline, offset northwest 1,031'

North

0 2,000 4,000 Feet

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7.4.6 *Existing Measure NA-6: Designate the Location and Orientation of Engine Runups*

The ROA approved voluntary implementation of a procedure described as follows:

> NA-6: Designate the location and orientation of engine runups. (NCP Table 3.2, Page 20; Section 3.2.6, Pages 23-24; Table 3.5, Page 36; Section 5.9.9, Pages 70-71; Section 5.10.2, Pages 76,79; Figure 5.4, Pages 77,78; Airport Memo on Engine Runup Operations - Appendix F).
>
> The Akron-Canton Regional Airport Authority recommends that the location and orientation of engine runups be designated. Several residents in close proximity to the airport have expressed concern regarding the noise associated with the engine runups that result from the maintenance operators at the airport. This measure designates a maintenance runup area to limit the noise impacts from runups. Given the amount of residential development to the south of the airport and the lack of residential development to the southeast of the airport, a designated area at the threshold to Runway 32 would be a suitable location for all engine maintenance runups above flight idle power. Flight idle power maintenance runups would continue to be allowed on the ramp areas. Maintenance runups above flight idle power should be prohibited from all areas of the airfield, except the designated engine runup area at the threshold to Runway 32 at the runway heading of 320 degrees if possible. Maintenance runups at flight idle power should also be limited to certain directions. On the Chautauqua ramp on the west side of the airport, flight idle runs should be limited to a heading of 360 degrees if possible, while on the PSA ramp on the east side of the airport flight idle runups should be limited to headings of 360 degrees or 050 degrees if possible.
>
> The intent of this measure is to minimize the single event noise levels from aircraft engine runups at night. This is a new measure.

As discussed previously and shown on all contour figures, this procedure has been implemented by designating a maintenance runup location on the east side of the airport, with the preferred aircraft heading being to the west. Operations data collected for development of the existing conditions contours reveal essentially complete compliance with this procedure. The associated significant noise exposure remains on airport property.

7.4.7 *Existing Measure NA-7: Designate the Location for an Engine Runup Enclosure*

The ROA approved consideration of a location for a future engine runup enclosure, for depiction on the next update of the airport layout plan:

> NA-7: Designate the location for an engine runup enclosure. (NCP Table 3.2, Page 20; Section 3.2.7, Pages 24-25; Table 3.5, Page 36; Section 5.10.6, Pages 80-81; Figure 5.5, Pages 83-84).
>
> The Akron-Canton Regional Airport Authority recommends that a location be designated for construction of an engine runup enclosure, should the number and type of runups increase substantially in the near future. Noise runup enclosures are structures that help where the runups are in close proximity to noise sensitive receivers and where maintenance runup restrictions or the designation of a maintenance runup area is insufficient to control noise from the runups in the surrounding areas.
>
> A ground runup enclosure (GRE) may be appropriate at Akron-Canton Regional Airport. The GRE is generally closed on all 4 sides but open over the roof area. Aircraft are towed into the GRE and the front doors are closed with the aircraft inside. The rear of the GRE incorporates a blast deflector, while the rear, side, and front walls are treated with sound absorbing material.

At the present time, the runup noise at the airport is the result of a relatively low number of propeller runup operations. Noise levels from these runup operations, although disturbing to some people, are much less than the runup noise created by turbojet aircraft. If the activity level of runup operations increases in the next several years, or if the type of aircraft changes, the airport should consider a ground runup enclosure to mitigate the noise from the runup operations. Given the relatively low noise levels from engine runups (propeller aircraft only), and the low number of runup operations, a GRE is not recommended at this time. However, the airport should consider the location of such a structure.

The runup analyses discussed in the preceding section indicate that the existing runup location has been successful in keeping significant runup-related noise exposure within the airport property boundary, eliminating the justification for consideration of a costly enclosure.

7.4.8 *Existing Measure NA-8: Improve Engine Runup and Taxiing Procedures*

The ROA approved voluntary implementation of a procedure described as follows:

NA-8: Improve engine runup and taxiing procedures. (NCP Table 3.2, Page 20; Section 3.2.8, Page 25; Table 3.5, Page 36; Section 5.11.1, Pages 85-86.

The Akron-Canton Regional Airport Authority recommends that engine runup and taxiing procedures be improved. Aircraft that undertake these procedures are recommended to perform them at specific designated areas on the airport so as to minimize the impact on residential areas to the north and northeast of the airport. Pre-flight engine checks should be undertaken either near the passenger terminal area or on Taxiway "C" with an aircraft orientation of 360 degrees.

The intent of these measures is to provide a reduction in the single event noise levels over residential areas around the airport. This is a new measure.

Once again, the runup analyses discussed in the Section 7.4.6 indicate that the existing runup location has been successful in keeping significant runup-related noise exposure within the airport property boundary, eliminating the justification for consideration of additional actions to address the concerns raised in the prior study. In addition, there has been no input regarding noise from engine runups or taxiing from community representatives who live to the north or northeast of the airport.

7.5 Part 150 Noise Abatement Alternative Analysis Requirements

Part 150 Section B150.7, “Analysis of program alternatives,” identifies the following seven specific alternatives that the airport must consider, “subject to the constraints that the strategies are appropriate to the specific airport:” [*Text inserted in brackets briefly addresses how this submission addresses these categories.*]:

(b) At a minimum, the operator shall analyze and report on the following alternatives, subject to the constraints that the strategies are appropriate to the specific airport (for example, an evaluation of night curfews is not appropriate if there are no night flights and none are forecast):

(1) Acquisition of land and interests therein, including, but not limited to air rights, easements, and development rights, to ensure the use of property for purposes which are compatible with airport operations.

[*Section 8 addresses this category*.]

(2) The construction of barriers and acoustical shielding, including the soundproofing of public buildings.

[*Sections 7.6.5 and 7.6.6 discuss barriers. Sections 7.4.6, 7.4.7, and 7.4.8 discuss ground noise issues for which barriers might be considered as an abatement option. Soundproofing of public buildings is not relevant, since, as discussed in Section 5.2, there are no noncompatible uses within the 65 dB DNL contour. Section 7.6.11 responds to a request for consideration of residential sound insulation.*]

(3) The implementation of a preferential runway system.

[*Section 7.3 discusses this category in detail and leads to a particularly promising option.*]

(4) The use of flight procedures (including the modifications of flight tracks) to control the operation of aircraft to reduce exposure of individuals (or specific noise sensitive areas) to noise in the area around the airport.

[*Sections 7.4.4, 7.4.5, and 7.6.4 discuss this category. They demonstrate the effectiveness of the existing FAA-approved noise abatement flight-track procedures for Runway 23 and 19.]*

(5) The implementation of any restriction on the use of airport by any type or class of aircraft based on the noise characteristics of those aircraft. Such restrictions may include, but are not limited to:

(i) Denial of use of the airport to aircraft types or classes which do not meet Federal noise standards;

(ii) Capacity limitations based on the relative noisiness of different types of aircraft;

(iii) Requirement that aircraft using the airport must use noise abatement takeoff or approach procedures previously approved as safe by the FAA;

(iv) Landing fees based on FAA certificated or estimated noise emission levels or on time of arrival; and

(v) Partial or complete curfews.

[*Formal use restrictions are not candidates for consideration at CAK, since there are no noncompatible land uses within the 65 dB DNL contour that the FAA considers the outer limit of the impact area for use in justifying restrictions under 14 C.F.R. Part 161, "Notice and Approval of Airport Noise and Access Restrictions."*[37] *Existing FAA-approved measure NA-1 discussed in Section 7.4.1 addresses voluntary use of noise abatement takeoff procedures. Sections 7.6.9 and 7.6.10 discuss related options suggested by public commenters.*]

(6) Other actions or combinations of actions which would have a beneficial noise control or abatement impact on the public.

[*An Advisory Committee member requested consideration of an airport-layout measure, consisting of displacing the Runway 5 start-of-takeoff roll point to reduce associated noise exposure in neighboring communities to the southwest of the airport. Section 7.5.1 addresses this recommendation.*]

(7) Other actions recommended for analysis by the FAA for the specific airport.

[*FAA Airport Traffic Control Tower staff representatives participated in the Advisory Committee meeting discussions of alternatives to consider, but did not specifically suggest any alternatives independent of those identified by the overall committee.*]

[37] See: http://www.faa.gov/airports/environmental/airport_noise/part_161/.

7.5.1 *Airport Layout Alternative (Alternative 9)*

As illustrated in Section 5.4, a 2004 environmental assessment investigated an extension of Runway 5-23 to the southwest. This extension relocated the Runway 23 start-of-takeoff-roll point closer to the residential communities on either side of the extended runway centerline southwest of the airport. Advisory Committee members from those neighborhoods requested an analysis of an alternative that would relocate that start-of-takeoff-roll point roughly back to its former location, at the first taxiway intersection northeast of the runway end.

"Alternative 9" assesses this request. Figure 50 presents the results of that analysis. It shows that there is a minor change in the 65 dB DNL contour on airport property, and no change in the 60 dB DNL contour off airport property. Therefore, there is no reduction in encompassed population. The lack of benefit, combined with the fact that it would reduce runway length available for takeoff, make this alternative an unrealistic candidate for further consideration.

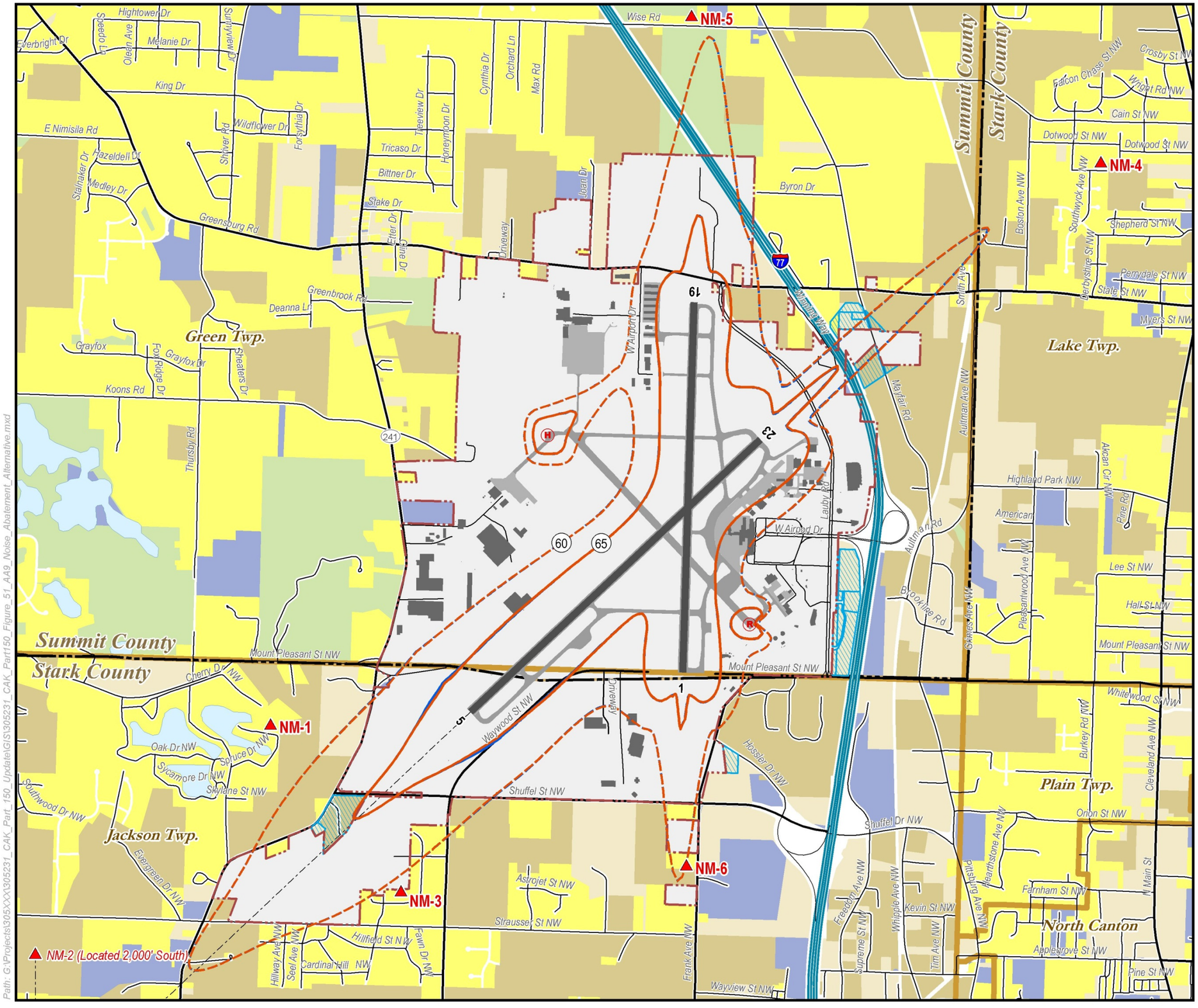

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Figure 51 - Alternative 9: 2014 DNL with Runway 5 Start-of-Takeoff Roll Point Displaced 1,250' to the Northeast (Next Taxiway Intersection), Compared to 2014 Exist. Conditions

14 CFR Part 150 Update

- Noise Abatement DNL Contour (65 dB)
- Noise Abatement DNL Contour (60 dB, for informational purposes only)
- 2014 DNL Contour (65 dB)
- 2014 DNL Contour (60 dB, for informational purposes only)
- Airport Property Boundary
- Avigation Easement
- Airport Runway
- NM-# Portable Noise Monitoring Sites
- OANG Helipad
- Designated Runup Location
- County Boundary
- Township Boundary

Land Use (Actual use, or zoned use where undeveloped.)

- Residential Use
- Public Use
- Commercial Use
- Manufacturing and Production
- Recreational and Open Space
- Interstate Highways
- Primary Roads
- Local Roads
- Water Bodies

Notes:
Part 150 Sec. A150.101, Table 1 presents FAA land use compatibility guidelines as a function of yearly DNL. Under those guidelines, all land uses are considered compatible with noise exposure outside 65 DNL.

Portable Noise Monitoring Site NM-2 (Not Shown) is located southwest 11,327' along runway 5 extended centerline, offset northwest 1,031'

North

0 2,000 4,000 Feet

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7.6 Noise Abatement Alternatives Suggested by Other Stakeholders

After the second workshop, two letters were received from residents of neighborhoods to the northeast of the airport. Appendix F presents full copies of these two letters from:

- Mr. David A. Mucklow, June 3, 2014
- Mr. Ronnie and Ms. Cynthia Anderson, June 12, 2014 (addressed to Mr. Mucklow and forwarded by him)

7.6.1 *Input from Mr. David A. Mucklow*

Mr. Mucklow's input included the following specific suggestions for alternatives analyses (paraphrased):

- Have aircraft maintain runway heading on departure from Runway 1 until after crossing Wise Road, and be stabilized on runway heading on final approach for Runway 19 before crossing Wise Road, to avoid overflight of neighborhoods to the east of the extended runway centerline in particular.
- Consider constructing noise walls or planting rows of evergreens along I-77 north of the airport to Wise Road, to mitigate aircraft noise on residences to the east of the highway, north of the airport.[38]
- Military aircraft sometimes travel low over houses in his neighborhood (north of the airport and to the east of I-77 and the Runway 1/19 extended centerline). He suggests cautioning them to stay at higher altitudes for noise abatement and safety.

7.6.2 *Input from Mr. Ronnie and Ms. Cynthia Anderson*

The Andersons' input included the following suggestions for alternatives analyses (paraphrased):

- Consider constructing noise walls or planting evergreens along I-77 to mitigate aircraft noise on residences east of the highway, north of the airport (i.e., Mr. Mucklow's second suggestion).
- Consider stricter regulations on flight times and patterns.
- Consider sound-insulation treatment to reduce aircraft noise inside homes most near the airport.

7.6.3 *Discussion of Recommended Alternatives*

The following sections address the preceding suggestions in a consolidated fashion:

- Reduce Runway 1 departure and Runway 19 arrival flight track dispersion (see Section 7.6.4)
- Consider noise barriers along I-77 north of the airport to Wise Road (see Sections 7.6.5, 7.6.6, and 7.6.7)
- Consider requesting military aircraft to fly higher over residences (see Section 7.6.8)
- Consider stricter regulations on flight times and patterns (see Sections 7.6.9 and 7.6.10)
- Consider sound-insulation treatment of homes most near the airport (see Section 7.6.11)

[38] Mr. Mucklow notes that the barrier might also mitigate noise from I-77 and help contain the smell of burnt jet fuel that he has noticed in the winter months. Neither of these matters is within the scope of a Part 150.

7.6.4 *Reduce Dispersion for Runway 1 Departures and Runway 19 Arrivals (Alternative 10)*

To evaluate this proposal, noise contours for "Alternative 10." were prepared that assumed procedures were implemented that resulted in a 50% reduction in the dispersion of departure and arrival flight tracks modeled in the 2014 Existing Conditions Noise Exposure Map (Figure 36). It would be unrealistic to assume elimination of all dispersion, since crosswinds, aircraft performance, and other operational considerations inevitably lead to variation in flight tracks, even this close to a runway end.

The hypothetical reduction in dispersion that this alternative tests is generally consistent with the precision observed when aircraft follow the most precise FAA-published navigation procedures; i.e., "Area Navigation" (RNAV) procedures employing satellite-based (global positioning system, GPS) guidance. The FAA is in the process of introducing such procedures nationwide, as part of the implementation of the "NextGen" air traffic control system.[39] FAA has scheduled for the most critical components of NextGen implementation to be in place by 2020 or shortly thereafter.[40] Those implementation components require FAA and aircraft operator investments. Until that time, this type of reduced dispersion would be extremely difficult – or impossible – to achieve.

The figure on the following page presents contours for Alternative 10 compared to those for the 2014 existing conditions Noise Exposure Map. The figure includes insets that illustrate the hypothetical reduction in dispersion assumed in the analysis. Table 35 compares the residential land uses within the 60-65 dB DNL contour – by runway end – to that for the 2014 existing conditions case.

Table 35 Residential Land Uses within 2014 60-65 dB DNL Contours by Runway End for Alternative 10, "Reduced Flight Track Dispersion for Runway 1 Departures and Runway 19 Arrivals," Compared to 2014 Existing Conditions
Source: HMMH, 2014

Case	Metric	North – off Runway 19 approach / 1 departure end	Northeast – off Runway 23 approach / 5 departure end	South – off Runway 1 approach / 19 departure end	Southwest – off Runway 5 approach / 23 departure end	Total
Alternative 10	Residents	1	2	4	56	63
	Dwellings	0	1	2	24	27
2014 Existing Conditions	Residents	0	2	4	56	62
	Dwellings	0	1	2	24	27

This analysis reveals that a slight extension of the 60 dB DNL contour across Wise Road may actually increase the encompassed population, although from a practical perspective the change is insignificant in the context of the likely accuracy limits of the modeling and population analysis. However, residents of dwellings near the runway centerline along Wise Road (near monitoring location #5) would likely notice the increased concentration of direct overflights.

[39] See: http://www.faa.gov/nextgen/

[40] This date is based on FAA's current schedule for full implementation of a NextGen component called "Automatic Dependent Surveillance-Broadcast" (ADS-B), the NextGen successor to radar for tracking aircraft.

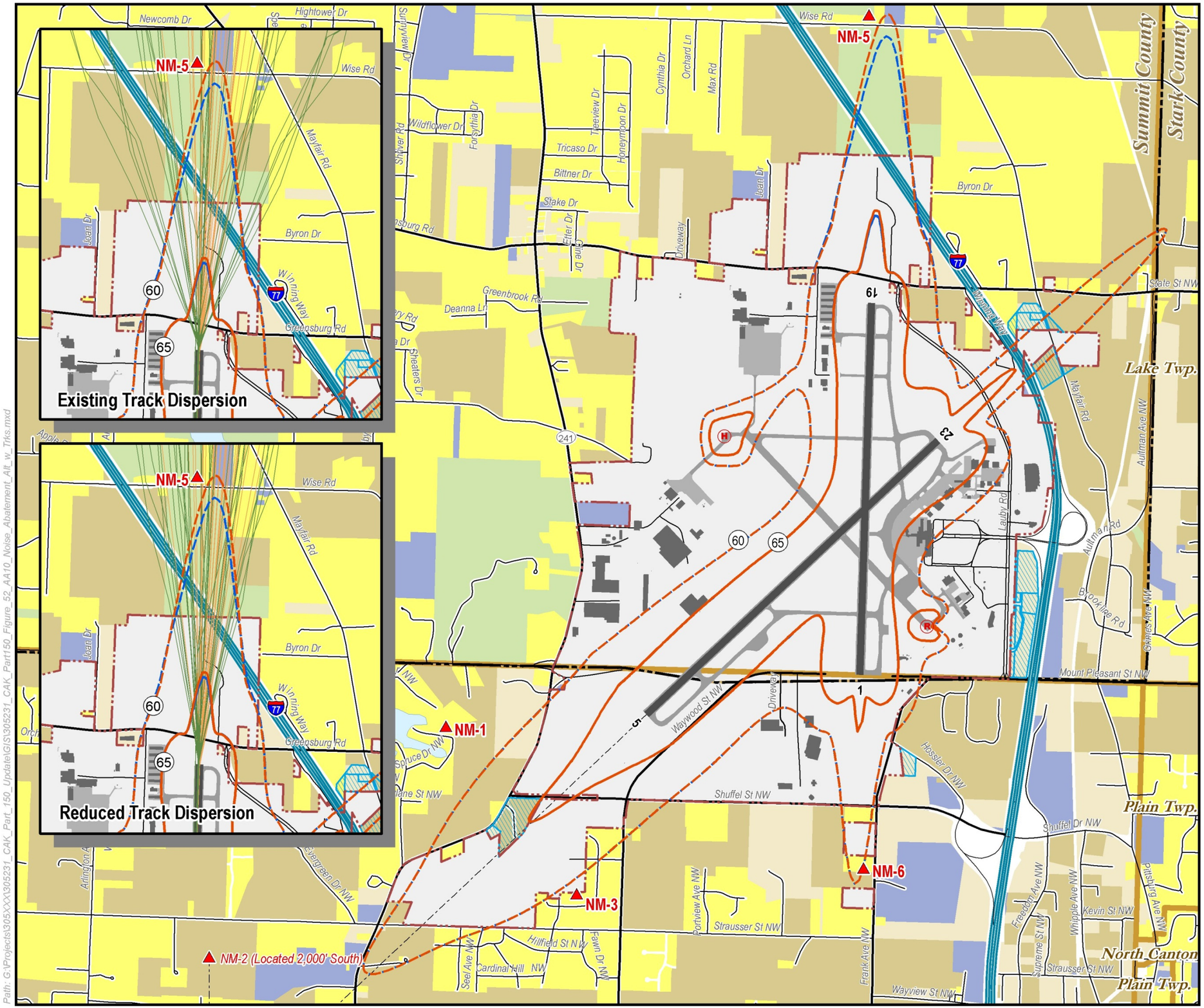

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Figure 52 - Alternative 10: 2014 DNL with Reduced Flight Track Dispersion for Runway 1 Departures and Runway 19 Arrivals, Compared to 2014 Existing Conditions

14 CFR Part 150 Update

- Noise Abatement DNL Contour (65 dB)
- Noise Abatement DNL Contour (60 dB, for informational purposes only)
- 2014 DNL Contour (65 dB)
- 2014 DNL Contour (60 dB, for informational purposes only)
- Arrival Track
- Departure Track
- Airport Property Boundary
- Avigation Easement
- Airport Runway
- NM-# Portable Noise Monitoring Sites
- OANG Helipad
- Designated Runup Location
- County Boundary
- Township Boundary

Land Use (Actual use, or zoned use where undeveloped.)

- Residential Use
- Public Use
- Commercial Use
- Manufacturing and Production
- Recreational and Open Space
- Interstate Highways
- Primary Roads
- Local Roads
- Water Bodies

Notes:
Part 150 Sec. A150.101, Table 1 presents FAA land use compatibility guidelines as a function of yearly DNL. Under those guidelines, all land uses are considered compatible with noise exposure outside 65 DNL.

Portable Noise Monitoring Site NM-2 (Not Shown) is located southwest 11,327' along runway 5 extended centerline, offset northwest 1,031'

North

0 2,000 4,000 Feet

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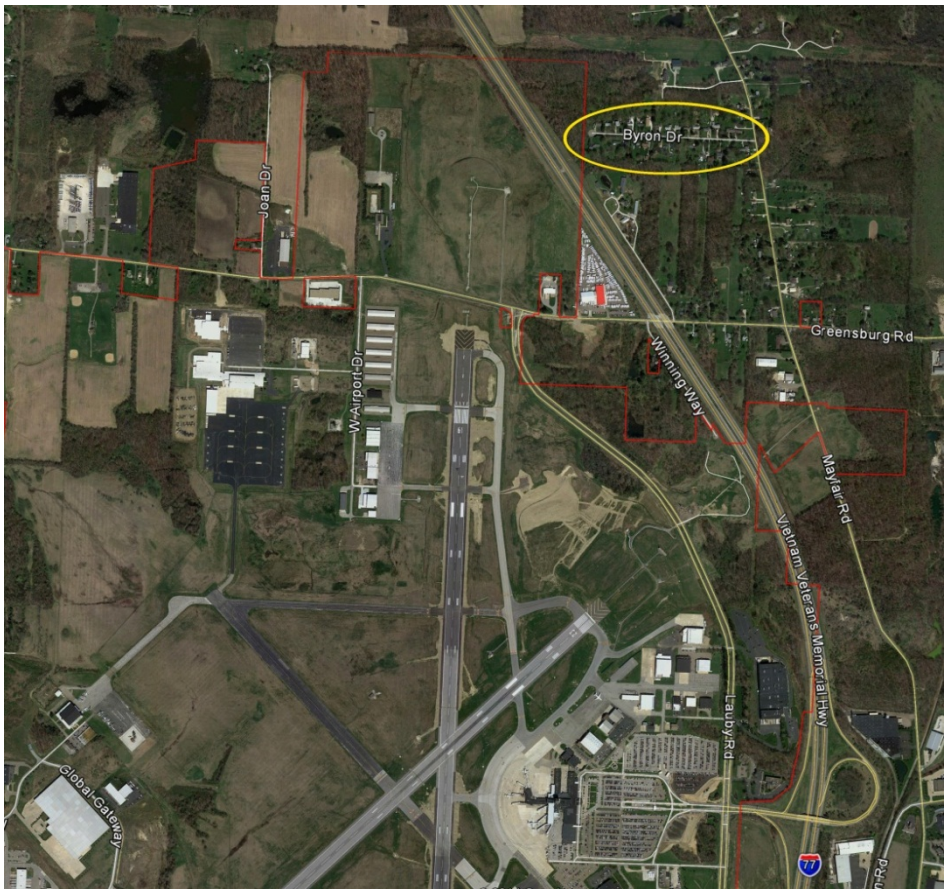
7.6.5 *Consider Noise Barriers along I-77 North of the Airport to Wise Road*

This section discusses the feasibility and design requirements of a sound barrier intended to reduce ground-based aircraft noise for Byron Drive residents, in the general location shown in Figure 53.

Figure 53 Barrier Analysis Vicinity Map
Source: HMMH and Google Earth Professional, 2014



Noise Barrier Location Considerations

"A sound barrier is any large object that blocks the line of sight between source and receiver."[41] The best description of barrier performance is its "insertion loss" (IL), which is the difference in the noise environment before and after the barrier is constructed.[42]

Barriers are often used to reduce noise from transportation noise sources, in particular highway and rail sources. In limited situations, a barrier can be effective in reducing noise from aircraft activities on the ground, including start-of-takeoff-roll, thrust-reverse, and run-up operations. However, "the smallest insertion loss [of these three transportation sources] is obtained in the case of ground-based airport operations due to the larger source/receiver distances and greater source height [that are typical for aircraft sources]."[43]

[41] Beranek, L. L., & Vér, I. L. (1992). Noise and Vibration Control Engineering. John Wiley & Sons, Inc.

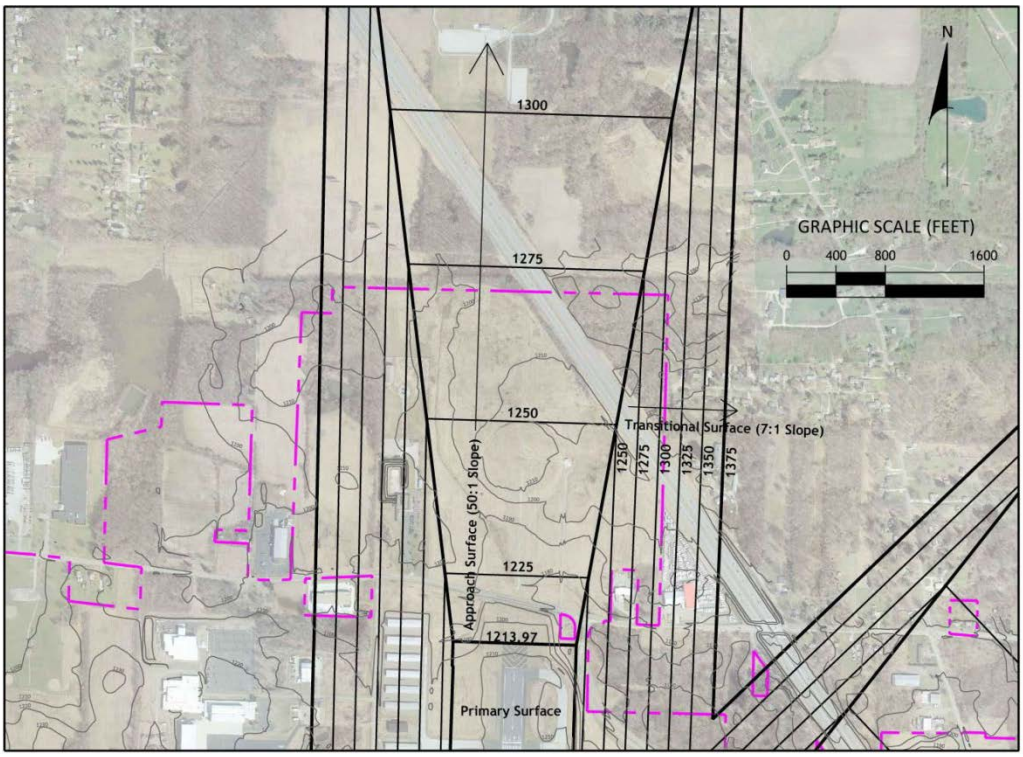
[42] I-INCE. (1999). Technical Assessment of the Effectiveness of Noise Walls. Retrieved from http://ince.org

[43] *Ibid.*

Barriers are most effective when they are close to either the source (the aircraft on the ground) or the receiver (the target residences). Safety factors preclude constructing barriers or other "obstructions" near runways. Specifically, the FAA "runway safety area" and "runway protection zone" restrictions prevent construction of barriers within approximately 200 to 1,000 feet of a runway edge.[44] This means that barriers generally must be constructed near the target residences to be effective.[45]

Federal Aviation Regulation (FAR) Part 77, "Safe, Efficient Use, and Preservation of the Navigable Airspace,"[46] places further limits on barrier height farther from the runway, as shown in Figure 54.

Figure 54 Part 77 Height Limits
Source: CHA, 2014



Part 77 requires the areas around the north end of Runway 01/19 runway end to be free of obstruction up to the elevations shown in the figure, in feet above mean sea level (MSL). Along the eastern border of airport-owned property running from the runway end to the northern border of the property line (on the northeast side of I-77), the maximum elevations are approximately 1,300 MSL, or approximately 86 feet above the 1,214 MSL runway end elevation. This includes the triangle of airport-owned property east of I-77, that is immediately west of the Byron Drive neighborhood. Local land use restrictions also may limit the height of a structure to 60 feet in an industrial district and 36 feet in a residential district.

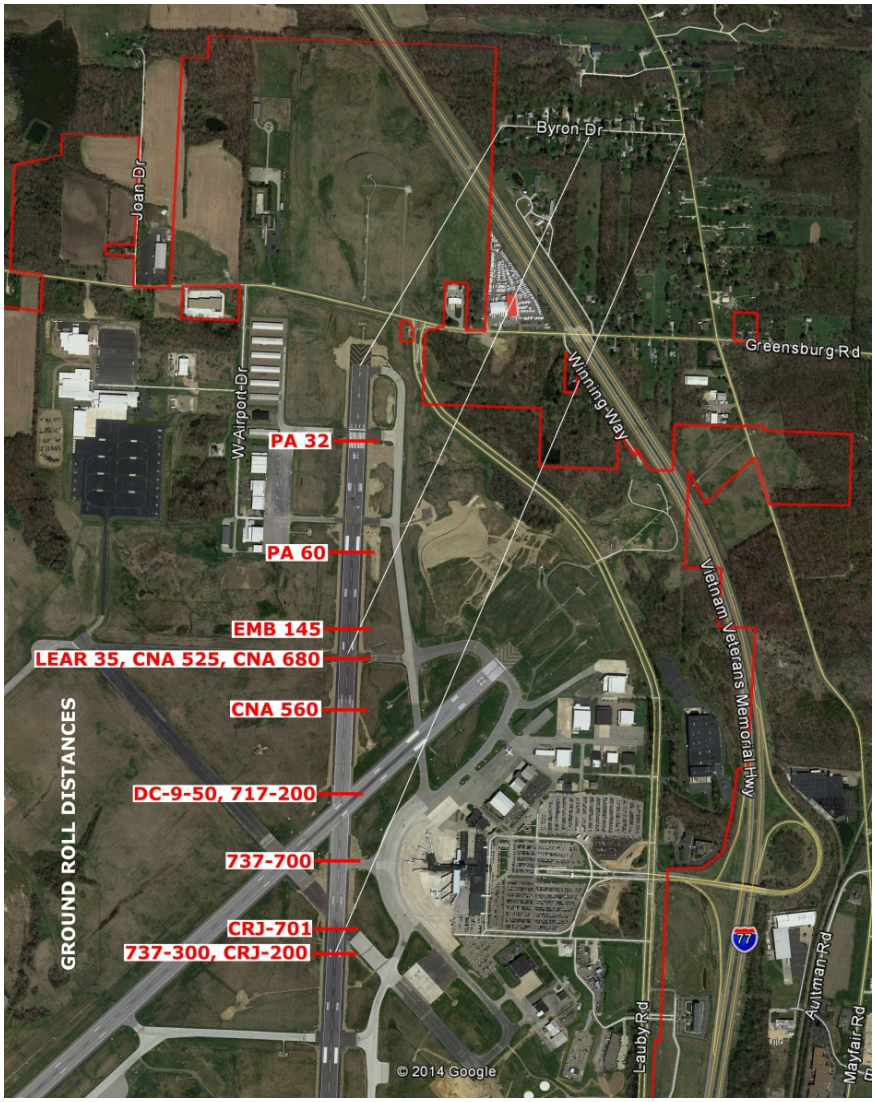
[44] See: FAA Advisory Circular (AC) 150/5300-13A, "Airport Design," http://www.faa.gov/documentLibrary/media/Advisory_Circular/150_5300_13A.pdf

[45] I-INCE. (1999). *Op. cit.*

[46] See: http://www.ecfr.gov/cgi-bin/text-idx?SID=245f80b495d49a25c5cf57b2a6b3e697&node=14:2.0.1.2.9&rgn=div5

Barrier length is just as important as height. For a barrier to be effective acoustically, it must break the line-of-sight from the source to the receiver by a relatively sharp angle, to prevent sound from passing around ("flanking") the ends of the barrier. In fact, "it is recommended that the minimum angle of view that should be screened to avoid flanking is 160°. This means that to effectively reduce the noise coming around its ends, a barrier should be at least eight times as long as the distance from the home or receiver to the barrier."[47] The barrier also must not have any openings in it. To illustrate barrier length issues applicable to the area of concern at CAK, Figure 55 depicts the line-of-sight path from each end of Byron Drive to the runway end on the north and ground-roll distances for a range of aircraft types, modeled in the 2014 existing conditions contours.[48]

Figure 55 Line-of-Sight Paths from Runway 19 Departure Ground Roll Segments to Byron Dive
Source: HMMH and Google Earth Professional, 2014



[47] Crocker, M. J. (2007). Handbook of Noise and Vibration Control. Hoboken, NJ: John Wiley & Sons, Inc.
[48] The ground roll distances were calculated by INM for CAK-specific conditions.

The 13 ground-roll distances are for a diverse range of aircraft types, including:[49]

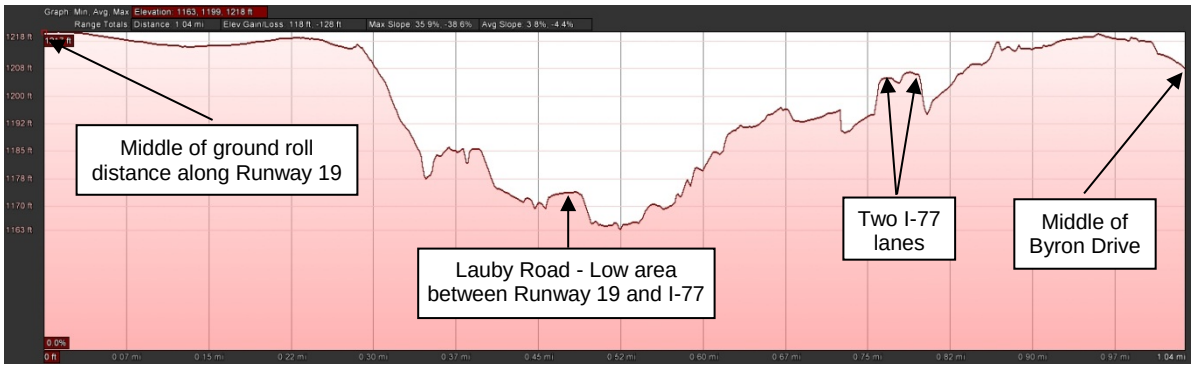
- Two propeller-driven general-aviation aircraft (PA32 and PA60)
- Four corporate jets (Lear35, CNA525, CNA560, and CNA680)
- Seven commercial jets (EMB145, DC-9-50, 717-200, 737-300, 737-700, CRJ-200, and CRJ-701)

Ground-roll is the portion of takeoff for which a barrier would provide the greatest benefit to the Byron Drive neighborhood, for two reasons. First, it is the portion of the takeoff that is closest to the barrier and community, which will maximize insertion loss. Second, after liftoff, the barrier will no longer block the line-of-sight path from the aircraft to the residences, eliminating any benefit.

As the figure shows, most Byron Drive residences have line-of-sight exposure to aircraft ground roll over a long distance. A barrier along the airport property line north of Greensburg Road would block only a portion of the exposure path. Where it would block the path, it would largely be by far less than the optimal 160° angle of view.

A barrier along Lauby Road (mostly, but not wholly on airport property), or off airport on the east side of I-77 might be suggested. The latter option would potentially address noise from the interstate, as suggested by the commenters. However, even ignoring land-ownership issues, the terrain in this area would make these barrier locations infeasible, as illustrated by Figure 56, which depicts the terrain along the center of the three line-of-sight paths depicted on Figure 55.

Figure 56 Elevation Profile along a Line from the Middle of Runway 19 Takeoff Ground Roll to the Middle of Byron Drive
Source: HMMH and Google Earth Professional, 2014



As the figure shows, there is a drop in the terrain on the airport side of I-77, in the vicinity of Lauby Road, which would require a barrier height of approximately 35 to even 50 ft. to simply to break the line-of-sight from the runway to the residences; an effective barrier would have to be impractically high. With regard to an off-airport barrier east of I-77, it is significant to note that Byron Drive is approximately 15 ft. below the raised terrain between it and the highway, which already acts as a barrier. A barrier along the east side of the highway would have to be substantially higher than that terrain to add any benefit for aircraft operations.

Other Considerations

There also are operational, acoustic, and financial considerations to take into account.

[49] The Advisory committee selected these aircraft types for use in single event comparisons presented in the PowerPoint presentation for the fifth Advisory Committee meeting and boards for the second public workshop, presented on pages K-93 and L-28 of this report, respectively.

Operational Considerations:

First, as noted previously, barriers only affect ground-based airport operations. Due to the location of Byron Drive relative to Runway 19, the greatest potential benefit would come from start-of-takeoff roll noise from Runway 19 departures. As shown in Table 9, Runway 19 departures make up only 13% of departures and only 8% of the total operations at CAK.

Acoustical Considerations

Soft ground (such as grass field) under a sound propagation path between a source and receiver results in some noise reduction due to "ground absorption." [50] By adding a barrier between the source and receiver, the sound path is elevated over the barrier and above the ground, resulting in loss of some ground effect. Consequently, the height of a barrier must be increased to make up for the loss of ground absorption.

Wind blowing from source-to-receiver can reduce barrier effectiveness, especially for barriers located midway between source and receiver.[51] Because aircraft generally use runways so that they take off into the wind, there is frequently a wind component in the source-to-receiver direction during takeoff. "It is generally recognized that downward-curving sound paths, as in propagation downwind or during the temperature inversions that are common at night, do reduce the insertion loss of a barrier."[52] To the extent that the Byron Drive neighborhood is downwind of the runway, the barrier effectiveness would be further reduced.

Financial Considerations

The cost of installation of a sound barrier usually exceeds $500,000 per mile.[53] FAA gives priority for funding under the federal Airport Improvement Program (AIP) to projects benefiting residences within the 65 dB DNL contour. The competition for funding within that contour means that projects rarely are located in areas where noise exposure levels are below 65 dB DNL. The exposures of the estimated 28 residences on Byron Drive range from approximately 54 to 58 dB DNL for both the 2014 and 2019 Noise Exposure Maps. It would be extremely unusual for the FAA to apply noise mitigation funding at such low exposure levels. The airport could not use other revenue from airport sources, because that would violate contractual commitments ("grant assurances") it makes to the FAA when it accepts AIP grants, which obligate it to use all airport revenue for federally approved, airport-related purposes. The same grant assurances prohibit the airport from using airport revenue or AIP funding to address non-airport environmental matters; e.g., noise from I-77.

7.6.6 ***Tree Line Sound Barrier***

One comment suggested a line of trees along I-77 might reduce noise levels at Byron Drive. In order for a wooded area to provide sound attenuation, several conditions must be met. In particular, the wooded area must be dense with trees, have sufficient underbrush to block direct view of the source from the receiver and to produce acoustically soft ground, and the trees must generally protrude above the line-of-sight by 16 ft. or more.[54] Furthermore, an appropriately wooded area is most beneficial in reducing for high frequency sound propagation, due to the diffraction of sound from

[50] Crocker, M. J. (2007). *Op. Cit.* and Beranek, L. L., & Vér, I. L. (1992). Noise and Vibration Control Engineering. John Wiley & Sons, Inc.

[51] Beranek & Vér (1992). *Op Cit.*

[52] I-INCE. (1999). *Op. cit.*

[53] *Ibid.*

[54] Beranek & Vér (1992). *Op Cit.*

leaves. However, aircraft noise (especially start of takeoff noise) tends to be low frequency, and thus less susceptible to being reduced by the wooded area. A simple row of trees would not be effective.

7.6.7 *Conclusion of Noise Barrier and Tree Line Sound Barrier Analyses*

For a range of geographical, regulatory, operational, acoustical, and financial considerations, a sound barrier or a tree line is not a feasible solution to reduce ground-based aircraft noise at Byron Drive.

7.6.8 *Consider Requesting Military Aircraft to Fly Higher Over Residences*

This proposal calls for FAA and military operators to adjust air traffic control (ATC) and aircraft operating procedures. Current ATC procedures are in place to maintain safe separation of aircraft operating in the airspace under the control of the CAK airport traffic control tower (within a five-mile radius circle centered on the airport, from the ground to 4,000' above airport elevation). Given that there are no noncompatible land uses within the noise contours in the area of concern to these commenters, there is no basis under Part 150 for requesting changes to existing procedures designed to maximize safe aircraft operation.

7.6.9 *Consider Stricter Regulations on Flight Times*

Strict regulation of flight times falls under the category of "use restrictions," as discussed in Section 7.5, item b.5. A separate federal regulation (14 C.F.R. Part 161, "Notice and Approval of Airport Noise and Access Restrictions") governs these types of restrictions.[55] Part 161 establishes very rigorous analysis, notice, documentation, application, and approval processes. Obtaining FAA approval of a use restriction would require demonstrating that the noise-related benefits of the restriction would exceed the costs to all potentially affected parties (e.g., aircraft operators, the airport, aircraft passengers, businesses benefiting from the operations, etc.). FAA only considers noise benefit within the 65 dB DNL contour.

As discussed in Section 5.2, there is no noncompatible land use within the Noise Exposure Map contours for either 2014 or 2019. Therefore, a Part 161 application would be an unproductive effort from the outset, due to the absence of any benefit recognized by the FAA.[56]

7.6.10 *Consider Stricter Regulation of Flight Patterns*

Twelve alternatives presented in preceding sections (Alternatives 1-10, and 1A and 5A) address a broad range of "flight pattern" options. Alternative 10 actually responds to a suggestion by these same commenters. Section 7.7 presents noise contours for promising combinations of these alternatives. The Advisory Committee reviewed these alternatives and combinations in detail, and the public had opportunity to review them on the study website, and at public workshops.

7.6.11 *Consider Sound-Insulation Treatment of Homes Most Near the Airport*

FAA supports sound insulation of residences or other noise-sensitive uses under very strict conditions, as set forth in "Program Guidance Letter 12-09, Eligibility and Justification

[55] See http://www.faa.gov/airports/environmental/airport_noise/, "Airport Noise and Access Restrictions (14 CFR Part 161)" heading.

[56] It is worth noting that since FAA promulgated Part 161 in 1991 (at the direction of the U.S. Congress in the "Airport Noise and Capacity Act of 1990," ANCA), only two airports have received FAA approval for a new noise or access restriction. In one of those cases, the airport had to sue the FAA to obtain that approval. In both cases, the budget for the effort was in excess of $2 million.

Requirements for Noise Insulation Projects," revised November 7, 2012.[57] The "PGL" defines three primary conditions: (1) the residence or other structure under consideration must be within the 65 dB DNL contour, (2) existing interior levels must be in excess of 45 dB DNL, and (3) the noncompatible development must have existed as of October 1, 1998.

Since no land uses in the CAK environs meet even the first of these conditions, sound insulation is not a viable option for consideration under Part 150 or any other federal funding under the Airport Improvement Program. Section 8.2.2 discusses the status of a previously approved sound insulation element of the land use management portion of the CAK Noise Compatibility Program.

7.7 Analysis of Combinations Noise Abatement Alternatives

The noise abatement alternative analyses conducted through the steps summarized in Sections 7.3 through 7.6 resulted in the identification of several that reduce the number of residents within the 60 dB DNL contour. While this contour is five decibels outside the FAA's normal area for considering approval of new noise abatement measures, the Advisory Committee reached consensus that analysis of combinations of four of the alternatives merited consideration:

- Alternative 1A: South-Flow Nighttime Runway Use Changed to Shift Departures from Runway 23 to 19
- Alternative 5A: All South-Flow Runway Use Changed to Shift Departures from Runway 23 to 19
- Alternative 7: Eastbound Jet Departures on Runway 23 Fly Runway Heading Until Three Nautical Miles from the Radar
- Alternative 8: All East- and Southbound Jet Departures on Runway 19 Initiate a Turn to 160° at One Nautical Mile from the Radar

Since the first two alternatives are mutually exclusive runway use options, two combinations of alternatives were considered:

- Combination 1: Alternative 1A Runway Use Combined with Alternative 7 and 8 Flight Track Use
- Combination 2: Alternative 5A Runway Use Combined with Alternative 7 and 8 Flight Track Use

These combinations are discussed below.

7.7.1 *Combination 1: Alt. 1A Runway Use Combined with Alt. 7 and 8 Flight Track Use*

Figure 57 presents contours for Combination 1 compared to those for the 2014 existing conditions Noise Exposure Map. Table 36 compares the residential land uses within the 60-65 dB DNL contour – by runway end – to that for the 2014 existing conditions case.

[57] http://www.faa.gov/airports/aip/guidance_letters/media/pgl_12_09_NoiseInsulation.pdf

Table 36 Residential Land Uses within 2014 60-65 dB DNL Contours by Runway End for Combination 1: Alt. 1A Runway Use Combined with Alt.s 7 and 8 Flight Track Use, Compared to 2014 Existing Conditions
Source: HMMH, 2014

Case	Metric	North – off Runway 19 approach / 1 departure end	Northeast – off Runway 23 approach / 5 departure end	South – off Runway 1 approach / 19 departure end	Southwest – off Runway 5 approach / 23 departure end	Total
Combination 1	Residents	0	2	5	26	33
	Dwellings	0	1	3	12	16
2014 Existing Conditions	Residents	0	2	4	56	62
	Dwellings	0	1	2	24	27

This analysis reveals that Combination 1 reduces the number of residents within the 60 dB DNL contour substantially on both an annual average day and south-flow day.

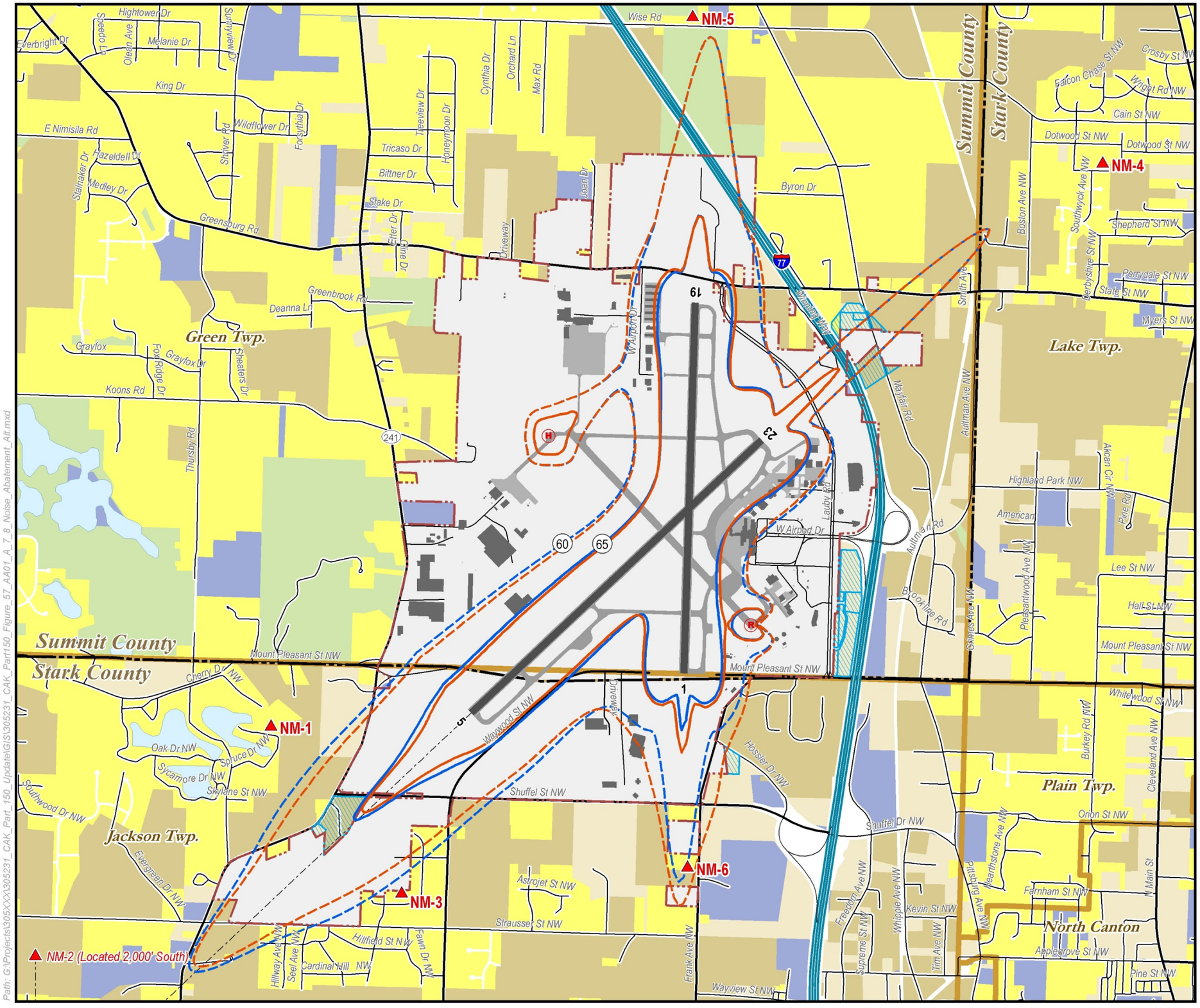


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Figure 57
Combination 1: 2014 DNL for Alt. 1A Runway Use with Alt.s 7 and 8 Flight Track Use, Compared to 2014 Existing Conditions
14 CFR Part 150 Update

- Noise Abatement DNL Contour (65 dB)
- Noise Abatement DNL Contour (60 dB, for informational purposes only)
- 2014 DNL Contour (65 dB)
- 2014 DNL Contour (60 dB, for informational purposes only)
- Airport Property Boundary
- Avigation Easement
- Airport Runway
- NM-# Portable Noise Monitoring Sites
- (H) OANG Helipad
- (R) Designated Runup Location
- County Boundary
- Township Boundary

Land Use (Actual use, or zoned use where undeveloped.)

- Residential Use
- Public Use
- Commercial Use
- Manufacturing and Production
- Recreational and Open Space
- Interstate Highways
- Primary Roads
- Local Roads
- Water Bodies

Notes:
Part 150 Sec. A150.101, Table 1 presents FAA land use compatibility guidelines as a function of yearly DNL. Under those guidelines, all land uses are considered compatible with noise exposure outside 65 DNL.

Portable Noise Monitoring Site NM-2 (Not Shown) is located southwest 11,327' along runway 5 extended centerline, offset northwest 1,031'

North

0 2,000 4,000 Feet

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7.7.2 *Combination 2: Alt. 5A Runway Use Combined with Alt. 7 and 8 Flight Track Use*

Figure 58 presents contours for Combination 2 compared to those for the 2014 existing conditions Noise Exposure Map. Table 36 compares the residential land uses within the 60-65 dB DNL contour – by runway end – to that for the 2014 existing conditions case.

Table 37 Residential Land Uses within 2014 60-65 dB DNL Contours by Runway End for Combination 2: Alt. 5A Runway Use Combined with Alt.s 7 and 8 Flight Track Use, Compared to 2014 Existing Conditions
Source: HMMH, 2014

Case	Metric	North – off Runway 19 approach / 1 departure end	Northeast – off Runway 23 approach / 5 departure end	South – off Runway 1 approach / 19 departure end	Southwest – off Runway 5 approach / 23 departure end	Total
Combination 2	Residents	0	2	5	15	22
	Dwellings	0	1	3	7	11
2014 Existing Conditions	Residents	0	2	4	56	62
	Dwellings	0	1	2	24	27

This analysis reveals that Combination 2 reduces the number of residents within the 60 dB DNL contour substantially. The reduction is even greater than Combination 1, which is logical, since Combination 1 only affects nighttime south-flow runway use, whereas Combination 2 affects south-flow runway use on a 24-hour basis.

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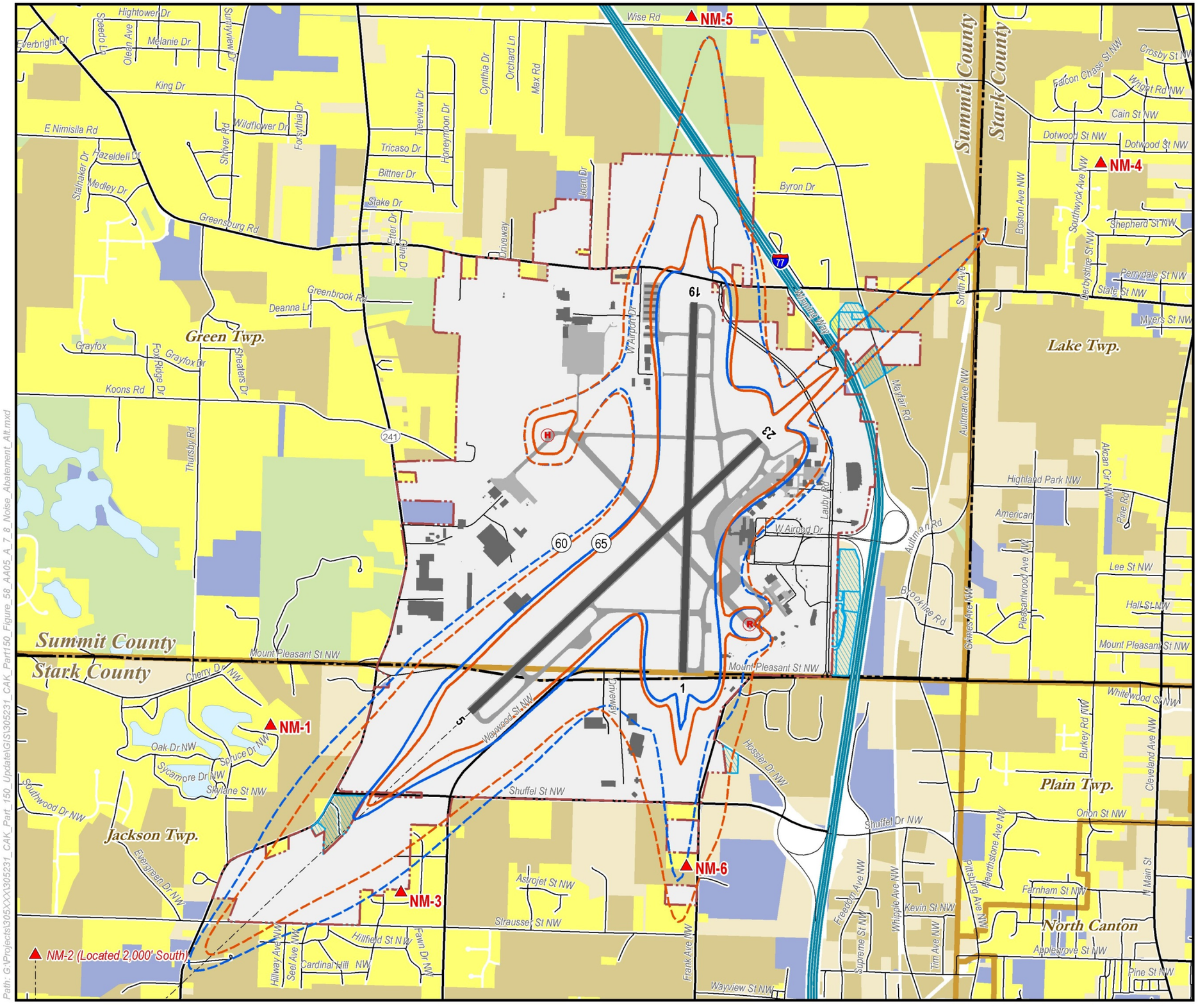

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AKRON-CANTON AIRPORT

Figure 58
Combination 2: 2014 DNL for Alt. 5A Runway Use with Alt.s 7 and 8 Flight Track Use, Compared to 2014 Existing Conditions
14 CFR Part 150 Update

- Noise Abatement DNL Contour (65 dB)
- Noise Abatement DNL Contour (60 dB, for informational purposes only)
- 2014 DNL Contour (65 dB)
- 2014 DNL Contour (60 dB, for informational purposes only)
- Airport Property Boundary
- Avigation Easement
- Airport Runway
- NM-# Portable Noise Monitoring Sites
- OANG Helipad
- Designated Runup Location
- County Boundary
- Township Boundary

Land Use (Actual use, or zoned use where undeveloped.)

- Residential Use
- Public Use
- Commercial Use
- Manufacturing and Production
- Recreational and Open Space
- Interstate Highways
- Primary Roads
- Local Roads
- Water Bodies

Notes:
Part 150 Sec. A150.101, Table 1 presents FAA land use compatibility guidelines as a function of yearly DNL. Under those guidelines, all land uses are considered compatible with noise exposure outside 65 DNL.

Portable Noise Monitoring Site NM-2 (Not Shown) is located southwest 11,327' along runway 5 extended centerline, offset northwest 1,031'

North

0 2,000 4,000 Feet

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7.8 Summary of Abatement Alternative Noise Benefits

The noise abatement alternative analyses conducted under the oversight of the Advisory Committee process addressed 14 noise abatement alternatives cases, in four major groups:

- Eight preferential-runway use cases; i.e., Alternatives 1- 6 and 1A and 5A.
- Three flight-track cases; i.e., Alternatives 7, 8, and 10, which address Runway 23 departure tracks, Runway 19 departure tracks, and a combination of Runway 1 departure and Runway 19 arrival tracks, respectively.
- One case, Alternative 9, considering a shift in the Runway 5 start-of-takeoff-roll point.
- Two cases that combine promising runway use and flight track alternatives; i.e., Combinations 1 and 2 that merge flight track use adjustments from Alternatives 7 and 8 with runway-use adjustments from Alternatives 1A and 5A, respectively.

Table 38 summarizes the "benefits" in terms of the number of residents removed from the 2014 annual average day 60 dB DNL contour for these 14 cases.

Table 38 Summary of Residents within 2014 60-65 dB DNL Contour Intervals by Runway End for All Noise Abatement Alternative Cases and 2014 Noise Exposure Map
Source: HMMH, 2014

Case	Component(s)	Residents within Quadrant					Population Reduction (Increase)
		N	NW	S	SE	Total	
2014	Existing Conditions NEM Baseline	0	2	4	56	62	n.a.
Alt. 1	Night departure runway use revised to match night arrivals	0	10	5	17	32	30
Alt. 1A	South-flow departures shifted from Rwy. 23 to 19 at night	0	2	5	25	32	30
Alt. 2	Night arrival runway use revised to match night departures	0	38	5	37	80	(18)
Alt. 3	Day departure runway use revised to match day arrival use	0	2	5	34	41	21
Alt. 4	Day arrival runway use revised to match day departure use	0	2	4	51	57	5
Alt. 5	All departure runway use revised to match all arrival use	0	29	7	9	45	17
Alt. 5A	South-flow departures shifted from 23 to 19 day and night	0	2	7	8	17	45
Alt. 6	All arrival runway use revised to match all departure use	0	58	5	35	98	(36)
Alt. 7	Eastbound Runway 23 jet departures fly runway heading until three nautical miles from the radar	0	2	4	54	60	2
Alt. 8	All east- and southbound jet departures on Runway 19 initiate a turn to 160° one nautical mile from the radar	0	2	3	56	61	1
Alt. 9	Runway 5 start-of-takeoff displaced 1,250' to the northeast	0	2	4	56	62	0
Alt. 10	Reduce Runway 1 departure and 19 arrival track dispersion	1	2	4	56	63	(1)
Comb. 1	Alternatives 1A, 7, and 8	0	2	5	26	33	29
Comb. 2	Alternatives 5A, 7, and 8	0	2	5	15	22	40

These analyses primarily support pursuing preferential runway use Alternative 1A or 5A. Combinations 1 and 2, which add the flight track refinements, provide slightly *less* benefit, because the combined effect of preferential runway use and tightened flight corridors tend to extend the contours into populated areas.

7.9 FAA Air Traffic Control Tower Manager Feedback

At the final Advisory Committee meeting, the Manager of the FAA Air Traffic Control Tower (ATCT) at CAK provided feedback on the noise abatement analyses.

With regard to the preferential runway options under consideration, The ATCT Manager stated the tower would *not* support the 24-hour option (Alternative 5A), for safety reasons. He particularly cited his concern that the measure would require aircraft departing from the terminal and other ramp areas on the east side of the airport to cross an active runway (Runway 23) in order to use Runway 19 for departures. However, he felt that the measure would be safe and feasible during the nighttime, as contemplated in Alternative 1A.

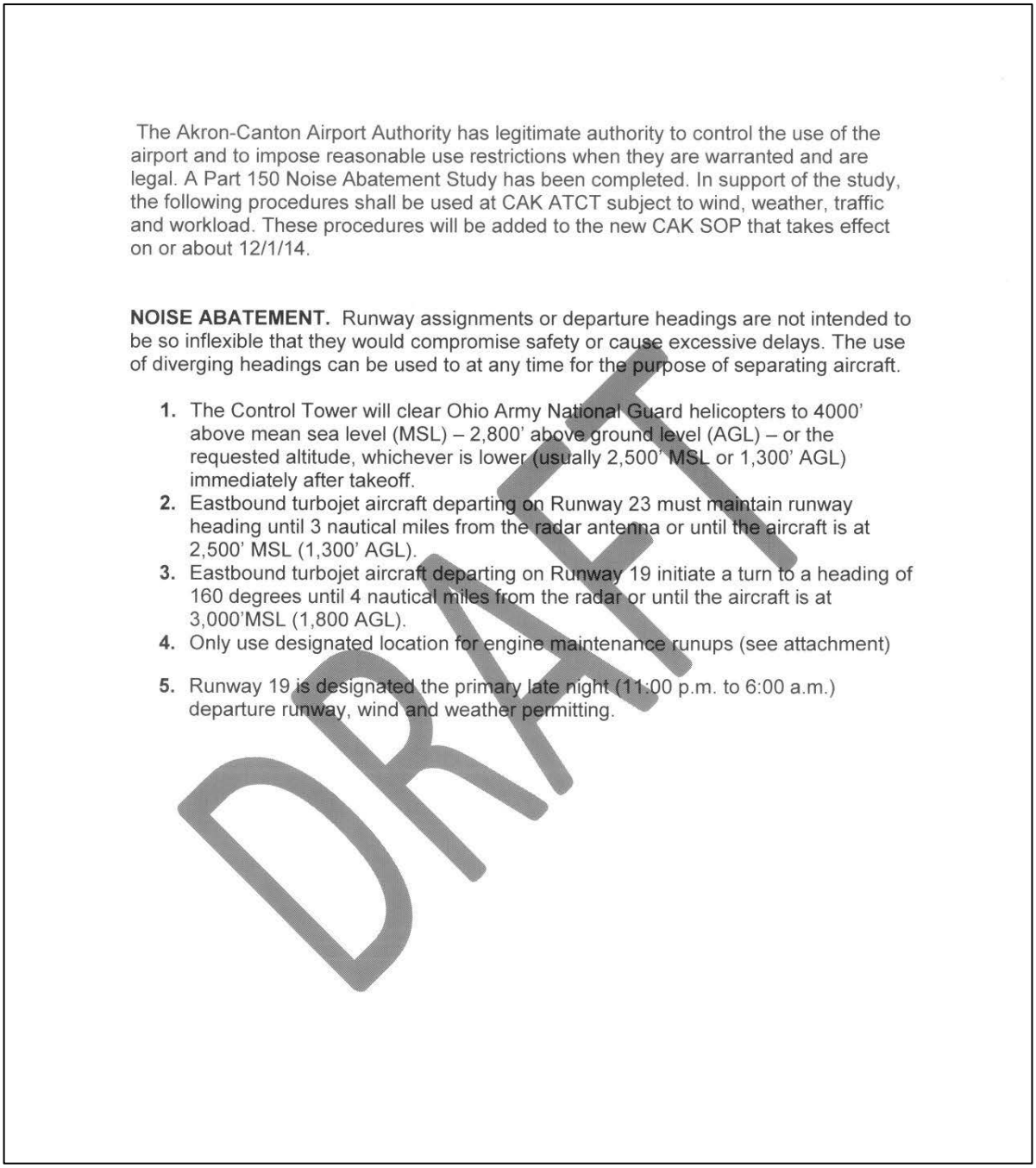
The ATCT Manager provided a draft "Noise Abatement" section that he proposes to include in the in CAK ATCT Standard Operating Procedures (SOP). Figure 59 reproduces that draft SOP, which shows his support for the nighttime runway use proposal, where it states, "Runway 19 is designated the primary late night (11 p.m. to 6 a.m.) departure runway, wind and weather permitting."

While the SOP language does not cover the first and last hours of the 10 p.m. to 7 a.m. period, it is more aggressive than Alternative 1A from 11 p.m. to 6 a.m., by designating Runway 19 to be the overall preferential departure runway during those seven hours. As discussed in Section 7.3.2, Alternative 1A incorporates the more moderate assumption that night departure use would match night arrival use, as split between Runway 19 and 23.

Analysis of actual operations from 11 p.m. to 6 a.m. versus 10 p.m. to 7 a.m. shows that the ATCT manager's proposed approach would result in one more departure every four nights using Runway 19 rather than Runway 23 than Alternative 1A. To be conservative (i.e., slightly *understate* the potential benefit of the program), the contours prepared for Alternative 1A will continue to be used to represent the benefit of the nighttime preferential runway procedure as worded in the SOP.

The proposed nighttime runway use program is the only new noise abatement measure. The Authority does not propose to change any existing, FAA-approved measures. The ATCT Manager's proposed SOP language incorporates those existing measures.

Figure 59 Draft FAA Air Traffic Control Tower Noise Abatement Standard Operating Procedures to Implement Revised Runway Assignments and Other Continuing Measures
Source: FAA, 2014



The Akron-Canton Airport Authority has legitimate authority to control the use of the airport and to impose reasonable use restrictions when they are warranted and are legal. A Part 150 Noise Abatement Study has been completed. In support of the study, the following procedures shall be used at CAK ATCT subject to wind, weather, traffic and workload. These procedures will be added to the new CAK SOP that takes effect on or about 12/1/14.

NOISE ABATEMENT. Runway assignments or departure headings are not intended to be so inflexible that they would compromise safety or cause excessive delays. The use of diverging headings can be used to at any time for the purpose of separating aircraft.

1. The Control Tower will clear Ohio Army National Guard helicopters to 4000' above mean sea level (MSL) – 2,800' above ground level (AGL) – or the requested altitude, whichever is lower (usually 2,500' MSL or 1,300' AGL) immediately after takeoff.
2. Eastbound turbojet aircraft departing on Runway 23 must maintain runway heading until 3 nautical miles from the radar antenna or until the aircraft is at 2,500' MSL (1,300' AGL).
3. Eastbound turbojet aircraft departing on Runway 19 initiate a turn to a heading of 160 degrees until 4 nautical miles from the radar or until the aircraft is at 3,000'MSL (1,800 AGL).
4. Only use designated location for engine maintenance runups (see attachment)
5. Runway 19 is designated the primary late night (11:00 p.m. to 6:00 a.m.) departure runway, wind and weather permitting.

Note: The attachment to which Item 4 refers is Figure 31 of this document.

7.10 Summary of Noise Abatement Recommendations

Based on the preceding analyses and consultation, the President and CEO of the Airport Authority presented recommendations for the revised Noise Compatibility Program in a letter to the Advisory Committee in advance of its sixth meeting. Appendix I presents a full copy of the letter.

In the letter, he notified the Advisory Committee of his intention to recommend that the Authority request FAA approval to continue six of the eight existing noise abatement measures, forego two existing measures the analyses revealed are now unnecessary, and add a new measure related to nighttime preferential runway use, as follow:

- Continue existing Noise Abatement Measure 1 (NA-1) as approved by the FAA for implementation on a voluntary basis: Pilots of all turbojet aircraft may voluntarily use noise abatement departure procedures, including the "close-in" procedure described in FAA Advisory Circular 91-53A "Noise Abatement Departure Profiles" and the "standard" procedure defined in National Business Aviation Association publication "Noise Abatement Procedures for Turbojet Business Aircraft."
- Continue existing Noise Abatement Measure 2 (NA-2) as approved by the FAA for implementation on a voluntary basis: The control tower will clear Ohio Army Air National Guard helicopters to 4,000' above mean sea level (MSL) – 2,800' above ground level (AGL) – or the requested altitude, whichever is lower (usually 2,500' MSL or 1,300' AGL) immediately after takeoff.
- Continue existing Noise Abatement Measure 3 (NA-3) as approved by the FAA for implementation on a voluntary basis: Pilots of all turbojet aircraft may voluntarily restrict the use of reverse thrust activity at night (10:00 p.m. - 7:00 a.m.).
- Continue existing Noise Abatement Measure 4 (NA-4) as approved by the FAA for implementation on a voluntary basis: Eastbound turbojet aircraft departing on Runway 23 maintain runway heading until three nautical miles from the radar, or until the aircraft is at 2,500' MSL (1,300' AGL).
- Continue existing Noise Abatement Measure 5 (NA-5) as approved by FAA for implementation on a voluntary basis: Eastbound turbojet aircraft departing on Runway 19 initiate a turn to a heading of 160 degrees at two nautical miles from the radar and maintain until four nautical miles.
- Continue existing, FAA-approved Noise Abatement Measure 6 (NA-6): Use designated location and orientation for engine maintenance runups.
- Discontinue Noise Abatement Measures 7 and 8 (NA-7 and NA-8), which also address runups and associated taxiing noise. These measures do not address any continuing issues not covered by NA-6, so they are not recommended for inclusion in the revised Noise Compatibility Program.)
- Request that FAA approve a new noise abatement measure (NA-9), which was analyzed as Alternative 1A in the study: Adopt a voluntary, informal runway use program, as defined under FAA Order 8400.9, "National Safety and Operational Criteria for Runway Use Programs," to shift departures from Runway 23 to 19 when operating in the south flow at night (10 p.m. – 7 a.m.).

The Advisory Committee reached consensus at the sixth meeting to support these recommendations, which the Authority staff and consultants presented to other stakeholders through the third public workshop, final public hearing, and posting on the study website.

Section 10 summarizes the recommendations for the overall revised Noise Compatibility Program, with revisions based on the analyses of existing measures and of proposed alternatives in the noise abatement, compatible land use, and program management categories.