ACR Recommendations Analyses and Requests:

-Collective Analysis: 6,000-foot Minimum Altitude on Downwinds, Altitude-Based Turns, and Change Initial Departure Heading on South Flow Departures -ACR Slate Public Meeting Preparation: Sample Talking Points for Individual Slate Measures

For ACR Review, Understanding, and Discussion

February 12, 2020



Request of the ACR at the December 2019 ACR meeting





ACR Slate Collective Analysis:

6,000-foot Minimum Altitude on Downwinds, Altitude-Based Turns, and Change Initial Departure Heading on South Flow Departures

- Modified calendar year 2018 operations collectively such that:
 - Arrival aircraft would maintain altitudes of at least 6,000 feet on downwind
 - Departure aircraft would not initiate turns until reaching 2,000 feet
 - South flow departure aircraft would utilize initial headings of 240 and 120 degrees, north flow departure aircraft would remain on existing headings
- Represents combinations of three individual ACR slate measures presented at the August, October, and December 2019 ACR meetings
- The following slides present our prior analysis of each of the individual measures included as part of this collective analysis



Review of Prior Individual ACR Slate Measures in Collective Analysis



Annual Average Day Aircraft Overflights Analysis: 2018 Operations with 2,000 ft. Altitude-Based Turns Compared to Baseline





Annual Average Day Aircraft Overflights Analysis: Difference – 2018 Operations with 2,000 ft. Altitude-Based Turns Compared to Baseline

Overflight Interval (Operations)	Count of Grid Points / % Change	Count of Population / % Change
Less than -30	48 / 0.8%	2,843 / 0.4%
-30 to -20	24 / 0.4%	2,777 / 0.4%
-20 to -10	130 / 2.1%	14,915 / 2.0%
-10 to -1	910 / 14.4%	101,025 / 13.7%
-1 to 1	3,106 / 49.3%	415,600 / 56.4%
1 to 10	1,888 / 30.0%	184,062 / 25.0%
10 to 20	93 / 1.5%	7,030 / 1.0%
20 to 30	34 / 0.5%	2,498 / 0.3%
Greater Than 30	68 / 1.1%	6,035 / 0.8%
Total	6,301 / 100.0%	736,785 / 100.0%

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Average Annual Day Operations Grid Analysis January 1, 2018 through December 31, 2018 CLT Operations with Altitude Based Turns at 2,000 ft MSL Compared to Baseline Operations

	Nummay		
	Airport Boundary (Approximate	e)	
Differe	nce in Average Annual Day O	peratio	ns
•	<-30		
•	-2030		
	-1020		
0	-110		
	0		
0	1 - 10		
•	10 - 20		
•	20 - 30		
•	>30		
-	State Boundary		County Boundary
_	Highway		Minor Roads
_	Major Roads		Railroad
	Charlotte Regions		
-	City Council District Boundarie	IS	
	County Commission Districts		
	Water / Stream		
•	Landmark Locations		
1000	1 West Mecklenburg High		7 UNCC
	2 Southwest Middle School		8 US Whitewater Center
	3 Olympic Community High 4 Ougli Hollow Middle Scho	School	9 Renaissance Park
	5 South Park Mall	^o	11 Mountain Island Lake
	6 NorthLake Mall		
Data S	Mathalan Coat CC Norma	Aur 2018	Parts Pressed Dist Later
Ponda GIS, Ma Bounda	suroe, Mechlenberg County GIS, Novem Roeds); Gastan County GIS, November sich 2018; (Parka, Community Points); C ry, Charolette Regiona)	ber 2018. (P 2018. (P 2LT, Marc	(Parks, Community Points, Lakes, erks, Community Points): York Dount In 2019, (County Boundary, City

- 1,112 Grid points (17.7%) / 121,560 people (16.5%) would experience reduced numbers of overflights with 2,000 ft. altitude based turns
- 2,083 Grid points (33.1%) / 199,625 people (27.1%) would experience increased numbers of overflights with 2,000 ft. altitude based turns

Number of Noise Events Above 70 dB (N70) Analysis: 2018 Operations with 2,000 ft. Altitude-Based Turns Compared to <u>Baseline</u>





Number of Noise Events Above 70 dB (N70) Analysis: Difference – 2018 Operations with 2,000 ft. Altitude-Based Turns Compared to Baseline

N70 Difference Interval (Events)	Count of Grid Points / % Change	Count of Population / % Change	
Less than -75	63 / 1.0%	4,699 / 0.6%	
-75 to -25	461 / 7.3%	59,096 / 8.0%	
-25 to -10	508 / 8.1%	54,784 / 7.4%	
-10 to -1	1,576 / 25.0%	248,029 / 33.7%	
-1 to 1	1,512 / 24.0%	182,102 / 24.7%	
1 to 10	1,248 / 19.8%	116,811 / 15.9%	
10 to 25	469 / 7.4%	26,370 / 3.6%	
25 to 75	355 / 5.6%	33,131 / 4.5%	
Greater than 75	109 / 1.7%	11,763 / 1.6%	
Total	6,301 / 100.0%	736,785 / 100.0%	

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- 2,608 Grid points (41.4%) / 366,608 people (49.7%) would experience fewer events above 70 dB Lmax with 2,000 ft. altitude based turns
- 2,181 Grid points (34.5%) / 188,075 people (25.6%) would experience more events above 70 dB Lmax with 2,000 ft. altitude based turns

Annual Average Day Aircraft Overflights Analysis: 2018 Operations with Change in Initial Heading on South Flow <u>Departures Compared to Baseline</u>





Annual Average Day Aircraft Overflights Analysis: Difference – 2018 Operations with Change in Initial Heading on South Flow Departures Compared to Baseline

Overflight Interval (Operations)	Count of Grid Points / % Change	Count of Population / % Change	
Less than -30	0 / 0.0%	0 / 0.0%	
-30 to -20	0 / 0.0%	0 / 0.0%	
-20 to -10	71 / 1.1%	3,424 / 0.5%	
-10 to -1	531 / 8.4%	23,729 / 3.2%	
-1 to 1	5,060 / 80.3%	650,564 / 88.3%	
1 to 10	497 / 7.9%	54,540 / 7.4%	
10 to 20	77 / 1.2%	2,496 / 0.3%	
20 to 30	65 / 1.0%	2,032 / 0.3%	
Greater Than 30	0 / 0.0%	0 / 0.0%	
Total	6,301 / 100.0%	736,785 / 100.0%	





Average Annual Day Operations Grid Analysis January 1, 2018 through December 31, 2018 CLT Operations with Change in Initial Heading for South Flow Departures Compared to Baseline Operations

Runway
Airport Boundary (Approximate)

Difference in Average Annual Day Operation • <.30 .20 -- 30 -10--20 -1--10 0 0 1-10 0 10-20 9 20-30 >30 State Boundar - - County Boundary Minor Roads Major Road Railroad Charlotte Regions City Council District Boundaries County Commission Districts Water / Stream Landmark Locations West Mecklenburg High 7 UNCC 8 US Whitewater Center Southwest Middle School 3 Olympic Community High School 9 Renaissance Park 4 Quail Hollow Middle School 10 Ballantyne South Park Mall 11 Mountain Island Lak 6 NorthLake Mall Data Source: Mechlenberg County GIS. November 2018. (Parka: Community Points: Lales Ponds: Roeds): Gasteri County GIS. November 2018. (Parka: Community Points): York Ca GIS. March 2019. (Parka: Community Paints): CLT. March 2019. (County Boundary: City



• 602 Grid points (9.6%) / 27,153 people (3.7%) would experience reduced numbers of overflights with change in initial heading

• 639 Grid points (10.1%) / 59,068 people (8.0%) would experience increased numbers of overflights with change in initial heading

Number of Noise Events Above 70 dB (N70) Analysis: 2018 Operations with Change in Initial Heading on South Flow Departures Compared to Baseline





Number of Noise Events Above 70 dB (N70) Analysis: Difference – 2018 Operations with Change in Initial Heading on South Flow Departures Compared to Baseline

N70 Difference Interval (Events)	Count of Grid Points / % Change	Count of Population / % Change
Less than -75	0 / 0.0%	0 / 0.0%
-75 to -25	95 / 1.5%	2,659 / 0.4%
-25 to -10	194 / 3.1%	5,238 / 0.7%
-10 to -1	890 / 14.1%	104,091 / 14.1%
-1 to 1	4,285 / 68.0%	528,917 / 71.8%
1 to 10	531 / 8.4%	80,386 / 10.9%
10 to 25	176 / 2.8%	9,835 / 1.3%
25 to 75	130 / 2.1%	5,659 / 0.8%
Greater than 75	0 / 0.0%	0 / 0.0%
Total	6,301 / 100.0%	736,785 / 100.0%





Number Above Lmax 70 Grid Analysis January 1, 2018 through December 31, 2018 **CLT Operations with Change in Initial Heading** for South Flow Departures Compared to **Baseline Operations** - Runway Airport Boundary (Approximate) Lmax Difference Grid • -75+ ·25 to -75 -10 to -25 -1 to -10 -1 to 1 (No Color) 1 to 10 10 to 25 25 to 75 0 75+ State Bounda - - County Boundary Minor Roads Major Roads Railroad Charlotte Regions City Council District Boundaries County Commission Districts Water / Stream Open Space Landmark Locations West Mecklenburg High UNCC Southwest Middle School 8 US Whitewater Center Olympic Community High School 9 Renaissance Park 4 Quail Hollow Middle School 10 Ballantyne 5 South Park Mall 11 Mountain Island Lake 6 NorthLake Mall Data Source: Mechlenberg County GIS. Nevember 2018. (Parks, Community Pointa, Laki Ponds, Roads): Gaston County GIS, November 2018. (Parks, Community Pointa): York C GIS, March 2019. (Parks, Community Points): CLT, March 2019. (County Boundary, Caly dary, Charolette Regional

- 1,179 Grid points (18.7%) / 111,988 people (15.2%) would experience fewer events above 70 dB Lmax with change in initial heading
- 837 Grid points (13.3%) / 95,880 people (13.0%) would experience more events above 70 dB Lmax with change in initial heading

Annual Average Day Aircraft Overflights Analysis: 2018 Operations with 6,000-foot Minimum Altitude on Arrivals Downwind Compared to Baseline





Annual Average Day Aircraft Overflights Analysis: Difference – 2018 Operations with 6,000-foot Minimum Altitude on Arrivals Downwind Compared to Baseline

Overflight Interval (Operations)	Count of Grid Points / % Change	Count of Population / % Change
Less than -30	11 / 0.0%	1,784 / 0.1%
-30 to -20	22 / 0.1%	2,038 / 0.1%
-20 to -10	65 / 0.2%	4,061 / 0.2%
-10 to -1	2,780 / 7.3%	217,728 / 10.0%
-1 to 1	30,288 / 79.1%	1,775,473 / 81.3%
1 to 10	3,842 / 10.0%	107,142 / 4.9%
10 to 20	467 / 1.2%	27,860 / 1.3%
20 to 30	298 / 0.8%	14,259 / 0.7%
Greater Than 30	528 / 1.4%	33,216 / 1.5%
Total	38,301 / 100.0%	2,183,561 / 100.0%





Average Annual Day Operations Grid Analysis January 1, 2018 through December 31, 2018 CLT Operations with Minimum 6,000 foot Downwind Compared to Baseline Operations



• 2,878 Grid points (7.6%) / 225,611 people (10.4%) would experience reduced numbers of overflights with minimum 6,000 foot downwind alternative

• 5,135 Grid points (13.4%) / 182,477 people (8.4%) would experience increased numbers of overflights with minimum 6,000 foot downwind alternative

Annual Average Day Aircraft Overflights Analysis: 2018 Operations with 6,000-foot Minimum Altitude on Arrivals Downwind Compared to Baseline





Number of Noise Events Above 70 dB (N70) Analysis: Difference – 2018 Operations with 6,000-foot Minimum Altitude on Arrivals Downwind Compared to Baseline

N70 Difference Interval (Events)	Count of Grid Points / % Change	Count of Population / % Change
Less than -75	0 / 0.0%	0 / 0.0%
-75 to -25	171 / 0.4%	24,891 / 1.1%
-25 to -10	1,026 / 2.7%	104,983 / 4.8%
-10 to -1	5,050 / 13.2%	306,444 / 14.0%
-1 to 1	31,020 / 81.0%	1,687,147 / 77.3%
1 to 10	746 / 1.9%	39,856 / 1.8%
10 to 25	203 / 0.5%	14,309 / 0.7%
25 to 75	85 / 0.2%	5,931 / 0.3%
Greater than 75	0 / 0.0%	0 / 0.0%
Total	38,301 / 100.0%	2,183,561 / 100.0%





Number Above Lmax 70 Grid Analysis January 1, 2018 through December 31, 2018 CLT Operations with Minimum 6,000 foot Downwind Compared to Baseline Operations

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	-/5+ 26 kg 76		
	-2010-70		
	-1010-20		
	-1 to -10		
	-1 to 1 (No Color)		
	11010		
	10 10 25		
	25 10 /5		
•	/5+		
_	State Boundary		County Boundary
_	Highway		Minor Roads
_	Major Roads		Railroad
	Charlotte Regions		
-	City Council District Boundarie	s	
	County Commission Districts		
	Water / Stream	17	Open Space
	Landmark Locations		
_	1 West Mecklenburg High		7 UNCC
	2 Southwest Middle School	Cohool	8 US Whitewater Cent
	Orympic Community High A Origit Mollow Middle Scho	SChool	10 Relianture
	5 South Park Mall		11 Mountain Island Lak

• 6,247 Grid points (16.3%) / 436,318 people (19.9%) would experience fewer events above 70 dB Lmax with minimum 6,000 foot downwind alternative

• 1,034 Grid points (2.6%) / 60,096 people (2.8%) would experience more events above 70 dB Lmax with minimum 6,000 foot downwind alternative

Collective Analysis Results



ACR Slate Collective Analysis:

6,000-foot Minimum Altitude on Downwinds, Altitude-Based Turns, and Change Initial Departure Heading on South Flow Departures

- Combined individual ACR slate measures previously analyzed
- Compared the modified collective results with the 2018 baseline results at each of the grid points (including population estimates at each grid point) in terms of:
 - Number of annual-average overflights
 - Number of average daily noise events above 70 dB (N70)
- Collective results are presented on the expanded grid and utilize updated 2017 ACS population data
- Collective results for differences between 2018 baseline and collective alternative also presented in Google Earth for closer ACR inspection



Annual Average Day Aircraft Overflights Collective Analysis: 6,000-foot Minimum Altitude on Downwinds, Altitude-Based Turns, and Change Initial Departure Heading on South Flow Departures

Overflight Interval (Operations)	Count of Grid Points	Count of Population	
Less than 5	30,406	1,589,196	
6-15	5,170	396,558	
16-30	1,152	76,276	
31-60	759	50,239	
61-120	485	29,656	
121-240	318	40,348	
241-360	8	855	
Greater than 360	3	433	
Total	38,301	2,183,561	





Average Annual Day Operations Grid Analysis January 1, 2018 through December 31, 2018 CLT Operations with Min. 6,000 ft Downwind Altitude Based Turns, and Change Initial Headings for South Flow Departures



- 2,146 Grid points (5.6%) / 165,181 people (7.6%) would experience 16 or more average daily overflights with 2018 baseline
- 2,725 Grid points (7.1%) / 197,807 people (9.0%) would experience 16 or more average daily overflights with collective measures

Annual Average Day Aircraft Overflights Collective Analysis: 6,000-foot Minimum Altitude on Downwinds, Altitude-Based Turns, and Change Initial Departure Heading on South Flow Departures Comparison





Annual Average Day Aircraft Overflights Collective Analysis: 6,000-foot Minimum Altitude on Downwinds, Altitude-Based Turns, and Change Initial Departure Heading on South Flow Departures Comparison





Annual Average Day Aircraft Overflights Analysis: Difference – 6,000-foot Minimum Altitude on Downwinds, Altitude-Based Turns, and Change Initial Departure Heading on South Flow Departures Compared to Baseline

Overflight Interval (Operations)	Count of Grid Points / % Change	Count of Population / % Change
Less than -30	74 / 0.2%	8,469 / 0.4%
-30 to -20	73 / 0.2%	6,691 / 0.3%
-20 to -10	360 / 0.9%	26,091 / 1.2%
-10 to -1	5,817 / 15.2%	416,428 / 19.1%
-1 to 1	22,310 / 58.2%	1,182,612 / 54.2%
1 to 10	7,851 / 20.5%	459,038 / 21.0%
10 to 20	801 / 2.1%	36,222 / 1.7%
20 to 30	403 / 1.1%	18,351 / 0.8%
Greater Than 30	612 / 1.6%	29,659 / 1.4%
Total	38,301 / 100.0%	2,183,561 / 100.0%





Average Annual Day Operations Grid Analysis January 1, 2018 through December 31, 2018 CLT Operations with Min. 6,000 ft Downwind Altitude Based Turns, and Change Initial Headings for South Flow Departures Compared to Baseline Operations

Airport Boundary (Approximate) Difference in Average Annual Day Operations	
Difference in Average Annual Day Operations	
 <.30 -20 - 30 -10 - 20 -1 - 10 0 1 - 10 0 10 - 20 20 - 30 20 - 30 20 - 30 State Boundary - County Major Roads Charlotte Regions Charlotte Regions Charlotte Regions Charlotte Regions County Commission Districts Water / Stream Open S Landmark Locations West Mediale School U Southwest Middle School U State Media Common School 	
20 - 30 -10 - 20 -10 - 20 -1 - 10 0 1 - 10 0 1 - 10 10 - 20 20 - 30 -30 State Boundary County Highway Minor R Major Roads Railroac Charlotte Regions Charlotte Regions Charlotte Regions Charlotte Regions County Commission Districts Water / Stream Open S Landmark Locations 1 West Meckenburg High Open S Southwest Middle School 8 U 3 Optime Community High School 9 3 Optime Community High School 9 3 Optime Community High School 9	
- 10 - 20 - 20 - 11 - 10 - 20 - 20 - 30 - 330 - 330 - 330 - 330 - 330 - 330 - 330 - 330 County Highway Minor R Major Roads - Charlotte Regions Charlotte Regions Charlotte Regions County Dutrict Boundaries County Commission Districts Water / Stream Open S Landmark Locations 1 West Mecklehourg High School	
- 110 0 -	
0 0 1-10 10-20 20-30 20-30 330 State Boundary - County Highway Minor R Major Roads Railroac Charlotte Regions Charlotte Regions County Commission Districts County Commission Districts Water / Stream Open S Landmark Locations Landmark Locations Landmark Locations Landmark Locations Landmark Locations Supple Community High School 9 R Supple Community High School 9 R Supple Community High School 9 R	
1-10 10-20 20-30 20-30 23-30 State Boundary County Highway Minor R Major Roads Railroad Charlotte Regions Charlotte Regions County Commission Districts Water / Stream Open S Landmark Locations 1 West Macklenburg High Shood 9, 7 2 Southwest Middle School 8 U 3 Opymey Community High Shood 9, 7	
10 - 20 20 - 30 20 - 30 State Boundary - County Highway Minor R Major Roads Railroad Charlotte Regions Charlotte Regions County Commission Districts Water / Stream Open S Landmark Locations 1 West Mecklehourg High School 8 U 2 Southwest Middle School 8 U	
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Major Roads Railroad Charlotte Regions Charlotte Regions City Council District Boundaries County Commission Districts Water / Stream Open S Landmark Locations 1 West Mecklehourg High 7 U 2 Southwest Media School 8 U 2 Southwest Media School 9 R 4 Over High School 9 R 4 Over	oads
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Data Source Machinehing County GS, November 2018, (Pasis, County GS, November 2018), (Pasis, County GS, November 2018), (Pasis, County GS, November 2019), (Pasis, County GA, March 2019, (California), Caronistin Regional Coli, March 2019, (Pasis, Community Paritie, Cd.), March 2019, (Ca Bounday, Caronistin Regional	ennunity Points, Lakes, unity Points): York County unity Boundary, City

• 6,324 Grid points (16.5%) / 457,679 people (21.0%) would experience reduced numbers of overflights with collective measures

• 9,667 Grid points (25.3%) / 543,270 people (24.9%) would experience increased numbers of overflights with collective measures

Number of Noise Events Above 70 dB (N70) Analysis: 2018 Baseline Operations

ACR Criteria	N70 Interval (Events)	Count of Grid Points	Count of Population
Comfort	25 or Less	33,865	1,688,861
Comfort	26-50	2,217	252,854
Concorn	51-75	660	78,199
Concern	76-100	396	40,312
No-Go	101-150	418	45,668
	151-200	294	31,313
	201-300	219	26,463
	301-400	147	15,057
	401-500	68	4,210
	More than 500	17	624
	Total	38,301	2,183,561





Number of Noise Events Above 70 dB (N70) Collective Analysis: 6,000-foot Minimum Altitude on Downwinds, Altitude-Based Turns, and Change Initial Departure Heading on South Flow Departures

ACR Criteria	N70 Interval (Events)	Count of Grid Points	Count of Population
Comfort	25 or Less	34,561	1,789,954
comort	26-50	1,590	169,455
Concern	51-75	578	67,890
	76-100	360	34,908
No-Go	101-150	408	37,623
	151-200	275	27,220
	201-300	287	35,614
	301-400	301-400 138	
	401-500	81	6,974
	More than 500	23	1,147
	Total	38,301	2,183,561





Number Above Lmax 70 Grid Analysis January 1, 2018 - December 31, 2018 CLT Operations with Min. 6,000 ft Downwind Altitude Based Turns, and Change Initial Headings for South Flow Departures



- 2,219 Grid points (5.8%) / 241,846 people (11.0%) would experience 51 or more N70 events with 2018 baseline
- 2,150 Grid points (5.6%) / 224,152 people (10.3%) would experience 51 or more N70 events with collective measures

Number of Noise Events Above 70 dB (N70) Collective Analysis: 6,000-foot Minimum Altitude on Downwinds, Altitude-Based Turns, and Change Initial Departure Heading on South Flow Departures Comparison





Number of Noise Events Above 70 dB (N70) Collective Analysis: 6,000-foot Minimum Altitude on Downwinds, Altitude-Based Turns, and Change Initial Departure Heading on South Flow Departures Comparison

ACR N70		Collective Alternative		Baseline		Difference: Collective Alternative vs. Baseline	
Criteria	Interval (Events)	Count of Grid Points	Count of Population	Count of Grid Points	Count of Population	Count of Grid Points	Count of Population
Comfort	25 or Less	34,561	1,789,954	33,865	1,688,861	696	101,093
Comfort	26-50	1,590	169,455	2,217	252,854	-627	-83,399
Con	nfort Subtotal	36,151	1,959,409	36,082	1,941,715	69	17,694
Concorn	51-75	578	67,890	660	78,199	-82	-10,309
Concern	76-100	360	34,908	396	40,312	-36	-5,404
Con	cern Subtotal	938	102,798	1,056	118,511	-118	-15,713
	101-150	408	37,623	418	45,668	-10	-8,045
	151-200	275	27,220	294	31,313	-19	-4,093
No Go	201-300	287	35,614	219	26,463	68	9,151
NO-00	301-400	138	12,776	147	15,057	-9	-2,281
	401-500	81	6,974	68	4,210	13	2,764
	More than 500	23	1147	17	624	6	523
No	-Go Subtotal	1,212	121,354	1,163	123,335	49	-1,981
(Grand Total	38,301	2,183,561	38,301	2,183,561	N/A	N/A



Number of Noise Events Above 70 dB (N70) Collective Analysis: Difference – 6,000-foot Minimum Altitude on Downwinds, Altitude-Based Turns, and Change Initial Departure Heading on South Flow Departures

Compared to Baseline

N70 Difference Interval (Events)	Count of Grid Points / % Change	Count of Population / % Change
Less than -75	89 / 0.2%	9,644 / 0.4%
-75 to -25	869 / 2.3%	135,414 / 6.2%
-25 to -10	1,889 / 4.9%	237,479 / 10.9%
-10 to -1	8,698 / 22.7%	637,556 / 29.2%
-1 to 1	20,050 / 52.3%	622,765 / 28.5%
1 to 10	4,775 / 12.5%	332,492 / 15.2%
10 to 25	1,136 / 3.0%	109,477 / 5.0%
25 to 75	687 / 1.8%	84,478 / 3.9%
Greater than 75	108 / 0.3%	14,256 / 0.7%
Total	38,301 / 100.0%	2,183,561 / 100.0%





Southwest Middle School
 Southwest Middle School
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 Data Source: Monthlow Coll (Planks, Community Park), Laines,
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 Yourk, Roads), Grain Colly Coll, November 2018, (Planks, Community Park), Texic Control
 Boundary, Charoliter Regioned



• 11,545 Grid points (30.1%) / 1,020,093 people (46.7%) would experience fewer events above 70 dB Lmax with collective measures

• 6,706 Grid points (15.9%) / 540,703 people (24.8%) would experience more events above 70 dB Lmax with collective measures

- Number of average daily overflights:
 - A greater number of grid points and people experienced an increase than decrease
- Number of noise events greater than 70 dB (N70)
 - In general, a greater number of grid points and more people experienced a decrease in N70 than an increase
 - ACR Criteria
 - Comfort: A greater number of grid points and people experienced an increase than a decrease
 - Concern: A greater number of grid points and people experienced a decrease than an increase
 - No-go: A greater number of grid points experienced an increase than a decrease, but fewer people experienced an increase than a decrease



Maintaining a minimum altitude of 6,000 feet on the downwind continues to provide the greatest benefits for areas north and south of the airport between the extended runway centerlines and downwind, and disbenefit for areas north and south on runway centerline further away from the airport



 Altitude-based turns provide the greatest benefits for areas immediately adjacent to the north side of the airport as well as south of the airport where aircraft turn today, and disbenefit for areas further to the north of the airport and immediately adjacent to the south side of the airport



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Changing the initial heading for south flow departures provide the greatest benefits for areas east and west of the airport close to the south side of the airport as well as south of the airport where aircraft turn today, and disbenefit closer to the airport along and east and west of the runway centerlines



31

Potential noise increases across most of the grid, and potential noise reduction along the eastern and western edges of the grid for the community of Mountain Island Lake





Potential noise increases in all but the southwest most corner of the grid, and potential noise reduction elsewhere in the grid for the community of South Park





 Potential noise increases along the northwest, northeast, and central southern edge of the grid, and noise reductions elsewhere in the grid for the community of Steele Creek





- 6,000 foot downwinds may negatively effect arrival operations throughput due to reduced flexibility to vector aircraft close to the airport and the potential, on average, to increase flight miles
- Changing the initial departure heading on south flow departures may negatively effect departure operations throughput due to departure aircraft taking longer to achieve divergence



ACR Slate Public Meeting Preparation: Sample Talking Points for Individual Slate Measures

Request of the ACR at the January 2020 ACR meeting



ACR Slate Public Meeting Preparation: Sample Talking Points for Individual Slate Measures

- ACR requested at January ACR meeting to identify key talking points as an example for one of the slate items to be discussed at upcoming public/community meetings
- Based on progress completed to date, HMMH selected the 6,000-foot Minimum Downwind Altitude slate recommendation as an example for discussion of potential talking points
- Note: community regions will be removed for public meetings from graphics as presented in this example at the request of the ACR



Annual Average Day Aircraft Overflights Analysis: Difference – 2018 Operations with 6,000-foot Minimum Altitude on Arrivals Downwind Compared to Baseline

Overflight Interval (Operations)	Count of Grid Points / % Change	Count of Population / % Change
Less than -30	11 / 0.0%	1,784 / 0.1%
-30 to -20	22 / 0.1%	2,038 / 0.1%
-20 to -10	65 / 0.2%	4,061 / 0.2%
-10 to -1	2,780 / 7.3%	217,728 / 10.0%
-1 to 1	30,288 / 79.1%	1,775,473 / 81.3%
1 to 10	3,842 / 10.0%	107,142 / 4.9%
10 to 20	467 / 1.2%	27,860 / 1.3%
20 to 30	298 / 0.8%	14,259 / 0.7%
Greater Than 30	528 / 1.4%	33,216 / 1.5%
Total	38,301 / 100.0%	2,183,561 / 100.0%





Average Annual Day Operations Grid Analysis January 1, 2018 through December 31, 2018 CLT Operations with Minimum 6,000 foot Downwind Compared to Baseline Operations



• 2,878 Grid points (7.6%) / 225,611 people (10.4%) would experience reduced numbers of overflights with minimum 6,000 foot downwind alternative

5,135 Grid points (13.4%) / 182,477 people (8.4%) would experience increased numbers of overflights with minimum 6,000 foot downwind alternative

Number of Noise Events Above 70 dB (N70) Analysis: Difference – 2018 Operations with 6,000-foot Minimum Altitude on Arrivals Downwind Compared to Baseline

N70 Difference Interval (Events)	Count of Grid Points / % Change	Count of Population / % Change
Less than -75	0 / 0.0%	0 / 0.0%
-75 to -25	171 / 0.4%	24,891 / 1.1%
-25 to -10	1,026 / 2.7%	104,983 / 4.8%
-10 to -1	5,050 / 13.2%	306,444 / 14.0%
-1 to 1	31,020 / 81.0%	1,687,147 / 77.3%
1 to 10	746 / 1.9%	39,856 / 1.8%
10 to 25	203 / 0.5%	14,309 / 0.7%
25 to 75	85 / 0.2%	5,931 / 0.3%
Greater than 75	0 / 0.0%	0 / 0.0%
Total	38,301 / 100.0%	2,183,561 / 100.0%





Number Above Lmax 70 Grid Analysis January 1, 2018 through December 31, 2018 CLT Operations with Minimum 6,000 foot Downwind Compared to Baseline Operations

	75.		
	-70* -25 In -75		
	-10 to -25		
	-1 to -10		
0	-1 to 1 (No Color)		
	1 to 10		
	10 to 25		
	25 to 75		
•	75+		
_	State Boundary		County Boundary
_	- Highway		Minor Roads
_	Major Roads		Railroad
	Charlotte Regions		
-	City Council District Boundari	es	
	County Commission Districts		
	Water / Stream	177	Open Space
•	Landmark Locations		1010020
	1 West Mecklenburg High 2 Southwart Middle School	2	7 UNCC 8 US Whitewater Cen
	3 Olympic Community High	h School	9 Renaissance Park
	4 Quail Hollow Middle Sch	loo	10 Ballantyne
	5 South Park Mall 6 NorthLake Mall		11 Mountain Island La
Dete 1 Ponta GIS 1	6 NorthLake Mall Source: Mechlenberg County GIS, Noven , Roadul, Galaton County GIS, Novemb Aren 2019, Parka: Commission Painta:	mber 2018 er 2018, (P CLT, Merc	, (Parks, Community Points, Laker arks, Community Points), York Co o 2019, (Courty Boundery, City
Bound	lary, Charolette Regions/		1 10 100

• 6,247 Grid points (16.3%) / 436,318 people (19.9%) would experience fewer events above 70 dB Lmax with minimum 6,000 foot downwind alternative

• 1,034 Grid points (2.6%) / 60,096 people (2.8%) would experience more events above 70 dB Lmax with minimum 6,000 foot downwind alternative

ACR Slate Public Meeting Preparation:

6,000-foot Minimum Downwind Altitude Sample Talking and Key Takeaways

- Aircraft overflights
 - May <u>decrease</u> for communities between approximately 6 and 16 miles north and south of the airport between the existing downwind and extended runway centerlines
 - May <u>increase</u> for communities beyond approximately 16 miles north and south of the airport between the existing downwind and extended runway centerlines, as well as for communities underneath the existing downwinds and underneath the runway centerlines
 - Remain roughly the same elsewhere
- Number of noise events greater than 70 dB (N70)/noise levels
 - May <u>decrease</u> for communities between approximately 6 and 20 miles north and south of the airport between the existing downwind and runway centerlines as well as underneath the existing downwinds
 - May <u>increase</u> for communities beyond 20 miles north and south of the airport directly underneath the existing downwinds and underneath the runway centerlines
- May negatively affect the airports capacity due to reduced flexibility and efficiency for controllers to accommodate arrival aircraft and may be difficult to implement due to potential airspace and procedural changes

Discussion

