14 CFR Part 150 Noise Compatibility Program Update

John Glenn Columbus International Airport

Draft – June 2021

PREPARED FOR
Columbus Regional Airport Authority

PRESENTED BY
Landrum & Brown, Incorporated

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STATEMENT OF CERTIFICATION AND PUBLIC NOTIFICATION

The Noise Exposure Maps and accompanying documentation for the Noise Exposure Maps for the John Glenn Columbus International Airport submitted in accordance with 14 CFR Part 150 with the best available information, are hereby certified as true and complete to the best of my knowledge and belief. I verify that the data used to develop the Existing (2020) Noise Exposure Map and the Future (2025) Noise Exposure Map is representative of the best available information and reasonable assumptions at the time the noise modeling began. It is acknowledged that the current impacts of the COVID-19 public health emergency resulted in a decline in air travel demand and aviation activity. The data used to prepare the Existing (2020) Noise Exposure Map and the Future (2025) Noise Exposure Map was developed prior to the COVID-19 public health emergency. Therefore, operating levels used to prepare the Existing (2020) Noise Exposure Map do not necessarily reflect conditions at the time of submittal. It is expected that aviation activity will return to previously forecast levels; although, there may be some delay in reaching operating levels originally forecast for the Future (2025) Noise Exposure Map condition.

Interested persons have been afforded adequate opportunity to submit their views, data, and comments concerning the correctness and adequacy of the draft Noise Exposure Maps and descriptions of the forecast of aircraft operations.

____ Date ____________________

Joseph R. Nardone
President & CEO
Columbus Regional Airport Authority

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AIRPORT NAME: John Glenn Columbus International Airport REVIEWER: ________________

	Yes / No / NA	Page No.\Other Reference
I. IDENTIFICATION AND SUBMISSION OF MAP DOCUMENT:		
A. Is this submittal appropriately identified as one of the following, submitted under 14 CFR Part 150:		
1. a NEM only	No	N/A
2. a NEM and NCP	Yes	Letter of Transmittal
3. a revision to NEMs which have previously been determined by FAA to be in compliance with Part 150?	Yes	Letter of Transmittal
B. Is the airport name and the qualified airport operator identified?	Yes	Letter of Transmittal, Chapter 1, page 1-1
C. Is there a dated cover letter from the airport operator which indicates the documents are submitted under Part 150 for appropriate FAA determinations?	Yes	Letter of Transmittal
II. CONSULTATION: [150.21(b), A150.105(a)]		
A. Is there a narrative description of the consultation accomplished, including opportunities for public review and comment during map development?	Yes	Chapter 1, Pages 1-5 to 1-7, Appendix G, Public Involvement
B. Identification:		
1. Are the consulted parties identified?	Yes	Appendix G, Public Involvement
2. Do they include all those required by 150.21(b) and A150.105(a)?	Yes	Chapter 1, Pages 1-5 to 1-7, and Appendix G
C. Does the documentation include the airport operator's certification, and evidence to support it, that interested persons have been afforded adequate opportunity to submit their views, data, and comments during map development and in accordance with 150.21(b)?	Yes	Sponsor's Certificatation
D. Does the document indicate whether written comments were received during consultation and, if there were comments, that they are on file with the FAA region?	Pending	Appendix G will contain the responses to comments made at the public hearing.

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	Yes / No / NA	Page No.\Other Reference
III. GENERAL REQUIREMENTS: [150.21]		
A. Are there two maps, each clearly labeled on the face with year (existing condition year and 5-year)?	Yes	Exhibits NEM-1 & NEM-2
B. Map currency:		
1. Does the existing condition map year match the year on the airport operator's submittal letter?	Yes	Letter of Transmittal & Exhibit NEM-1
2. Is the 5-year map based on reasonable forecasts and other planning assumptions and is it for the fifth calendar year after the year of submission?	Yes	Chapter 1, Pages 1-4 to 1-5; Appendix C, page C-52; and Appendix H, Page H-1
3. If the answer to 1 and 2 above is no, has the airport operator verified in writing that data in the documentation are representative of existing condition and 5-year forecast conditions as of the date of submission?	N/A	N/A
C. If the NEM and NCP are submitted together:		
1. Has the airport operator indicated whether the 5-year map is based on 5-year contours without the program vs. contours if the program is implemented?	Yes	Letter of Transmittal & Chapter 4, Page 4-49
2. If the 5-year map is based on program implementation:		
a. are the specific program measures which are reflected on the map identified:	Yes	Chapter 4
b. does the documentation specifically describe how these measures affect land use compatibilities depicted on the map?	Yes	Chapter 4
3. If the 5-year NEM does not incorporate program implementation, has the airport operator included an additional NEM for FAA determination after the program is approved which shows program implementation conditions and which is intended to replace the 5-year NEM as the new official 5-year plan?	N/A	N/A

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	Yes / No / NA	Page No.\Other Reference
IV. MAP SCALE, GRAPHICS, AND DATA REQUIREMENTS: [A150.101, A150.103, A150.105, 150.21(a)]		
A. Are the maps of sufficient scale to be clear and readable (they must not be less than 1" to 8,000'), and is the scale indicated on the maps?	Yes	Exhibits NEM-1 & NEM-2
B. Is the quality of the graphics such that required information is clear and readable?	Yes	Exhibits NEM-1 & NEM-2
C. Depiction of the airport and its environs.		
1. Is the following graphically depicted to scale on both the existing condition and 5-year maps:		
a. airport boundaries	Yes	Exhibits NEM-1 & NEM-2
b. runway configurations with runway end numbers	Yes	Exhibits NEM-1 & NEM-2
2. Does the depiction of the off-airport data include:		
a. a land use base map depicting streets and other identifiable geographic features	Yes	Exhibits NEM-1 & NEM-2
b. the area within the 65 Ldn (or beyond, at local discretion)	Yes	Exhibits NEM-1 & NEM-2
c. clear delineation of geographic boundaries and the names of all jurisdictions with planning and land use control authority within the 65 Ldn (or beyond, at local discretion)	Yes	Exhibits NEM-1 & NEM-2
D. 1. Continuous contours for at least the Ldn 65, 70, and 75?	Yes	Exhibits NEM-1 & NEM-2
2. Based on current airport and operational data for the existing condition year NEM, and forecast data for the 5-year NEM?	Yes	Letter of Transmittal, Exhibits NEM-1 & NEM-2

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	Yes / No / NA	Page No.\Other Reference
E. Flight tracks for the existing condition and 5-year forecast time frames (these may be on supplemental graphics which must use the same land use base map as the existing condition and 5-year NEM), which are numbered to correspond to accompanying narrative?	Yes	Appendix C, Exhibits C-10, C-11, C-12, C-13, C-14, C-15, and C-16
F. Locations of any noise monitoring sites (these may be on supplemental graphics which must use the same land use base map as the official NEMs)	Yes	Exhibit B-1
G. Noncompatible land use identification:		
1. Are noncompatible land uses within at least the 65 Ldn depicted on the maps?	Yes	NEM-1, NEM-2, and Appendix B,
2. Are noise sensitive public buildings identified?	Yes	Exhibit D-1 and Table D-2
3. Are the noncompatible uses and noise sensitive public buildings readily identifiable and explained on the map legend?	Yes	Exhibits NEM-1 & NEM-2
4. Are compatible land uses, which would normally be considered noncompatible, explained in the accompanying narrative?	Yes	Exhibits NEM-1 & NEM-2, and Chapter 3
V. NARRATIVE SUPPORT OF MAP DATA: [150.21(a), A150.1, A150.101, A150.103]		
A. 1. Are the technical data, including data sources, on which the NEMs are based adequately described in the narrative?	Yes	Chapter 3, Appendix C
2. Are the underlying technical data and planning assumptions reasonable?	Yes	Chapter 3, Appendix C
B. Calculation of Noise Contours:		
1. Is the methodology indicated?		
a. is it FAA approved?	Yes	Chapter 3, Appendix C
b. was the same model used for both maps?	Yes	Appendix C, Page C-22
c. has AEE approval been obtained for use of a model other than those which have previous blanket FAA approval?	N/A	N/A

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	Yes / No / NA	Page No.\Other Reference
2. Correct use of noise models:		
a. does the documentation indicate the airport operator has adjusted or calibrated FAA-approved noise models or substituted one aircraft type for another?	No	Appendix B, Page B-11
b. if so, does this have written approval from AEE?	N/A	N/A
3. If noise monitoring was used, does the narrative indicate that Part 150 guidelines were followed?	Yes	Appendix B, Page B-2
4. For noise contours below 65 Ldn, does the supporting documentation include explanation of local reasons? (Narrative explanation is highly desirable but not required by the Rule.)	Yes	Chapter 3, Page 3-1
C. Noncompatible Land Use Identification:		
1. Does the narrative give estimates of the number of people residing in each of the contours (Ldn 65, 70 and 75, at a minimum) for both the existing condition and 5-year maps?	Yes	Chapter 3
2. Does the documentation indicate whether Table 1 of Part 150 was used by the airport operator?	Yes	Appendix A, Table A-1
a. If a local variation to Table 1 was used:		
(1) does the narrative clearly indicate which adjustments were made and the local reasons for doing so?	N/A	N/A
(2) does the narrative include the airport operator's complete substitution for Table 1?	N/A	N/A
3. Does the narrative include information on self-generated or ambient noise where compatible/noncompatible land use identifications consider non-airport/aircraft sources?	N/A	N/A

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	Yes / No / NA	Page No.\Other Reference
4. Where normally noncompatible land uses are not depicted as such on the NEMs, does the narrative satisfactorily explain why, with reference to the specific geographic areas?	N/A	N/A
5. Does the narrative describe how forecasts will affect land use compatibility?	Yes	Chapter 3, Page 3-6, Appendix D
VI. MAP CERTIFICATIONS: [150.21(b), 150.21(e)]		
A. Has the operator certified in writing that interested persons have been afforded adequate opportunity to submit views, data, and comments concerning the correctness and adequacy of the draft maps and forecasts?	Yes	Sponsor's Certificate
B. Has the operator certified in writing that each map and description of consultation and opportunity for public comment are true and complete?	Yes	Sponsor's Certificate

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	Yes / No / NA	Page No.\Other Reference
I. IDENTIFICATION AND SUBMISSION OF PROGRAM:		
A. Submission is properly identified:		
1. 14 CFR Part 150 NCP?	Yes	Letter of Transmittal
2. NEM and NCP together?	Yes	Letter of Transmittal
3. Program revision?	Yes	Letter of Transmittal
B. Airport and Airport Operator's name identified?	Yes	Letter of Transmittal & Chapter 1, Page 1-1
C. NCP transmitted by airport operator cover letter?	Yes	Letter of Transmittal
II. CONSULTATION: [150.23]		
A. Documentation includes narrative of public participation and consultation process?	Yes	Chapter 1, pages 1-5 to 1-7 and Appendix G
B. Identification of consulted parties:		
1. all parties in 150.23(c) consulted?		Chapter 1, pages 1-5 to 1-7 and Appendix G
2. public and planning agencies identified?	Yes	Chapter 1, pages 1-5 to 1-7 and Appendix G
3. agencies in 2., above, correspond to those indicated on the NEM?	Yes	Chapter 1, pages 1-5 to 1-7 and Appendix G
C. Satisfies 150.23(d) requirements:		
1. documentation shows active and direct participation of parties in B., above?	Yes	Exhibits NEM-1 & NEM-2
2. active and direct participation of general public?	Yes	Chapter 1, pages 1-5 to 1-7 and Appendix G
3. participation was prior to and during development of NCP and prior to submittal to FAA?	Yes	Chapter 1, pages 1-5 to 1-7 and Appendix G
4. indicates adequate opportunity afforded to submit views, data, etc.?	Yes	Chapter 1, pages 1-5 to 1-7 and Appendix G
D. Evidence included of notice and opportunity for a public hearing on NCP?	Pending	Appendix G will include a copy of the public hearing notice.
E. Documentation of comments:		
1. includes summary of public hearing comments, if hearing was held?	Pending	Appendix G will include a summary of comments.

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	Yes / No / NA	Page No.\Other Reference
2. includes copy of all written material submitted to operator?	Pending	Appendix G
3. includes operator's responses / disposition of written and verbal comments?	Pending	Appendix G will contain the responses to comments made at the public hearing.
F. Informal agreement received from FAA on flight procedures?	N/A	Chapter 4
III. NOISE EXPOSURE MAPS: [150.23, B150.3; 150.35(f)] (This section of the checklist is not a substitute for the Noise Exposure Map checklist. It deals with maps in the context of the Noise Compatibility Program submission.)		
A. Inclusion of NEMs and supporting documentation:		
1. Map documentation either included or incorporated by reference?	Yes	Attached to Checklist, Exhibits NEM-1 & NEM-2, Appendix C
2. Maps previously found in compliance by FAA?	Yes	Letter of Transmittal
3. Compliance determination still valid?	Yes	Letter of Transmittal
4. Does 180-day period have to wait for map compliance finding?	Yes	None
B. Revised NEMs submitted with program: (Review using NEM checklist if map revisions included in NCP submittal)		
1. Revised NEMs included with program?	Yes	Attached to Checklist, Exhibits NEM-1 & NEM-2
2. Has airport operator requested FAA to make a determination on the NEM(s) when NCP approval is made?	Yes	Letter of Transmittal

AIRPORT NAME: John Glenn Columbus International Airport REVIEWER: ______________

	Yes / No / NA	Page No.\Other Reference
C. If program analysis uses noise modeling:		
1. AEDT or FAA-approved equivalent?	Yes	Appendix C
2. Monitoring in accordance with A150.5?	Yes	Appendix B
D. Existing condition and 5-year maps clearly identified as the official NEMs?	Yes	Attached to Checklist, Exhibits NEM-1 & NEM-2
IV. CONSIDERATION OF ALTERNATIVES: [B150.7, 150.23(e)]		
A. At a minimum, are the alternatives below considered?		
1. land acquisition and interests therein, including air rights, easements, and development rights?	Yes	Appendix F, Alternative LU-A
2. barriers, acoustical shielding, public building soundproofing	Yes	Chapter 4, Measures NA-2, NA-8 & NA-9
3. preferential runway system	Yes	Chapter 4, Measure NA-3 & NA-4; and Appendix E Alternatives NA-E & NA-F
4. flight procedures	Yes	Chapter 4, Measures NA-6 & NA-7, Appendix E, Alternatives NA-A, NA-B, NA-C, and NA-D
5. restrictions on type/class of aircraft (at least one restriction below must be checked)		
a. deny use based on Federal standards	No	N/A
b. capacity limits based on noisiness	No	N/A
c. noise abatement takeoff/approach procedures	No	N/A
d. landing fees based on noise or time of day	No	N/A
e. nighttime restrictions	Yes	Appendix E, Alternative NA-G

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	Yes / No / NA	Page No.\Other Reference
6. other actions with beneficial impact	Yes	Chapter 4; Appendix E
7. other FAA recommendations	No	N/A
B. Responsible implementing authority identified for each considered alternative?	Yes	Chapter 4
C. Analysis of alternative measures:		
1. measures clearly described?	Yes	Chapter 4, Appendices E & F
2. measures adequately analyzed?	Yes	Chapters 4, Appendices E & F
3. adequate reasoning for rejecting alternatives?	Yes	Appendices E & F
D. Other actions recommended by the FAA: Should other actions be added? (list separately on back of this form actions and discussions with airport operator to have them included prior to the start of the 180-day cycle)	No	N/A
V. ALTERNATIVES RECOMMENDED FOR IMPLEMENTATION: [150.23(e), B150.7(c); 150.35(b), B150.5]		
A. Document clearly indicates:		
1. alternatives recommended for implementation?	Yes	Chapter 4
2. final recommendations are airport operator's not those of consultant or third party?	Yes	Letter of Transmittal
B. Do all program recommendations:		
1. relate directly or indirectly to reduction of noise and noncompatible land uses?	Yes	Chapter 4
2. contain description of contribution to overall effectiveness of program?	Yes	Chapter 4
3. noise/land use benefits quantified to extent possible?	Yes	Chapter 4
4. include actual/anticipated effect on reducing noise exposure within noncompatible area shown on NEM?	Yes	Chapter 4
5. effects based on relevant and reasonable expressed assumptions?	Yes	Chapter 4

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	Yes / No / NA	Page No.\Other Reference
6. have adequate supporting data to support its contribution to noise/land use compatibility?	Yes	Chapter 4
C. Analysis appears to support program standards set forth in 150.35(b) and B150.5?	Yes	Chapter 4
D. When use restrictions are recommended:		
1. Are alternatives with potentially significant noise/compatible land use benefits thoroughly analyzed so that appropriate comparisons and conclusions can be made?	N/A	N/A
2. Use restriction coordinated with APP-600 prior to making determination on start of 180-days?	N/A	N/A
E. Do the following also meet Part 150 analytical standards:		
1. formal recommendations which continue existing practices?	Yes	Chapter 4
2. new recommendations or changes proposed at end of Part 150 process?	No	N/A
F. Documentation indicates how recommendations may change previously adopted plans?	Yes	Chapter 4
G. Documentation also:		
1. identifies agencies which are responsible for implementing each recommendation?	Yes	Chapter 4, Table 4-1
2. indicates whether those agencies have agreed to implement.	Yes	Letter of Transmittal
3. Indicates essential government actions necessary to implement recommendations.	Yes	Chapter 4
H. Timeframe:		
1. includes agreed-upon schedule to implement alternatives?	Yes	Chapter 4, Page 4-54
2. indicates period covered by the program?	Yes	Chapter 4, Page 4-54

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	Yes / No / NA	**Page No.\Other Reference**
I. Funding/Costs:		
1. includes costs to implement alternatives?	Yes	Chapter 4, Table 4-1 and Table 4-3
2. includes anticipated funding sources?	Yes	Chapter 4
VI. PROGRAM REVISION: [150.23(e)(9)] Supporting documentation includes provision for revision?	Yes	Chapter 4, Measure PM-5 and Page 4-54

OFFICIAL NOISE EXPOSURE MAPS

The following pages contain small-scale representations of the official Noise Exposure Maps (NEMs) for Existing (2020) and Future (2025) conditions and supporting maps for the John Glenn Columbus International Airport. The official NEMs and supplemental maps, at a scale of 1 inch equals 2,000 feet, are included at the back of this document. The Existing (2020) NEM is based on data developed between 2018 and 2020 as further explained in this document in Chapter Three, *Baseline Noise Exposure* and Appendix C, *Noise Methodology*.

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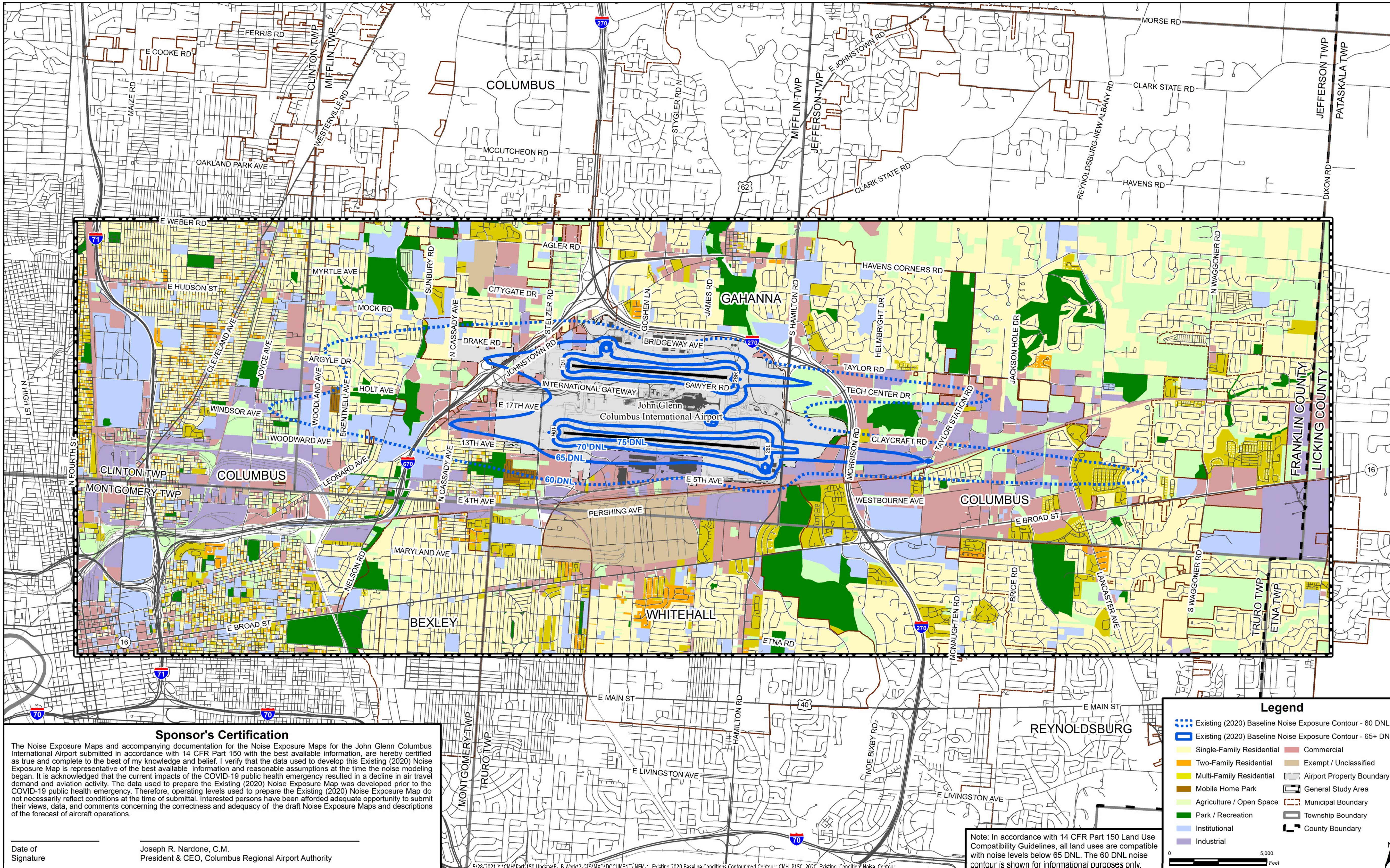
NEM-1 Existing (2020) Noise Exposure Map



Note: In accordance with 14 CFR Part 150 Land Use Compatibility Guidelines, all land uses are compatible with noise levels below 65 DNL. The 60 DNL noise contour is shown for informational purposes only.

Sponsor's Certification

The Noise Exposure Maps and accompanying documentation for the Noise Exposure Maps for the John Glenn Columbus International Airport submitted in accordance with 14 CFR Part 150 with the best available information, are hereby certified as true and complete to the best of my knowledge and belief. I verify that the data used to develop this Existing (2020) Noise Exposure Map is representative of the best available information and reasonable assumptions at the time the noise modeling began. It is acknowledged that the current impacts of the COVID-19 public health emergency resulted in a decline in air travel demand and aviation activity. The data used to prepare the Existing (2020) Noise Exposure Map was developed prior to the COVID-19 public health emergency. Therefore, operating levels used to prepare the Existing (2020) Noise Exposure Map do not necessarily reflect conditions at the time of submittal. Interested persons have been afforded adequate opportunity to submit their views, data, and comments concerning the correctness and adequacy of the draft Noise Exposure Maps and descriptions of the forecast of aircraft operations.

Date of Signature

Joseph R. Nardone, C.M.
President & CEO, Columbus Regional Airport Authority

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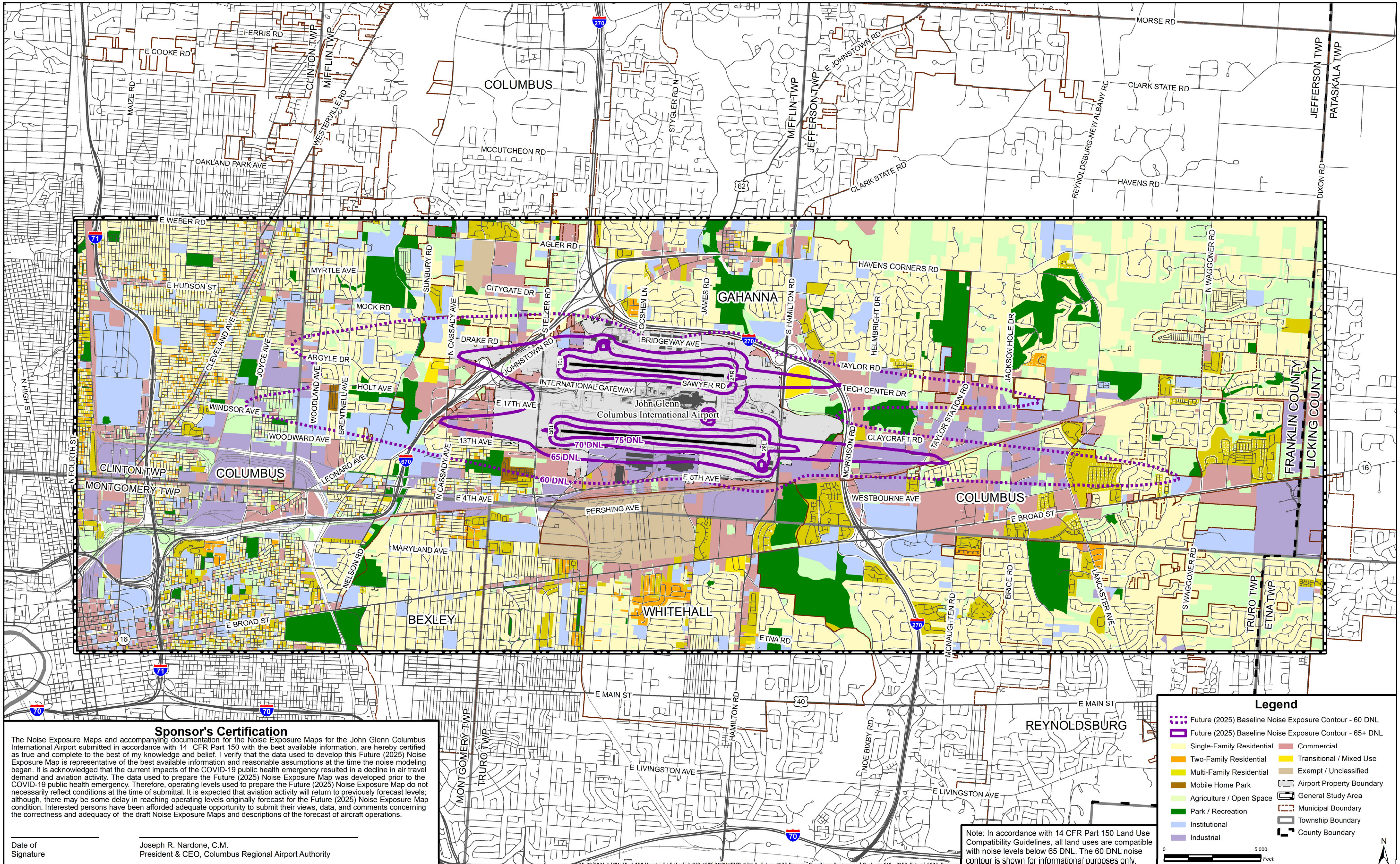
NEM-2 Future (2025) Noise Exposure Map



Sponsor's Certification

The Noise Exposure Maps and accompanying documentation for the Noise Exposure Maps for the John Glenn Columbus International Airport submitted in accordance with 14 CFR Part 150 with the best available information, are hereby certified as true and complete to the best of my knowledge and belief. I verify that the data used to develop this Future (2025) Noise Exposure Map is representative of the best available information and reasonable assumptions at the time the noise modeling began. It is acknowledged that the current impacts of the COVID-19 public health emergency resulted in a decline in air travel demand and aviation activity. The data used to prepare the Future (2025) Noise Exposure Map was developed prior to the COVID-19 public health emergency. Therefore, operating levels used to prepare the Future (2025) Noise Exposure Map do not necessarily reflect conditions at the time of submittal. It is expected that aviation activity will return to previously forecast levels; although, there may be some delay in reaching operating levels originally forecast for the Future (2025) Noise Exposure Map condition. Interested persons have been afforded adequate opportunity to submit their views, data, and comments concerning the correctness and adequacy of the draft Noise Exposure Maps and descriptions of the forecast of aircraft operations.

Date of Signature

Joseph R. Nardone, C.M.
President & CEO, Columbus Regional Airport Authority

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GLOSSARY

Airport Improvement Program (AIP) – A Federal funding program for airport improvements. AIP is periodically reauthorized by Congress with funding appropriated from the Aviation Trust Fund. Proceeds to the Trust Fund are derived from excise taxes on airline tickets, aviation fuel, etc.

Airport Layout Plan (ALP) – A scaled drawing of existing and proposed land and facilities necessary for the operation and development of the airport. The ALP shows boundaries and proposed additions to all areas owned or controlled by the airport operator for airport purposes, the location and nature of existing and proposed airport facilities and structures, and the location on the airport of existing and proposed non-aviation areas and improvements thereon.

Airport operations – Landings (arrivals) and takeoffs (departures) from an airport.

Airport Surveillance Radar (ASR) – A radar system which allows air traffic controllers to identify an arriving or departing aircraft's distance and direction from an airport.

Airport Traffic Control Tower (ATCT) – The airport traffic control facility located on an airport that is responsible for traffic separation within the immediate vicinity of the airport and on the surface of the airport to provide for safe and efficient flow of aircraft.

Air Route Traffic Control Center (ARTCC or Center) – A FAA facility established to provide air traffic control service to aircraft operating on Instrument Flight Rules (IFR) flight plans within controlled airspace during the en route portion of flight.

Air Traffic Control (ATC) – A service operated to promote the safe, orderly, and expeditious flow of air traffic.

Ambient noise – The total sum of noise from all sources in a given place and time.

Approach Light Systems (ALS) – A series of lights that assists the pilot when aligning aircraft with the extended runway centerline on final approach.

Area Navigation (RNAV) – RNAV enables aircraft to fly on any desired flight path within the coverage of ground- or space – based navigation aids, within the limits of the capability of aircraft self-contained systems, or a combination of both capabilities.

Attenuation – Acoustical phenomenon whereby sound energy is reduced between the noise source and the receiver. This energy loss can be attributed to atmospheric conditions, terrain, vegetation, other natural features, and man-made features (e.g., sound insulation).

Automated Radar Terminal System (ARTS) – Computer-aided radar display subsystems capable of associating alphanumeric data – such as aircraft identification, altitude, and airspeed – with aircraft radar returns.

Aviation Environmental Design Tool (AEDT) – FAA developed software system that models aircraft performance in space and time to estimate fuel consumption, emissions, noise, and air quality consequences.

A-weighted sound (dBA) – A system for measuring sound energy that is designed to represent the response of the human ear to sound. Energy at frequencies more readily detected by the human ear is more heavily weighted in the measurement, while frequencies less well detected are assigned lower weights. A-weighted sound measurements are commonly used in studies where the human response to sound is the object of the analysis.

Bank – A cluster of arrivals or departures in a short period of time, characteristic of an airline hub operation.

Baseline Condition – The existing condition or conditions prior to future development or the enactment of additional noise abatement procedures, which serve as a foundation for analysis.

Building Restriction Line (BRL) – A line drawn on an airport layout plan, which distinguishes, between areas that are suitable for buildings and areas that are unsuitable. The BRL is drawn to exclude the runway protection zones, the runway visibility zones required for clear line of sight from the airport traffic control tower, and all airport areas with a clearance of less than 35 feet (10.5 meters) beneath the Federal Aviation Regulation (FAR) Part 77 surfaces.

Commuter aircraft – Commuters are commercial operators that provide regularly scheduled passenger or cargo service with aircraft seating less than 60 passengers. A typical commuter flight operates over a trip distance of less than 300 miles.

Connecting passenger – An airline passenger who transfers from an arriving aircraft to a departing aircraft in order to reach his or her ultimate destination.

Controlled airspace – Airspace of defined dimensions within which air traffic control service is provided to IFR flights and to VFR flights in accordance with the airspace classification. Controlled airspace is designated as Class A, Class B, Class C, Class D, or Class E. Aircraft operators are subject to certain pilot qualifications, operating rules, and equipment requirements as specified in FAR Part 91, depending upon the class of airspace in which they are operating.

Crosswind leg – A flight path at right angles to the approach runway end off of its upwind end.

Day-night average sound level (DNL) – A noise measure used to describe the average sound level over a 24-hour period, typically an average day over the course of a year. In computing DNL, an extra weight of 10 decibels is assigned to noise occurring between the hours of 10:00 p.m. and 7:00 a.m. to account for increased annoyance when ambient noise levels are lower and people are trying to sleep. DNL may be determined for individual locations or expressed in noise contours.

Decibel (dB) – Sound is measured by its pressure or energy in terms of decibels. The decibel scale is logarithmic. A ten-decibel increase in sound is equal to a tenfold increase in sound energy.

DGPS antenna – Differential Global Positioning System is a way to correct the various inaccuracies in the GPS system by placing a reference antenna on a point that has been accurately surveyed. This antenna receives the same GPS signals as an aircraft but corrects the GPS signal for any inaccuracies.

Displaced Threshold – A threshold that is located at a point on the runway other than the designated beginning of the runway. The portion of pavement behind a displaced threshold may be available for takeoffs in both directions and landings from the opposite direction.

Distance measuring equipment (DME) – A flight instrument that measures the line-of-sight distance of an aircraft from a navigational radio station in nautical miles.

Double-clear zone – The double-clear zone is an area on the ground, up of land up to 1,250 feet from each side of the runway centerline and extending 5,000 feet beyond each end of the primary runway surface. It is also known as the approach transitional area for runways serving or anticipated to serve turbojet aircraft or having an existing or planned precision instrument runway.

Easement – The legal right of one party to use part of the rights of a piece of real estate belonging to another party. This may include, but is not limited to, the right of passage over, on or below the property; certain air rights above the property, including view rights; and the rights to any specified form of development or activity.

Enplanements – The number of passengers boarding an aircraft at an airport. Does not include arriving or through passengers.

En route system – That part of the National Airspace System where aircraft are operating between origin and destination airports.

En route control – The control of IFR traffic en route between two or more adjacent approach control facilities.

Environmental Assessment (EA) – A concise document that assesses the environmental impacts of a proposed Federal Action. It discusses the need for, and environmental impacts of, the proposed action and alternatives. An environmental assessment should provide sufficient evidence and analysis for a Federal determination whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI). Public participation and consultation with other Federal, state, and local agencies is a cornerstone of the EA process.

Environmental Impact Statement (EIS) – An EIS is a document that provides a discussion of the significant environmental impacts which would occur as a result of a proposed project, and informs decision-makers and the public of the reasonable alternatives which would avoid or minimize adverse impacts. Public participation and consultation with other Federal, state, and local agencies is a cornerstone of the EIS process.

Equivalent sound level (Leq) – The average A-weighted sound level over any specified time period.

Federal Aviation Administration (FAA) – The FAA is the Federal agency responsible for insuring the safe and efficient use of the nation's airspace, for fostering civil aeronautics and air commerce, and for supporting the requirements of national defense. The activities required to carry out these responsibilities include: safety regulations; airspace management and the establishment, operation, and maintenance of a system of air traffic control and navigation facilities; research and development in support of the fostering of a national system of airports, promulgation of standards and specifications for civil airports, and administration of Federal grants-in-aid for developing public airports; various joint and cooperative activities with the Department of Defense; and technical assistance (under State Department auspices) to other countries.

Federal Aviation Regulations (FAR) – The body of Federal regulations relating to aviation. Published as Title 14 of the Code of Federal Regulations.

Final approach – A flight path that follows the extended runway centerline. It usually extends from the base leg to the runway.

Finding of No Significant Impact (FONSI) – If, following the preparation of an environmental assessment, the Federal agency determines a proposed project will not result in any significant environmental impact, a finding of no significant impact (FONSI) is issued by the Federal Agency. A FONSI is a document briefly explaining the reasons why an action will not have a significant effect on the human environment and for which an EIS, therefore, is not necessary.

Fixed-base operator (FBO) – A business located on the airport that provides services such as hangar space, fuel, flight training, repair, and maintenance to airport users.

Flight track utilization – The use of established routes for arrival and departure by aircraft to and from the runways at the airport.

FMS/GPS – Flight Management System/Global Positioning System equipment onboard an aircraft takes advantage of various radio navigation and/or GPS routes to guide the aircraft.

Glide slope (GS) – Provides vertical guidance for aircraft during approach and landing. The glide slope consists of the following:

> Electronic components emitting signals which provide vertical guidance by reference to airborne instruments during instrument approaches such as ILS, or
>
> Visual ground aids, such as VASI, which provide vertical guidance for VFR approach or for the visual portion of an instrument approach and landing.

Geographic Information Systems (GIS) – An information system that is designed for storing, integrating, manipulating, analyzing, and displaying data referenced by spatial or geographic coordinates.

Global Positioning System (GPS) – A system of 24 satellites used as reference points to enable navigators equipped with GPS receivers to determine their latitude, longitude, and altitude. The accuracy of the system can be further refined by using a ground receiver at a known location to calculate the error in the satellite range data. This is known as differential GPS (DGPS).

Grid analysis – A type of aircraft noise analysis that evaluates the noise levels at individual points rather than through generation of noise contours.

Ground effect – Noise attenuation attributed to absorption or reflection of noise by man-made or natural features on the ground surface.

Hub – An airport that services airlines that have hubbing operations.

Hubbing – A method of airline scheduling that times the arrival and departure of several aircraft in a close period of time in order to allow the transfer of passengers between different flights of the same airline in order to reach their ultimate destination. Several airlines may conduct hubbing operations at an airport.

Infill – Urban development occurring on vacant lots in substantially developed areas. May also include the redevelopment of areas to a greater density

Instrument approach – A series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to a landing, or to a point from which a landing may be made visually.

Instrument flight rules (IFR) – That portion of the Federal Aviation Regulations (14 CFR 91) specifying the procedures to be used by aircraft during flight in Instrument Meteorological Conditions. These procedures may also be used under visual conditions and provide for positive control by ATC. (See also VFR).

Instrument Landing System (ILS) – An electronic system installed at some airports which helps to guide pilots to runways for landing during periods of limited visibility or adverse weather.

Instrument meteorological conditions (IMC) – Weather conditions expressed in terms of visibility, distance from clouds, and cloud ceilings during which all aircraft are required to operate using instrument flight rules (IFR).

Integrated Noise Model (INM) – A computer model developed, updated and maintained by the FAA to predict the noise exposure generated by aircraft operations at an airport. INM has been replaced by AEDT as the approved computer noise model.

Knots – Airspeed measured as the distance in nautical miles (6,076.1 feet) covered in one hour. (Approximately equal to 1.15 miles per hour.)

Land and Hold Short Operations (LAHSO) – An air traffic control procedure intended to increase overall airport capacity without compromising safety. LAHSO include landing and holding short of an intersecting runway, taxiway, or some other designated point on a runway or taxiway.

Land use compatibility – The ability of land uses surrounding the airport to coexist with airport-related activities with minimum conflict.

Landing and takeoff (LTO) cycle – The time that an aircraft is in operation at or near an airport. An LTO cycle begins when an aircraft starts its final approach (arrival) and ends after the aircraft has made its climb-out (departure).

Ldn – See **DNL**. Ldn is used in place of DNL in mathematical equations only.

Leq – Equivalent Sound Level. The steady A-weighted sound level over any specified period of time (not necessarily 24 hours) that has the same acoustic energy as the fluctuating noise during that period (with no consideration of nighttime weighting). It is a measure of cumulative acoustical energy. Because the time interval may vary, it should be specified by a subscript (such as Leq_8 for an 8-hour exposure to noise) or be clearly understood from the context.

Local passenger – A passenger who either enters or exits a metropolitan area on flights serviced by the area's airport. A local passenger is the opposite of a connecting passenger.

Localizer – The component of an ILS which provides lateral course guidance to the runway.

Loudness – The subjective assessment of the intensity of sound.

Mean sea level (MSL) – The average height of the surface of the sea for all stages of the tide; used as a reference for elevations. Also called sea level datum.

Merge – Combining noise events that exceed a given threshold level and occur within a selected period of time.

Missed approach – A prescribed procedure to be followed by aircraft that cannot complete an attempted landing at an airport.

Narrow-body aircraft – A commercial passenger jet having a single aisle and maximum of three seats on each side of the aisle. Common narrow-body aircraft include A320, B717, B727, B737, B757, DC9, MD80, and MD90.

National Airspace System (NAS) – The common network of U.S. airspace; air navigation facilities, equipment, services, airports, or landing areas; aeronautical charts, information, and services; rules, regulations, and procedures; technical information, manpower, and materials, all of which are used in aerial navigation.

National Environmental Policy Act of 1969 (NEPA) – The original legislation establishing the environmental review process for proposed Federal actions.

Nautical mile – A measure of distance equal to one minute of arc on the earth's surface (6,076.1 feet or 1,852 meters).

NAVAIDs (Navigational Aids) – Any facility used by an aircraft for navigation.

Navigational fix – A geographical position determined by reference to one or more radio navigational aids.

Noise abatement – A measure or action that minimizes the amount of impact of noise on the environs of an airport. Noise abatement measures include aircraft operating procedures and use or disuse of certain runways or flight tracks.

Noise berm – A manmade soil structure designed to interrupt the direct transmission of noise from a source to a noise-sensitive area.

Noise contour – A map feature representing average annual noise levels summarized by lines connecting points of equal noise exposure.

Noise Compatibility Program (NCP) – Program developed in accordance with FAR Part 150 guidance that contains provisions for the abatement of aircraft noise through aircraft operating procedures, air traffic control procedures, or airport facility modifications. It also includes provisions for land use compatibility planning and may include actions to mitigate the impact of noise on incompatible land uses and recommendations for amending local land use controls to affect future land uses and development. The program must contain provisions for updating and periodic revision.

Noise Compatibility Study – The process, methods, and procedures provided in the FAR Part 150 guidance to develop a Noise Compatibility Program, including the development of noise exposure maps, a noise compatibility program, and public participation.

Noise Exposure Map (NEM) – A geographic depiction of an airport, its noise contours for existing conditions and as forecast for five years in the future, and surrounding area developed in accordance with FAR Part 150 guidance. Documentation of the Noise Exposure Maps must include airport operating characteristics for existing conditions and all reasonable and foreseeable airport operating characteristics for the future condition.

Nondirectional beacon (NDB) – A beacon transmitting nondirectional signals whereby the pilot of an aircraft equipped with direction finding equipment can determine his bearing to and from the station. When the radio beacon is installed in conjunction with the ILS marker, it is normally called a compass locator.

Nonprecision approach – A standard instrument approach procedure providing runway alignment but no glide slope or descent information.

Operation – A takeoff or landing by an aircraft.

Outer fix – An air traffic control term for a point in the airspace from which aircraft are normally cleared to the approach fix or final approach course.

Performance-Based Navigation (PBN) - comprised of Area Navigation (RNAV) and Required Navigation Performance (RNP) and describes an aircraft's capability to navigate using performance standards.

Positive control – The separation of all air traffic within designated airspace as directed by air traffic controllers.

Precision Approach Path Indicator (PAPI) – Provides visual approach slope guidance to aircraft during an approach. It is similar to a VASI but provides a sharper transition between the colored indicator lights.

Precision Approach Procedure – A standard instrument approach procedure in which an electronic glide slope/glide path is provided (e.g., ILS and PAR*)*.

Precision Approach Radar (PAR) – Navigational equipment located on the ground adjacent to the runway, and consisting of one antenna, which scans the vertical plane, and a second antenna, which scans the horizontal plane. The PAR provides the controller with a picture of the descending aircraft in azimuth, distance, and elevation, permitting an accurate determination of the aircraft's alignment relative to the runway centerline and the glide slope.

Primary Commercial Service Airport – A commercial airport which enplanes 0.01 percent or more of the total annual U.S. enplanements.

Primary Runway – The runway on which the majority of operations take place.

Profile – The position of the aircraft during an approach or departure in terms of altitude above the runway and distance from the runway end.

Propagation – Sound propagation is the spreading or radiating of sound energy from the noise source. It usually involves a reduction in sound energy with increased distance from the source. Atmospheric conditions, terrain, natural objects, and manmade objects affect sound propagation.

Public use airport – An airport open to public use without prior permission, and without restrictions within the physical capabilities of the facility. It may or may not be publicly owned.

Reliever airport – An airport which, when certain criteria are met, relieves the aeronautical demand on a busier air carrier airport.

Required Navigation Performance (RNP) – Similar to Area Navigation (RNAV) with the addition of an onboard performance monitoring and alerting capability. RNP enables the aircraft navigation system to monitor the navigation performance it achieves and inform the crew if the requirement is not met during an operation. This onboard monitoring and alerting capability enhances the pilot's situational awareness and can enable reduced obstacle clearance.

Run-up – A routine procedure for testing aircraft systems by running one or more engines at a high power setting. Engine run-ups are normally conducted by airline maintenance personnel checking an engine or other on board systems following maintenance.

Runway End Identifier Lights (REIL) – Two synchronized flashing lights, one on each side of the runway threshold, which identify the approach end of the runway.

Runway Protection Zone (RPZ) – An area, trapezoidal in shape and centered about the extended runway centerline, designated to enhance the safety of aircraft operations. It begins 200 feet (60 M) beyond the end of the area usable for takeoff or landing. The RPZ dimensions are functions of the aircraft, type of operation and visibility minimums. (Formerly known as the clear zone).

Runway Safety Area (RSA) – A defined surface surrounding the runway prepared or suitable for reducing the risk or damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway.

Runway threshold – The beginning of that portion of the runway usable for landing.

Runway use program – A noise abatement runway selection plan crafted to further noise abatement efforts for communities around airports. A runway selection plan is developed into a runway use program. It typically applies to all turbojet aircraft 12,500 pounds or heavier. Turbojet aircraft less than 12,500 pounds are included only if the airport proprietor determines that the aircraft creates a noise problem. These programs are coordinated with the FAA in accordance with FAA Order 8400.9, *National Safety and Operational Criteria for Runway Use Programs*, and are administered as either "formal" or "informal" programs.

> **Formal** – An approved runway use program outlined in a Letter of Understanding between the FAA–Flight Standards, FAA–Air Traffic Service, the airport proprietor, and the users. It is mandatory for aircraft operators and pilots as provided for in FAR Section 91.87.
>
> **Informal** – An approved runway use program that does not require a Letter of Understanding. Participation in the program by aircraft operators and pilots is voluntary.

Single event – One noise event. For many kinds of analysis, the sound from single events is expressed using the Sound Exposure Level (SEL) metric.

Slant-range distance – The distance along a straight line between an aircraft and a point on the ground.

Sound – Sound is the result of vibration in the air. The vibration produces alternating bands of relatively dense and sparse particles of air, spreading outward from the source in the same way as ripples do on water after a stone is thrown into it. The result of the movement is fluctuation in the normal atmospheric pressure or sound waves.

Sound exposure level (SEL) – A standardized measure of a single sound event, expressed in A-weighted decibels, that takes into account all sound above a specified threshold set at least 10 decibels below the maximum level. All sound energy in the event is integrated over one second.

Special Use Airspace – Airspace of defined dimensions identified by an area on the earth's surface wherein activities must be confined because of their nature and/or wherein limitations may be imposed upon aircraft operations, which are not part of those activities.

Standard instrument departure procedure (SID) – A planned IFR air traffic control departure procedure published for pilot use in graphic and textual form. SIDs provide transition from the terminal to the en route air traffic control structure.

Standard terminal arrival route (STAR) – A planned IFR air traffic control arrival procedure published for pilot use in graphic and textual form. STARs provide transition from the en route air traffic control structure to an outer fix or an instrument approach fix in the terminal area.

Statute mile – A measure of distance equal to 5,280 feet.

TACAN – Tactical Air Navigation. A navigational system used by the military. TACAN provides both azimuth and distance information to a receiver on board an aircraft.

Terminal Radar Approach Control (TRACON) – An FAA Air Traffic Control Facility which uses radar and two-way communication to provide separation of air traffic within a specified geographic area in the vicinity of one or more airports.

Terminal Radar Service Area (TRSA) – Airspace surrounding certain airports where ATC provides radar vectoring, sequencing, and separation on a full-time basis for all IFR and participating VFR aircraft.

Through passenger – An airline passenger who arrives at an airport and departs without deplaning the aircraft.

Time Above (TA) – The amount of time that sound exceeds a given decibel level during a 24-hour period (e.g., time in minutes that the sound level is above 75 dBA).

Touchdown Zone Lighting (TDZ) – A system of two rows of transverse light bars located symmetrically about the runway centerline, usually at 100-foot intervals and extending 3,000 feet along the runway.

Traffic pattern – The traffic flow for aircraft landing and departure at an airport. Typical components of the traffic pattern include: upwind leg, crosswind leg, downwind leg, base leg, and final approach.

UNICOM – A nongovernment communication facility, which may provide airport information at certain airports. Aeronautical charts and publications show the locations and frequencies of UNICOMs.

Upwind Leg – A flight path parallel to the approach runway in the direction of approach.

Vector – Compass heading instructions issued by ATC in providing navigational guidance by radar.

Very High Frequency Omnidirectional Range (VOR) Station – A ground-based radio navigation aid transmitting signals in all directions. A VOR provides azimuth guidance to pilots by reception of electronic signals.

Very High Frequency Omnidirectional Range Station with Tactical Air Navigation (VORTAC) - A navigational aid providing VOR azimuth and TACAN distance measuring equipment (DME) at one site.

Visual approach – An approach conducted on an IFR flight plan, which authorizes the pilot to proceed visually and clear of clouds to the airport.

Visual approach slope indicator (VASI) – A visual aid to final approach to the runway threshold, consisting of two wing bars of lights on either side of the runway. Each bar produces a split beam of light – the upper segment is white, the lower is red.

Visual flight rules (VFR) – Rules and procedures specified in 14 CFR 91 for aircraft operations under visual conditions. Aircraft operations under VFR are not generally under positive control by ATC. The term VFR is also used in the United States to indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, it is used by pilots and controllers to indicate a type of flight plan.

Visual meteorological conditions (VMC) – Weather conditions expressed in terms of visibility, distance from cloud, and cloud ceiling equal to or greater than those specified in 14 CFR 91.155 for aircraft operations under Visual Flight Rules (VFR).

Wide-body aircraft - A commercial jet with a wingspan generally greater than 155 feet and, in passenger configuration, having two aisles with 8 to 11 seats across in a row. Common wide-body aircraft include the A300, A310, B747, B767, B777, DC-10, and MD-11.

Yearly Day-Night Average Sound Level – see DNL

Chapter 1 Background

The Columbus Regional Airport Authority (CRAA) is conducting an update to its Part 150 Noise Compatibility Study (Study) to document the noise levels from aircraft operations at the John Glenn Columbus International Airport (Airport or CMH). The purpose of conducting a Noise Compatibility Study is to identify potential measures to reduce the impacts of noise from existing aircraft operations on incompatible land uses, and to discourage the introduction of new incompatible land uses in the areas that are determined to be impacted by aircraft noise. This chapter provides the background information necessary for public and/or governmental reviewers to make an informed decision as to the adequacy of the Noise Compatibility Study to meet the requirements set forth by the Code of Federal Regulations (CFR) Title 14 Part 150 under which it was prepared.

1.1 14 Code of Federal Regulations (CFR) Part 150

Title 14 Part 150 is a section of the CFR that sets forth rules and guidelines for airports desiring to undertake airport noise compatibility planning. The regulations were promulgated by the Federal Aviation Administration (FAA) pursuant to the Aviation Safety and Noise Abatement Act (ASNA) of 1979, Public Law 96-193. ASNA was enacted to "…provide and carry out noise compatibility programs, to improve assistance to assure continued safety in aviation and for other purposes." The FAA was vested with the authority to implement and administer this act. This legislation required the establishment of a single system for measuring aircraft noise, determining noise exposure, and identifying land uses, which are normally compatible with various noise exposure levels. Through 14 CFR Part 150, the FAA established regulations governing the technical aspects of aircraft noise analysis and the public participation process for airports choosing to prepare airport noise compatibility plans.

1.1.1 Purpose of Conducting a Part 150 Noise Compatibility Study

The purpose for conducting a Noise Compatibility Study at an airport is to develop a balanced and cost-effective plan for reducing current noise impacts due to airport operations, where practical, and to minimize additional impacts in the future. By following the process, the airport operator is assured of the FAA's cooperation through the involvement of air traffic control professionals in the study and the FAA's review of the recommended Noise Compatibility Program (NCP). An airport with an FAA-approved NCP also becomes eligible for funding assistance for the implementation of approved measures in the NCP.

Among the general goals and objectives addressed by a Noise Compatibility Study are the following:

- To reduce, where feasible, existing and forecasted noise levels over existing noise-sensitive land uses;
- To reduce new noise-sensitive developments near the airport;
- To mitigate, where feasible, adverse impacts in accordance with Federal guidelines;
- To provide mitigation measures that are sensitive to the needs of the community and its stability;
- To minimize the impact of mitigation measures on local tax bases; and
- To be consistent, where feasible, with local land use planning and development policies.

The FAA recommends updating an airport Part 150 Noise Compatibility Study periodically to reflect current operating conditions. Updates are recommended when there is a notable change in operating levels or a change to the airfield that affects how aircraft operate. The previous Noise Compatibility Study for CMH was completed in 2007, and was approved by the FAA in May 2008. The FAA also conducted a concurrent Environmental Impact Statement (EIS), which assessed the proposed relocation of Runway 10R/28L at CMH. The FAA issued a Record of Decision (ROD) for the proposed runway relocation in August 2009.

The ROD stipulated that the CRAA conduct a Part 150 Noise Compatibility Study to assess operational and noise conditions after the relocated runway became operational. Construction of the relocated runway was completed in August 2013. In 2016, the CRAA reconstructed Runway 10L/28R by rehabilitating and replacing the existing runway pavement. Therefore, the Part 150 Study Update was delayed until after the rehabilitation of Runway 10L/28R was complete in order to assess conditions using actual data that included a full 12 months of operations after the airfield was fully operational. This current Part 150 Noise Compatibility Study represents the first update since Runway 10R/28L was relocated.

1.1.2 Part 150 Noise Compatibility Study Planning Process

The Noise Compatibility Study planning process involves the methods and procedures an airport operator must follow when developing an NCP. The decision to undertake noise compatibility planning is entirely voluntary on the part of the airport operator. If the airport operator chooses to prepare an NCP, the FAA will provide funding assistance if the operator follows the regulations of 14 CFR Part 150. As a further encouragement to undertake noise compatibility planning, an airport operator becomes eligible for Federal funding assistance for the implementation of measures in an FAA-approved NCP. See **Exhibit 1-1, *Noise Compatibility Planning Process***, for a flowchart of the planning process.

A Noise Compatibility Study involves six major steps:

- Study initiation, including identification of airport noise and land use issues and data collection;
- Definition of current and future noise exposure patterns;
- Evaluation of alternative measures for abating noise (e.g., changing aircraft flight paths), mitigating the impact of noise (e.g., sound insulation), and managing local land uses (e.g., airport-compatible zoning);
- Development of an NCP;
- Development of an implementation and monitoring plan; and
- FAA review and approval of the recommended NCP, including the analysis of alternatives, the compatibility plan, and the implementation and monitoring plan.

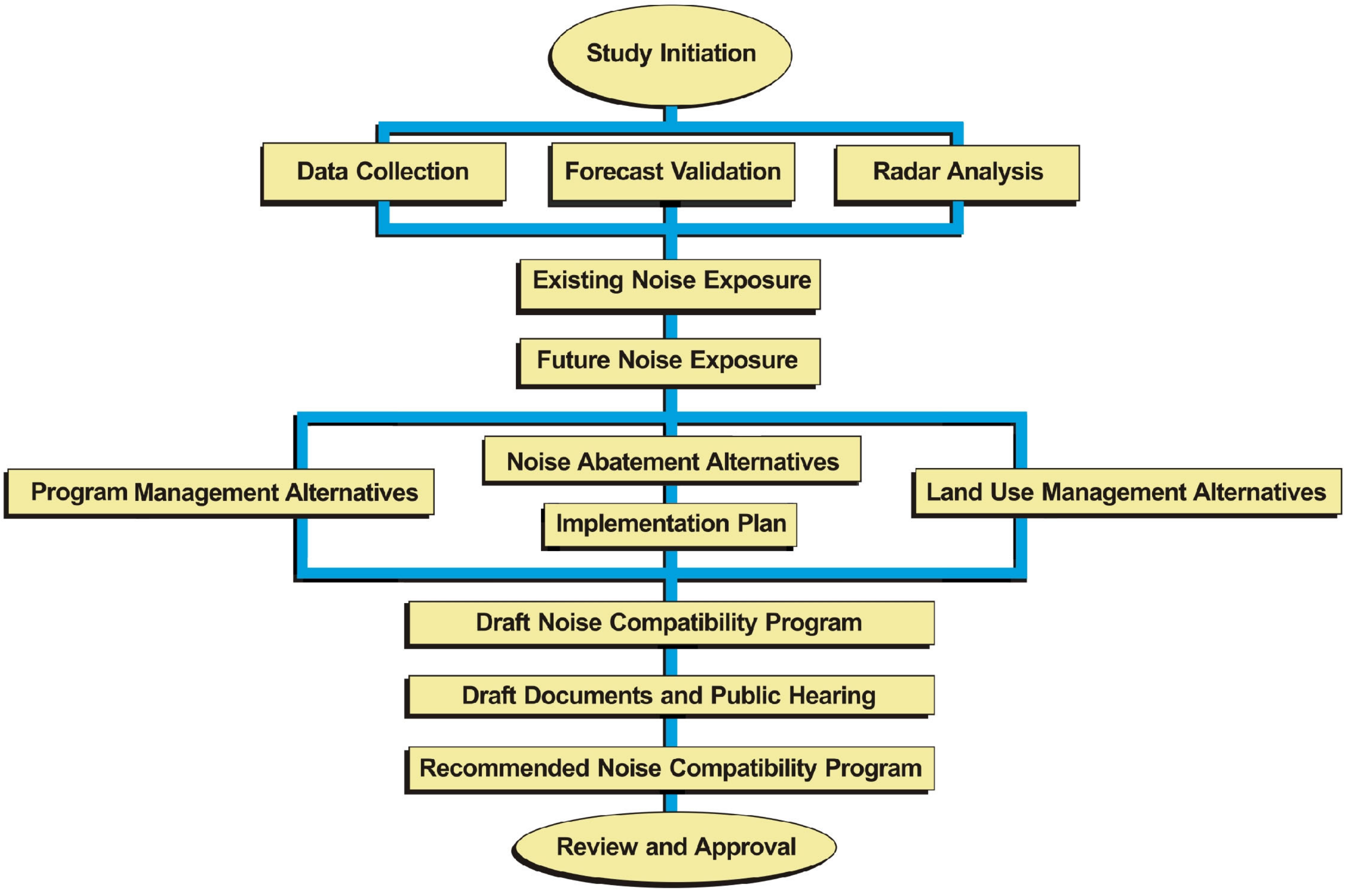
The Noise Compatibility Study process is designed to identify noise incompatibilities surrounding an airport, and to recommend measures to both correct existing incompatibilities and to prevent future incompatibilities. For Noise Compatibility Study purposes, noise incompatibilities are generally defined as residences or public use noise-sensitive facilities (libraries, churches, schools, nursing homes, and hospitals) within the 65 Day-Night Average Sound Level (DNL) noise contour. See **Appendix A, *FAA Policies, Guidance, and Regulations,*** for more information on land use and noise compatibility guidelines contained in 14 CFR Part 150.

The planning process has both technical and procedural components. The first component involves the preparation of Noise Exposure Maps (NEMs), which requires the use of specific technical criteria and methods to complete analyses of aircraft noise exposure, potential noise abatement, and land use mitigation measures. NEMs show the official noise contours for the airport. For this Study, NEMs were prepared for existing conditions (2020) and for five years in the future. The future year NEM for this Noise Compatibility Study is labeled 2025. The NEMs must be prepared according to 14 CFR Part 150 guidelines with regard to methodology, noise metrics, identification of incompatible land uses, and public participation. More detailed information regarding the NEM process is included in **Section 1.1.3** of this chapter.

The second component of the planning process involves the development of an NCP. The NCP sets forth measures intended to mitigate the impacts of significant noise exposure on residential or other noise-sensitive areas near an airport, and to limit, to the extent possible, the introduction of new incompatible land uses at locations exposed to significant noise levels. Levels of significant noise are identified in 14 CFR Part 150 (see Appendix A).

The regulations also require that potentially affected airport users, local governments, and the public be consulted during the study, with the process culminating in the opportunity for a public hearing on the recommended NCP. More detailed information regarding the NCP process is included in **Section 1.1.4** of this chapter.

Exhibit 1-1 Noise Compatibility Planning Process



1.1.3 Noise Exposure Maps (NEMs)

The NEM component of a Noise Compatibility Study presents airport noise exposure contours for the existing condition and a forecast condition five years from the date of submission of the documentation for FAA review. The current year NEM is labeled 2020. The data collection and analysis for this Noise Compatibility Study Update began in 2019 and continued through 2020. The Existing (2020) Baseline Noise Exposure Contour is based on data from September 2018 through August 2019. The total of annual aircraft operations during this period was 134,999, which converts to 370 average-annual day operations.

The Future (2025) Noise Exposure Contour is based on an Aviation Activity Demand Forecast that was prepared for this Noise Compatibility Study Update. This forecast projects annual operations to be 150,140 for the year 2025 or 411 average-annual day operations. The year 2025 is used as the future year because it is five years from the date of submission of this Noise Compatibility Study for FAA review.

The Future (2025) NEM/NCP Noise Exposure Contour includes the implementation of all new recommended noise abatement procedures. The NEM noise contours are superimposed on a land use map to show areas of incompatible land use, as defined in 14 CFR Part 150 and presented in Appendix A of this document. **Appendix C, *Noise Methodology***, contains detailed information on the inputs and methodology for preparing the noise exposure contours, including use of the DNL noise metric. The official NEMs are located at the front of this document with the NEM and NCP checklist.

14 CFR Part 150 requires the use of standard methodologies and metrics for analyzing and describing noise. It also establishes the guidelines for the identification of land uses that are incompatible with noise of different levels. Section 150.21(d) of 14 CFR Part 150 states that airport proprietors are required to update NEMs when changes in the operation of the airport would create any new, substantial incompatible use. This is considered to be an increase in DNL noise levels of 1.5 decibels (dB) over incompatible land uses when the aircraft noise level exceeds 65 DNL. Of course, the airport operator may update the NEMs at any time based on their own needs and concerns. As previously stated, this is the first update to the NEMs since Runway 10R/28L was relocated.

The airport proprietor can gain limited protection through preparation, submission, and publication of NEMs. ASNA provides in Section 107(a), as codified in U.S.C. Title 49 section 47506, that:

> "No person who acquires property or an interest therein after the date of enactment of the Act in an area surrounding an airport with respect to which a noise exposure map has been submitted under section 47503 of the Act shall be entitled to recover damages with respect to the noise attributable to such airport if such person had actual or constructive knowledge of the existence of such noise exposure map unless, in addition to any other elements for recovery of damages, such person can show that:
>
> i. A significant change in the type or frequency of aircraft operations at the airport; or
>
> ii. A significant change in the airport layout; or
>
> iii. A significant change in the flight patterns; or
>
> iv. A significant increase in nighttime operations; occurred after the date of acquisition of such property or interest therein and that the damages for which recovery is sought have resulted from any such change or increase."

ASNA provides that "constructive knowledge" shall be imputed to any person if a copy of the NEM was provided to them at the time of property acquisition or if notice of the existence of the NEM was published three times in a newspaper of general circulation in the area.

In addition, Part 150 defines "significant increase" as an increase of 1.5 dB of DNL. For purposes of this provision, FAA officials consider the term "area surrounding an airport" to mean an area within the 65 DNL contour. (See 14 CFR Part 150, Section 150.21(d), (e), (f)(1), and (f)(2)). An acceptance of the NEMs by the FAA is required before the FAA will approve an NCP for the airport.

1.1.4 Noise Compatibility Program (NCP)

An NCP includes provisions for the abatement of aircraft noise through aircraft operating procedures, air traffic control procedures, or airport facility modifications. It also includes provisions for land use compatibility planning and may include actions to mitigate the impact of noise on incompatible land uses. **Chapter Four, *Noise Compatibility Program***, includes detailed information for the CMH NCP recommendations. The NCP must also contain provisions for updating and periodic revision.

FAR Part 150 NCP establishes procedures and criteria for FAA evaluation of the NCP. Two criteria are of particular importance: the airport proprietor may not take any action that imposes an undue burden on interstate or foreign commerce; nor may the proprietor unjustly discriminate between different categories of airport users.

The FAA also reviews changes in flight procedures proposed for noise abatement for potential effects on flight safety, safe and efficient use of the navigable airspace, management and control of the national airspace and traffic control systems, security and national defense, and compliance with applicable laws and regulations. Because the FAA has the ultimate authority for air traffic control and flight procedures related to air traffic control requirements, any measures relating to these subjects that are recommended in an NCP must be explicitly approved by the FAA and may not be implemented unilaterally by the airport proprietor.

FAA approval of Part 150 measures, through a Record of Approval (ROA) that is supported by an environmental assessment and a finding of no significant impact, environmentally clears the agency to participate in actions over which it has primary implementation responsibility (e.g., air traffic modifications). With an approved NCP, an airport proprietor becomes eligible for Federal funding to implement the eligible items of the program. Approval by the FAA does not, however, commit the agency to either a specific schedule of implementation or guarantee the allocation of Federal funds for implementation of any measure.

1.2 Public Involvement

As discussed previously, a key element in the Noise Compatibility Study process is public involvement. In order to inform and gather input from the public regarding the findings of the Noise Compatibility Study, a Technical Advisory Committee (TAC) was convened and met to review Study progress and provide input as necessary. Public Information Meetings were held in the community at key points throughout the Study.

1.2.1 Technical Advisory Committee (TAC)

A TAC was organized early in the planning process to provide feedback and advice to the planning team on the contents and preparation of the Noise Compatibility Study. The TAC provided residents, airport users, agencies, and local officials an opportunity to be involved in developing CMH's Part 150 NCP. In refining the NCP, staff from the CRAA, as well as the consultant team wanted to benefit from the TAC members' special viewpoints and the people and resources they represented. A process was therefore designed to encourage the open exchange of creative ideas to achieve results. The members of the TAC assisted the process in several ways.

- **As a Sound Board** – The TAC provided a forum in which the consultant team and other TAC members could present information, findings, ideas, and recommendations. All benefited from listening to the diverse viewpoints and concerns of the wide range of interests represented on the committee.

- **As a Link to the Community** – Each member represented a key constituent interest – local neighborhoods, local governments, public agencies, or airport users. Committee members provided a link between the study team and the people they represented. They were asked to inform their constituents about the study as it progressed, and to convey the views of others at committee meetings.
- **As a Critical Reviewer** – The consultant team wanted to have its work scrutinized closely for completeness of detail and clarity of thought. The committee membership was urged to review the consultant's work and provide any input to help improve it.
- **As an Aid to Implementation** – Each member has a unique role to play in implementing the plan, ranging from making changes in flight procedures to changes in local land use plans and regulations.

The TAC operated informally, with no compulsory attendance, no voting, and no officers. The final decision on which measures to include in the Part 150 NCP rests with the CRAA. The meetings were conducted by the consultant team and were conducted at key points in the study when committee input was especially needed. Members were urged to attend the general public information meetings held during the study to listen firsthand to the concerns that were raised and to speak with members of the consultant team and representatives of the CRAA one-on-one. Many organizations were contacted and invited to designate a representative to serve on the TAC. The resulting membership represents a broad range of interests that includes pilots, airlines, commerce, community, environmental, air traffic controllers, government and planning, as well as interested and affected citizens. A roster of the membership of the TAC is provided in **Appendix G, *Public Involvement***.

1.2.2 Public Information Meetings

During the course of the Noise Compatibility Study Update, two sets of public information meetings were held in local communities, and a third set of meetings is scheduled in conjunction with the release of a Draft Noise Compatibility Study . Meeting dates and times are noted below. The public information meetings were attended by interested citizens, elected officials, and local media representatives. Appendix G, *Public Involvement*, includes copies of meeting notices, sign-in sheets, comments received, and meeting handouts.

Public Information Meeting #1 – April 8 & 9, 2020

The first set of Public Information Meetings were scheduled for April 8th and April 9th, 2020. However, due to the outbreak of the COVID-19 virus and recommended precautions to prevent the spread of the virus and to protect public health, the public meetings were cancelled. All meeting materials were posted on the project website and methods for submitting public questions and comments were advertised online and in local newspapers.

Public Information Meeting #2

The second Public Information Meeting was held on September 2, 2020. The meeting was conducted via online webinar with question and answer session. Information was published on the project website before the meeting and the presentation and transcript were posted on the project website after the meeting.

Public Information Meeting #3

The third and final Public Information Meeting is scheduled to be held on July 29, 2021 and will be conducted concurrently with a Public Hearing.

1.2.3 Public Hearing and Comment Period

14 CFR Part 150 requires that Draft Part 150 NCP documents be made available to the public prior to conducting a Public Hearing. The Draft Part 150 NCP document was made available to the public at local libraries, the Airport, and online at https://www.airportprojects.net/cmh-part150/. A Public Meeting/Hearing is scheduled to be held on July 29, 2021 from 5:30 p.m. to 7:00 p.m. A list of document locations, a summary of the Public Meeting/Hearing, meeting materials, comments received, and response to those comments will be included in the Final Part 150 Noise Compatibility Study Document.

1.2.4 Additional Public Coordination

Additional efforts to provide information and opportunity for public involvement in this Part 150 Noise Compatibility Study Update included a project website. Information about the Study; including general information, upcoming and past meetings, and a method to contact the Study Team; is available online at the following address: https://www.airportprojects.net/cmh-part150/.

1.3 Status of 2007 Noise Compatibility Plan

The 2007 Part 150 Noise Compatibility Study Update included 27 recommended measures: nine noise abatement measures, 12 land use management measures, and six program management measures. Each measure is listed below, followed by its status in italics.

Summary of the 2007 NCP Noise Abatement Measures

NA-1: Amend the Port Columbus International Airport nighttime maintenance run-up policy to designate an additional run-up location north of the airfield for the relocation of the Executive Jet Aviation's (EJA) new facility. This measure will provide attenuation of jet engine maintenance run-ups for adjacent residential areas located along I-270.

Status: Implemented – Run-ups are performed at the EJA (now NetJets) facility.

NA-2: Construct a new run-up barrier at the north airfield, if the EJA building does not adequately attenuate jet engine maintenance run-up noise for adjacent residential areas located along I-270.

Status: Implemented – A run-up barrier is used at the EJA (now NetJets) facility.

NA-3: Increase nighttime use of Runway 10L/28R, and amend the tower order CMH ATCT 7110.1 to read as follows:

- Unless wind, weather, runway closure or loss of NAVAIDS dictate otherwise, between the hours of 10:00 p.m. and 8:00 a.m. local time, Runways 28L and 10R are assigned to jet aircraft;
- Jet aircraft with Stage 3 engines may use Runway 10L/28R for arrival operations between the hours of 10:00 p.m. and 1:00 a.m. local time; and
- Jet aircraft with Stage 3 engines may use Runway 10L or 28R after 6:00 a.m.

Status: Partially implemented – The current Tower Order (CMH 7110.1L) includes a provision that unless wind, weather, runway closures, or loss of NAVAIDS dictate otherwise, Runway 10L/28R is a noise-sensitive runway. All arriving and departing aircraft must request Runway 10L/28R with an operational need between the hours of 10:00pm and 6:00am.

NA-4: Maximize east flow and amend FAA Tower Order CMH ATCT 7110.1B and the Airports Facilities Directory to reflect implementation of the "East Flow" informal preferential runway use system.

Status: Partially implemented – Complex conditions at the airport such as winds, flow control policies at destination airports, and taxi times have limited the use of this measure.

NA-5: Amend FAA Tower Order CMH ATCT 7110.1 and FAA Notice CMH ATCT N7110.22 to read as follows:

During nighttime operations, 10:30 p.m. to 7:00 a.m. local time, the following procedures shall be used for departures off Runway 10R:

i. Aircraft normally assigned a runway heading shall be assigned a heading of 100 degrees.

ii. Propeller driven aircraft, conventional or turboprop, shall be turned no further than 15 degrees left or right (085 degrees to 115 degrees). These headings shall not be altered until the aircraft has reached 3,000 feet Mean Sea Level (MSL) or is three miles from the runway end.

iii. The aircraft will begin the turn at 2.2 Distance Measuring Equipment (DME) from the Runway 10R Localizer(LOC)/DME.

iv. The aircraft must climb to an altitude of 1,215 feet MSL before turning.

Status: Withdrawn – The measure was developed for AirNet Systems, Inc. operations during the nighttime hours. In June 2005, AirNet relocated from CMH to Rickenbacker International Airport, so its application since then has not been required and the measure was withdrawn from the 2007 NCP.

NA-6: Implement a 15-degree divergent turn off of Runway 28R, after crossing the runway end to a 295-degree heading, only during peak operating periods when traffic warrants.

Status: Implemented – This measure is used when traffic conditions warrant.

NA-7: Create performance-based overlay procedures for all existing and proposed arrival/departure procedures. (RNAV/RNP/GPS/CDA).

Status: Not Implemented – RNAV/RNP procedures are being developed independently by the FAA and are expected to be implemented in April 2021.

NA-8: Construct a noise berm/wall.

Status: Not Implemented – This measure was considered for the acquisition area along East 13th Avenue as mitigation for the runway relocation. Further investigation and surveys of property owners determined that a noise berm in the location was not desirable.

NA-9: Replacement and potential relocation of Ground Run-Up Barrier B

Status: Not Implemented – Potential replacement and relocation of the Ground Run-Up Barrier B was proposed to accommodate larger aircraft associated with potential new maintenance hangars proposed for the southeast airfield at CMH. The proposed maintenance hangars were not constructed. Therefore, an upgrade to Barrier B was not pursued.

Summary of the 2007 NCP Land Use Compatibility Measures

LU-1: Offer a program for noise insulation of noncompatible structures for noncompatible residences within the 65+ DNL contour of the Future (2012) Noise Compatibility Program (NCP) condition, in exchange for an avigation easement.

Status: Implemented – the boundary was updated based on the Future (2012) NEM/NCP Noise Exposure Contour from the 2007 Part 150 Noise Compatibility Program Update. To date, the CRAA has provided for sound insulation of nearly 800 residences. All homes eligible for sound insulation based on the 2007 NEM/NCP Update Study, have been sound insulated or have been offered sound insulation and the owner(s) declined or did not respond to the offer.

LU-2: Offer a program for noise insulation of noncompatible structures for noncompatible churches within the 65+ DNL contour of the Future (2012) Noise Compatibility Program (NCP) condition in exchange for an avigation easement.

Status: Implemented – One church, the Wonderland Community Church, was identified within the 65 DNL of the 2002 Part 150 Noise Compatibility Study. The CRAA purchased an avigation easement on the property and it is now considered a compatible land use. One other church, the Mount Judea Church, was contacted for potential inclusion in the program and did not respond. No other churches were identified within the 65+ DNL contour of the Future (2012) NEM/NCP Noise Exposure Contour.

LU-3: Seek cooperation from the City of Columbus and Franklin County to amend their Land Use Compatibility Standards to achieve the level of compatibility identified in the Recommended Land Use Compatibility Guidelines.

Status: Partially implemented – Both the City of Columbus and Franklin County have adopted land use development standards similar to what was recommended in the previous NCP. However, in some cases these standards are not as strict as was recommended. (See Chapter Four for additional details).

LU-4: Seek cooperation from the City of Columbus and Franklin County to amend the AEO (Airport Environs Overlay) District boundaries to include the proposed Airport Land Use Management District (ALUMD) corresponding to the 60 DNL of the 20 year NCP contour.

Status: Not implemented – Both Columbus and Franklin County set the AEO boundary at the 65 DNL contour.

LU-5: Seek cooperation from Franklin County, the City of Gahanna, and Jefferson Township to amend each jurisdiction’s zoning resolution to require applicants for rezoning, change of use, or special use permit to convey an avigation easement to the appropriate airport.

Status: Partially implemented – Section 660.07 requires conveyance of avigation easements for variance or conditional use permits only.

LU-6: Seek cooperation from Jefferson Township and the City of Gahanna to adopt the proposed Airport Land Use Management District (ALUMD) as part of their official zoning regulations.

Status: Not implemented – Coordination with local jurisdictions has occurred; however, zoning regulations have not been updated.

LU-7: Seek cooperation from Franklin County, Jefferson Township, Mifflin Township, and the City of Gahanna to adopt subdivision codes applicable to the proposed Airport Land Use Management District (ALUMD).

Status: Partially implemented – Coordination with local jurisdictions has occurred; however, only Franklin County has updated it subdivision regulations to require a note identifying whether or not the plat is located wholly or in part in an established ALUMD (Franklin County Subdvision Regulations Section 307.03 (M)).

LU-8: Seek cooperation from Franklin County, Jefferson Township, Mifflin Township, and the City of Gahanna to adopt building codes applicable to the proposed Airport Land Use Management District (ALUMD).

Status: Not implemented – Coordination with local jurisdictions has occurred; however, building codes have not been updated. Franklin, Jefferson, and Mifflin all reference Ohio Building Code. Gahanna adopted the OBC as their own. There is no reference to the ALUMD or airport compatibility in the OBC.

LU-9: Seek cooperation from the Board of Realtors to participate in a voluntary fair disclosure program for property located within the proposed Airport Land Use Management District (ALUMD).

Status: Not implemented – Coordination has occurred; however, local jurisdictions elected not to amend their ordinances to include the ALUMD. The CRAA makes the noise exposure maps and other noise compatibility information available on its website.

LU-10: Periodically place advertisements in real estate sections of local newspapers delineating the boundaries of the proposed Airport Land Use Management District (ALUMD).

Status: Not implemented – Coordination has occurred; however, local jurisdictions elected not to amend their ordinances to include the ALUMD. The CRAA makes the noise exposure maps and other noise compatibility information available on its website.

LU-11: Purchase the Buckles property to prevent imminent non-compatible developments from occurring.

Status: Not implemented – The Buckles property is located to the northeast of CMH east of Hamilton Road and southwest of I-270. Much of the land area is undeveloped although since the 2007 Part 150 Noise Compatibility Study the property has been bisected by Techcenter Drive and some lots have been subdivided with new commercial development at the eastern end of Techcenter Drive. The other undeveloped parcels are zoned for commercial use.

LU-12: Develop an Airport Land Use Management District (ALUMD) based on the 20-year Noise Exposure Map/Noise Compatibility Program (NCP) noise contour, natural geographic and jurisdictional boundaries.

Status: Not implemented – The intent of this measure was to eliminate changing boundaries set by the current noise exposure contours and establish a fixed boundary for consistency. The suggested fixed boundary was not implemented. The City of Columbus and Franklin County continue to apply an Airport Environs Overlay Zone, the boundaries of which correspond to the noise exposure contour from the previous Part 150 Noise Compatibility Study Update which is subject to periodic review and potential revision.

Summary of the 2007 NCP Program Management Measures

PM-1: Maintain the noise abatement elements of the FAA ATCT Tower Order

Status: Implemented – The noise abatement elements are contained in the current Tower Order.

PM-2: Maintain the Noise Management Office for noise compatibility program management.

Status: Ongoing.

PM-3: Maintain an ongoing public involvement program regarding the noise compatibility program.

Status: Ongoing.

PM-4: Maintain the noise and flight track monitoring system and expand and upgrade the system as necessary. Add up to eight permanent NMTs and upgrade the computer software and hardware as necessary

Status: Implemented – In 2014, four additional permanent noise monitors (NMTs) were installed, two west of the relocated Runway 10R/28L and two east of Runway 10R/28L, which expanded the system to include a total of 16 NMTs. In addition, in 2015, the other existing 12 NMTs were upgraded with newer equipment. The CRAA Airport Operations department continues to monitor the operation of the system and receives ongoing software updates.

PM-5: Routinely update the noise contours and periodically update the noise program.

Status: Ongoing.

PM-6: Establish a land use compatibility task force which meets periodically to discuss issues relevant to airport noise compatibility planning.

Status: Previously implemented but no longer active. Airport Facilities and Activity

The following sections provide a basic discussion of the history of the Airport, a description of the area surrounding the Airport, an inventory of the existing airport facilities, and an identification of the typical aircraft activity at CMH.

1.3.1 Airport History

CMH opened in 1929 as Port Columbus which served as a stop for transcontinental air/rail travel. That year Transcontinental & Western Air (TWA) began its New York to West Coast air/rail service through Columbus. By 1939 there were 15 daily flights leaving from CMH. At the onset of World War II, CMH was one of only 31 non-military airports in the country that could accommodate military aircraft of the time; in 1941 the Federal government took control of and expanded CMH. After the War, CMH began to grow and in 1952 the east/west runway was extended from 4,500 to 8,000 feet in length. A new passenger terminal was dedicated in 1958 as part of a $12 million upgrade to CMH. That same year CMH was ranked as the 16th busiest airport in the nation. In 1965 the Airport gained "international" status when a U.S. Customs facility was established. In 1979, the 50th anniversary of air travel at CMH, the airport undertook a $70 million expansion that included the addition of enclosed jetways at every gate.[1]

[1] Columbus Regional Airport Authority, online at https://columbusairports.com/storage/staging/20171211172828-columbus-regional-airport-authority-history.pdf, Accessed, June 2, 2021.

In 1989, 17th Avenue was renamed as International Gateway, which leads to the front door of the Airport. The terminal was expanded in 1989 with the opening of the seven-gate South Concourse, (also known as Concourse A) and again expanded in 1996 with the four-gate North Concourse (also known as Concourse C).[2] Later, there was a second expansion to Concourse C adding 7 gates.

In 1991, the Columbus Municipal Airport Authority was formed. Operation of CMH was transferred from the City of Columbus to the Authority. In late 2002, the City of Columbus, Franklin County, and the Columbus Municipal Airport Authority approved the merger of the Columbus Airport Authority and the Rickenbacker Port Authority, forming the new CRAA, effective January 1, 2003.[3]

The North Runway (Runway 10L/28R) was extended from 6,000 to 8,000 feet in 1997. Other improvements included the realignment of International Gateway in 2008 and construction of the I-670 / Stelzer Road overpass in 2009 to provide more convenient access by eliminating the former intersection of Stelzer Road and International Gateway. In 2013, the CRAA completed construction of a replacement to the South Runway (Runway 10R/28L), which was relocated approximately 700 feet south of its original location. The relocated runway became fully operational in August 2013.[4] The CRAA rehabilitated Runway 10L/28R in 2016 by replacing or repairing the existing pavement. Other recent development at CMH includes the ongoing construction of a new consolidated rental car facility and redevelopment of other facilities along International Gateway to improve passenger convenience.

In 2016, CMH was renamed from Port Columbus International Airport to John Glenn Columbus International Airport to honor Ohio native and former Marine Corps aviator, astronaut, and U.S. Senator John Glenn. The name change was unanimously agreed upon by the CRAA, and Governor John Kasich signed a bill officially renaming the Airport in June 2016.[5]

1.3.2 Airport Location

CMH is located on the eastern edge of the City of Columbus, to the north of the cities of Bexley and Whitehall, southwest of the City of Gahanna and west of Jefferson Township. The area surrounding CMH includes a mixture of land uses, including single-family residential housing, multi-family residential communities and mobile home parks, commercial, and industrial areas. **Exhibit 1-2, *Airport Location,*** shows the location of CMH in relation to the Columbus Area.

1.3.3 Airport Runways

The airfield at CMH consists of two parallel, east/west runways spaced approximately 3,500 feet apart. Runway 10R/28L, the south runway, is the longest runway on the airfield at 10,113 feet. Runway 10L/28R, the north runway, is 8,001 feet in length.

1.3.4 Airport Operators and Facilities

As of October 2020, CMH was served by the following commercial airline operators:

- Alaska Airlines
- Air Canada Express (Air Georgian & Jazz)
- American Airlines
- Delta Air Lines / Delta Connection
- Frontier Airlines
- Southwest Airlines
- Spirit Airlines
- United Airlines / United Express

2 Ibid.
3 Ibid.
4 Ibid.
5 *Port Columbus officially renamed after John Glenn,* WBNS 10TV, June 28, 2016. Available online at: https://www.10tv.com/article/john-glenn-be-honored-today-port-columbus-renaming-ceremony.

1.3.4.1 Terminal Facilities

The Passenger Terminal at CMH includes 31 total gates in three separate concourses. As of December 2019, Concourse A, the South Concourse, has five gates, Concourse B has 15 gates, and Concourse C, the North Concourse, has 11 gates.

1.3.4.2 Airside Facilities

CMH property can be divided into three distinct areas – north airfield, midfield, and south airfield. The north airfield, which is north of Runway 10L/28R, consists of the airfield maintenance facilities, NetJets, MPW hangar, and Nationwide hangars, and other airport-related commercial facilities. The midfield area is situated between Runway 10L/28R and Runway 10R/28L. The midfield includes the passenger terminal and apron area and the Lane Aviation facility. A new consolidated rental car facility (CONRAC) is currently under construction within the midfield area to the west of the existing terminal. The primary access to the terminal and parking is from International Gateway, which connects the Airport to I-670 and I-270 to the west. Access from the east is available via Sawyer Road and Bridgeway Avenue. The passenger terminal and parking garage is located at the east end of International Gateway. Several hotels, surface parking lots, and the airport traffic control tower (ATCT) are located along International Gateway west of the terminal. The south airfield is located to the south of Runway 10R/28L. The original terminal building is located in the southeast corner of the airfield. The Columbus International Air Center is also located south of the airfield along 5th Avenue which accommodates maintenance operations for Republic Airways. The airport facilities at CMH are shown on **Exhibit 1-3, *Existing Airport Layout***.

1.3.5 Fixed-Base Operators (FBOs)

There are two fixed-base operators (FBOs), Lane Aviation and Signature Flight Support ,at CMH, that provide aircraft services such as fueling services, ramp parking, hangar parking/storage, parts, and maintenance for general aviation (GA) aircraft.

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Exhibit 1-2 Airport Location

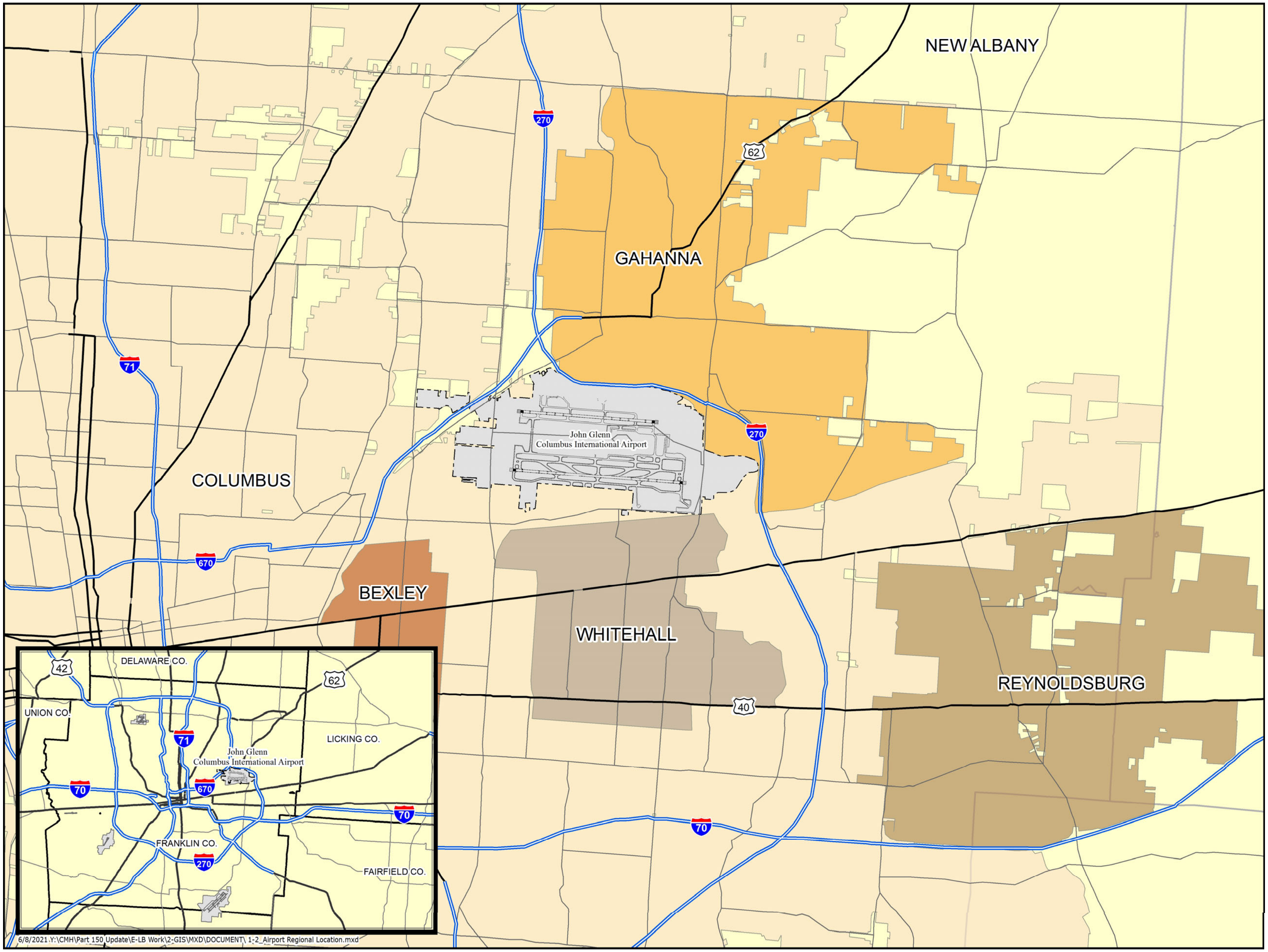

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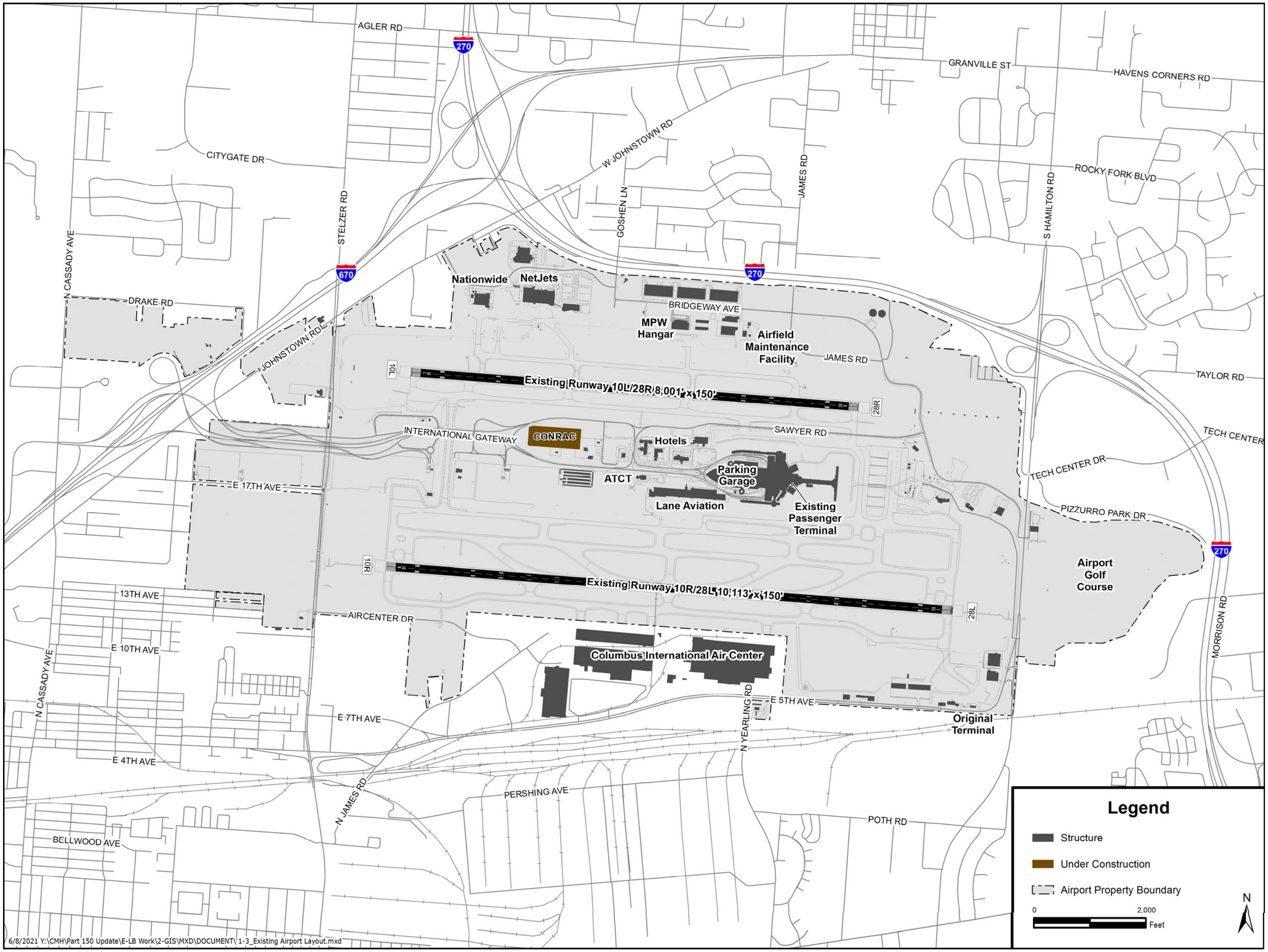
Exhibit 1-3 Existing Airport Layout



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1.3.6 Based Aircraft

A total of 73 aircraft are based at CMH. **Table 1-1** provides the number of general aviation aircraft based at CMH by aircraft type.

Table 1-1 Based Aircraft

Aircraft Type	Number
Single engine airplanes	23
Multi engine airplanes	6
Jet airplanes	42
Helicopters	2
Total aircraft based on the field	**73**

Source: www.airnav.com. Airport information published as of October 15, 2020.

1.3.7 Annual Operations

The number of annual operations at CMH for the Existing (2020) Baseline period was 134,999, which results in 369.9 average-annual day operations. The number of annual operations at CMH was based on ATCT records, airport landing fee reports, and discussions with operations. **Table 1-2** shows a summary of the Existing (2020) average daily operations by primary user group. For a detailed breakdown of the annual operations, refer to Appendix C, *Noise Methodology*.

Table 1-2 Summary of Average-Annual Day Operations

Aircraft Type	Arrivals		Departures		Total
	Daytime	Nighttime	Daytime	Nighttime	
Large Jets	93.5	26.7	97.8	22.4	240.3
Regional / Air Taxi Jets	28.8	3.8	29.5	3.1	65.1
Commuter / Air Taxi Props	2.2	1.2	2.9	0.6	6.9
General Aviation Jets	16.4	1.8	16.5	1.7	36.4
General Aviation Props	9.7	0.9	10.1	0.5	21.2
Total	150.6	34.3	156.7	28.2	369.9

Notes: Sum may not equal total due to rounding.
Daytime = 7:00 am – 9:59 pm, Nighttime = 10:00 pm – 6:59 am.
Source: Federal Aviation Administration (FAA) Operations Network (OpsNet) data, CRAA Landing Fee Reports from September 2018 through August 2019, CMH ANOMS data from September 2018 through August 2019, Landrum & Brown analysis, 2020.

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Chapter 2 Affected Environment

Airports and aircraft operations generally have direct benefits and impacts on surrounding communities as aviation activity is inherently intertwined with its neighbors. This includes both positive and negative impacts. Identifying and evaluating land uses surrounding an airport is an important step in quantifying potential impacts through the Noise Compatibility Study process. This evaluation identifies the residential and other noise-sensitive land uses around CMH. A discussion of the land use mapping methodology and zoning information is provided in **Appendix D, *Land Use Assessment Methodology***.

2.1 Airport Location

CMH is located on the eastern edge of the City of Columbus in Franklin County, Ohio, to the north of the cities of Bexley and Whitehall, southwest of the City of Gahanna, west of Jefferson Township, and northwest of the City of Reynoldsburg. These jurisdictions generally share both the benefits and the potentially negative impacts of airport operations at CMH, and therefore, are the subject of the land use evaluation in this study.

2.1.1 Columbus Regional Airport Authority

CMH is operated by the Columbus Regional Airport Authority (CRAA), which sets the policies under which the airport is operated. The CRAA is an independent governmental entity responsible for the operation of CMH as well as Rickenbacker International Airport (LCK) and Bolton Field Airport (TZR). The creation of the CRAA was a result of a merger between the Columbus Municipal Airport Authority and the Rickenbacker Port Authority (RPA) on January 1, 2003.

A Board of Directors is the governing body of the CRAA and is composed of nine business and community leaders. Four members of the Board are appointed by the Mayor of the City of Columbus with the advice and consent of City Council, four are appointed by the Franklin County Board of Commissioners, and one member is appointed jointly by the Mayor and the Franklin County Board of Commissioners. All Board members serve four-year staggered terms.

2.1.2 Airport Environs

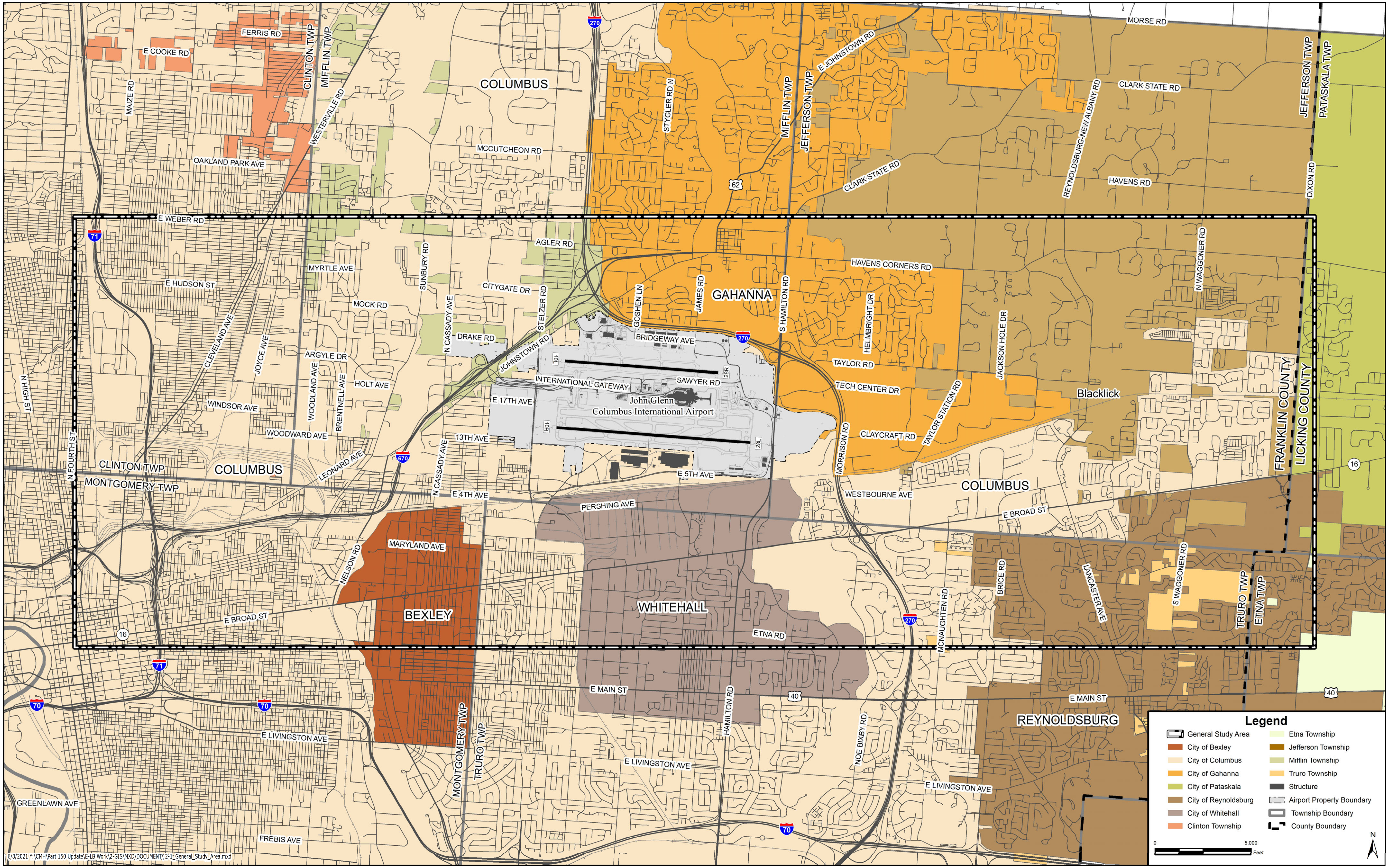
The airport environs refers to the regional area that may experience broader effects from the noise due to aircraft operations. The airport environs does not have a specifically defined boundary as these effects do not stop at geographic or jurisdictional lines. The airport environs roughly encompasses the area of northeast Columbus and other jurisdictions in eastern Franklin County and western Licking County as shown in **Exhibit 2-1, *Airport Environs and General Study Area***. This map includes jurisdictional boundaries, local roads and major highways, the airport property boundary, and other geographical features. For the purpose of this study, the airport environs encompasses an area approximately 14 by 9 miles (126 square miles). The area extends approximately four miles to the north and south of the airport, and six miles to the east and west, covering the full extent of Exhibit 2-1. The area is of adequate size to depict flight tracks and the jurisdictional boundaries used in this study.

2.1.3 General Study Area (GSA)

The General Study Area (GSA) is defined as the area that experiences direct overflights of aircraft at lower altitudes. The GSA was determined by examining the boundaries of previous 65 Day-Night Average Sound Level (DNL) noise exposure contours (the FAA-defined threshold for significant noise impacts), and by reviewing flight tracks of aircraft operating in the airport vicinity and/or under the control of the CMH Air Traffic Control Tower (ATCT). The GSA, shown in Exhibit 2-1, is the map used to show existing and future noise contours, as well as noise abatement alternatives in this document.

To the north, the GSA extends past Agler Road in Columbus, Granville Street in Gahanna, and Havens Corners Road in Jefferson Township. To the east, the GSA extends just beyond the Franklin/Licking County border. To the south the GSA extends past East Broad Street/State Route 16 and almost to U.S. Route 40. To the west, the GSA extends into downtown Columbus, just past I-71.

Exhibit 2-1 Airport Environs and General Study Area



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2.1.4 Existing Land Uses in the General Study Area

Land uses in the GSA were identified, mapped, and categorized in terms of the general land use classifications presented in 14 CFR Part 150, which includes residential (single and multi-family), commercial, industrial/manufacturing, public/institutional, parks/recreational, and agriculture/open space. These uses were identified based on each county's Geographic Information System (GIS) database (where available), and was supplemented as necessary by review of current aerial photography and field verification. Appendix D*, Land Use Assessment Methodology*, provides additional detailed information regarding the classification and identification of land uses. **Exhibit 2-2, *Existing Land Uses***, depicts the existing land uses within the GSA.

The area for which existing land uses were identified involves two levels of delineation: 1) the area directly adjacent to the airport and the areas directly in line with the east/west orientation of the runways that may be affected by specific localized impacts of noise abatement measures; and 2) the regional area that may experience the broader incompatibilities of aircraft overflight and noise impacts. To the immediate east and within previous 65 DNL noise exposure contours, land uses are characterized by commercial/industrial areas, interspersed with low density to medium density residential areas. To the west of CMH, land uses include a mix of medium density residential, commercial and industrial development.

2.1.5 Existing Noise-Sensitive Public Facilities in the General Study Area

Land uses that could be considered incompatible with airport operations include more than just residential uses. 14 CFR Part 150 defines certain public facilities as noise-sensitive: churches, schools, nursing homes, libraries, and hospitals. Within the GSA there are 160 schools (including licensed daycare facilities), 230 churches, two hospitals, and three libraries as shown on **Exhibit 2-3, *Existing Noise-Sensitive Public Facilities***. Appendix D*, Land Use Assessment Methodology*, presents the methodology for collecting and organizing the noise-sensitive facility data and **Table D-2** provides a list of all facilities.

2.1.6 Existing Historic Sites

Historic properties on or eligible for inclusion in the National Register of Historic Places (NRHP) should be identified on the NEMs per 14 CFR Part 150. The NRHP is the official list of historic places worthy of preservation in the U.S. as authorized by the National Historic Preservation Act of 1966. Efforts to identify historic structures within the GSA included reviewing the list of properties on the NRHP maintained by the U.S. National Park Service, as well as reviewing previous environmental studies, including the 2009 Final Environmental Impact Statement (EIS).[6] Within the GSA, there are 72 existing structures that are listed on or determined eligible for the NRHP. These historic sites are shown on **Exhibit 2-4, *Existing Historic Sites*** and listed in Appendix D, **Table D-3**.

6 Port Columbus International Airport Final Environmental Impact Statement Section 303(C) And Section 106 of the National Historic Preservation Act Evaluation U.S. Department of Transportation Federal Aviation Administration, March 2009

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Exhibit 2-2 Existing Land Uses

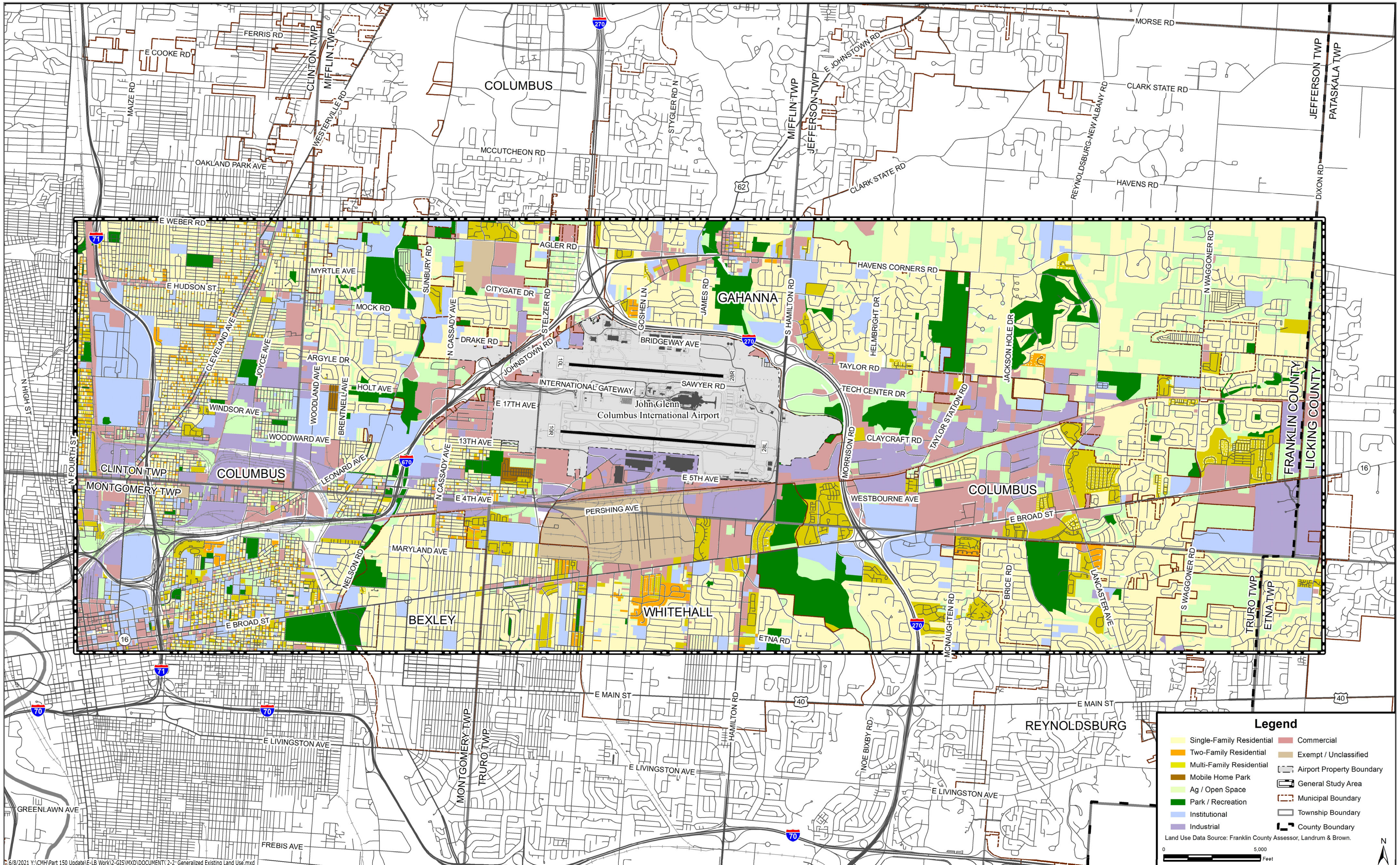

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Exhibit 2-3 Existing Noise-Sensitive Public Facilities

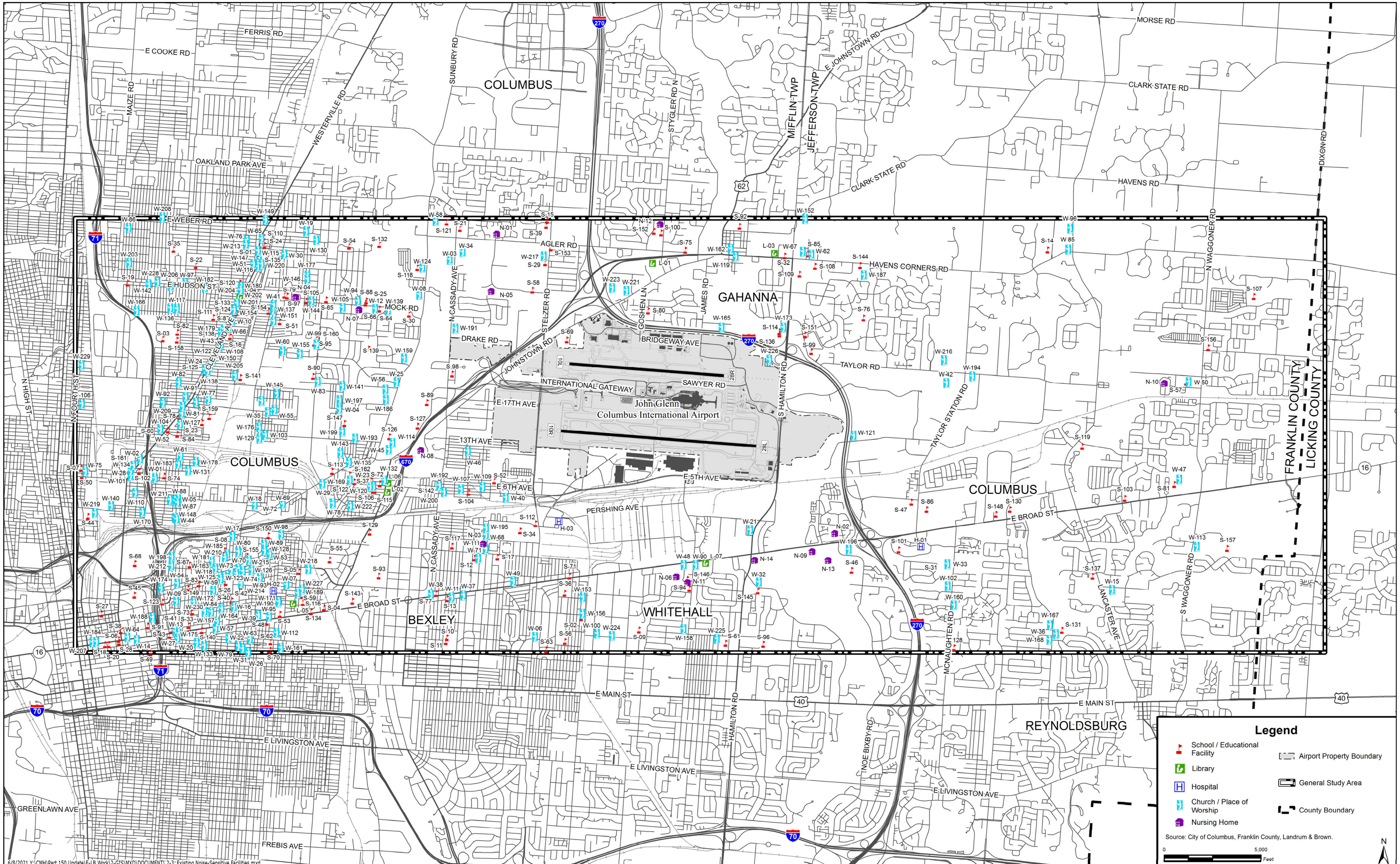

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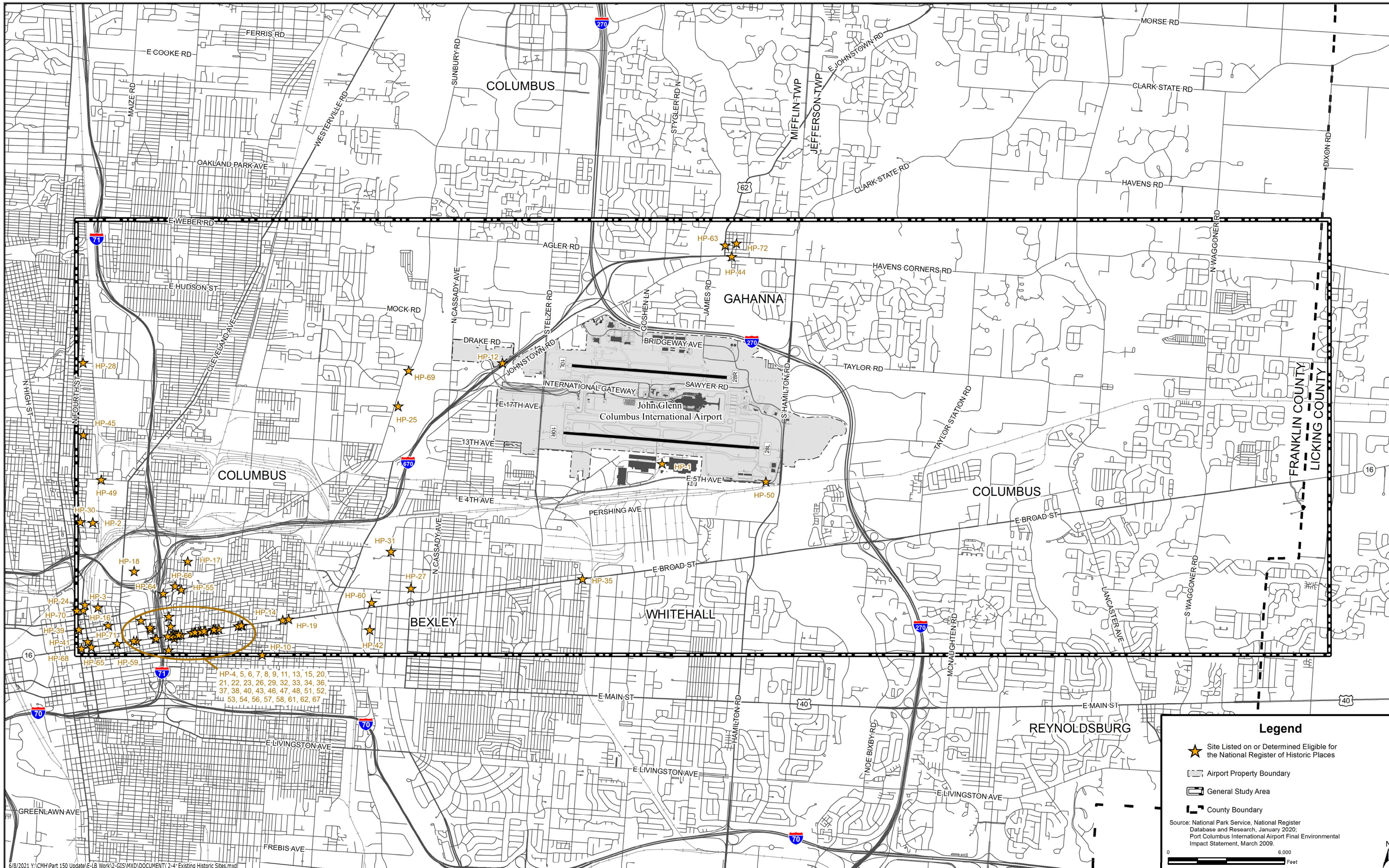
Exhibit 2-4 Existing Historic Sites



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2.2 Land Use Policies and Regulatory Authority

Neither the CRAA nor the Federal government has the authority to implement or enforce local land use policies and regulations. That responsibility falls to the local jurisdictions, which in Ohio could include a county, city, or township. The Part 150 process includes a review of local comprehensive planning efforts, land use regulations, zoning ordinances, building codes, and subdivision regulations.

In most cities and counties, the chief land use regulatory document is the zoning ordinance, which regulates the types of uses, building height, bulk, and density permitted in various locations. Subdivision regulations are another important land use tool, regulating the platting of land. Local communities also regulate development through building codes and, in some cases, enforce noise regulations. The local capital improvements program, a schedule for constructing and improving public facilities such as streets, sewers, and water lines, is another important policy document that could influence development; although, on its own it does not involve regulation.

The Part 150 planning process does not propose, recommend, or fund the mitigation of future proposed development. It does, however, identify areas of potential future noise exposure for use by local planners in the development of comprehensive planning documents and land use policies. By preparing a comprehensive plan and setting land use policies, a jurisdiction or community can develop land appropriately and according to a locally accepted, approved plan. It is important that these planning efforts identify the likely development potential of land near the airport, within the published airport noise contours, or under existing or proposed future aircraft flight tracks. The local land use planning policies provide the airport sponsor with a description of the types of future development that should occur in areas not yet developed or to be redeveloped within the community.

Within the CMH GSA, six municipalities (Bexley, Columbus, Gahanna, Pataskala, Reynoldsburg, and Whitehall), Franklin County, and Jefferson Township share the responsibility for land use regulations. Summaries of the existing and future land use and zoning plans for these jurisdictions are included in Section 2.2.1.1 through Section 2.2.1.7 of this chapter.

2.2.1 Existing Land Use Planning and Development Regulations

This section summarizes the land use development regulations related to airport noise compatibility planning for each jurisdiction within the GSA. Coordination with local governments to plan for airport noise compatibility is an integral step in the Part 150 Noise Compatibility Planning process.

The previous Part 150 Noise Compatibility Study in 1993 recommended the establishment of an Airport Environs Overlay (AEO) Zone to assist in controlling residential development within the higher noise levels resulting from Airport activity. Two jurisdictions within the GSA, the City of Columbus and Franklin County, have adopted the AEO to limit development within areas that are significantly impacted by airport noise. The local ordinances are based on model regulations developed by the Mid-Ohio Regional Planning Commission (MORPC) in 1991. The City of Columbus adopted the AEO in 1994 and Franklin County adopted a similar ordinance in 1996. Both ordinances added an overlay zone that established additional development standards and criteria for property within areas that are significantly impacted by noise. The AEO ordinances establish subdistricts according to the 65+, 70+, and 75+ DNL indicated by the most recently published NEM. Within these subdistricts, land use is regulated to prevent non-compatible development that is incompatible with high levels of aircraft noise. The overlay zone boundary changes accordingly to updates to the NEM and is therefore not static. Specific regulations from each jurisdiction’s zoning ordinance regarding the application of the AEO are discussed in the following sections.

2.2.1.1 Franklin County

Franklin County encompasses approximately 540 square miles, of which the unincorporated areas of Mifflin Township comprise approximately 1.4 square miles and unincorporated Truro Township comprises just over one square mile. The county has a total estimated population of 1,310,300 in 2018, including 38,166 and 28,793 in Mifflin and Truro Townships, respectively.[7] Franklin County administers planning and zoning within the unincorporated areas, excluding Jefferson Township which has a separate planning and zoning department. Franklin County administers planning and zoning on behalf of Mifflin and Truro Townships, both of which are partially within the GSA.

The Franklin County Board of Commissioners approved the Clinton-Mifflin Land Use Plan on January 13, 2009.[8] This plan identified land use and development goals; including the topics of safe neighborhoods, complete streets, and economic development; within the planning area bounded by Morse Road to the north, I-270 to the east, Mock Road and I-670 to the south, and Karl Road to the west. The plan includes land use recommendations for minimizing noise sensitive land uses along Drake Road to the northwest of CMH.[9]

The county has adopted an Airport Environs Overlay (AEO) District to restrict development within areas impacted by aircraft noise. **Table 2-1** shows the land use development standards for Franklin County within the Airport Environs Overlay District.

Franklin County has subdivision regulations that address platting of new land subdivision within the AEO District. Section 307.03(U) stipulates that the final plat shall contain a "note identifying whether or not the plat is located wholly or in part in an established Airport Land Use Management District." Furthermore, under Section 404.15 an avigation easement and nonsuit covenant may be required within identified airport noise zones.[10]

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[7] US Census Bureau, Annual Population Estimates, 2018.
[8] Clinton-Mifflin Land Use Plan, Clinton and Mifflin Townships, Franklin County, Ohio; Online at https://development.franklincountyohio.gov/planning-zoning/land-use-planning/clinton-mifflin-land-use-plan, Accessed: June 2, 2021.
[9] Franklin County Zoning Resolution, Amended and readopted August 13, 2019.
[10] Franklin County Subdivision Regulations, for unincorporated areas of Franklin County, Ohio, Adopted March 27, 2012.

Table 2-1 Franklin County Airport Environs Overlay District Land Use Compatibility Standards

Land Use (provided it is permitted in the district overlaid)	Subdistrict A	Subdistrict B	Subdistrict C
	65 DNL	70 DNL	75 DNL
Residential			
Single, Two & Multi	Y(1)	N	N
Manufactured housing	N	N	N
Hotels, Motels	Y(2)	Y(3)	N
All other residential	Y(1)	Y(1)	N
Commercial			
Retail	Y	Y(2)	Y(3)
Business services	Y	Y(2)	Y(3)
Personal services	Y	Y(2)	N
Professional services	Y	Y(2)	Y(3)
Offices	Y	Y(2)	N
All other commercial	Y	Y(2)	Y(3)
Manufacturing			
Manufacturing, warehousing, distribution	Y	Y(2)	Y(3)
Parking facilities	Y	Y(2)	Y(3)
All other manufacturing	Y	Y(2)	Y(3)
Institutional			
Hospitals, Nursing	Y(2)	Y(3)	N
Other medical facilities	Y	Y(2)	Y(3)
Educational facilities	Y(2)	Y(3)	N
Public assembly, churches	Y(2)	Y(3)	N
Government facilities	Y	Y(2)	Y(3)
Parks, recreation	Y	Y(2)	Y(3)
All other public/semi public	Y	Y	Y
All Other Uses	Y	Y	Y

Key:
Y – Land use is permitted
N – Land use is prohibited
(1) Interior noise level reduction of 25dB required in District A, 30 dB in District B
(2) Interior noise level reduction of 25dB is required for all areas where the public is received, office areas, noise sensitive areas, or where normal noise level is low.
(3) Interior noise level reduction of 30dB is required for all areas where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.
Source: Franklin County Zoning Resolution, Section 660, Airport Environs (Noise) Overlay District.

2.2.1.2 City of Bexley

The City of Bexley is located to the south of CMH and encompasses approximately 2.4 square miles. It had an estimated population of over 13,800 in 2018 according to the U.S. Census Bureau.[11] The City updated its Strategic Plan in 2013.[12] It contains no land use provisions regarding compatibility with airport operations.

2.2.1.3 City of Columbus

The City of Columbus is located to the north, south, east, and west of CMH and encompasses approximately 225.9 square miles. It had an estimated population of over 892,000 in 2018 according to the U.S. Census Bureau.[13] Development within the City of Columbus is guided by its Comprehensive Plan, adopted in December of 1993.[14] The Columbus Comprehensive Plan includes recommendations for limiting noise-sensitive development within the current 65 DNL (Ldn) noise contour, requiring soundproofing and other preventative measures for new development. In addition to the Comprehensive Plan, the Columbus Citywide Planning Policies (C2P2), adopted in July 2018, and various neighborhood plans, address targeted areas.

Land use regulations are enforced through the City Zoning Code. The City of Columbus has established an Airport Environs Overlay (AEO) District to "…protect the public health, safety, and welfare by regulating development and land use within airport environs and airport hazard areas; to ensure compatibility between existing airports, and any future airport and surrounding land uses; and to protect said airports from incompatible encroachment." The AEO is divided into three subdistricts (A,B,C), which represent different levels of noise impact and within which incompatible development is restricted. Subdistrict A includes the 65 DNL to 70 DNL noise exposure area. Subdistrict B includes the 70 DNL to 75 DNL noise exposure area. Subdistrict C includes the 75 DNL and greater noise exposure area.[15] **Table 2-2** shows the land use development standards within the AEO District.

[11] U.S. Census Bureau, Annual Population Estimates, 2018.
[12] City of Bexley Strategic Plan, Revised 2013, Version 1.2; Online at http://www.bexley.org/strategic, Accessed on June 2, 2021.
[13] US Census Bureau, Annual Population Estimates, 2018.
[14] Columbus Comprehensive Plan, December 1993; Online at: https://www.columbus.gov/Templates/Detail.aspx?id=24074, Accessed: June 2, 2021.
[15] City of Columbus Code, Title 33, Zoning Code, Chapter 3384, Airport Environs Overlay.

Table 2-2 City of Columbus Airport Environs Overlay District Land Use Compatibility Standards

Land Use	Subdistrict A	Subdistrict B	Subdistrict C
	65 DNL	70 DNL	75 DNL
Residential			
Single-, Two-, Three-, or Four-Family	Y	N	N
Apartment	Y	N	N
Manufactured Housing, Mobile Homes	N	N	N
Hotels, Motels	Y	Y	N
Church, House of Worship	Y	Y	N
Public Park, Noncommercial Recreation	Y	Y	Y
All Other Residential	Y	Y	N
Commercial			
Retail	Y	Y	Y
Business Services	Y	Y	Y
Personal Services	Y	Y	N
Professional Services	Y	Y	Y
Offices	Y	Y	N
All Other Commercial	Y	Y	Y
Manufacturing			
Manufacturing, Warehousing, Distribution	Y	Y	Y
Parking Facilities	Y	Y	Y
All Other Manufacturing	Y	Y	Y
Institutional			
Hospitals, Nursing Homes	Y	Y	N
Other Medical Facilities	Y	Y	Y
Educational Facilities	Y	Y	N
Public Assembly	Y	Y	N
Government Facilities	Y	Y	Y
All Other Public and Semi-Public	Y	Y	Y
Industrialized Unit	**N**	**N**	**N**
All Other Uses	**Y**	**Y**	**Y**

Y = Land Use is Permitted
N = Land Use is Permitted
Source: City of Columbus Code, Title 33, Zoning Code, Chapter 3384, Airport Environs Overlay.

2.2.1.4 City of Gahanna

The City of Gahanna is located to the north, northeast, and east of CMH and encompasses approximately 12.5 square miles. According to the 2018 U.S. Census Bureau estimates Gahanna had a population of over 35,500.[16] The City updated its Land Use Plan in September 2019.[17] The Plan contains no land use management recommendations regarding compatibility with airport operations. However, the City of Gahanna and the CRAA have coordinated on land use compatibility issues for the areas immediately east of the Airport.

2.2.1.5 City of Reynoldsburg

The City of Reynoldsburg is located approximately 2.5 miles southeast of CMH and encompasses over 10.5 square miles. The city had an estimated population of over 38,000 in 2018 according to the U.S. Census Bureau.[18] The city updated its Comprehensive Plan in 2018,[19] which contains no recommendations regarding compatibility between land use and airport operations.

2.2.1.6 City of Whitehall

The City of Whitehall is located to the south of CMH and encompasses approximately 5.2 square miles. It had an estimated population of just over 19,000 people in 2018 according to the U.S. Census Bureau.[20] The City published a draft comprehensive plan in 2019.[21] The City currently has no plans or zoning codes that address land use and airport noise compatibility.

2.2.1.7 Jefferson Township

Jefferson Township is located to the northeast of CMH and encompasses approximately 17 square miles. The township had an estimated population of over 11,300 in 2018 according to the U.S. Census Bureau.[22] Jefferson Township adopted its Comprehensive Plan in September 2018.[23] The Comprehensive Plan contains no recommendations regarding compatibility between land use and airport operations. The Zoning Ordinance includes airports as a special use that will be subject to the Exceptional Use District regulations but does not specifically address the compatibility between airports and the Exceptional Use District and other land uses.[24]

2.3 Growth/Risk Significant Development Trends

The Central Ohio region continues to experience growth in population and employment. The Mid-Ohio Regional Planning Commission has prepared population and employment estimates for each jurisdiction through the year 2050. **Table 2-4** shows the estimated population growth within the GSA by the year 2025. As shown in **Table 2-3**, the population of the jurisdictions within the GSA is expected to increase by over 7 percent between 2020 and 2025. Similarly, employment within the GSA is expected to increase by over 5 percent between 2020 and 2025 as shown in Table 2-4.

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16 US Census Bureau, Annual Population Estimates, 2018.
17 Gahanna Land Use Plan, 2019; Online at https://www.gahanna.gov/planning/, Accessed: June 2, 2021.
18 US Census Bureau, Annual Population Estimates, 2018.
19 Reynoldsburg Comprehensive Plan 2018; Online at http://www.ci.reynoldsburg.oh.us/departments/development/comp-plan.aspx, Accessed: June 2, 2021.
20 US Census Bureau, Annual Population Estimates, 2018.
21 Whitehall Works Development Blueprint, Draft, March 19, 2019; Online at: https://whitehallmeansbusiness.com/why-whitehall/economic-community-development-plan/, Accessed: June 2, 2021.
22 US Census Bureau, Annual Population Estimates, 2018.
23 Jefferson Township 2050: A Vision for the Future, Adopted September 10, 2018; Online at https://www.jeffersontownship.org/2050, Accessed: June 2, 2021.
24 Jefferson Township Zoning Resolution, Amended October 28, 2015; Online at: https://www.jeffersontownship.org/Departments/Zoning-and-Building/Zoning-Resolution, Accessed: June 2, 2021.

Overall, the growth trends within the GSA are expected to continue with population expected to increase by nearly 27 percent by 2050 and employment expected to increase by approximately 25 percent by 2050.

Table 2-3 Population Projections, 2020 - 2025

Jurisdiction	Population		Percent Growth, 2020-2025
	2020	2025	
City of Bexley	14,531	14,654	0.85%
City of Columbus	933,427	1,002,035	7.35%
City of Gahanna	38,851	39,785	2.40%
City of Reynoldsburg	42,181	43,313	2.68%
City of Whitehall	18,459	18,771	1.69%
Jefferson Township	13,226	14,341	8.43%
Mifflin Township	852	1,073	25.94%
Total	1,061,527	1,133,972	6.82%

Source: Mid-Ohio Regional Planning Commission, online at: https://www.morpc.org/tool-resource/estimates-projections/, 2020

Table 2-4 Employment Projections, 2020 - 2025

Jurisdiction	Workers		Percent Growth, 2020-2025
	2020	2025	
City of Bexley	6,868	6,879	0.16%
City of Columbus	479,733	507,300	5.75%
City of Gahanna	21,146	21,496	1.66%
City of Reynoldsburg	22,372	22,787	1.85%
City of Whitehall	8,460	8,510	0.59%
Jefferson Township	6,548	6,952	6.17%
Mifflin Township	396	475	19.95%
Total	545,523	574,399	5.29%

Source: Mid-Ohio Regional Planning Commission, online at: https://www.morpc.org/tool-resource/estimates-projections/, 2020

Currently, predominant land uses in the areas surrounding CMH are medium to high density residential, commercial, industrial/manufacturing, vacant property and parks/open space. Land use patterns are expected to change in response to demand from population and employment growth. Future residential growth near CMH could occur and, if not specifically restricted through zoning, could occur in areas that receive noise in excess of 65 DNL. The Mid-Ohio Regional Planning Commission (MORPC) has developed projected future land use patterns for the year 2025. These future land use projections include additional industrial/commercial development along I-270, and conversion from agricultural to residential land uses east of the Airport, particularly in Blacklick[25] and Reynoldsburg. Additional industrial development has occurred along the I-270 corridor near Tech Center Drive and Claycraft Road and this type of development in this location is expected

[25] Blacklick is an unincorporated community within Jefferson Township.

to continue in the future. Other infill development and increased development density may occur within vacant and underutilized land surrounding the Airport. This could include conversion of vacant land and pockets of older residential development into commercial and office uses, but may also include new residential uses.[26]

Development is also expected to occur to meet the demands for residential and commercial uses created by population growth. To the northwest, west, and southwest of CMH, infill development and/or redevelopment could occur along Stelzer Road and Cassady Avenue. To the south and east of the Airport, new residential development could occur through infill within existing neighborhoods and new subdivision development. Details about new residential development that is is underway or proposed within the GSA is included in Appendix D. Properties that are under development or proposed for development are displayed as “transitional / mixed-use” on the Future (2025) NEM.

The existing and future noise impacts upon land uses in the vicinity of CMH is discussed in Chapter Three.

[26] Mid-Ohio Regional Planning Commission, Land Use Estimates and Forecasts 2015-2020. Population and employment projections were prepared prior to the COVID-19 outbreak. Impacts of COVID-19 are expected to be short-term and the overall trend in growth is expected to resume between 2020 and 2025.

Chapter 3 Baseline Noise Exposure

3.1 Overview

The discussion of the affected environment for noise and compatible land uses describes the existing noise exposure on communities surrounding John Glenn Columbus International Airport (CMH or Airport). The noise analysis presents the noise exposure for the existing conditions base year – 2020. Aircraft-related noise exposure is defined through noise contours prepared using the Federal Aviation Administration (FAA) Aviation Environmental Design Tool (AEDT) Version 3b. This noise exposure is presented using the Day-Night Average Sound Level (DNL) metric.

In addition to the Existing (2020) Baseline Noise conditions, this chapter provides information about the current and potential noise levels in 2025 if no action is taken to change the noise exposure pattern through abatement. The noise patterns are presented on exhibits, and the numbers of persons and housing units that fall within them are quantified.

An explanation of the AEDT and the DNL metric, along with a review of the physics of noise, noise impacts on humans, social impacts of noise, and the data required to develop noise exposure contours, is summarized in **Appendix C, *Noise Methodology***. This information details the operating characteristics in use at the Airport, the number of operations, and the use of flight paths to and from the airport both now and as they are expected to be in 2025.

3.2 Existing (2020) Baseline Noise Contour

The number of operations, runway use, flight track, and trip length data presented in Appendix C, *Noise Methodology,* are used as input to the AEDT computer model for calculation of noise exposure in the airport environs. **Exhibit 3-1, *Existing (2020) Baseline Noise Contour***, reflects the average annual noise exposure pattern present at the airport during the existing baseline period and **Table 3-1** summarizes the area within each noise contour level. Noise contours are presented for the 60, 65, 70, and 75 DNL. The FAA uses the 65 DNL as the noise level in which noise-sensitive land uses (residences, churches, schools, libraries, and nursing homes) become significantly impacted. Below the 65 DNL, all land uses are determined to be compatible. However, the Columbus Regional Airport Authority (CRAA) has chosen to show the 60 DNL because it indicates marginal noise impacts and is useful for land use planning purposes.

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Exhibit 3-1 Existing (2020) Baseline Noise Contour

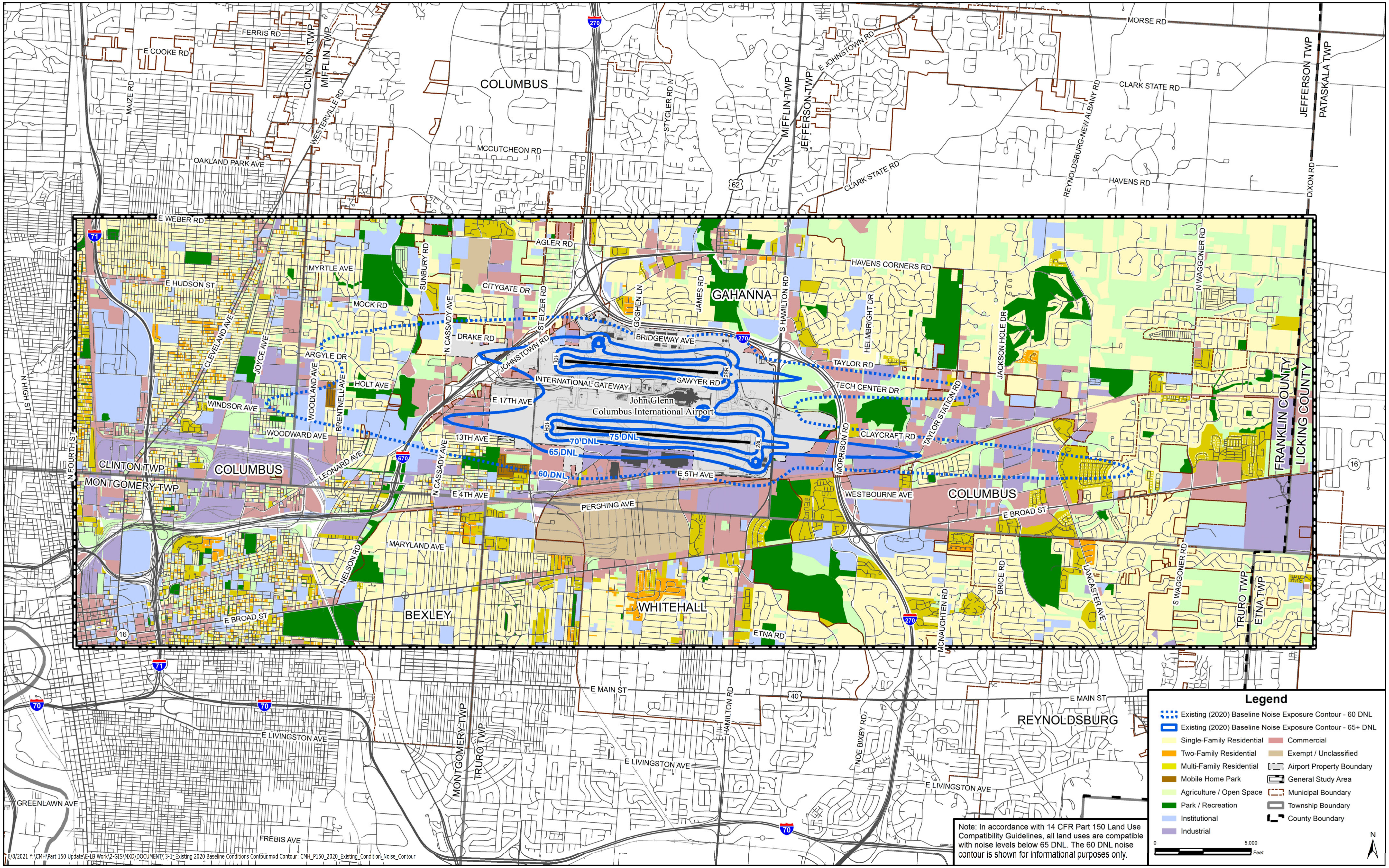

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Table 3-1 Areas Within Existing (2020) Noise Exposure Contour (in Square Miles)

Contour Range	Existing (2020) Baseline
60-65 DNL*	5.0
65-70 DNL	1.8
70-75 DNL	0.5
75 + DNL	0.4
65 + DNL	2.7

*Note: In accordance with 14 CFR Part 150 Land Use Compatibility Guidelines, all land uses are compatible with noise levels below 65 DNL. The 60-65 DNL noise contour is shown for informational purposes only.

Source: Landrum & Brown, 2020.

A DNL noise contour does not represent the noise levels present on any specific day, but, represents the energy-average of all 365 days of operation during the year. Noise contour patterns extend from an airport along each extended runway centerline, reflective of the flight tracks used by all aircraft. The relative distance of a contour from the Airport along each route is a function of the frequency of use of each runway end for total arrivals and departures, as well as use at night, and the type of aircraft assigned to each runway end.

The size and shape of the noise contours for CMH are a function of the combination of flight tracks and runway use. During the existing baseline period, the airport operated approximately 75 percent of the time in west flow (arriving to and departing from Runways 28L/28R) and approximately 25 percent of the time in east flow (arriving to and departing from Runways 10L/10R). Typically, noise contours from departure operations are typically wider due to the wider distribution of flight corridors and higher engine thrust settings on departure compared to arrivals. As a result, the Existing (2020) Baseline noise contour is longer and wider to the west of the Airport than to the east.

The south runway (Runway 10R/28L) is the most heavily used runway because it is the longer of the two runways on the airfield. For this reason, the Existing (2020) Baseline noise contour extends farther out in both directions along the extended centerline of this runway as compared to the north runway.

West of the Airport, the noise contour primarily reflects usage by aircraft departing to the west and to a lesser degree aircraft arriving from the west. The 65 DNL of the Existing (2020) Noise Contour extends approximately 1.1 miles beyond the west end of Runway 10R/28L and extends approximately 0.9 miles beyond the west end of Runway 10L/28R. This area is comprised of a mix of medium-density residential, commercial, and industrial uses located in the City of Columbus and Mifflin Township. The 60 DNL of the Existing (2020) Noise Contour extends approximately 2.9 miles beyond the west end of Runway 10R/28L and extends approximately 2.4 miles beyond the west end of Runway 10L/28R. The area between the 60 and 65 DNL is comprised of medium density residential, commercial, and industrial uses located in the City of Columbus.

To the east of the Airport, the noise contour primarily reflects usage by aircraft arriving from the east and to a lesser degree aircraft departing to the east. The 65 DNL of the Existing (2020) Noise Contour extends approximately 1.7 miles east from the end of Runway 10R/28L and extends approximately 0.8 miles east from the end of Runway 10L/28R. The area east of the airport within the 65 DNL is comprised of commercial and industrial land uses, and undeveloped land within the cities of Columbus and Gahanna. The 60 DNL of the Existing (2020) Noise Contour extends approximately 3.8 miles beyond the east end of Runway 10R/28L and extends approximately 2.6 miles beyond Runway 10L/28R. The area between the 60 and 65 DNL is comprised of a mix of low to medium density residential, commercial, and industrial land uses and undeveloped property located in the cities of Columbus and Gahanna and Jefferson Township. The 70 and 75 DNL of the Existing (2020) Noise Contour remain over airport property.

3.3 Future (2025) Baseline Noise Contour

The baseline noise exposure contour projected for 2025 is presented in **Exhibit 3-2, *Future (2025) Baseline Noise Contour***. This projected contour assumes growth as forecasted in the *Aviation Activity Forecast, John Glenn Columbus International Airport* (See Appendix H). This forecast was approved by the FAA on March 3, 2020. The Future (2025) Baseline noise contour is larger than the Existing (2020) Baseline noise contour due to a projected increase in the number of operations. **Table 3-2** provides a comparison of the areas within the Existing (2020) Baseline and Future (2025) Baseline noise contours.

Table 3-2 Comparison of Areas Within Existing (2020) and Future (2025) Noise Exposure Contour (in Square Miles)

Contour Range	Existing (2020) Baseline	Future (2025) Baseline	Difference
60-65 DNL*	5.0	5.6	0.6
65-70 DNL	1.8	2.2	0.4
70-75 DNL	0.5	0.6	0.1
75 + DNL	0.4	0.4	0.0
65 + DNL	2.7	3.2	0.5

*Note: In accordance with 14 CFR Part 150 Land Use Compatibility Guidelines, all land uses are compatible with noise levels below 65 DNL. The 60-65 DNL noise contour is shown for informational purposes only.

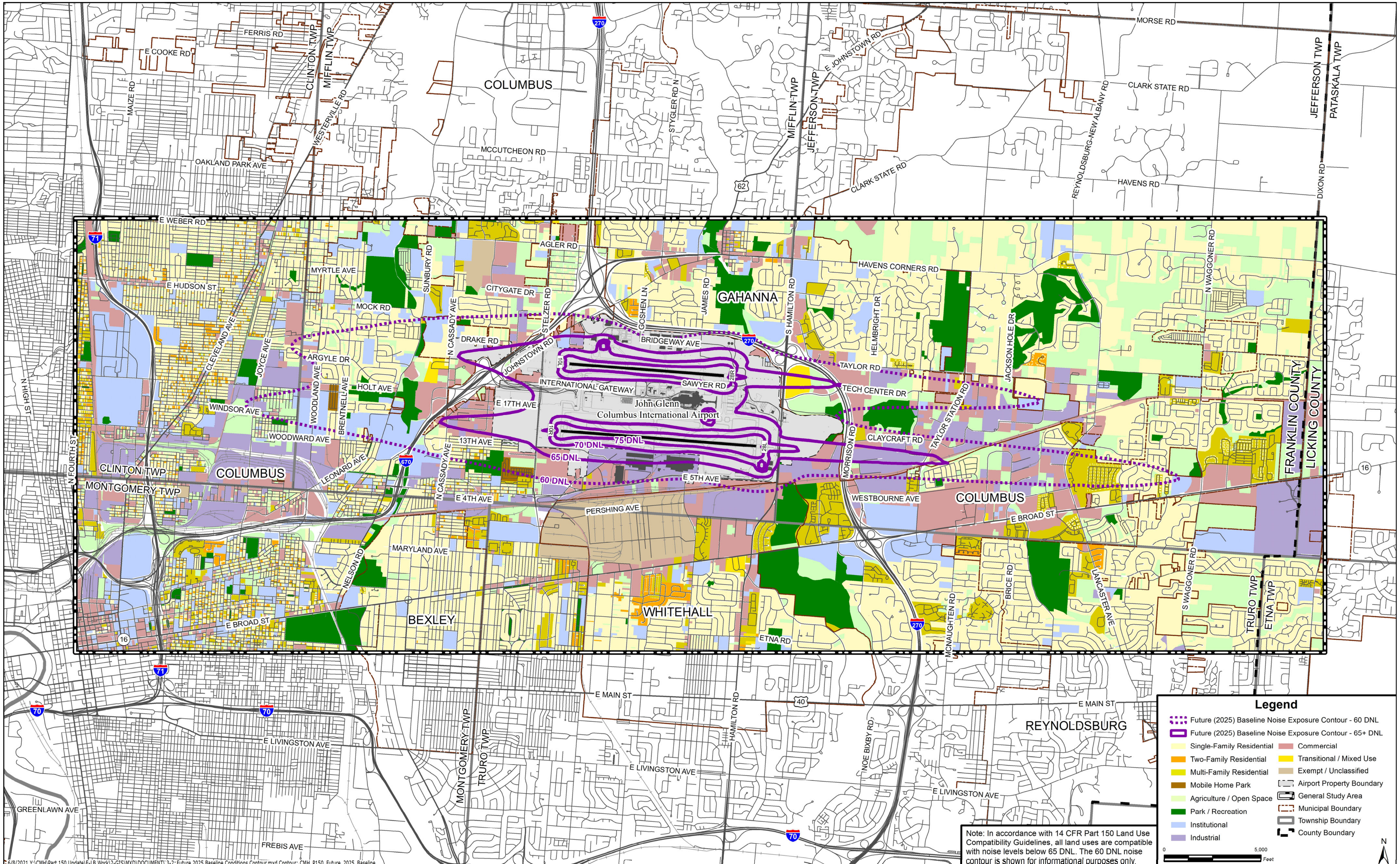
Source: Landrum & Brown, 2020.

For the Future (2025) Baseline conditions, operating levels are expected to increase from 369.9 average annual day operations to 411.4 average annual day operations. The Future (2025) Baseline noise contour increases in size compared to the Existing (2020) Baseline noise contour due to the increase in operations projected for 2025. The shape of the Future (2025) Baseline noise contour remains similar to the Existing (2020) noise contour because runway use patterns and flight tracks would be expected to remain similar to Existing (2020) conditions with minor variations in runway use based on long-term wind and weather patterns.

The 65 DNL of the Future (2025) Noise Contour extends approximately 1.2 miles beyond the west end of Runway 10R/28L and extends approximately 1.1 miles beyond the west end of Runway 10L/28R. The 60 DNL of the Future (2025) Noise Contour extends approximately 3.1 miles beyond the west end of Runway 10R/28L and extends approximately 2.7 miles beyond the west end of Runway 10L/28R.

The 65 DNL of the Future (2025) Noise Contour extends approximately 1.9 miles east from the end of Runway 10R/28L and extends approximately 1.2 miles east from the end of Runway 10L/28R. The 60 DNL of the Future (2025) Noise Contour extends approximately 4.1 miles beyond the east end of Runway 10R/28L and extends approximately 3.1 miles beyond Runway 10L/28R. The 70 and 75 DNL of the Future (2025) Noise Contour remain over airport property.

Exhibit 3-2 Future (2025) Baseline Noise Contour



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3.4 Baseline Noise Contour Incompatibilities

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

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

Summaries of the residential population, housing units, and noise-sensitive facilities affected by noise level for the Existing (2020) and Future (2025) Baseline noise contours are provided in **Table 3-3** and **Table 3-4**. A summary of the impacts for the Existing (2020) and Future (2025) Baseline is provided in **Table 3-5**. These tables show the number of housing units within each noise contour band (e.g. 60-65 DNL, 65-70 DNL) by jurisdiction. The tables also present the current mitigation status of each housing unit. Some housing units have been previously sound insulated, or the owner granted an avigation easement for the property, in which cases the housing unit is considered to be mitigated. Unmitigated housing units include those that are not within the sound insulation program boundary and are not previously mitigated, and housing units that were potentially eligible but not sound insulated. Housing units that were potentially eligible but not sound insulated include those in which the owners declined or did not respond to an offer to sound insulate the housing unit, or housing units that were tested and determined to already achieve the acceptable level of sound attenuation.

There are no housing units located within the 65+ DNL of the Existing (2020) Baseline noise contour. There is one school / educational facility, the Franklin County Board of Developmental Disabilities (FCBDD) Early Childhood Education Center, within the 65+ DNL of the Existing (2020) Baseline noise contour. There are no places of worship, libraries, hospitals, or nursing homes located within the 65+ DNL of the Existing (2020) Baseline noise contour. There are approximately 3,282 housing units; an estimated 7,020 residents, 11 churches / places of worship, and six schools / educational facilities within the 60-65 DNL of the Existing (2020) Baseline noise contour. All land uses below 65 DNL are considered compatible for Part 150 purposes and are presented here for informational purposes only.

There are two homes and an estimated five residents that would be located within the 65+ DNL of the Future (2025) Baseline noise contour. There is one school / educational facility, the FCBDD Early Childhood Education Center, within the 65+ DNL of the Future (2025) Baseline noise contour. There are no places of worship, libraries, hospitals, or nursing homes located within the 65+ DNL of the Future (2025) Baseline noise contour.

There are approximately 4,550 housing units; an estimated 9,920 residents, 20 churches / places of worship, eight schools / educational facilities, and one nursing home within the 60-65 DNL of the Future (2025) Baseline noise contour. All land uses below 65 DNL are considered compatible for Part 150 purposes and are presented here for informational purposes only.

Table 3-3 Existing (2020) Baseline Housing, Population, and Noise-Sensitive Facility Incompatibilities

	60-65 DNL*	65-70 DNL	70-75 DNL	75+ DNL	65+ DNL
Housing Units					
Columbus	**3,037**	**0**	**0**	**0**	**0**
Mitigated	718	0	0	0	0
Sound Insulated	680	0	0	0	0
Easement	38	0	0	0	0
Unmitigated	2,319	0	0	0	0
Potentially Eligible but not Sound Insulated	140	0	0	0	0
Not Previously Mitigated	2,179	0	0	0	0
Mifflin Township	**49**	**0**	**0**	**0**	**0**
Mitigated	35	0	0	0	0
Sound Insulated	35	0	0	0	0
Easement	0	0	0	0	0
Unmitigated	14	0	0	0	0
Potentially Eligible but not Sound Insulated	11	0	0	0	0
Not Previously Mitigated	3	0	0	0	0
Gahanna	**155**	**0**	**0**	**0**	**0**
Mitigated	0	0	0	0	0
Sound Insulated	0	0	0	0	0
Easement	0	0	0	0	0
Unmitigated	155	0	0	0	0
Potentially Eligible but not Sound Insulated	1	0	0	0	0
Not Previously Mitigated	154	0	0	0	0
Jefferson Township	**41**	**0**	**0**	**0**	**0**
Mitigated	0	0	0	0	0
Sound Insulated	0	0	0	0	0
Easement	0	0	0	0	0
Unmitigated	41	0	0	0	0
Potentially Eligible but not Sound Insulated	0	0	0	0	0
Not Previously Mitigated	41	0	0	0	0
Total Housing Units	**3,282**	**0**	**0**	**0**	**0**
Population					
Total Population	7,020	0	0	0	0
Noise-Sensitive Facilities					
Churches / Places of Worship	11	0	0	0	0
Schools / Educational Facilities	6	1	0	0	0
Libraries	0	0	0	0	0
Hospitals	0	0	0	0	0
Nursing Homes	0	0	0	0	0

Notes:

* In accordance with 14 CFR Part 150 Land Use Compatibility Guidelines, all land uses are compatible with noise levels below 65 DNL. The counts of land uses within the 60-65 DNL noise contour are shown for informational purposes only.

Noise contours were generated using the FAA's AEDT, Version 3b computer model.

Housing counts are based on field verification.

Population numbers are estimated based on the housing counts multiplied by the average household size from the 2000 Census.

Source: Landrum & Brown, 2020.

Table 3-4 Future (2025) Baseline Housing, Population, and Noise-Sensitive Facility Incompatibilities

	60-65 DNL*	65-70 DNL	70-75 DNL	75+ DNL	65+ DNL
Housing Units					
Columbus	**4,034**	**1**	**0**	**0**	**1**
Mitigated	720	0	0	0	0
Sound Insulated	682	0	0	0	0
Easement	38	0	0	0	0
Unmitigated	3,314	1	0	0	1
Eligible for Sound Insulation but not Insulated	141	0	0	0	0
Not Previously Mitigated	3,173	1	0	0	1
Mifflin Township	**57**	**0**	**0**	**0**	**0**
Mitigated	35	0	0	0	0
Sound Insulated	35	0	0	0	0
Easement	0	0	0	0	0
Unmitigated	22	0	0	0	0
Eligible for Sound Insulation but not Insulated	11	0	0	0	0
Not Previously Mitigated	11	0	0	0	0
Gahanna	**313**	**1**	**0**	**0**	**1**
Mitigated	0	0	0	0	0
Sound Insulated	0	0	0	0	0
Easement	0	0	0	0	0
Unmitigated	313	1	0	0	1
Eligible for Sound Insulation but not Insulated	0	1	0	0	1
Not Previously Mitigated	313	0	0	0	0
Jefferson Township	**146**	**0**	**0**	**0**	**0**
Mitigated	12	0	0	0	0
Sound Insulated	0	0	0	0	0
Easement	12	0	0	0	0
Unmitigated	134	0	0	0	0
Eligible for Sound Insulation but not Insulated	0	0	0	0	0
Not Previously Mitigated	134	0	0	0	0
Total Housing Units	**4,550**	**2**	**0**	**0**	**2**
Population					
Total Population	9,920	5	0	0	5
Noise-Sensitive Facilities					
Churches / Places of Worship	20	0	0	0	0
Schools / Educational Facilities	8	1	0	0	1
Libraries	0	0	0	0	0
Hospitals	0	0	0	0	0
Nursing Homes	1	0	0	0	0

Notes:
* In accordance with 14 CFR Part 150 Land Use Compatibility Guidelines, all land uses are compatible with noise levels below 65 DNL. The counts of land uses within the 60-65 DNL noise contour are shown for informational purposes only.

Noise contours were generated using the FAA's AEDT, Version 3b computer model.

Housing counts are based on field verification.

Population numbers are estimated based on the housing counts multiplied by the average household size from the 2000 Census.

Source: Landrum & Brown, 2020.

Table 3-5 Existing (2020) Baseline versus Future (2025) Baseline Housing, Population, and Noise-Sensitive Facility Incompatibilities

Category	Existing (2020) Baseline	Future (2025) Baseline
Housing Units		
60 – 65 DNL*	3,282	4,550
65 – 70 DNL	0	2
70 – 75 DNL	0	0
75+ DNL	0	0
65+ DNL	0	2
Population		
60 – 65 DNL*	7,020	9,920
65 – 70 DNL	0	5
70 – 75 DNL	0	0
75+ DNL	0	0
65+ DNL	0	5
Noise-Sensitive Facilities (Churches, Schools, Libraries, and Nursing Homes)		
60 – 65 DNL*	17	29
65 – 70 DNL	1	1
70 – 75 DNL	0	0
75+ DNL	0	0
65+ DNL	1	1

Notes:
* In accordance with 14 CFR Part 150 Land Use Compatibility Guidelines, all land uses are compatible with noise levels below 65 DNL. The counts of land uses within the 60-65 DNL noise contour are shown for informational purposes only.

Noise contours were generated using the FAA's AEDT, Version 3b computer model.

Housing counts are based on field verification.

Population numbers are estimated based on the housing counts multiplied by the average household size from the 2000 Census.

Source: Landrum & Brown, 2020.

Chapter 4 Noise Compatibility Program

The culmination of the 14 Code of Federal Regulations (CFR) Part 150 planning process is the development of a set of measures designed to enhance the compatibility between an airport and its surrounding environs. This chapter presents previous measures from the 2007 Part 150 program that are either being continued as is, continued with modifications, or are being withdrawn. Collectively these measures are referred to as the 2020 Noise Compatibility Program (2020 NCP). These include noise abatement, land use mitigation, and program management measures designed to reduce or mitigate the impact of aircraft noise upon the surrounding community.

4.1 Noise Compatibility Program Measures

The NCP measures recommended for implementation for the John Glenn Columbus International Airport (CMH or Airport) have resulted from the planning process described throughout this document. **Appendix E, *Noise Abatement Alternatives***, and **Appendix F, *Land Use Alternatives***, include a list of all alternatives assessed for this 2020 NCP. **Appendix G, *Public Involvement***, contains meeting materials and summaries of the Technical Advisory Committee (TAC) meetings and public meetings, that included discussion of NCP measures.

The NCP measures are presented as a series of “plates” that summarize pertinent information required about each of the measures by 14 CFR Part 150 guidance. This information includes:

- A description and the background and intent of the measure
- The anticipated effect on land use compatibility
- The party (or parties) responsible for implementation
- The steps necessary for implementation, the anticipated cost, and the projected timing of implementation
- The relationship to other planning programs and other measures

Where helpful for clarification, an exhibit associated with the measure is provided. **Table 4-1** summarizes the measures included in 2020 NCP for CMH.

Following the plates for individual program measures is an exhibit showing the NCP map which incorporates each of the recommended program measures, as well as a description of the population, housing, and noise-sensitive land use impacts associated with its full implementation by the year 2025. The final section of this chapter summarizes the anticipated costs of implementing the 2020 NCP and provides an implementation schedule for the program. As discussed previously, the approval of the 2020 NCP by the Federal Aviation Administration (FAA) does not commit the FAA or the Columbus Regional Airport Authority (CRAA) to the costs or the implementation schedule listed in this document. This information is provided here as a planning tool to assist the implementation of the NCP.

Implementation of the noise abatement, corrective land use, and program management measures is at the discretion of the CRAA and subject to available funding from both the FAA and CRAA. Implementation of the preventive land use measures is solely at the discretion of local governments and other local agencies.

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Table 4-1 2020 Noise Compatibility Program Recommendations

Measure	Responsible Party	Cost to Airport	Cost to Local Governments	Cost to Users	Implementation Status
Noise Abatement Recommendations					
NA-1: Amend the CMH Nighttime Aircraft Maintenance Run-Up Policy to designate an additional run-up location north of the airfield for the relocation of the NetJets' facility. This measure will provide attenuation of jet engine maintenance run-ups for adjacent residential areas located north of the Airport.	CRAA	None	None	None	Implemented – Run-ups are performed at the NetJets facility.
NA-2: Construct a new run-up barrier at the north airfield, if the NetJets building does not adequately attenuate jet engine maintenance run-up noise for adjacent residential areas located north of the Airport.	CRAA	None	None	None	Implemented – A run-up barrier is used at the NetJets facility.
NA-3: Increase nighttime use of Runway 10L/28R and amend FAA Tower Order CMH ATCT 7110.1 to read as follows: Unless wind, weather, runway closure, or loss of NAVAIDS dictate otherwise, between the hours of 10:00 p.m. and 8:00 a.m. local time, Runways 28L or 10R are assigned jet aircraft; jet aircraft with Stage 3 engines may use Runway 10L/28R for arrival operations between the hours of 10:00 p.m. and 1:00 a.m., local time; and jet aircraft with Stage 3 engines may use Runway 10L or 28R after 6:00 a.m.	CRAA, FAA	Minimal costs for staff time to periodically review the implementation of this measure.	None	None	This measure is partially implemented. The current Tower Order (CMH 7110.1L) includes a provision that unless wind, weather, runway closures, or loss of NAVAIDS dictate otherwise, Runway 10L/28R is a noise-sensitive runway. All arriving and departing aircraft must request Runway 10L/28R with an operational need between the hours of 10:00pm and 6:00am.

Table 4-1 2020 Noise Compatibility Program Recommendations, *(continued)*

Measure	Responsible Party	Cost to Airport	Cost to Local Governments	Cost to Users	Implementation Status
Noise Abatement Recommendations *(continued)*					
NA-4: Maximize east flow and amend FAA Tower order CMH ATCT 7110.1b and the Airport Facilities Directory to reflect implementation of the "east flow" informal preferential runway use system.	CRAA, FAA	Minimal costs for staff time to periodically review the implementation of this measure.	None	None	Partially implemented. Complex conditions at the Airport such as winds, flow control policies at destination airports, and taxi times have limited the use of this measure.
NA-5: previously withdrawn	n/a	n/a	n/a	n/a	n/a
NA-6: Implement a 15-degree divergent turn off of Runway 28R, after crossing the runway end to a 295-degree heading, only during peak operating periods when traffic warrants.	CRAA, FAA	Minimal costs for staff time to periodically review the implementation of this measure.	None	None	Implemented – This measure is used when traffic conditions warrant.
NA-7: Create performance-based overlay procedures for all existing and proposed arrival/departure procedures. (RNAV/RNP/GPS/CDA)	FAA, Aircraft Operators	Minimal cost for staff time to monitor the implementation of this measure.	None	Minimal cost for training and publication of materials for pilot awareness	Currently being implemented – RNAV/RNP procedures are being developed independently by the FAA and are expected to be implemented in April 2021.

Table 4-1 2020 Noise Compatibility Program Recommendations, *(continued)*

Measure	Responsible Party	Cost to Airport	Cost to Local Governments	Cost to Users	Implementation Status
Noise Abatement Recommendations *(continued)*					
NA-8: Construct a noise berm/wall – Withdraw Measure	CRAA	None	None	None	Not Implemented - This measure was considered for the acquisition area along East 13th Avenue as mitigation for the runway relocation. Further investigation and surveys of property owners determined that a noise berm in the location was not desirable. Therefore, this measure is recommended to be withdrawn.
NA-9: Replacement and potential relocation of Ground Run-up Barrier B (location/materials/size).	CRAA (if the need for an upgraded barrier arises)	None	None	None	Not Implemented – Potential replacement and relocation of the Ground Run-Up Barrier B was proposed to accommodate larger aircraft associated with potential new maintenance hangars proposed for the southeast airfield at CMH. The proposed maintenance hangars were not constructed. Therefore, an upgrade to Barrier B was not pursued.

Table 4-1 2020 Noise Compatibility Program Recommendations, *(continued)*

Measure	Responsible Party	Cost to Airport	Cost to Local Governments	Cost to Users	Implementation Status
Land Use Recommendations					
LU-1: Offer a program for noise insulation of noncompatible structures for noncompatible residences within the 65+ DNL contour of the Future (2012) Noise Compatibility Program (NCP) condition, in exchange for an avigation easement.	CRAA (no properties have been identified as currently eligible for this program)	None	None	None	Implemented. All homes eligible for sound insulation based on the 2007 NEM/NCP Update Study, have been sound insulated or have been offered sound insulation and the owner(s) declined or did not respond to the offer.
LU-2: Offer a program for noise insulation of noncompatible structures for noncompatible churches within the 65+ DNL contour of the Future (2012) Noise Compatibility Program (NCP) condition in exchange for an avigation easement.	CRAA (no properties have been identified as currently eligible for this program)	None	None	None	One church, the Wonderland Community Church, was identified within the 65 DNL of the 2002 Part 150 Noise Compatibility Study. The CRAA purchased an avigation easement on the property and it is now considered a compatible land use. One other church, the Mount Judia Church, was contacted for potential inclusion in the program and did not respond. No other churches were identified within the 65+ DNL contour of the Future (2012) NEM/NCP Noise Exposure Contour.

Table 4-1 2020 Noise Compatibility Program Recommendations, *(continued)*

Measure	Responsible Party	Cost to Airport	Cost to Local Governments	Cost to Users	Implementation Status
Land Use Recommendations *(continued)*					
LU-3: Seek cooperation from the City of Columbus and Franklin County to amend their land use compatibility standards to achieve the level of compatibility identified in the recommended land use compatibility guidelines.	City of Columbus, Franklin County, and CRAA	Minimal	Minimal	None	Partially implemented. Both the City of Columbus and Franklin County have adopted land use development standards similar to what was recommended in the previous NCP. However, in some cases these standards are not as strict as was recommended.
LU-4: Seek cooperation from the City of Columbus and Franklin County to amend the boundaries of the Airport Environs Overlay (AEO) district to reflect the proposed Airport Land Use Management District (ALUMD).	City of Columbus, Franklin County, and CRAA	Minimal	Minimal	None	Not implemented - Both Columbus and Franklin County set the AEO boundary at the 65 DNL contour.
LU-5: Seek cooperation from Franklin County, the City of Gahanna, and Jefferson Township to amend each jurisdiction's zoning resolution to require applicants for rezoning, change of use, or special use permit to convey an avigation easement to the appropriate airport.	Franklin County and CRAA	Minimal	Minimal	None	Partially implemented - Section 660.07 of the Franklin County Zoning Resolution requires conveyance of avigation easements for variance or conditional use permits only.

Table 4-1 2020 Noise Compatibility Program Recommendations, *(continued)*

Measure	Responsible Party	Cost to Airport	Cost to Local Governments	Cost to Users	Implementation Status
Land Use Recommendations *(continued)*					
LU-6: Seek cooperation from Jefferson Township and the City of Gahanna to adopt the proposed Airport Land Use Management District (ALUMD) as part of their official zoning regulations.	Jefferson Township, City of Gahanna, and CRAA	Minimal	Minimal	None	Not implemented - Coordination with local jurisdictions has occurred; however, zoning regulations have not been updated.
LU-7: Seek cooperation from Franklin County, Jefferson Township, and the City of Gahanna to adopt subdivision codes applicable to the proposed Airport Land Use Management District (ALUMD).	Franklin County, Jefferson Township, City of Gahanna, and CRAA	Minimal	Minimal	None	Not implemented – Coordination with local jurisdictions has occurred; however, only Franklin County has updated its subdivision regulations Section 307.03 (M)
LU-8: Seek cooperation from Franklin County, Jefferson Township, and the City of Gahanna to adopt building codes applicable to the proposed Airport Land Use Management District (ALUMD).	Franklin County, Jefferson Township, City of Gahanna, and CRAA	Minimal	Minimal	None	Not implemented – Coordination with local jurisdictions has occurred; however, building codes have not been updated.
LU-9: Seek cooperation from the board of realtors to participate in a fair disclosure program for property located within the proposed Airport Land Use Management District (ALUMD).	Columbus Area Board of Realtors and Homebuilders Association.	Approximately $10,000 for outside consulting assistance	None	None	Coordination has occurred; however, local jurisdictions elected not to amend their ordinances to include the ALUMD. The CRAA makes the noise exposure maps and other noise compatibility information available on its website.

Table 4-1 2020 Noise Compatibility Program Recommendations, *(continued)*

Measure	Responsible Party	Cost to Airport	Cost to Local Governments	Cost to Users	Implementation Status
Land Use Recommendations *(continued)*					
LU-10: Periodically place advertisements in a variety of media outlets delineating the boundaries of the Airport Land Use Management District (ALUMD).	CRAA	Approximately $10,000 annually	None	None	Not implemented – The ALUMD has not been adopted. The CRAA makes the noise exposure maps and other noise compatibility information available on its website.
LU-11: previously withdrawn	n/a	n/a	n/a	n/a	n/a
LU-12: Develop an Airport Land Use Management District (ALUMD) based on the 2023 Noise Exposure Map/Noise Compatibility Program (NCP) noise contour, natural geographic and jurisdictional boundaries.	Franklin County, Jefferson Township, City of Gahanna, City of Columbus, Bexley, Whitehall, Reynoldsburg, Truro Township, MORPC, and CRAA	Approximately $55,000 for outside consulting assistance	Minimal	None	Not implemented – The intent of this measure was to eliminate changing boundaries set by the current noise exposure contours and establish a fixed boundary for consistency. The suggested fixed boundary was not implemented. The City of Columbus and Franklin County continue to apply an Airport Environs Overlay Zone, the boundaries of which correspond to the noise exposure contour from the previous Part 150 Noise Compatibility Study Update which is subject to periodic review and potential revision.

Table 4-1 2020 Noise Compatibility Program Recommendations, *(continued)*

Measure	Responsible Party	Cost to Airport	Cost to Local Governments	Cost to Users	Implementation Status
Program Management Recommendations					
PM-1: Maintain the noise abatement elements of the FAA ATCT Tower Order	FAA	None	None	None	Implemented – The noise abatement elements are contained in the current Tower Order
PM-2: Maintain the Noise Management Office for noise compatibility program management	CRAA	Cost for staff time	None	None	Ongoing – The CRAA continues to address noise complaints through the operations department to minimize the noise impact of CMH.
PM-3: Maintain an ongoing public involvement program regarding the noise compatibility program	CRAA	Minimal cost for staff time	None	None	Ongoing – The CRAA maintains public involvement activities, including the 24-hour noise hotline, WebTrak tracking system, and noise monitoring system.

Table 4-1 2020 Noise Compatibility Program Recommendations, *(continued)*

Measure	Responsible Party	Cost to Airport	Cost to Local Governments	Cost to Users	Implementation Status
Program Management Recommendations *(continued)*					
PM-4: Maintain the noise and flight track monitoring system and expand and upgrade the system as necessary.	CRAA	Minimal cost for staff time	None	None	Implemented - In 2014, four additional permanent noise monitors (NMTs) were installed. The other existing 12 NMTs were upgraded with newer equipment. The CRAA continues to monitor the operation of the system and receives ongoing software updates.
PM-5: Routinely update the noise contours and periodically update the noise program	CRAA, FAA	NEMs ($500,000) NEMs and NCP ($1,500,000)	None	None	Ongoing – this 2020 NCP update represents the continuation of this measure. CRAA will continue to monitor and provide for periodic updates.
PM-6: Establish a land use compatibility task force which meets periodically to discuss issues relevant to airport noise compatibility planning	CRAA	Cost for staff time (dependent upon frequency of meetings)	None	None	Previously implemented but no longer active. Could be reestablished if determined to be necessary.

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Noise Compatibility Program Measure: NA-1

Exhibit: 4-1

Description: Amend the CMH Nighttime Aircraft Maintenance Run-Up Policy to designate an additional run-up location north of the airfield for the NetJets' facility. This measure will provide attenuation of jet engine maintenance run-ups for adjacent residential areas located north of the Airport.

Background and Intent: Approved Measure NA-1 was recommended due to NetJets' (formerly Executive Jet Aviation) relocation from the southeast side of the airfield to 1,000 feet north of the centerline of Runway 10L/28R. NetJets' primary location for performing engine maintenance run-ups was on the southeast corner of the airfield (Barrier B). The relocation to the north side of the airfield no longer made this location convenient. An additional run-up location was identified on the north airfield. Therefore, it was recommended that the CMH Nighttime Aircraft Maintenance Run-Up Policy be amended to include this location as an approved location for nighttime run-ups. Originally, it was recommended that aircraft be positioned in a way such that the existing hangar complex would provide noise attenuation. Since then, a run-up barrier was constructed on the southwest side of the NetJets ramp (as recommended in Measure NA-2) and the CMH Nighttime Aircraft Maintenance Run-Up Policy was amended to include this run-up barrier.

Relationship to 2007 NCP: Continues approved measure NA-1 of 2007 Part 150 Noise Compatibility Program (NCP) with modifications to include the use of the new run-up barrier.

Land Use Compatibility Improvement: Provides for noise reduction associated with ground run-up activity.

Responsible Implementing Parties: Columbus Regional Airport Authority (CRAA)

Implementation Steps, Costs, and Phasing:

Steps: No additional steps.

Costs: No additional costs.

Schedule: This measure is currently implemented.

Effects on Other Programs/Measures: The measure is not expected to impact other measures or existing programs.

Noise Compatibility Program Measure: NA-2

Exhibit: 4-1

Description: Construct a new run-up barrier at the north airfield, if the NetJets building does not adequately attenuate jet engine maintenance run-up noise for adjacent residential areas located north of the Airport.

Background and Intent: Approved Measure NA-2 was recommended due to NetJets' (formerly Executive Jet Aviation) relocation from the southeast side of the airfield to 1,000 feet north of the centerline of Runway 10L/28R. NetJets primary location for performing engine maintenance run-ups was on the southeast corner of the airfield (Barrier B). The relocation to the north side of the airfield no longer made this location convenient. An additional run-up location was identified on the north airfield (NA-1) and eventually a run-up barrier was recommended (Barrier C). The barrier was constructed and is currently in use.

Relationship to 2007 NCP: Completed measure NA-2 from the 2007 Part 150 NCP.

Land Use Compatibility Improvement: Provides for noise reduction associated with ground run-up activity.

Responsible Implementing Parties: Columbus Regional Airport Authority (CRAA)

Implementation Steps, Costs, and Phasing:

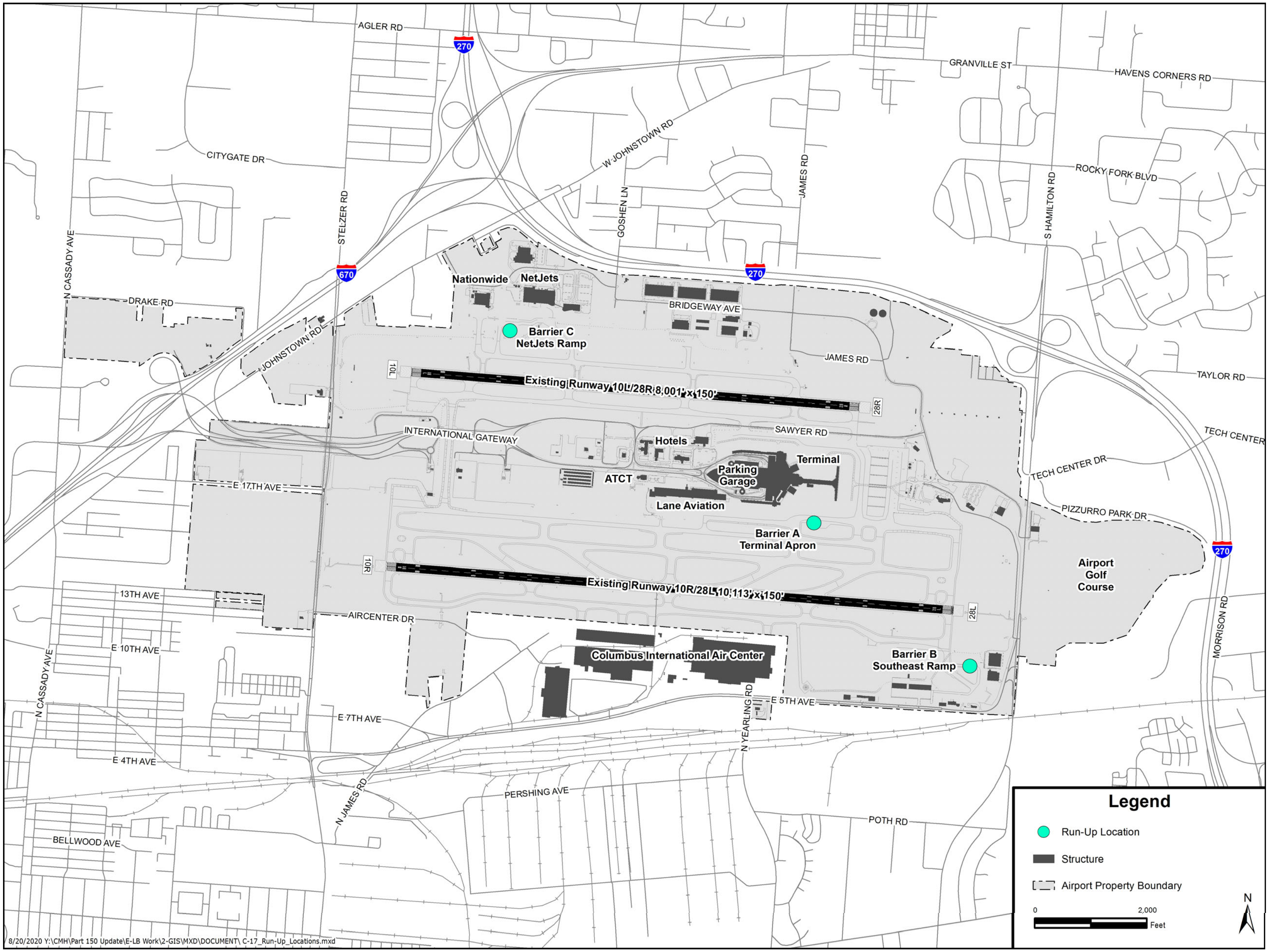
Steps: No additional steps.

Costs: No additional costs.

Schedule: This measure is complete

Effects on Other Programs/Measures: Measure NA-1 recommended modification to the CMH Nighttime Aircraft Maintenance Run-Up Policy to include use of the existing NetJets building for sound attenuation from run-ups. Once the new run-up barrier was complete, the CMH Nighttime Aircraft Maintenance Run-Up Policy was modified to include the new run-up barrier as an approved location for nighttime run-ups. This measure is not expected to impact any other measures or existing programs.

Exhibit 4-1 Aircraft Engine Run-Up Locations



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Noise Compatibility Program Measure: NA-3

Exhibit: N/A

Description: Increase nighttime use of Runway 10L/28R and amend FAA Tower Order CMH ATCT 7110.1 to read as follows: Unless wind, weather, runway closure, or loss of NAVAIDS dictate otherwise, between the hours of 10:00 p.m. and 8:00 a.m. local time, Runways 28L or 10R are assigned jet aircraft; jet aircraft with Stage 3 engines may use Runway 10L/28R for arrival operations between the hours of 10:00 p.m. and 1:00 a.m., local time; and jet aircraft with Stage 3 engines may use Runway 10L or 28R after 6:00 a.m.

Background and Intent: Approved Measure NA-3 implemented air traffic procedures which were designed to keep the noisiest aircraft on the south runway (Runway 10R/28L) during the nighttime, while providing flexibility to FAA ATCT to assign aircraft to the north runway (Runway 10L/28R) for operational efficiency. This measure has been implemented with modifications. The Tower Order reads as follow:

The following shall be utilized between the hours of 2200-0600 local time: Unless wind, weather, runway closures, or loss of NAVAIDS dictate otherwise, Runways 28R or 10L is a noise sensitive runway. All arriving and departing aircraft must request (Runway) 10L/28R with an operational need. Noise sensitive procedures are not applicable to emergency situations or if no other runway is available.

These procedures continue to guide the Airport's nighttime noise abatement initiatives.

Relationship to 2007 NCP: Continues approved measure NA-3 of 2007 Part 150 NCP.

Land Use Compatibility Improvement: Focuses nighttime activity over the most compatible areas around the Airport.

Responsible Implementing Parties: Columbus Regional Airport Authority (CRAA) and FAA Airport Air Traffic Control Tower (ATCT).

Implementation Steps, Costs, and Phasing:

Steps: No additional steps.

Costs: No additional costs.

Schedule: The program has been initiated and will continue without interruption

Effects on Other Programs/Measures: The measure is not expected to impact other measures or existing programs.

Noise Compatibility Program Measure: NA-4

Exhibit: N/A

Description: Maximize east flow and amend FAA Tower order CMH ATCT 7110.1b and the Airport Facilities Directory to reflect implementation of the "east flow" informal preferential runway use system.

Background and Intent: Approved measure NA-4 identified east flow as the preferred flow during calm winds due to land use patterns being more compatible to the east of the Airport. Currently, the Airport operates in east flow approximately 25 percent of the time in an average year depending upon seasonal wind conditions. This percentage is lower than what would be anticipated given historical weather data. This is due to airline scheduling and airfield layout. The CRAA continues to promote the use of east flow as often as possible.

Relationship to 2007 NCP: Continues approved measure NA-4 of 2007 Part 150 NCP.

Land Use Compatibility Improvement: Renewing efforts to maximize east flow will reduce noise-sensitive land use impacts.

Responsible Implementing Parties: Columbus Regional Airport Authority (CRAA) and FAA Airport Air Traffic Control Tower.

Implementation Steps, Costs, and Phasing:

Steps: CRAA will work to identify ways to increase the use of east flow and will continue to reach out for FAA ATCT and airline cooperation.

Costs: Minimal cost for staff time to review compliance with the measure and coordinate with FAA ATCT and airlines

Schedule: The program has been initiated and will continue without interruption.

Effects on Other Programs/Measures: The measure is not expected to impact other measures or existing programs.

Noise Compatibility Program Measure: NA-6

Exhibit: 4-2

Description: Implement a 15-degree divergent turn off of Runway 28R, after crossing the runway end to a 295-degree heading, only during peak operating periods when traffic warrants.

Background and Intent: Current procedures instruct jet aircraft to fly runway heading until reaching five miles or 3,500 feet MSL. A divergent turn is a turn of at least 15 degrees from the typical departure path that allows departing aircraft to maintain separation from other aircraft in the air. During the 2007 Part 150 Study, FAA ATCT requested this additional departure headings in order to increase capacity and reduce delays during peak periods. In response to this request, a number of divergent departure headings off of each runway end were assessed for their ability to also reduce noise impacts. This measure includes a 15-degree right turn off of Runway 28R. It was recognized that this turn would only be used when air traffic warrants the need for an additional heading. This procedure was approved by the FAA in the 2007 Part 150 Study Record of Approval and was environmentally cleared in accordance with the National Environmental Policy Act (NEPA) in the 2009 Record of Decision (ROD) for the Environmental Impact Statement (EIS) for the Replacement Runway 10R/28L and Associated Development. This measure is implemented by FAA ATCT on an as-needed basis.

Relationship to 2007 NCP: This procedure reduces the number of homes within the 65 DNL and would reduce overflights of areas outside the 65 DNL along the Runway 28R centerline.

Land Use Compatibility Improvement: Performance based procedures have the potential to reduce noise levels for homes located near the Airport (within the 65 DNL) and for those homes located farther from the Airport (outside of the 65 DNL).

Responsible Implementing Parties: FAA

Implementation Steps, Costs, and Phasing:

Steps: n/a

Costs: n/a

Schedule: n/a

Effects on Other Programs/Measures: The measure is not expected to impact other measures or existing programs.

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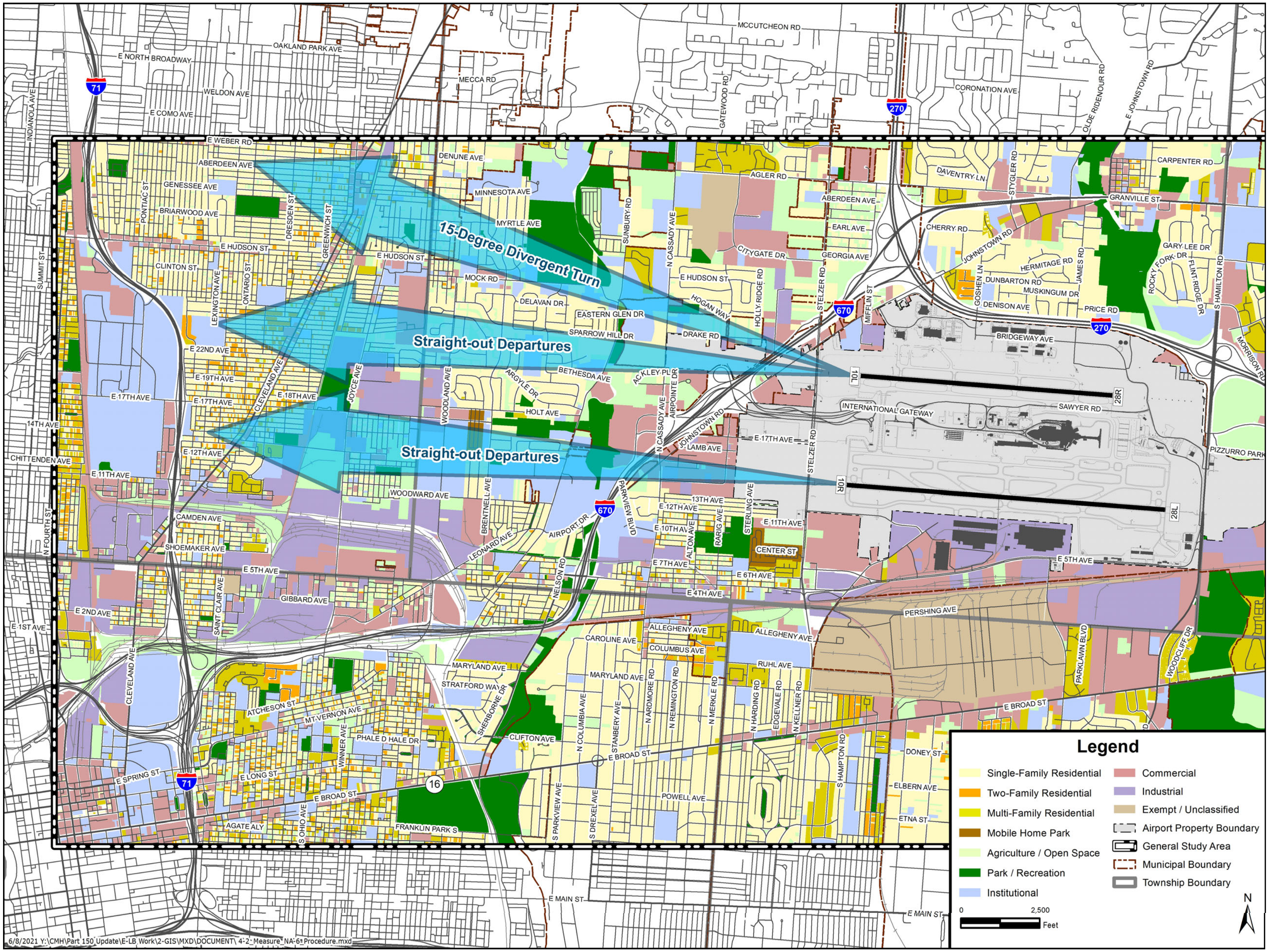
Exhibit 4-2 Measure NA-6 Flight Procedure



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Noise Compatibility Program Measure: NA-7

Exhibit: N/A

Description: Create performance-based overlay procedures for all existing and proposed arrival/departure procedures. (RNAV/RNP/GPS/OPD)

Background and Intent: The FAA is modernizing the national airspace system at airports across the country by implementing a satellite-enabled navigation system and utilizing new Performance Based Navigation (PBN) technologies, such as Area Navigation (RNAV) and Required Navigation Performance (RNP), to assist in defining flight routes. RNAV/RNP procedures utilize ground-based Differential Global Positioning System (DGPS antenna); satellite-based, Global Positioning System (GPS); and on-board Flight Management System (FMS)/GPS equipment to assist the pilot in navigating from point to point. The systems work by identifying the geographic location of aircraft in relationship to another geographic location called a “waypoint.” This provides the necessary information to guide the aircraft towards the desired “waypoint.” With GPS, the pilot manually guides the aircraft towards the “waypoint,” while an FMS works with the auto-pilot system on the aircraft to automatically fly the aircraft towards the desired “waypoint.” In both cases, the use of GPS/FMS can reduce the width and size of departure corridors over standard navigation techniques. The advantage of FMS is that it can more accurately guide the aircraft towards the desired point than can the GPS/pilot system. Aircraft must be equipped with the necessary equipment to fly RNAV/FMS procedures. For RNP procedures, a specific equipment rating is applied to the procedure to ensure that aircraft are able to maintain the intended routes.

In addition, an Optimized Profile Descent (OPD), formerly referred to as a Continuous Descent Approach (CDA), procedure combines the benefits of a steady, continuous descent with optimized flap and landing gear management to create a quieter approach for noise-sensitive communities under the approach path. Current Air Traffic Control Tower (ATCT) procedures involve a series of short descents and periods of leveling off that require adjusting thrust or changing flap settings, before merging with the required three-degree glideslope for the final approach. The CDA procedure involves starting a continuous steady descent from as high as enroute altitudes (25,000-35,000 feet), which allows for a reduction in the required amount of power, thereby reducing noise exposure in two ways: by keeping the aircraft at a higher altitude above the ground; and by stabilizing the flap settings, which reduces airframe noise, and amount of applied thrust.

The FAA is currently in the process of implementing Performance Based Navigation (PBN) procedures at CMH.

Relationship to 2007 NCP: Continues approved measure NA-7 of 2007 Part 150 NCP.

Land Use Compatibility Improvement: Performance based procedures have the potential to reduce noise levels for homes located near the Airport (within the 65 DNL) and for those homes located farther from the Airport (outside of the 65 DNL).

Responsible Implementing Parties: FAA
Implementation Steps, Costs, and Phasing:

Steps: The study of RNP procedures is being implemented independently by the FAA. CRAA continues to be involved in monitoring the review and implementation process.

Costs: The study of RNP procedures is being implemented independently by the FAA.

Schedule: n/a

Effects on Other Programs/Measures: The measure is not expected to impact other measures or existing programs.

Noise Compatibility Program Measure: NA-8

Exhibit: N/A

Description: Withdraw measure to Construct a noise berm/wall on airport property along East 13th Avenue.

Background and Intent: In 2013 the CRAA completed construction of the relocated Runway 10R/28L, which was relocated 702 feet to the south of the old runway alignment runway. The FAA conducted an Environmental Impact Statement (EIS) to assess the impacts of the proposed project. As part of that EIS process, 35 homes on the north side of 13th Avenue in East Columbus were identified for removal to meet airport design standards. The homes were located within the relocated Runway Protection Zone (RPZ), which is an area around a runway that is required to be void of tall objects or places in which humans may congregate. The homes were purchased and the residents were relocated in accordance with the Uniform Relocation Assistance and Real Property Acquisition Act. During the EIS and 2007 Part 150 Study, the CRAA and FAA took into consideration effects of the removal of the 35 homes and relocation of the runway would have on the remaining homes in the area. In order to address this, the CRAA and FAA recommended a noise berm/wall be constructed to the north of 13th Avenue to help reduce noise and to minimize the visual impact of the removed homes. However, further investigation and surveys of property owners determined that a noise berm in the proposed location was not desirable. Therefore, this measure was not implemented and is being withdrawn from this NCP Update.

Relationship to 2007 NCP: Withdraws approved measure NA-8 of 2007 Part 150 NCP.

Land Use Compatibility Improvement: n/a

Responsible Implementing Parties: n/a

Implementation Steps, Costs, and Phasing:

Steps: n/a

Costs: n/a

Schedule: n/a

Effects on Other Programs/Measures: n/a

Noise Compatibility Program Measure: NA-9

Exhibit: N/A

Description: Replacement and potential relocation of Ground Run-up Barrier B (location/materials/size).

Background and Intent: Run-up barriers are constructed to reduce noise impacts associated with run-up operations. They are typically installed at airports with heavy maintenance facilities and large numbers of complaints related to run-up operations.

The Airport currently has three ground run-up barriers at CMH. Barrier A (located to the south of Concourse B), Barrier B (located north of the southeast end of Taxiway G), and Barrier C (located on the north airfield north of Runway 10L/28R). An assessment of these barriers was conducted which found that Barriers A and C are properly sized and located for the types of operations they serve. That study identified the potential need to relocate and/or expanded Barrier B to accommodate larger aircraft that would be associated with a potential maintenance hangar that was proposed for the southeast side of the airfield at CMH. Currently Barrier B can accommodate up to Design Group C-II aircraft. It was recommended to upgrade Barrier B to accommodate larger aircraft (i.e.: Airbus A-319, B-737), and relocate or construct a new barrier if the existing barrier could not be expanded beyond its existing capacity. However, the proposed new maintenance hangar was never constructed and aircraft larger than Design Group C-II can use Barrier A. Therefore, no changes were made to Barrier B. This measure is recommended to be continued in the event a larger run-up barrier is ever needed in this location. However, a cost and implementation schedule are not needed at this time.

Relationship to 2007 NCP: Continues approved measure NA-9 of 2007 Part 150 NCP.

Land Use Compatibility Improvement: Upgrading the barrier will help to continue the noise reduction it provides today if it is needed to accommodate larger aircraft.

Responsible Implementing Parties: CRAA

Implementation Steps, Costs, and Phasing:

Steps: n/a

Costs: n/a

Schedule: n/a

Effects on Other Programs/Measures: The measure is not expected to impact other measures or existing programs.

Noise Compatibility Program Measure: LU-1

Exhibit: 4-3

Description: Offer a program for noise insulation of noncompatible structures for noncompatible residences within the 65+ DNL contour of the Future (2025) Noise Compatibility Program (NCP) condition, in exchange for an avigation easement.

Background and Intent: The CRAA has sound insulated nearly 800 housing units as part of its residential sound insulation program. The 2007 NCP recommended sound insulating eligible housing units that were located within the 65 DNL of the 2012 NEM/NCP Noise Exposure Contour. The program also includes housing units that were adjacent to the 65 DNL and would be included in the program to preserve neighborhood continuity. Housing units were tested to determine if interior noise levels met the requirements set forth in the FAA Airport Improvement Program (AIP) Handbook. All homes that participated in the sound insulation program were required to confer an avigation easement to the CRAA in exchange for the improvements.

This modification to the measure would revise the sound insulation program boundary to be based on the 65 DNL of the Future (2025) Noise Compatibility Program (NCP) Noise Exposure Contour as shown in **Exhibit 4-3**. There are two housing units that are located within the 65+ DNL of the Future (2025) NCP Noise Exposure Contour. One housing unit is located in a commercial area on Taylor Station Road. The owner of this housing unit was offered sound insulation and did not respond or declined the offer. The other housing unit is located on Stockton Trail Way. The housing units in this area along Stockton Trail Way were constructed after the Noise Exposure Maps from the 2007 Part 150 Study were published. It is expected that these homes would have been constructed to meet the recommended interior sound attenuation guidelines and would already reduce noise to below acceptable levels. Therefore, these housing units are considered compatible and no housing units are recommended for sound insulation at this time. This measure is being continued in the event noise levels increase in the future and land uses would become newly eligible.

Relationship to 2007 NCP: Continues approved measure LU-1 of 2007 Part 150 NCP, revised based on the 65 DNL noise contour for the Future (2025) NCP Noise Exposure Contour.

Land Use Compatibility Improvement: No new housing units are located within the 65 DNL of the Future (2025) NCP Noise Exposure Contour.

Responsible Implementing Parties: CRAA

Implementation Steps, Costs, and Phasing:

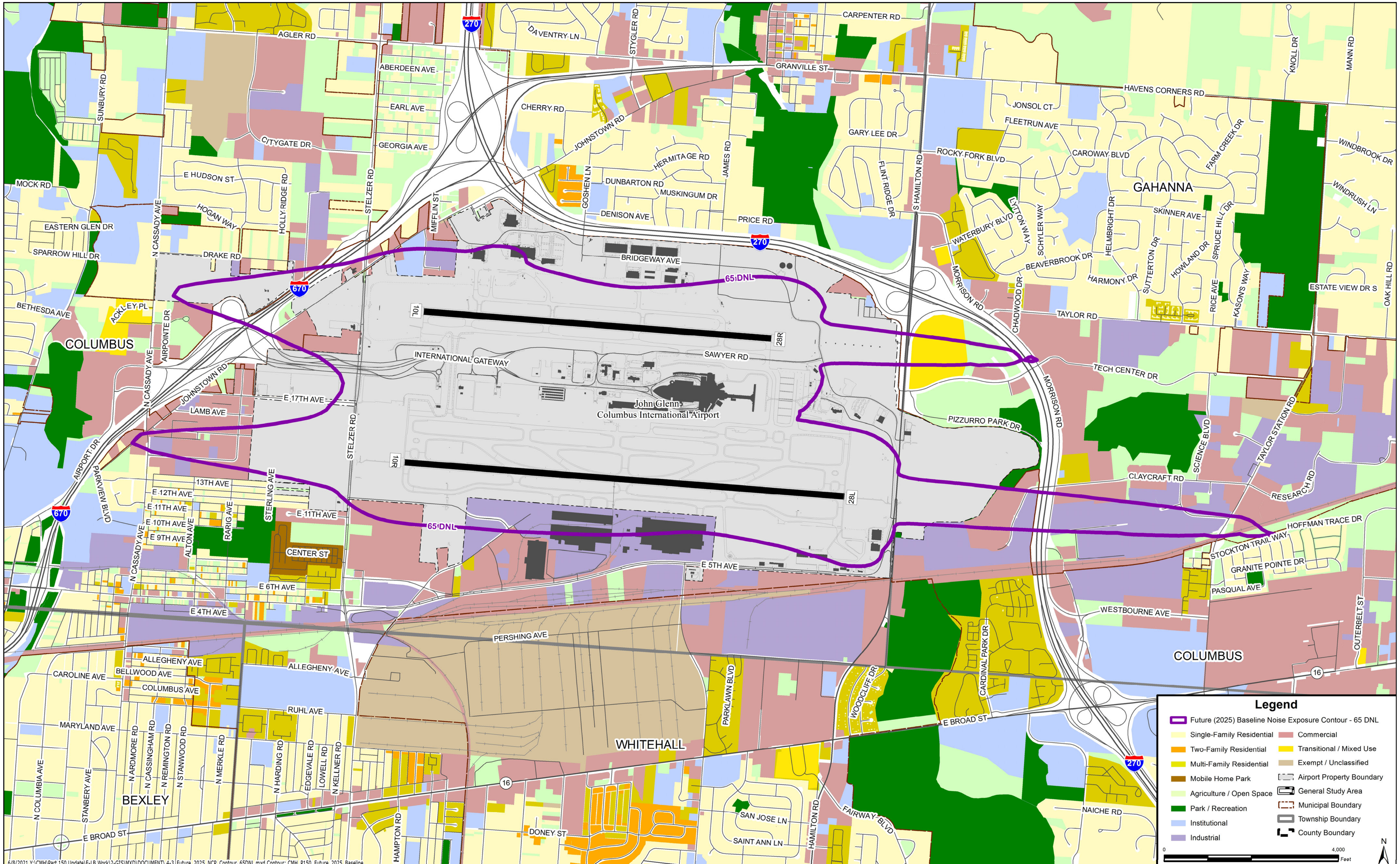
Steps: No eligible residences are located in the 65+ DNL of the Future (2025) NCP therefore no steps are needed at this time

Costs: n/a

Schedule: n/a

Effects on Other Programs/Measures: The implementation of this measure is not expected to adversely affect any other mitigation program measures.

Exhibit 4-3 Future (2025) Noise Exposure Contour – 65 DNL



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Noise Compatibility Program Measure: LU-2

Exhibit: 4-3

Description: Offer a program for noise insulation of noncompatible structures for noncompatible churches within the 65+ DNL contour of the Future (2025) Noise Compatibility Program (NCP) condition in exchange for an avigation easement.

Background and Intent: As part of the 1999 Part 150 Update two churches were identified within the 65 DNL of the Future (2003) Noise Exposure Contour: Mount Judia Church of Old Regular Baptists of Jesus Christ and Wonderland Community Church. The Mount Judia Church of Old Regular Baptists of Jesus Christ was contacted and advised that required paper work would need to be submitted to the IRS to confirm their church status with the IRS. To date, the CRAA has not heard back from the church that the paperwork has been filed. The church would not be located in the 65 DNL of the Future (2026) NCP noise contour. The CRAA currently has an avigation easement on the Wonderland Community Church, making the land use compatible. Neither of these church properties are located within the 65 DNL of the Future (2025) NCP noise contour and no additional churches have been identified within the 65 DNL of the Future (2025) NCP noise contour. This measure is being continued in the event noise levels increase in the future and land uses would become newly eligible.

Relationship to 2007 NCP: Continues approved measure LU-2 of 2007 Part 150 NCP, revised based on the 65 DNL noise contour for the Future (2025) NCP.

Land Use Compatibility Improvement: Continues the CRAA policy of providing sound insulation for churches within a 65 DNL noise contour.

Responsible Implementing Parties: CRAA

Implementation Steps, Costs, and Phasing:

Steps: No churches are located in the 65+ DNL of the Future (2025) NCP therefore no steps are needed at this time.

Costs: None

Schedule: n/a

Effects on Other Programs/Measures: This measure is not expected to adversely affect any other mitigation program measures.

Noise Compatibility Program Measure: LU-3

Exhibit: N/A

Description: Seek cooperation from the City of Columbus and Franklin County to amend their land use compatibility standards to achieve the level of compatibility identified in the recommended land use compatibility guidelines.

Background and Intent: This measure was partially implemented. The recommended guidelines called for restrictions on certain land uses within the Airport Environs Overlay (AEO) sub-district boundaries. In some cases the jurisdictions have adopted the recommendations for land uses within the AEO sub-districts. However, in other cases the guidelines adopted are not as strict as the original recommendation. Coordination between local jurisdictions and the CRAA is ongoing.

Relationship to 2007 NCP: Continues approved measure LU-3 of 2007 Part 150 NCP.

Land Use Compatibility Improvement: Will enhance the compatibility of land used surrounding the Airport.

Responsible Implementing Parties: City of Columbus, Franklin County, and Columbus Regional Airport Authority (CRAA)

Implementation Steps, Costs, and Phasing:

Steps: CRAA to continue working with local jurisdictions to achieve compatibility standards that are in accordance with Federal guidelines.

Costs: Minimal cost to the CRAA and local governments.

Schedule: This is an on-going measure that will continue.

Effects on Other Programs/Measures: This measure is not expected to adversely affect any other mitigation program measures.

Noise Compatibility Program Measure: LU-4

Exhibit: N/A

Description: Seek cooperation from the City of Columbus and Franklin County to amend the boundaries of the Airport Environs Overlay (AEO) district to reflect the proposed Airport Land Use Management District (ALUMD).

Background and Intent: This measure was not fully implemented. Both the City of Columbus and Franklin County have an Airport Environs Overlay district that establishes requirements for land use compatibility near an airport. Both jurisdictions set the AEO boundary at the most recently approved 65 DNL contour. In order to address concerns by the jurisdictions about overlay zoning boundaries that shift over time, and to provide a more reliable land use policy, a fixed boundary approach is being recommended through the implementation of the ALUMD. More information on the ALUMD is provided in Measure LU-12.

Relationship to 2007 NCP: Continues approved measure LU-4 of 2007 Part 150 NCP.

Land Use Compatibility Improvement: Will enhance the compatibility of land used surrounding the Airport.

Responsible Implementing Parties: City of Columbus, Franklin County, and Columbus Regional Airport Authority (CRAA)

Implementation Steps, Costs, and Phasing:

Steps: CRAA to continue working with local jurisdictions to implement the recommendations for the area defined in the ALUMD.

Costs: Minimal cost to the CRAA and local governments.

Schedule: Can be implemented immediately.

Effects on Other Programs/Measures: This measure is dependent upon measure LU-12 which defines the boundary of the ALUMD.

Noise Compatibility Program Measure: LU-5

Exhibit: N/A

Description: Seek cooperation from Franklin County, the City of Gahanna, and Jefferson Township to amend each jurisdiction's zoning resolution to require applicants for rezoning, change of use, or special use permit to convey an avigation easement to the appropriate airport.

Background and Intent: This measure was partially implemented. Section 660.07 of the Franklin County Zoning Resolution requires conveyance of avigation easements for variance or conditional use permits only.

Relationship to 2007 NCP: Continues approved measure LU-5 of 2007 Part 150 NCP.

Land Use Compatibility Improvement: Will enhance the compatibility of land used surrounding the Airport.

Responsible Implementing Parties: Franklin County, City of Gahanna, Jefferson Township, and Columbus Regional Airport Authority (CRAA)

Implementation Steps, Costs, and Phasing:

Steps: CRAA will continue to work with the local jurisdiction to implement the original language of the measure.

Costs: Minimal cost to the CRAA and local governments.

Schedule: This is an ongoing measure that will continue.

Effects on Other Programs/Measures: This measure is not expected to adversely affect any other mitigation program measures.

Noise Compatibility Program Measure: LU-6

Exhibit: N/A

Description: Seek cooperation from Jefferson Township and the City of Gahanna to adopt the proposed Airport Land Use Management District (ALUMD) as part of their official zoning regulations.

Background and Intent: This measure was not implemented as originally recommended using the Airport Environs Overlay (AEO) boundary. Neither the City of Gahanna nor Jefferson Township adopted the AEO boundary. In order to address concerns by the jurisdictions about moving boundaries and to provide a more reliable land use policy, a fixed boundary approach is being recommended through the implementation of the ALUMD. More information on the ALUMD is provided in Measure LU-12.

Relationship to 2007 NCP: Continues approved measure LU-6 of 2007 Part 150 NCP.

Land Use Compatibility Improvement: Will enhance the compatibility of land used surrounding the Airport.

Responsible Implementing Parties: Jefferson Township, City of Gahanna, and Columbus Regional Airport Authority (CRAA)

Implementation Steps, Costs, and Phasing:

Steps: CRAA to continue working with local jurisdictions to implement the recommendations for the area defined in the ALUMD.

Costs: Minimal cost to the CRAA and local governments.

Schedule: Can be implemented immediately.

Effects on Other Programs/Measures: This measure is dependent upon measure LU-12 which defines the boundary of the ALUMD.

Noise Compatibility Program Measure: LU-7

Exhibit: N/A

Description: Seek cooperation from Franklin County, Jefferson Township, and the City of Gahanna to adopt subdivision codes applicable to the proposed Airport Land Use Management District (ALUMD).

Background and Intent: This measure was not implemented as originally recommended using the Airport Environs Overlay (AEO) boundary. None of the jurisdictions listed adopted subdivision codes applicable to development near the airport for the AEO boundary. In order to address concerns by the jurisdictions about moving boundaries and to provide a more reliable land use policy, a fixed boundary approach is being recommended through the implementation of the ALUMD. More information on the ALUMD is provided in Measure LU 12.

Relationship to 2007 NCP: Continues approved measure LU-7 of 2007 Part 150 NCP.

Land Use Compatibility Improvement: Will enhance the compatibility of land used surrounding the airport.

Responsible Implementing Parties: Franklin County, Jefferson Township, City of Gahanna, and Columbus Regional Airport Authority (CRAA)

Implementation Steps, Costs, and Phasing:

Steps: CRAA to continue working with local jurisdictions to implement the recommendations for the area defined in the ALUMD.

Costs: Minimal cost to the CRAA and local governments.

Schedule: Can be implemented immediately.

Effects on Other Programs/Measures: This measure is dependent upon measure LU-12 which defines the boundary of the ALUMD.

Noise Compatibility Program Measure: LU-8

Exhibit: N/A

Description: Seek cooperation from Franklin County, Jefferson Township, and the City of Gahanna to adopt building codes applicable to the proposed Airport Land Use Management District (ALUMD).

Background and Intent: This measure was not implemented as originally recommended using the Airport Environs Overlay (AEO) boundary. None of the jurisdictions listed adopted building codes applicable to development near the Airport for the AEO boundary. In order to address concerns by the jurisdictions about moving boundaries and to provide a more reliable land use policy, a fixed boundary approach is being recommended through the implementation of the ALUMD. More information on the ALUMD is provided in Measure LU-12.

Relationship to 2007 NCP: Continues approved measure LU-8 of 2007 Part 150 NCP.

Land Use Compatibility Improvement: Will enhance the compatibility of land used surrounding the Airport.

Responsible Implementing Parties: Franklin County, Jefferson Township, City of Gahanna, and Columbus Regional Airport Authority (CRAA)

Implementation Steps, Costs, and Phasing:

Steps: CRAA to continue working with local jurisdictions to implement the recommendations for the area defined in the ALUMD.

Costs: Minimal cost to the CRAA and local governments.

Schedule: Can be implemented immediately.

Effects on Other Programs/Measures: This measure is dependent upon measure LU-12 which defines the boundary of the ALUMD.

Noise Compatibility Program Measure: LU-9

Exhibit: N/A

Description: Seek cooperation from the board of realtors to participate in a fair disclosure program for property located within the proposed Airport Land Use Management District (ALUMD).

Background and Intent: **F**air disclosure regulations are intended to ensure that prospective buyers of property are informed that the property is, or may be, exposed to potentially disruptive aircraft noise.

Proposed State Legislation (House Bill 133) was written for the 122nd Ohio General Assembly (1997-1998). This Bill, introduced by Representatives Thomas, Corbin, and Terwilleger, included a fair disclosure element. The Bill proposed that the Aviation Administrator for the State of Ohio Department of Transportation would publish a notice in a newspaper of general circulation in each affected political subdivision, indicating that an airport zone had been identified, and indicating where the public could inspect the airport zone delineation. The Administrator would also notify each landowner of record of land located in the airport zone. This notification would be sent by certified mail to the landowner at the address indicated in the most recent tax duplicate. Any person who received written notice that a parcel of real property that the person owns is included in an airport zone shall not sell or transfer any interest in that real property unless the person first provides written notice to the purchaser or grantee that the real property is included in an airport zone. House Bill 133 never received any further action, and was never moved forward. Currently there is no state law that addresses the issue of fair disclosure.

Since the regulatory approach did not succeed, it may be possible to achieve fair disclosure through voluntary programs. Assistance should be sought from local groups in the housing industry such as the Board of Realtors and the Homebuilders Association and their ethics committees, and local lending institutions. The Columbus Regional Airport Authority (CRAA) should also periodically place advertisements in the real estate sections of the newspapers.

Since owners of property located within the ALUMD are subject to the regulations imposed by the ALUMD, it follows that prospective buyers of real property or lessees of residential property located within the ALUMD should receive fair disclosure regarding the location of the property with respect to the ALUMD.

Relationship to 2007 NCP: Continues approved measure LU-9 of 2007 Part 150 NCP.

Land Use Compatibility Improvement: This measure would notify potential homeowners of the proximity to the Airport and the noise associated with aircraft operations.

Responsible Implementing Parties: Columbus Area Board of Realtors and Homebuilders Association

Implementation Steps, Costs, and Phasing:

Steps:

- CRAA contacts local Board of Realtors/Homebuilders Association.
- Develop model Fair Disclosure Statement.
- Fair Disclosure Statement is implemented by the Board of Realtors.

Costs: Approximately $10,000 for outside consulting assistance.

Schedule: This measure can be implemented immediately, contingent upon the availability of funding.

Effects on Other Programs/Measures: This measure is dependent upon measure LU-12 which defines the boundary of the ALUMD.

Noise Compatibility Program Measure: LU-10

Exhibit: N/A

Description: Periodically place advertisements in a variety of media outlets delineating the boundaries of the Airport Land Use Management District (ALUMD).

Background and Intent: The intent of this measure is to notify people living near the Airport that aircraft may cause noise that they find objectionable. This outreach effort would be focused on placing advertisements in the local newspapers, on websites, and other media outlets, as appropriate.

Relationship to 2007 NCP: Continues approved measure LU-10 of 2007 Part 150 NCP.

Land Use Compatibility Improvement: Will notify people interested in living in the area about the proximity of the Airport.

Responsible Implementing Parties: CRAA

Implementation Steps, Costs, and Phasing:

Steps: After FAA approval and funding is secured, advertisements will be developed and placed through local media outlets.

Costs: Approximately $10,000 annually for advertising

Schedule: This measure can be implemented immediately, contingent upon the availability of funding.

Effects on Other Programs/Measures: This measure is dependent upon measure LU-12 which defines the boundary of the ALUMD.

Noise Compatibility Program Measure: LU-12

Exhibit: 4-4

Description: Develop an Airport Land Use Management District (ALUMD) based on the 2023 Noise Exposure Map/Noise Compatibility Program (NCP) noise contour, other geographic, and jurisdictional boundaries.

Background and Intent: This measure would develop a fixed boundary within which land use controls will be recommended. These land use controls will include noise overlay zoning, updates to subdivision regulations and building codes, and formal fair disclosure policies, as discussed in currently approved measures LU-4 through LU-9.

This measure would identify a boundary, within which, the Airport has some influence. This influence includes indirect economic benefits such as hotel and commercial development, noise from aircraft overflights, and restrictions on the use of land or height of structures. All jurisdictions within the ALUMD have been contacted and coordinated with to discuss incorporating this boundary into their planning documents.

The ALUMD is envisioned with a series of sub-districts where different land use controls can be applied. It is recommended that the sub-districts also be fixed boundaries so that normal increases and decreases in the Airport's noise contours do not require reestablishing the land use boundaries. The boundaries and suggested levels of restrictions are summarized below:

<u>Boundary A: 2,000' x 5,000' Runway End Boxes:</u>

This area is defined using the existing north and proposed south runway locations. Within 5,000 feet of the end of the runway and 1,000' to either side of the runway centerline is generally an area that will receive the highest noise levels and number of disruptive overflights. In general, within these areas the aircraft, no matter how quiet, are likely to be disruptive to noise-sensitive land uses. It is recommended that no new noise-sensitive land uses be allowed in this area and that the CRAA and the appropriate jurisdiction work to redevelop existing noise-sensitive land uses to something more compatible. This may take the form of changes in zoning and/or avigation easements that restrict the use if sold.

<u>Boundary B: 4,000' x 10,000' Runway End Boxes Modified to Reflect Noise Contours:</u>

Within 10,000 feet of the end of the runway and 2,000 feet to either side of the runway is an area that will likely receive high levels of noise and numerous overflights now and in the future. This area was modified slightly to reflect the boundaries of the 2012 and 2023 noise exposure contours from the 2007 Part 150 Study and to follow naturally occurring boundaries within the community. It is recommended that new noise-sensitive development is discouraged and allowed only if the owner is willing to sign an avigation easement and upgrade building materials to meet noise level reduction criteria consistent with FAA standards.

Noise Compatibility Program Measure: LU-12, *(continued from previous page)*

Background and Intent, *continued*:

Boundary C: Community Based Boundary:

This area was defined using the 60 DNL of the 2023 noise exposure contour from the 2007 Part 150 Study and community landmarks and boundaries, such as political boundaries and roads. This area would occasionally experience direct overflights and would generally recognize that an airport is nearby. It is acknowledged that at times, the noise levels could be disruptive for those living in this area. It is recommended that within this area, a program for notification should be implemented that alerts people to the fact that they live near an airport and at times there may be some disruption. Suggestions to deal with excessive noise levels for both existing and new development would be offered to people, schools and churches in this area. The CRAA should be given an opportunity for discretionary review from all of the jurisdictions with zoning powers for all projects in the green zone that are noise sensitive (residential, schools, churches, etc.). This review would allow the CRAA to compare the proposed project with the most current DNL contours available at that time. If the 65 DNL contours extend into the area and the project falls within the 65 DNL, then the recommendation from the CRAA could be less favorable and may include a request for an avigation easement. If the project is outside the noise contours, then the recommendation could be more of a notification and suggested ways to reduce noise. This approach allows the use of the most recent contours while having a fixed boundary that provides more uniform protection.

Because there are nine jurisdictions with various land use and zoning regulations, implementation would require the assistance of the Mid-Ohio Regional Planning Agency (MORPC) or some similar organization to help coordinate and facilitate this process.

Relationship to 2007 NCP: Continues approved measure LU-12 of 2007 Part 150 NCP.

Land Use Compatibility Improvement: This measure would establish a fixed boundary around the Airport within which consistent land use planning for compatibility purposes can be conducted.

Responsible Implementing Parties: Franklin County, Jefferson Township, City of Gahanna, City of Columbus, Bexley, Whitehall, Reynoldsburg, Truro Township, MORPC, and Columbus Regional Airport Authority (CRAA)

Implementation Steps, Costs, and Phasing:

Steps:

- Secure Federal Aviation Administration (FAA) funding and CRAA budget approval.
- Contract with MORPC (or similar agency) to assist with definition and initial contacts with jurisdictions.
- Identify the boundary of the ALUMD
- Request that local jurisdictions incorporate the ALUMD into their current land use planning documents.

Costs: The costs of implementing this measure will include contracting with MORPC (or similar agency) to coordinate and facilitate the implementation of this measure. There will also be administrative costs of the CRAA and local jurisdictions. Total cost estimated at approximately $55,000.

Schedule: This measure can be implemented immediately, contingent upon the availability of funding.

Effects on Other Programs/Measures: This measure would enable measures LU-4, LU 6, LU-7, LU-8, LU-9, LU-10, and any other future measures that would recommend land use control strategies within the airport area.

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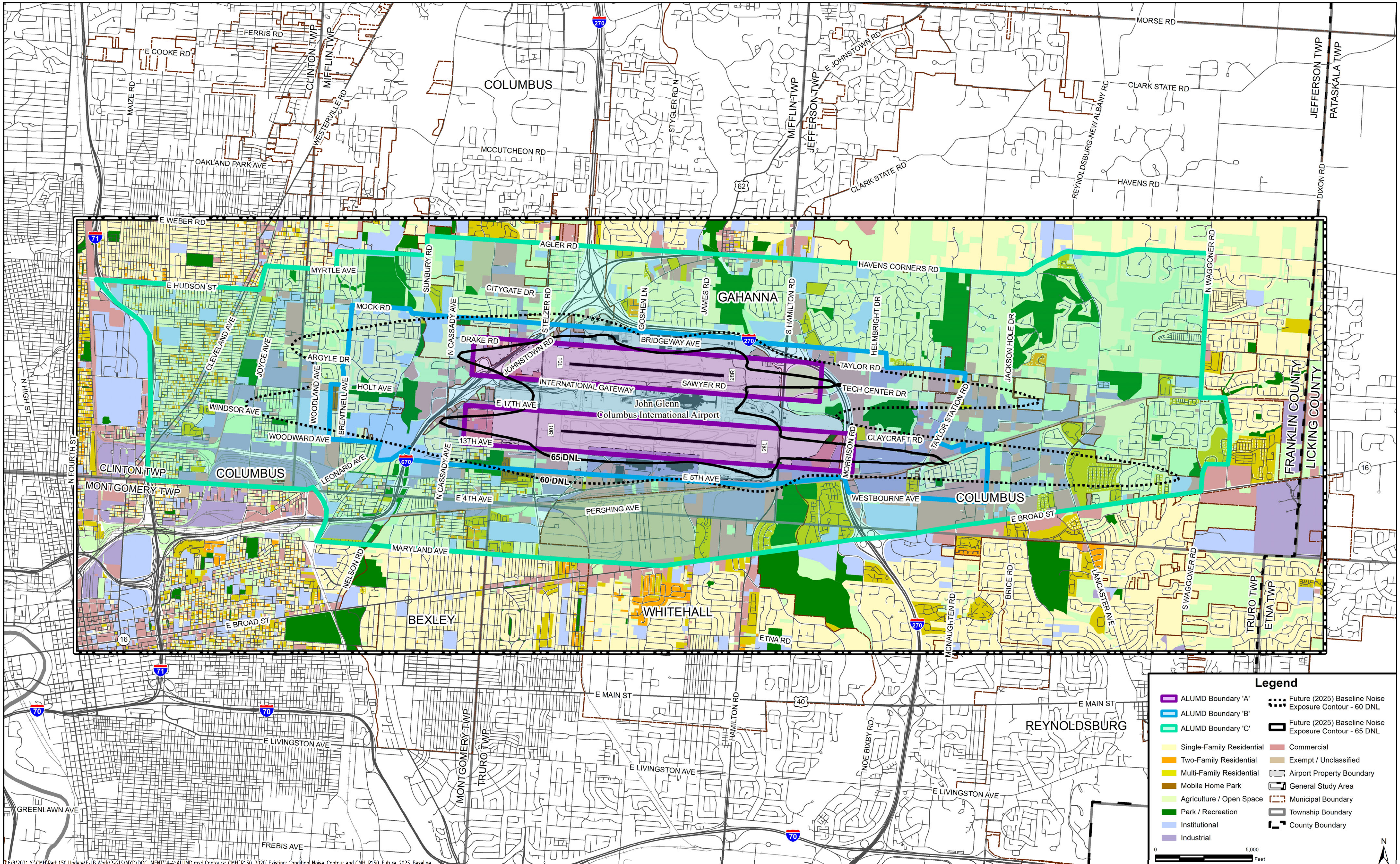
Exhibit 4-4 Measure LU-12 – Recommended Airport Land Use Management District Boundary



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Noise Compatibility Program Measure: PM-1

Description: Maintain the noise abatement elements of the FAA ATCT Tower Order.

Background and Intent: The Columbus Regional Airport Authority (CRAA) has and will continue to work with the John Glenn Columbus International Airport (CMH) Air Traffic Control Tower (ATCT) to implement noise abatement procedures. This includes insuring that the ATCT Tower Order clearly and correctly states the noise abatement procedures in a way that reflects the intent of the measure. The CRAA will work with the ATCT to update the existing Tower Order to recognize the recommended measures from this Part 150 Update.

Relationship to 2007 NCP: Continues approved measure PM-1 of 2007 Part 150 NCP.

Land Use Compatibility Improvement: Does not specifically improve land use compatibility, however, it does help to ensure that the intended procedures are being implemented by the ATCT.

Responsible Implementing Parties: CRAA and FAA

Implementation Steps, Costs, and Phasing:

Steps: After FAA approval of the Part 150 Noise Compatibility Program, the CRAA would work with the ATCT to update the Tower Order as necessary.

Costs: No additional costs.

Schedule: The program has been initiated and will continue without interruption.

Effects on Other Programs/Measures: The measure is not expected to impact other measures or existing programs.

Noise Compatibility Program Measure: PM-2

Description: Maintain the Noise Management Office for noise compatibility program management.

Background and Intent: Typically, the management of an ongoing Noise Compatibility Plan (NCP) involves the designation of a person (or persons) that will manage the short-term and long-term activities related to noise at the Airport. The Part 150 NCP may involve the implementation of several actions that will require the close management and coordination by the facilitator of the NCP. The Columbus Regional Airport Authority (CRAA) manages noise complaints and the noise monitoring system through the operations department. Operations is responsible for receiving and responding to noise complaints, reviewing compliance with noise abatement procedures, evaluating progress on implementing land use recommendations, etc..

Relationship to 2007 NCP: Continues approved measure PM-2 of 2007 Part 150 NCP.

Land Use Compatibility Improvement: No specific improvement to land use compatibility, but improved communications between the Airport and neighboring communities.

Responsible Implementing Parties: CRAA

Implementation Steps, Costs, and Phasing:

Steps: No additional steps.

Costs: Minimal cost for staff time to manage the program

Schedule: The program has been initiated and will continue without interruption.

Effects on Other Programs/Measures: The measure is not expected to impact other measures or existing programs.

Noise Compatibility Program Measure: PM-3

Description: Maintain an ongoing public involvement program regarding the noise compatibility program.

Background and Intent: The basic elements of the Part 150 Study public involvement program could be refined and adapted as continuing program elements. Components of the program include: holding routine public workshops, routine distribution of newsletters, and sending out press releases. Other elements could be added such as tours of the noise abatement office and demonstration of the noise and flight track monitoring system.

Relationship to 2007 NCP: Continues approved measure PM-3 of 2007 Part 150 NCP.

Land Use Compatibility Improvement: No specific improvement to land use compatibility, but improved communications between the Airport and neighboring communities would identify and correct possible deviations from approved flight operating procedures that could be incompatible with surrounding land use.

Responsible Implementing Parties: CRAA

Implementation Steps, Costs, and Phasing:

Steps: Continuation of current outreach efforts. No new steps required.

Costs: $25,000 annually to produce outreach materials such as the noise complaint hotline annual report and pilot awareness materials.

Schedule: The program has been initiated and will continue without interruption.

Effects on Other Programs/Measures: The measure is not expected to impact other measures or existing programs.

Noise Compatibility Program Measure: PM-4

Description: Maintain the noise and flight track monitoring system, and expand and upgrade the system as necessary.

Background and Intent: The Columbus Regional Airport Authority (CRAA) has an Airport Noise & Flight Track Monitoring System, which is located at John Glenn Columbus International Airport (CMH). This system provides aircraft flight tracks and noise measurement data for all three airports managed by the CRAA (CMH, Rickenbacker International (LCK), and Bolton Field (TZR)). The system originally included 12 permanent noise monitors (NMTs) in the community surrounding CMH and two permanent noise monitors near LCK. The system provides data that can be used by the CRAA noise office to monitor flight events, noise levels, and to assist in responding to noise complaints. The 2007 Part 150 Study recommended several enhancements to the system to improve the ability of the CRAA to collect and analyze data for CMH and respond to public requests for information.

These enhancements included:

- The purchase and installation of up to eight additional permanent noise monitors to be located around the Airport.
- Other system enhancements as technology improves.

In 2014, the system was upgraded with new software and hardware, including replacement of the original NMTs and addition of four new NMTs at CMH along the extended centerline of the relocate Runway 10R/28L. CRAA staff continue to monitor the operation of the system and provide for periodic maintenance and upgrades.

Relationship to 2007 NCP: Continues approved measure PM-4 of 2007 Part 150 NCP.

Land Use Compatibility Improvement: Improvements to the system would enable the Airport's Noise Office to better respond to the needs of the community.

Responsible Implementing Parties: CRAA

Implementation Steps, Costs, and Phasing:

Steps: Continue to monitor the system hardware and software and make periodic system updates as necessary and/or recommended by the vendor.

Costs: Minimal cost to monitor the system hardware and software.

Schedule: The program has been initiated and will continue without interruption.

Effects on Other Programs/Measures: This measure will provide additional noise and operations data that can be used in PM-2 and PM-3.

Noise Compatibility Program Measure: PM-5

Description: Routinely update the noise contours and periodically update the noise program.

Background and Intent: The NEMs are likely to become outdated and will need to be updated periodically. The NEMs should be updated every two to three years to consider changes in operating levels and patterns, as well as updates of the noise modeling software. In addition, the NEMs should be updated in accordance with the Federal Aviation Administration's (FAA's) guidelines for determining what constitutes a potentially significant increase in operations (17 percent increase in the area impacted by 65+ DNL). The NCP should be updated every five years, or as necessary, to reflect larger changes in the nature of aircraft noise surrounding the Airport. Should any development, such as runway realignments or significant modifications to ground facilities, enlarge the area of incompatible use exposed to aircraft noise above 65 Day-Night Average Sound Level (DNL), the NCP should be updated prior to the implementation of those improvements. A full update may not be required, but rather, a targeted assessment of the changes occasioned by specific development projects may suffice to bring the NCP to conformity and to qualify additional areas for NCP programs, if appropriate. Due to the proposed replacement runway, the NEM will be updated at a minimum 18 to 20 months after the opening of the proposed runway.

Relationship to 2007 NCP: Continues approved measure PM-5 of 2007 Part 150 NCP.

Land Use Compatibility Improvement: No specific improvement to land use compatibility; the measure provides for continuing planning and care in assuring the greatest compatibility between the Airport and its environs.

Responsible Implementing Parties: CRAA

Implementation Steps, Costs, and Phasing:

Steps:

- Evaluate the need of NEM or NCP update based on conditions.
- If appropriate, retain a qualified planning consultant to conduct the update(s).
- Complete and publish the results, modifying or expanding NCP programmatic boundaries as appropriate at the time of update.

Costs: Update of the NEMs could be accomplished for approximately $500,000. The NCP could be updated at a cost of $1,500,000 or less, assuming moderate facility changes. Substantial changes could increase the costs of NCP update significantly. Both updates are eligible for funding through FAA AIP grant monies at 80 percent FAA participation.

Schedule: Review operating levels periodically for significant changes. Conduct NEM update when changes to conditions warrant or by 2030/2031, with NCP update as needed.

Effects on Other Programs/Measures: Reviews all other programs and measures to assure their incorporation into the description of the noise condition at the Airport.

Noise Compatibility Program Measure: PM-6

Description: Establish a land use compatibility task force which meets periodically to discuss issues relevant to airport noise compatibility planning.

Background and Intent: A meeting was held on October 28, 1998, to discuss the Airport Environs Overlay (AEO) district. Representatives from the City of Columbus, Franklin County, John Glenn Columbus International Airport, Ohio State University Airport, and Rickenbacker International Airport participated in the meeting. The goal of the meeting was to achieve consensus amongst all the airports and jurisdictions that currently have an AEO in place regarding an approach to updating the AEO.

The group should continue to meet, as needed, to discuss land use compatibility planning issues that relate to all airports in the Columbus area. Jurisdictions that do not currently have an AEO in place should also be invited to participate.

Relationship to 2007 NCP: Continues approved measure PM-6 of 2007 Part 150 NCP.

Land Use Compatibility Improvement: the committee is intended to communicate the nature of land use compatibility to the community and assist with implementation of land use measures.

Responsible Implementing Parties: CRAA

Implementation Steps, Costs, and Phasing:

Steps: At this point the committee is no longer active, however if it is determined the committee is needed, the following steps would be taken.

- Identify organizations and communities desired for participation
- Request each organization/community to identify/assign a participant (continuation of membership by interested current members of the Part 150 PAC would be encouraged)
- Establish agenda and committee goals
- Begin meetings

Costs: Administrative costs for printing, staff support, report production, meeting facilities and refreshments, and potentially room rental costs. Total cost estimated at approximately $10,000 to $20,000 annually depending on frequency and type of meetings.

Schedule: Meetings as necessary, with continuing participation by all members during interim periods.

Effects on Other Programs/Measures: None

4.2 Noise Compatibility Program Map

No new noise abatement measures are proposed in this NCP update that would change the pattern of aircraft noise at CMH. As noted in this chapter, existing noise abatement measures are recommended to be continued. **Exhibit 4-5, *Future (2025) NEM/NCP Noise Exposure Contour***, constitutes the official NEM for the year 2025, and is reflective of implementation of all of the previously-recommended noise abatement measures.

Table 4-2 presents the noise impacts for the Future (2025) NEM/NCP noise exposure contour. There are two housing units and one noise-sensitive facility within the Future (2025) NEM/NCP noise exposure contour. All housing units have been sound insulated or will be eligible for sound insulation with the approval of the NCP.

Table 4-2 Future (2025) NEM/NCP Housing, Population, and Noise-Sensitive Facilities Incompatibilities

Category	Future (2025) NEM/NCP
Housing Units	
65 – 70 DNL	2
70 – 75 DNL	0
75+ DNL	0
65+ DNL	2
Population	
65 – 70 DNL	5
70 – 75 DNL	0
75+ DNL	0
65+ DNL	5
Noise Sensitive Facilities	
65 – 70 DNL	1
70 – 75 DNL	0
75+ DNL	0
65+ DNL	1

Source: Landrum & Brown, 2020.

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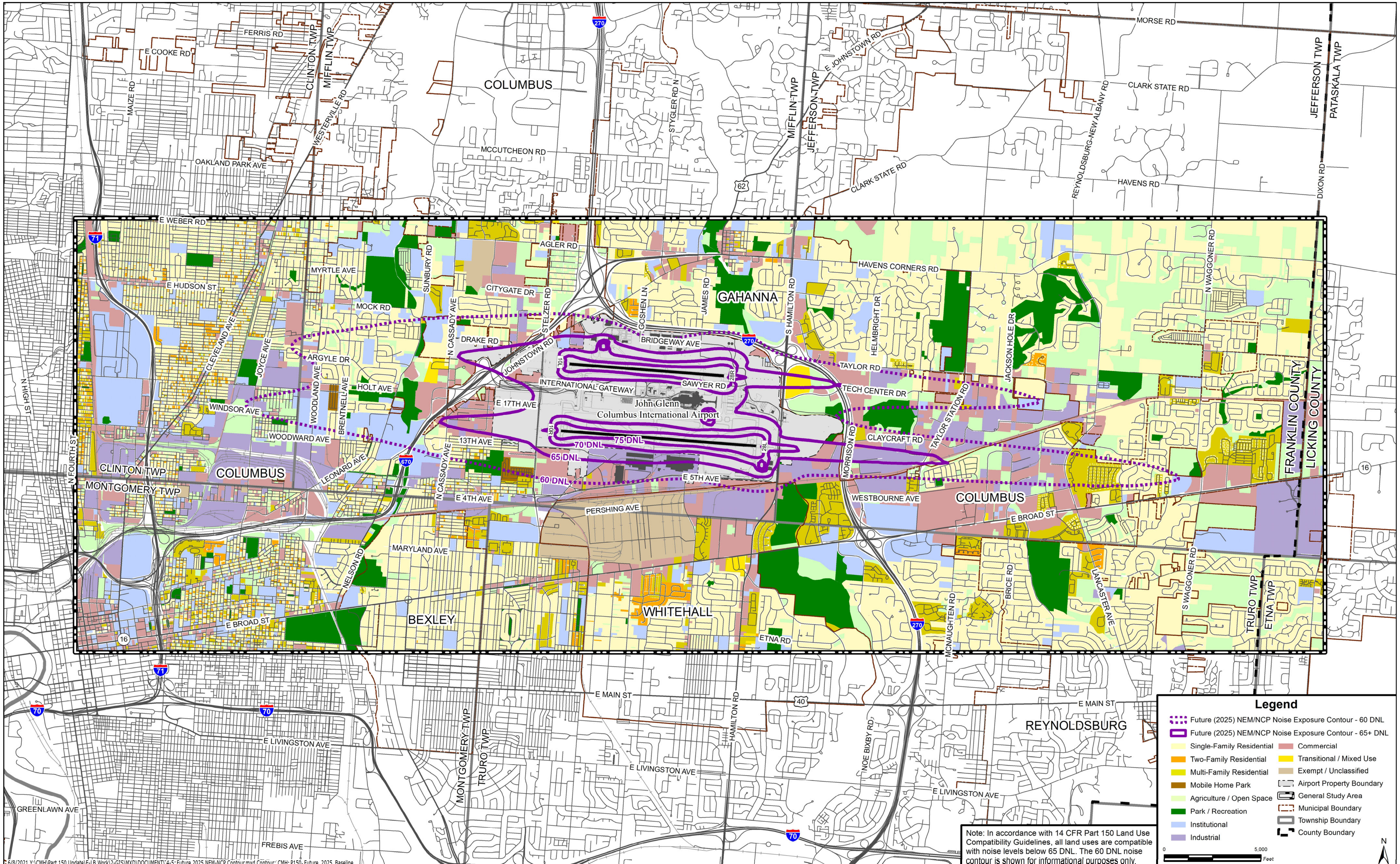
Exhibit 4-5 Future (2025) NEM/NCP Noise Exposure Contour



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4.3 Noise Compatibility Program Costs

The CRAA, supplemented by funding from the FAA, will incur the direct costs associated with the recommended NCP measures. Costs for continuation of the program have been estimated in 2020 dollars and are presented in **Table 4-3**. These costs are separated between costs to the CRAA, costs to local governments, and costs to users (e.g. airlines, corporate aviation, general aviation) if any, with CRAA carrying the vast majority of responsibility for the costs of the program measures. Where applicable, Table 4-3 notes if costs are annual or one-time expenses. The CRAA funded mitigation actions recommended for implementation are eligible for Federal matching funds amounting to approximately 80 percent of the total program cost. The costs of each individual measure are detailed earlier in this chapter.

Annual costs consist of the administrative expenses to review flight procedures or to coordinate public outreach efforts and land use compatibility planning meetings related to implementation of the ALUMD and related land use efforts. Costs for staff review of noise abatement measures NA-3, NA-4, NA-5, and NA-6 is estimated to be approximately $10,000 annually. The total estimated cost for all NCP recommendations is between $45,000 to $55,000 annually, plus a one-time cost of $575,000 to $1,575,000.

Table 4-3 NCP Implementation Costs

Type of Measure	Direct Cost to CRAA	Direct Cost to Local Government	Direct Cost to Users
Noise Abatement Measures			
- Periodic Review of flight procedures	$10,000 annually	None	None
Subtotal	*$10,000 annually*	*None*	*None*
Land Use Measures			
- Implement ALUMD and provide public/ realtor notification	$75,000 (on time cost)	*Minimal*	None
Subtotal	*$75,000 (one-time cost)*	*Minimal*	None
Program Management Measures			
- Public Involvement	$25,000 annually	None	None
- Update NEM or Update NEM and NCP	$500,000 to $1,500,000 (one-time cost)	None	None
- Miscellaneous staff and administrative costs	$10,000 to $20,000 annually	None	None
Subtotal	*$35,000 to $45,000 annually plus one-time cost of $500,000 to $1,500,000*	*None*	None
Total	***$45,000 to $55,000 annually plus one-time cost of $575,000 to $1,575,000***	**Minimal**	**None**

Notes: The CRAA-funded mitigation actions recommended for implementation are eligible for Federal matching funds amounting to approximately 80 percent of the total program cost.
Source: Landrum & Brown, 2020.

4.4 Implementation Schedule

As shown in Table 4-1, the existing noise abatement measures (NA-1 through NA-9) are from the previously approved 2007 Part 150 NCP and can continue uninterrupted. The existing corrective land use mitigation measures (LU-1 and LU-2) are previously approved; although, no land uses have been identified for implementation. The preventive land use measures (LU-3, LU-4, LU-5, LU-6, LU-7, LU-8, LU-9, LU-10 and LU-12) can be implemented immediately. Program management measures PM-1, PM-2, PM-3, PM-4, and PM-6 are continuations of previous measures and can be implemented immediately. Measure PM-5 is a continuation of a previously-approved measure and can be implemented at any time with a full update to the NEMs or NEMs/NCP expected to occur by the year 2030 or 2031.

Appendix A - FAA Policies, Guidance, and Regulations

A.1 Federal Laws and Policies and Research Related to Noise

This section presents information regarding noise and land use criteria that may be useful in the evaluation of noise impacts. With respect to airports, the FAA has a long history of publishing noise and land use assessment criteria. These laws and regulations provide the basis for local development of airport noise compatibility plans, analyses of airport impacts, and the enactment of noise compatibility policies. Other agencies, including the USEPA and the Department of Defense, have developed noise and land use criteria. A summary of some of the more pertinent regulations and guidelines is presented in the following paragraphs.

A.1.1 Noise Control Act

Congress passed the Noise Control Act (42 U.S.C. §4901 et seq.) in 1972, which established a national policy to promote an environment for all Americans free from noise that jeopardizes their health and welfare. This act set forth the foundation for conducting research and setting guidelines to restrict noise pollution.

A.1.2 U.S. Environmental Protection Agency Noise Assessment Guidelines

In response to the Noise Control Act, the U.S. Environmental Protection Agency (USEPA) published *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety.* This document identifies safe levels of environmental noise exposure without consideration for economic cost for achieving these levels. In this document, 55 dB DNL is identified as the requisite level with an adequate margin of safety for residential and recreational uses. This document does not constitute USEPA regulations or standards; rather, it is intended to “provide state and local governments as well as the Federal government and the private sector with an informational point of departure for the purpose of decision-making.”

A.1.3 Federal Aviation Noise Abatement Policy

On November 18, 1976, the U.S. Department of Transportation and FAA jointly issued the Federal Aviation Noise Abatement Policy. This policy recognized aircraft noise as a major constraint on the further development of the commercial aviation and established key responsibilities for addressing aircraft noise. The policy stated that the Federal Government has the authority and responsibility to regulate noise at the source by designing and managing flight procedures to limit the impact of aircraft noise on local communities; and by providing funding to airports for noise abatement planning.

A.1.4 Aviation Safety and Noise Abatement Act of 1979

The Aviation Safety and Noise Abatement Act of 1979 (ASNA), which is codified as 49 U.S.C. 47501-47510, set forth the foundation for the airport noise compatibility planning program outlined in 14 Code of Federal Regulations (CFR) Part 150 (see Section A.1.8). This act established the requirements for conducting noise compatibility planning and provided assistance to and funding for which airport operators could apply to undertake such planning.

A.1.5 Airport Noise and Capacity Act of 1990

The Airport Noise and Capacity Act of 1990 (ANCA) established two broad directives for the FAA: 1) to establish a method by which to review airport noise and access/use restrictions imposed by airport proprietors, and 2) to institute a program to phase-out Stage 2 aircraft over 75,000 lbs. by December 31, 1999, as defined by 14 CFR Part 36 (see Section A.1.6). To implement ANCA, the FAA amended 14 CFR Part 91 (see Section A.1.7) and issued 14 CFR Part 161 (see Section A.1.9).

A.1.6 14 CFR Part 36

Title 14, Part 36, of the CFR sets forth noise levels that are permitted for aircraft of various weights, engine number, and date of certification. Originally released in 1974 as a result of Congress' modification of the Federal Aviation Act of 1958 through the Noise Control Act of 1972, aircraft were divided into three classes, based on the amount of noise they produced at three specific noise measurement locations during certification testing. These classes (or stages) are:

Stage 1 – Includes the oldest and loudest aircraft, typically of the first generation of jets, designed before 1974, and having measured noise levels that exceed the standards set for the other classes of aircraft. This group included many of the first generation of jet aircraft used in passenger and cargo service, including the B-707, early B-727 and B-737 aircraft, and early DC-8s. Under 14 CFR Part 91, all such aircraft weighing more than 75,000 pounds were removed from the U.S. operating fleet by 1985, unless modified to meet Stage 2 noise standards.

Stage 2 – Includes aircraft that were type certified before November 15, 1975 that met noise levels defined by the FAA at takeoff, sideline, and approach measurement locations. The permissible amount of noise increased with the weight of the aircraft above 75,000 pounds and the number of engines. This category included many of the second-generation jet aircraft such as the B-727, B-737-200, and DC-9 that were extensively used in passenger and cargo service. Under 14 CFR Part 91, all such aircraft weighing more than 75,000 pounds were removed from the U.S. operating fleet by 2000, unless modified to meet Stage 3 noise standards. As of December 31, 2015, this requirement was extended to all aircraft with a maximum weight of 75,000 pounds or less operating in the contiguous United States.

Stage 3 – Includes aircraft that meet more stringent noise level requirements at takeoff, sideline, and approach measurement locations for their weight and engine number. This category includes a large percentage of business jet aircraft and all aircraft in passenger and cargo service that weigh more than 75,000 pounds.

Stage 4 – In July 2005, the FAA, through notice in the Federal Register, adopted by Final Rule for Stage 4 Aircraft Noise Standards. This includes all jet and transport-category airplanes with a maximum take-off weight of 12,500 pounds or more for which application of a new type design is submitted on or after January 1, 2006. The FAA's final Part 36 Stage 4 noise levels are a cumulative 10 EPNdB (effective perceived noise level in decibels) less than the current Stage 3 limits. These limits are based on the work of the International Civil Aviation Organization (ICAO), in which the FAA and the International Business Aviation Council are active members.

A.1.7 14 CFR Part 91

Title 14, Part 91 of the CFR as applied to noise, established schedules for phasing louder equipment out of the operating fleet of aircraft weighing according to Part 36 stage limits. The schedules called for all Stage 1 aircraft over 75,000 pounds to be removed from commercial fleets by 1982, with the exception of two engine aircraft in small city service, which were allowed to continue in service until 1985.

The schedule for the retirement of Stage 2 aircraft required the removal of all such aircraft over 75,000 pounds by the end of 1999, with interim retirement dates of 1994, 1996, and 1998 for the removal of portions of the Stage 2 fleet.

On July 2, 2013, the FAA issued a Final Rule which prohibits the operation in the contiguous United States of jet airplanes weighing 75,000 pounds or less that do not meet Stage 3 noise levels after December 31, 2015.[1]

The ICAO Committee on Aviation Environmental Protection continues to debate the merits of adopting a more stringent standard for new aircraft type designs. No action has been taken as of August 2020 to establish a phase-out schedule for Stage 3 aircraft in the United States.

A.1.8 14 CFR Part 150

Title 14, Part 150 of the CFR sets forth the standards under which a Part 150 Noise Compatibility Study is conducted. Notably, the preparation of a Noise Compatibility Program (NCP) under 14 CFR Part 150 is a voluntary action by an airport proprietor. The process of preparing the plan is intended to open/enhance lines of communication between the airport, its neighbors, and users. It is the only mechanism to provide for the mitigation of aircraft noise impacts on noise-sensitive surrounding areas that is not directly tied to airfield development or airspace utilization conducted subject to the rules for preparation of an Environmental Impact Statement (EIS) or Environmental Assessment (EA).

The Part 150 Program allows airport operators to voluntarily submit noise exposure maps (NEMs) and NCPs to the FAA for review and approval. An NCP sets forth the measures that an airport operator “has taken” or “has proposed” for the reduction of existing incompatible land uses and the prevention of additional incompatible land uses within the area covered by NEMs.

A.1.9 14 CFR Part 161

Title 14, Part 161 of the CFR was published in 1991, subsequent to passage of the ANCA. That act established the requirement and schedule for the phase-out of Stage 2 aircraft over 75,000 pounds. In return for that action, Congress severely restricted the ability of local communities to impose actions that would restrict the aircraft access to any airport. Different levels of requirements were established for voluntary restrictions, restrictions on Stage 2 aircraft, and restrictions on Stage 3 aircraft. These requirements are applicable to all aircraft except propeller-driven aircraft weighing less than 12,500 pounds, supersonic aircraft, and Stage 1 aircraft.

A.1.9.1 *Restrictive Agreements*

Subpart B of 14 CFR Part 161 sets forth requirements for the implementation of noise or access restriction on the operation of Stage 3 aircraft under an agreement between airport operators and all affected airport users. Before going into effect, notice of these proposed agreements must be published in local newspapers of area wide circulation, posted prominently at the airport, and sent directly to all regular airport users; the FAA; Federal, state, and local agencies with land use control authority; community groups and business organizations; and any aircraft operators that are known to be interested in providing service to the airport (new entrants). After this notification period, the agreement can be implemented if all current users and any new entrants proposing to serve the airport within 180 days sign on to the proposed restriction.

1 Federal Aviation Administration, Final Rule: Adoption of Statutory Prohibition on the Operation of Jets Weighing 75,000 Pounds or Less That Are Not Stage 3 Noise Compliant, Federal Register Volume 78, Number 127 (Tuesday, July 2, 2013).

A.1.9.2 *Stage 3 Restrictions*

Subpart D of 14 CFR Part 161 establishes the requirements that an airport operator must follow in order to implement a noise or access restriction on Stage 3 aircraft, including a study and formal application package. The required Part 161 study must demonstrate "by substantial evidence that the statutory conditions are met." These six conditions, specified in ANCA and codified in 14 CFR Part 161 are:

- Condition 1: The restriction is reasonable, non-arbitrary, and non-discriminatory.
- Condition 2: The restriction does not create an undue burden on interstate or foreign commerce.
- Condition 3: The proposed restriction maintains safe and efficient use of the navigable airspace.
- Condition 4: The proposed restriction does not conflict with any existing Federal statute or regulation.
- Condition 5: The applicant has provided adequate opportunity for public comment on the proposed restriction.
- Condition 6: The proposed restriction does not create an undue burden on the national aviation system.[2]

The applicant must also prepare an EA or documentation supporting a categorical exclusion.[3]

After submission by an airport operator of a complete Part 161 application package, the FAA has 30 days to review it for completeness. Notice of the proposed restriction must be published by the FAA in the *Federal Register*. After reviewing the application and public comments, the FAA must issue a decision approving or disapproving the proposed restriction within 180 days after receipt of a complete application. This decision is a final decision of the FAA Administrator for purposes of judicial review.[4]

A.1.9.3 *Consequences of Failing to Comply with Part 161*

Subpart F of 14 CFR Part 161 describes the consequences of an airport operator's failure to comply with Part 161. The sanction provided for in Subpart F is the termination of the airport's eligibility to receive airport grant funds and to collect PFCs.[5] Most of Subpart F describes the process for notifying airport operators of apparent violations, dispute resolution, and implementation of the required sanctions.

A.1.10 Federal Interagency Committee on Noise

FICON was formed in 1990 to review specific elements of the assessment of airport noise impacts and to make recommendations regarding potential improvements. The FICON review focused primarily on the manner in which noise impacts are determined, including:

- Whether aircraft noise impacts are fundamentally different from other transportation noise impacts;
- The manner in which noise impacts are described;
- The extent of impacts outside of DNL 65 decibels (dB) that should be reviewed in a National Environmental Policy Act (NEPA) document;
- The range of FAA-controlled mitigation options (noise abatement and flight track procedures) analyzed; and

[2] 14 CFR Part 161, Sec. 161.305(e).
[3] 14 CRF Part 161, Sec. 161.305(c).
[4] 14 CFR Part 161, Sec. 161.313(b)(2).
[5] 14 CFR Part 161, Sec. 161.501-505.

- The relationship of the 14 CFR Part 150 process to the NEPA process; including ramifications to the NEPA process if they are separate, and exploration of the means by which the two processes can be handled to maximize benefits.

FICON determined that there are no new descriptors or metrics of sufficient scientific standing to substitute for the present DNL cumulative noise exposure metric. The methodology employing DNL as the noise exposure metric and appropriate dose-response relationships to determine noise impact is considered the proper one for civil and military aviation scenarios in the general vicinity of airports.

FICON recommended continued use of DNL as the principle means of assessing noise impacts and encouraged agency discretion in the use of supplemental noise analysis. The Committee also recommended continued research on the impact of aircraft noise, and recommended that "a standing federal interagency committee should be established to assist agencies in providing adequate forums for discussion of public and private sector proposals, identifying needed research, and in encouraging the conduct of research and development in these areas."

Federal Interagency Committee on Aviation Noise (FICAN)

The FICAN was formed in 1993 to fulfill the FICON recommendation. The following Federal agencies concerned with aviation noise, including those with policy roles, are represented on the Committee:

- Department of Defense
  - U.S. Air Force
  - U.S. Army
  - U.S. Navy
- Department of Interior
  - National Park Service
- Department of Transportation
  - Federal Aviation Administration
- Environmental Protection Agency
- National Aeronautics and Space Administration (NASA)
- Department of Housing and Urban Development

A.1.11 Federal Requirements to use DNL in Environmental Noise Studies

DNL is the standard metric used for environmental noise analysis in the United States. This practice originated with the USEPA's effort to comply with the Noise Control Act of 1972. The USEPA designated a task group to "consider the characterization of the impact of airport community noise and develop a community noise exposure measure."[6] The task group recommended using the DNL metric. The USEPA accepted the recommendation in 1974, based on the following considerations:

1. The measure is applicable to the evaluation of pervasive, long-term noise in various defined areas and under various conditions over long periods of time.
2. The measure correlates well with known effects of the noise environment on individuals and the public.

[6] Information on Levels of Environmental Noise Requisite to Protect Health and Welfare with an Adequate Margin of Safety. U.S. Environmental Protection Agency, Office of Noise Abatement and Control. 1974, P. A-10.

3. The measure is simple, practical, and accurate.
4. Measurement equipment is commercially available.
5. The metric at a given location is predictable, within an acceptable tolerance, from knowledge of the physical events producing the noise.[7]

The Schultz Curve, which is depicted in **Exhibit A-1, *Schultz Curve***, was first published by T.J. Schultz in *Synthesis of Social Surveys on Noise Annoyance* in 1978. The curve relates specific DNL levels to the percent of people in a community whom those noise levels highly annoy. The Curve provided a widely-accepted dose-response relationship between cumulative environmental noise and annoyance. Like other Federal agencies that have established Federal land use guidelines for noise, FAA used the Schultz Curve, when it designated the DNL 65 dB contour as the cumulative noise exposure level above which residential land uses are not compatible without mitigation. At DNL 65 dBA, the Schultz Curve predicts that approximately 12.5 percent of the population will be highly annoyed.

Soon thereafter, the Department of Housing and Urban Development (HUD), Department of Defense, and the Veterans Administration adopted the use of the DNL.

At about the same time, the Acoustical Society of America developed a standard (ANSI S3.23-1980) which established DNL as the preferred metric for outdoor environments. This standard was reevaluated in 1990 and they reached the same conclusions regarding the use of DNL (ANSI S12.40-1990).

In 1980, the Federal Interagency Committee on Urban Noise (FICUN) met to consolidate Federal guidance on incorporating noise considerations in local land use planning. The committee selected DNL as the best noise metric for the purpose, thus endorsing the USEPA's earlier work and making it applicable to all Federal agencies.[8]

In response to the requirements of the ASNA Act of 1979 and the recommendations of FICUN and USEPA, the FAA established DNL in 1981 as the single metric for use in airport noise and land use compatibility planning. This decision was incorporated into the final rule implementing ASNA, 14 CFR Part 150, in 1985. Part 150 established the DNL as the noise metric for determining the exposure of individuals to aircraft noise and identified residential land uses as being normally compatible with noise levels below DNL 65 dBA.

In the early 1990s, Congress authorized the creation of a new interagency committee to study airport noise issues. The FICON was formed with membership from the USEPA, the FAA, the U.S. Air Force, the U.S. Navy, HUD, the Department of Veterans Affairs, and others. FICON concluded in its 1992 report that Federal agencies should "continue the use of the DNL metric as the principal means for describing long term noise exposure of civil and military aircraft operations."[9] FICON further concluded that there were no new sound descriptors of sufficient scientific standing to substitute for the DNL cumulative noise exposure metric."[10]

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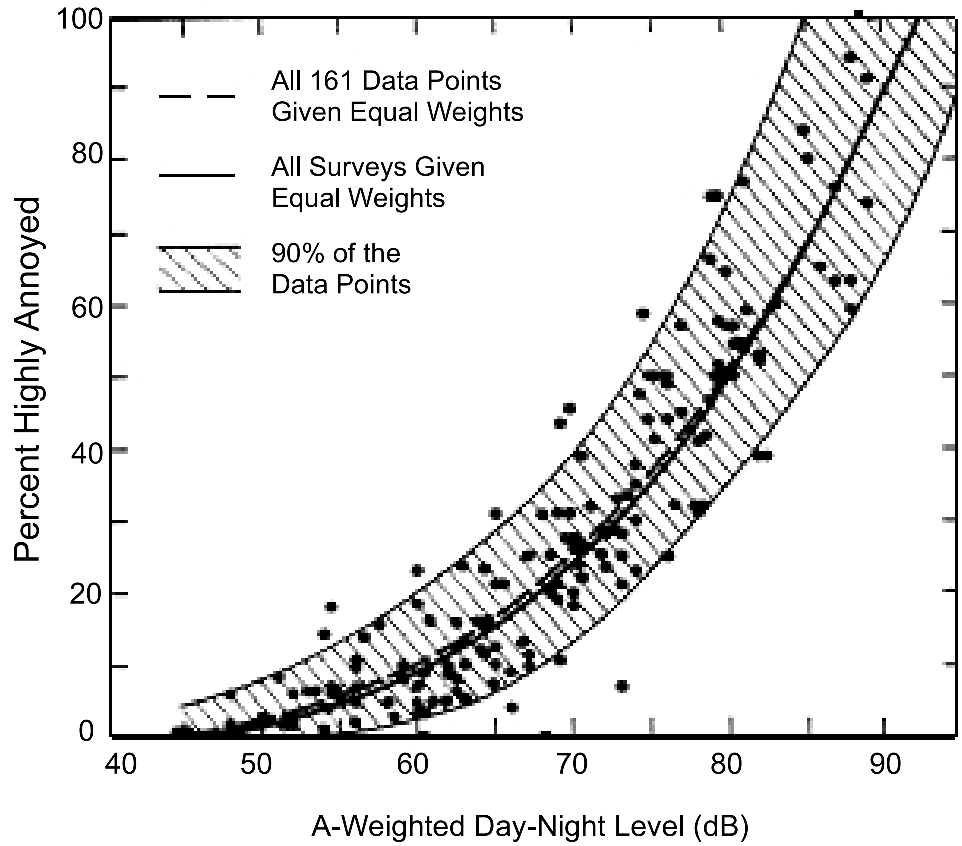
[7] Information on Levels of Environmental Noise Requisite to Protect Health and Welfare with an Adequate Margin of Safety. U.S. Environmental Protection Agency, Office of Noise Abatement and Control. 1974, Pp. A-1–A-23.

[8] *Guidelines for Considering Noise in Land Use Planning and Control*. Federal Interagency Committee on Urban Noise (FICUN). 1980.

[9] *Federal Agency Review of Selected Airport Noise Analysis Issues*. Federal Interagency Committee on Noise (FICON). August 1992, Pp. 3-1.

[10] Federal Agency Review of Selected Airport Noise Analysis Issues, Technical Report, Volume 2. Federal Interagency Committee on Noise (Technical). August 1992, Pp. 2-3.

Exhibit A-1 Schultz Curve



In 1993, the FAA issued its *Report to Congress on Effects of Airport Noise*. Regarding DNL, the FAA stated, "Overall, the best measure of the social, economic, and health effects of airport noise on communities is the Day-Night Average Sound Level (DNL)."[11] According to this report, DNL 65 dBA "…as a criterion of significance, and of the land use compatibility guidelines in Part 150 is reasonable."[12] In April 2020, the FAA issued a report to Congress in accordance with section 188 in the 2018 FAA Reauthorization Act which stated that the DNL metric is the metric to be used for FAA decision-making.[13] The report further noted that other supplemental metrics could be used for informational purposes. Information regarding supplemental metrics can be found in Appendix C.

As part of FAA's ongoing research program on aircraft noise, the Agency conducted a nationwide survey regarding annoyance related to aircraft noise. The results of this survey, titled the Neighborhood Environmental Survey, were published in the Federal Register on January 13, 2021. Based on the survey, a new National Curve was created by combining the Survey responses from the question related to "Noise from Aircraft" with the modeled aircraft noise levels. Compared with the existing Schultz Curve, the new National Curve shows a substantial increase in the percentage of people who are highly annoyed by aircraft noise over the entire range of aircraft noise levels considered, including at lower noise levels.[14]

11 *Report to Congress on Effects of Airport Noise*. Federal Aviation Administration. 1993, P. 1.
12 *Report to Congress on Effects of Airport Noise*. Federal Aviation Administration. 1993, P. 13.
13 *Report to Congress, FAA Reauthorization Act of 2018 (Pub. L. 115-254), Section 188 and Sec 173.* Federal Aviation Administration, 2020.
14 Federal Aviation Administration, Neighborhood Environmental Survey, Online at: https://www.faa.gov/regulations_policies/policy_guidance/noise/survey/, Accessed on June 1, 2021.

A.2 Federal Laws and Policies Related to Noise/Land Use Compatibility

The FAA adopted land use compatibility guidelines relating types of land use to airport sound levels in 1985. These guidelines were promulgated in 14 CFR Part 150. These guidelines, reproduced here as **Table A-1, *Land Use Compatibility Guidelines – 14 CFR Part 150***, show the compatibility parameters for residential, public (schools, churches, nursing homes, hospitals, libraries), commercial, manufacturing and production, and recreational land uses.

The Part 150 guidelines are the basis for defining areas potentially eligible for Federal funding through the Airport Improvement Program (AIP). The *Airport Improvement Handbook* states, "Noise compatibility projects usually must be located in areas where noise measured in day-night average sound level (DNL) is 65 decibel (dB) or greater."[15] Federal funding is available at noise levels below 65 DNL if the airport operator (Sponsor) determines that incompatible land uses exist below 65 DNL and the FAA concurs with the Sponsor's determination.

As shown in Table 4-1, all land uses within areas below 65 DNL are considered to be compatible with airport operations. Residential land uses are generally incompatible with noise levels above 65 DNL. In some areas, residential land use may be permitted in the 65 to 70 DNL with appropriate sound insulation measures implemented. This is done at the discretion of local communities. Schools and other public use facilities located between 65 and 75 DNL are generally incompatible without sound insulation. Above 75 DNL, schools, hospitals, nursing homes, and churches are considered incompatible land uses. The information presented in Table 4-1 is meant to act as a guideline. According to 14 CFR Part 150, "Adjustments or modifications of the descriptions of the land-use categories may be desirable after consideration of specific local conditions."[16]

[15] FAA Order 5300.38C, Chapter 7, paragraph 706.
[16] 14 CFR Part 150, Part B Noise Exposure Map Development, Section A150.101 Noise contours and land usages, paragraph (c).

Table A-1 Land Use Compatibility Guidelines – 14 CFR Part 150

Yearly Day-Night Average Sound Level (DNL) in Decibels						
Land Use	**Below 65**	**65-70**	**70-75**	**75-80**	**80-85**	**Over 85**
RESIDENTIAL						
Residential, other than mobile homes and transient lodgings	Y	N[1]	N[1]	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N[1]	N[1]	N[1]	N	N
PUBLIC USE						
Schools, hospitals, nursing homes	Y	25	30	N	N	N
Churches, auditoriums, and concert halls	Y	25	30	N	N	N
Governmental services	Y	Y	25	30	N	N
Transportation	Y	Y	Y[2]	Y[3]	Y[4]	N[4]
Parking	Y	Y	Y[2]	Y[3]	Y[4]	N
COMMERCIAL USE						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail -- building materials, hardware, and farm equipment	Y	Y	Y[2]	Y[3]	Y[4]	N
Retail trade, general	Y	Y	25	30	N	N
Utilities	Y	Y	Y[2]	Y[3]	Y[4]	N
Communication	Y	Y	25	30	N	N
MANUFACTURING AND PRODUCTION						
Manufacturing, general	Y	Y	Y[2]	Y[3]	Y[4]	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y[6]	Y[7]	Y[8]	Y[8]	Y[8]
Livestock farming and breeding	Y	Y[6]	Y[7]	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
RECREATIONAL						
Outdoor sports arenas and spectator sports	Y	Y	Y[5]	N[5]	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts, and camps	Y	Y	Y	N	N	N
Golf courses, riding stables, and water recreation	Y	Y	25	30	N	N

The designations contained in this table do not constitute a Federal determination that any use of land covered by the program is acceptable under Federal, State, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under Part 150 are not intended to substitute federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise compatible land uses.

Key to Table A-1

Y (Yes) Land use and related structures compatible without restrictions.
N (No) Land use and related structures are not compatible and should be prohibited.
NLR Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure
25, 30, 35Land use and related structures generally compatible; measures to achieve a NLR of 25, 30, or 35 dB must be incorporated into design and construction of structure.

Notes for Table 4-1

1. Where the community determines that residential or school uses must be allowed, measures to achieve outdoor-to-indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB, thus, the reduction requirements are often stated as five, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.
2. Measures to achieve NLR of 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
3. Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
4. Measures to achieve NLR of 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
5. Land use compatible provided special sound reinforcement systems are installed.
6. Residential buildings require a NLR of 25 dB.
7. Residential buildings require a NLR of 30 dB.
8. Residential buildings not permitted.

Source: 14 CFR Part 150 Airport Noise Compatibility Planning, Appendix A, Table 1.

A.2.1 FAA Final Policy on Part 150 Noise Mitigation Measures

The FAA issued a final policy to establish a distinction between remedial and preventive noise mitigation measures proposed by airport operators and submitted for approval by the FAA under noise compatibility planning regulations. In the notice of final policy[17] effective October 1, 1998, the FAA stated the following:

- As of October 1, 1998, the FAA will approve under 14 CFR Part 150 only remedial noise mitigation measures for existing incompatible development and only preventative noise mitigation measures in areas of potential new incompatible development.
- The FAA will not approve remedial noise mitigation measures for new incompatible development that occurs in the vicinity of airports.
- The use of AIP funds will be affected to the extent that such used depends on approval under Part 150.

The Airport Noise Compatibility Planning Program (14 CFR Part 150) was established under the ASNA. The Part 150 program allows airport operators to submit NEMs and NCPs to the FAA voluntarily. According to the ASNA, an NCP sets forth the measures that an airport operator has taken or has proposed for the reduction of existing incompatible land uses and the prevention of additional incompatible land uses within the area covered by NEMs.

The ASNA embodies strong concepts of local initiative and flexibility. The submission of NEMs and NCPs is left to the discretion of local airport operators. Airport operators also may choose to submit NEMs without preparing and submitting an NCP. The types of measures that airport operators may include in an NCP are not limited by the ASNA, allowing airport operators substantial latitude to submit a broad array of measures—including innovative measures—that respond to local needs and circumstances.

The criteria for approval or disapproval of measures submitted in a Part 150 program are set forth in the ASNA. The ASNA directs the Federal approval of an NCP, except for measures relating to flight procedures: (1) if the program measures do not create an undue burden on interstate or foreign commerce; (2) if the program measures are reasonably consistent with the goal of reducing existing incompatible land uses and preventing the introduction of additional incompatible land uses; and (3) if the program provides for its revision if necessitated by the submission of a revised NEM. Failure to approve or disapprove an NCP within 180 days, except for measures relating to flight procedures, is deemed to be an approval under the ASNA.

[17] FAA Notice of Final Policy, October 1, 1998.

Finally, the ASNA sets forth criteria under which grants may be made to carry out noise compatibility projects, consistent with ASNA's overall deference to local initiative and flexibility.

The FAA is authorized, but not obligated, to fund projects via the AIP to carry out measures in an NCP that are not disapproved by the FAA. Such projects also may be funded with local Passenger Facility Charges (PFC) revenue upon the FAA's approval of an application filed by a public agency that owns or operates a commercial service airport, although the use of PFC revenue for such projects does not require an approved NCP under Part 150.

In establishing the airport noise compatibility planning program, which became embodied in 14 CFR Part 150, the ASNA did not change the legal authority of state and local governments to control the uses of land within their jurisdictions. Public controls on the use of land are commonly exercised by zoning. Zoning is a power reserved to the states under the U.S. Constitution. It is an exercise of the police powers of the states that designates the uses permitted on each parcel of land. This power is usually delegated in states enabling legislation to local levels of government.

Many local land use control authorities (cities, counties, etc.) have not adopted zoning ordinances or other controls to prevent incompatible development (primarily residential) within the noise impact areas of airports. An airport noise impact area, identified within noise contours on an NEM, may extend over a number of different local jurisdictions that individually control land uses.

While airport operators have included measures in NCPs submitted under Part 150 to prevent the development of new incompatible land uses through zoning and other controls under the authorities of appropriate local jurisdictions, success in implementing these measures has been mixed.

One or more of the factors hindering effective land use controls may be of sufficient importance to preclude some jurisdictions from following through on the land use recommendations of an airport's Part 150 NCP. When either an airport sponsor's or a non-airport sponsor's jurisdiction allows additional incompatible development within the airport noise impact area. This can, in turn, result in noise problems for the airport operator in the form of inverse condemnation or noise nuisance lawsuits, public opposition to proposals by the airport operator to expand the airport's capacity, and local political pressure for airport operational and capacity limitations to reduce noise. Some airport operators have taken the position that they will not provide any financial assistance to mitigate aviation noise for new incompatible development. Other airport operators have determined that it is a practical necessity for them to include at least some new residential areas within their noise assistance programs to mitigate noise impacts that they were unable to prevent in the first place. Over a relatively short period of time, the distinctions blur between what is "new" and what is "existing" residential development with respect to airport noise issues.

Airport operators currently may include new incompatible land uses, as well as existing incompatible land uses, within their Part 150 NCPs and recommend that remedial noise mitigation measures--usually either property acquisition or noise insulation--be applied to both situations. These measures have been considered to qualify for approval by the FAA under 49 USC 47504 and 14 CFR Part 150. The Part 150 approval enables noise mitigation measures to be considered for Federal funding under the AIP, although it does not guarantee that Federal funds will be provided.

Final Policy

Therefore, as of October 1, 1998, the FAA will approve remedial noise mitigation measures under Part 150 only for incompatible development which exists as of that date. Incompatible development that potentially may occur on or after October 1, 1998, may only be addressed in Part 150 programs with preventative noise mitigation measures. This policy will affect the use of AIP funds to the extent that such funding is dependent on approval under Part 150.

Approval of remedial noise mitigation measures for bypassed lots or additions to existing structures within noise impacted neighborhoods, additions to existing noise impacted schools or other community facilities required by demographic changes within their service areas, and formerly noise compatible uses that have been rendered incompatible as a result of airport expansion or changes in airport operations, and other reasonable exceptions to this policy on similar grounds must be justified by airport operators in submittals to the FAA and will be considered by the FAA on a case-by-case basis. This policy does not affect AIP funding for noise mitigation projects that do not require Part 150 approval, that can be funded with PFC revenue, or that are included in FAA-approved environmental documents for airport development.

A.2.2 FAA Airport Improvement Program Handbook

Airport Improvement Program (AIP) Handbook[18] provides guidance and sets forth policy and procedures used in the administration of the AIP. Appendix R, *Noise Compatibility Planning/Projects*, provides guidance and eligibility requirements for airport noise mitigation programs. The following sections provide the general steps for determining eligibility for mitigation under AIP guidelines.

A.2.2.1 *General Eligibility Requirements*

Table A-1, Land Use Compatibility Guidelines – 14 CFR Part 150, defines the requirements for determining when various land uses are noncompatible with aircraft noise, and therefore potentially eligible for AIP funding. The DNL 65 dB noise contour is the noise level at or above which certain land uses are not considered to be compatible (49 USC § 47502, as defined in Table A-1). The converse is also true – because DNL 65 dB is the Federal threshold for considering certain land uses as compatible, noise-sensitive land uses located outside of the DNL 65 dB noise contour are not considered to be impacted by airport related noise. They are not eligible for mitigation funding unless a lower local standard is formally adopted.

A.2.2.2 *Interior Noise Level Requirements*

The 45 dB standard has been adopted by the FAA for interior noise. This is based on 46 Federal Register 8316 (January 26, 1981), which established the interim rule for 14 CFR part 150 and included specific requirements regarding interior noise level. This was further clarified in 1992 by the Federal Interagency Committee on Noise (FICON) findings of 45 dB to be the interior noise level that will accommodate indoor conversations or sleep. A noise-impacted noncompatible structure must be experiencing existing interior noise levels that are 45 dB or greater with the windows closed to be considered eligible. For residences, the calculation of interior noise level must be based on the average noise level of only the habitable rooms (e.g. living, sleeping, and kitchen areas). For schools, the interior noise level during school hours should be calculated for determination of eligibility. Eligibility for noise insulation is limited to classrooms, libraries, fixed seat auditoriums, and educators' offices.

A.2.2.3 *Block Rounding*

Block rounding refers to expanding the noise mitigation program area beyond the limits of the 65 DNL noise contour to a logical breakpoint (such as a neighborhood boundary, significant arterial surface street, highway, river, other physical or natural barrier or feature). The FAA will review a request for block rounding under a noise mitigation program (or environmental study). If approved under block rounding, the property must meet the interior noise level requirements described in Section A.2.2.2.

[18] U.S. Department of Transportation, Federal Aviation Administration, Order 5100.38D, Change 1, February 26, 2019.

A.2.2.4 *Neighborhood Equity*

A sponsor may consider the use of neighborhood equity when residences in the eligible noise contour threshold that do not meet the interior noise level requirements are scattered among residences that do meet the interior noise level criteria. If sponsor proposes to use neighborhood equity provisions, the FAA has the option to approve this request under the following circumstances.

- The residence must be in the eligible noise contour threshold
- The sponsor must develop a separate neighborhood equity package limited to improvements such as caulking, weather stripping, installation of storm doors or ventilation packages. The FAA must not approve the use of the standard noise insulation package for neighborhood equity residences.
- Per FAA policy, approval should not exceed more than 10% of the residences in the neighborhood, or 20 residences in a phase of the noise insulation program, whichever is less.
- In extremely rare cases, the FAA may determine that the program will benefit by providing noise equity packages to more than the 10% or 20 residence limit.
- The sponsor must provide the FAA, Airports District Office (ADO) with a complete list of the specific residences (by address) that are proposed for neighborhood equity.
- The sponsor must provide the ADO with detailed information comparing the cost of the proposed neighborhood equity package with the cost of a standard noise insulation package.
- The ADO must review and approve or disapprove the sponsor's proposed neighborhood equity package. In their determination, the ADO must ensure that the use of the minimal neighborhood equity packages on non-eligible residences is required to allow successful completion of the overall noise insulation program in the neighborhood, thus allowing these residences to be noise insulated within the guidelines of AIP eligibility. The ADO must document the determination and place a copy of the determination in the grant file.

A.2.2.5 *Pre- and Post-Testing Criteria for Noise Insulation Projects*

The AIP Handbook sets forth requirements for testing potentially eligible structures to determine if the interior noise level requirements are met. This guidance includes requirements for testing methodology, equipment, and the determination of an adequate sample size, which could impact program startup and implementation costs and funding reimbursement.

A.2.2.6 *Disposal of Excess/Unneeded AIP Funded Land*

Section 5-68 of the AIP Handbook sets forth requirements for disposal of land acquired under an airport NCP, commonly referred to as “noise land.” 49 USC § 47107(c)(2) requires a sponsor to promptly dispose of AIP funded land when the land is no longer needed for airport purposes. In this specific case, airport purpose includes land needed for an existing or future aeronautical purpose (including runway protection zone) or land that serves as a noise buffer. If it is determined that the land is no longer need for these purposes, the airport sponsor has the choice of either selling or keeping the land for non-airport purposes. In either case, the airport sponsor must use the Federal share of the fair market value on projects in the following order of precedence:

1. Reinvestment in an approved noise compatibility project
2. Reinvestment in an approved project that is eligible for funding under 49 USC § 47117(e)
3. Reinvestment in all other approved airport development projects at the airport
4. Transfer to a sponsor of another public airport for a noise compatibility project at the other airport
5. Repay the proceeds as directed by the FAA Office of Finance and Management

A.2.3 Program Guidance Letters

Program Guidance Letters are issued to update or clarify elements of the AIP Handbook. One current Program Guidance Letter (PGL), related to changes outlined in the FAA Reauthorization Act of 2018 dealing with noise and environmental issues is R-PGL 19-06.

A.2.3.1 *Reauthorization Program Guidance Letter (R-PGL) 19-06*

This Reauthorization Program Guidance Letter (R-PGL) 19-06 explains and implements provisions in the FAA Reauthorization Act of 2018 (the 2018 Act) (P.L.115-254) that impact environmental and noise programs.

Section 49 U.S.C. 47503(b) requires airport operators with noise exposure maps to submit a revised map if a change, which is not reflected in either the existing conditions map or forecast map currently on file with the FAA, in the operation of the airport:

1. Establishes a substantial new noncompatible use; or
2. Would significantly reduce noise over existing noncompatible uses.

Section 174 amends 49 U.S.C. 47503(b) by requiring submission of an updated noise exposure map only if the relevant change occurs during:

1. The forecast period of the applicable noise exposure map; or
2. The implementation period of the airport operator’s noise compatibility program.

This provision applies only to airport sponsors that have a noise exposure map on file with the FAA.

Appendix B - Noise Measurements and Complaints

This Part 150 Study included data collection related to measured aircraft noise levels and community complaints at the John Glenn Columbus International Airport (CMH or Airport). This appendix provides the results of a temporary field noise measurement program that was conducted to provide actual noise data for informational purposes useful for the development of noise contour modeling. Data collection also included analyzing long-term noise measurement data and reviewing complaints about aircraft noise documented by the Columbus Regional Airport Authority (CRAA) Noise Management Office.

B.1 Noise Measurement Program

A field noise measurement program was conducted the week of November 10, 2019 at CMH. The field noise measurement program was conducted in accordance with 14 C.F.R. Part 150 guidelines as provided in Section A150.5. Sound level meters were deployed at 30 locations around CMH, including residential areas and public locations, to measure noise from aircraft operations.

Measurements made for short periods of time are unique to that one period, and may not represent the average of the events that would occur at that location over a longer period of time. The relationship between field measurements and computer-modeled average noise levels is comparable to that between a book and its cover. While the cover (single-event measurements) may indicate something of the character of a book, and receive inordinate attention based on its color or graphics, the total story (average noise level) is in all the words that constitute the story. It is on the total story that the critic makes his assessment. In other words, the modeling process simulates overall average-annual conditions (the book) while field measurements (the cover) reflect only a small part of the whole story and should not be too heavily relied upon when conducting a noise analysis.

Aircraft noise measurements concentrated on the collection of a variety of single overflight noise information, with emphasis on the noise generated by air carrier aircraft during arrival and departure east and west of the Airport. Measurements occurred during all times that the Airport was operating.

B.1.1 Field Noise Measurement Equipment

State of the art equipment used in this program included the Larson Davis 824 and LxT sound level meters. These are Class I Precision Sound Level Meters (as defined by American National Standards Institute (ANSI) and International Electrotechnical Commission (IEC)). The equipment was calibrated in compliance with manufacturer's procedures. Microphones and recording equipment were of the highest quality and capable of recording and calculating the various noise metrics. The equipment settings included the "A" frequency weighting, filter characteristics, and the "slow response" characteristics. The instrumentation that was used for collecting short-term and long-term measurements are listed in **Table B-1**.

Table B-1 Acoustical Measurement Instrumentation

Sound Level Meter	Microphone	Pre-amp
Larson Davis LxT1 Sound Level Meter with Windscreen	377B02	PRMLXT
Larson Davis 824 Sound Level Meter with Windscreen	377B02	PRM902

B.1.2 Field Noise Measurement Procedures

Aircraft noise levels were recorded using the equipment indicated in Table B-1 for each of the 30 short-term sites. Radar data was obtained from the Airport flight tracking system to correspond to the times of measurement. The noise-measurement program was designed to provide a sampling of single events throughout the study area. It was not designed to record cumulative noise levels. The sound level meters were attended while active to ensure that only aircraft noise events were recorded, or to note instances where a non-aircraft noise event was recorded simultaneously with an aircraft noise event. The field noise measurement procedure required the operator to enable the noise monitor when an aircraft noise event first became audible and continue monitoring that event until the noise level receded back to ambient levels, usually lasting a duration of 30-90 seconds. After the event, the operator recorded the average noise level (Leq), the sound exposure level (SEL), the event duration, and the maximum sound level (Lmax). Other event information, such as aircraft type and operational characteristics, was also annotated, as available. Ambient noise levels, without aircraft noise or intermittent community noise, were recorded at each site.

The short-term field noise measurement program provided for the collection of a large number of single-event measurements at a variety of locations throughout the community at distances ranging from several hundred feet to several miles between the aircraft and the monitoring site. This information, when correlated with the radar data and operating schedules, allowed for a comparison to the determination of applicable noise curves and performance characteristics within the Aviation Environmental Design Tool (AEDT) database for the most significant aircraft and operators. **Section B.1.5** discusses the analysis of short-term noise measurement data and comparison to AEDT aircraft profiles based on the results of the noise measurement data correlation and further investigation of average aircraft weights upon departure.

B.1.3 Field Noise Measurement Sites

Noise measurements were taken at 30 short-term sites. These short-term field noise measurement sites were chosen based on their proximity to the Airport and the existing permanent noise monitoring terminals (NMTs), the flow of aircraft operations during the measurement program, and areas of past noise concerns. Sites were also screened on the basis of ambient noise level (or more specifically, the absence of loud ambient noise such as vehicular traffic). Specific selection criteria included the following:

- Emphasis on areas of aircraft overflight based on radar data;
- Sampling of both arrivals and departures of typical aircraft operations;
- Screening of each site for local noise sources or unusual terrain characteristics, which could affect measurements;
- Location in or near areas from which complaints about aircraft noise were received; and
- Location where there are concentrations of residential development.

While there are numerous locations available for monitoring, the selected sites fulfill the above criteria and provide a representative sampling of the varying aircraft noise conditions in the vicinity of the Airport. In addition to the short-term measurement program, the CRAA maintains a permanent noise monitoring system which includes 16 permanent NMTs located at various sites around CMH. **Exhibit B-1** illustrates the locations of both the short-term field noise measurement sites and the NMT locations. **Table B-2** lists the 30 short-term field noise measurement sites. More information about the NMT data collection is included in **Section B.3**.

Exhibit B-1 Noise Measurement Sites

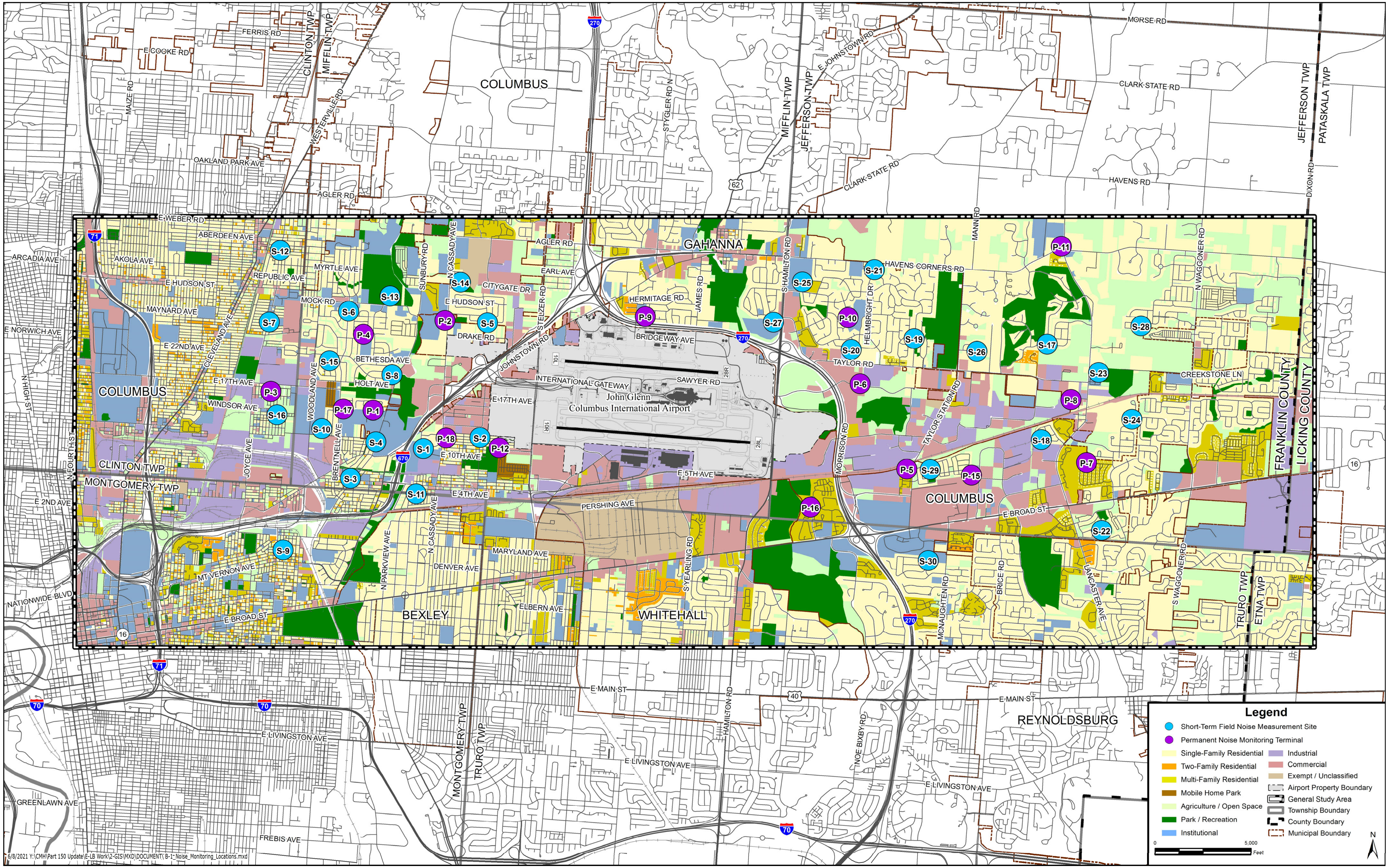


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Table B-2 Field Noise Measurement Sites

Site Number	Location
S-1	North Cassady Avenue near Summit Trace
S-2	E 13th Ave & Rarig Ave
S-3	E 5th Avenue & Sunbury Road
S-4	Sunbury Road near Woodward Avenue
S-5	Lone Spruce Road & Mountain Oak Road
S-6	Delavan Drive & Brentnell Avenue
S-7	Joyce Avenue & Maynard Avenue
S-8	Thames Drive north of Argyle Drive
S-9	Parkwood Ave & Pembroke Ave
S-10	Eastlawn Cemetery
S-11	Margaret Street & Drexel Avenue
S-12	Joyce Ave & Genessee Avenue
S-13	Mock Park - Mock Road & Bar Harbor Road
S-14	Baylor Avenue & Pepper Street
S-15	Marina Drive west of Toni Street
S-16	American Addition Park
S-17	Poppy Hills Drive & Keystone Ranch Court
S-18	Onyx Bluff Lane west of Stone Shadow Drive
S-19	Rice Avenue & Spruce Hill Drive
S-20	Hunters Run
S-21	Tamara Drive & Helmbright Drive
S-22	Serenoa Dr & Endora St
S-23	Olde Quarry Park
S-24	Sherridon Drive & Streamwater Drive
S-25	Meadow Green Circle
S-26	Estate View Drive east of Taylor Station Road
S-27	Shepherd Church of the Nazarene
S-28	Sand Bar Drive south of Headwater Drive
S-29	Lakes at Taylor Crossing Subdivision
S-30	Forestview Drive & Revere Road

B.1.4 Weather Information

The field noise measurement program was conducted for approximately one hour at each site during the week of November 10, 2019. The weather during the measurement period ranged from clear skies to rainy/overcast conditions. Field noise measurement collection was suspended during periods of heavy rain. Wind conditions dictated the use of west flow for the duration of the measurement period. When the Airport operates in west flow, aircraft arrive from the east heading west and depart to the west on Runways 28L and 28R.

B.1.5 Short-Term Noise Measurement Results Summary

The noise measurement process was designed to monitor the noise levels of a representative mix of aircraft operations at CMH. The noise measurement program recorded a wide range of noise exposure levels from aircraft activity within the airport environs. Some of the noise events collected at the measurement sites were produced by non-aircraft, e.g., cars, people, pets, wildlife, etc. However, at each site, the majority of noise events were produced by aircraft operations based on observations and aircraft radar data correlation. The measured noise levels from departing aircraft tended to produce SEL and peak decibel (dB) levels several dB higher than those of arriving aircraft. This difference is caused by two characteristics of the separate operations. First, exposure to noise above the background levels from arriving aircraft is typically shorter than from departing aircraft, resulting in less cumulative energy to be factored into the SEL exposure level. Second, the power settings used during approach are less than those necessary to climb during the takeoff, resulting in lower sound levels that are several dB lower than measured at similar locations during departure.

An evaluation of the SEL and peak (Lmax) levels measured at the various locations indicates that the SEL always measured several dB louder than the Lmax. The SEL values typically ranged between 5 to 15 dB higher than the Lmax level during each event. This is due to the calculation of the SEL metric which reports the total noise energy averaged over a one second period. Therefore, events that last more than one second will have a higher SEL because the acoustical energy is “compressed” into a one-second period.

Due to the wind conditions at the time of the noise measurement program, measurements taken to the west of the Airport primarily recorded departure operations; whereas measurements taken on the east side of the Airport primarily recorded arrivals. Measurements recorded to the west of the Airport in the City of Columbus, Clinton Township and Mifflin Township resulted in Lmax noise levels ranging from the middle 69.5 to 84.2 dB. To the east in Columbus, Gahanna, Jefferson Township and Truro Township, Lmax noise levels were recorded ranging from 54.0 to 80.7 dB.

The loudest aircraft event recorded was an Embraer E-170 departure. Other loud aircraft monitored included McDonnell-Douglas MD-90 series aircraft and Boeing 737-700 and 737-800 series aircraft. **Table B-3** provides a summary of the measurement data collection.

Table B-3 Short Term Field Noise Measurement Program Summary

Site Number	Location	Ambient Noise Level (dB)	Date Monitored	Time Monitored	Type of Events	Number of Events	Aircraft SEL Range	Lmax (loudest noise event)	Loudest aircraft
S-1	North Cassady near Summit Trace	47.4	11/12/2019	9:11am – 10:11am	Departures	21	69.0 - 87.2	78.1	Boeing 737-700
S-2	E 13th Ave & Rarig Avenue	47.9	11/12/2019	10:32am – 11:32am	Departures	8	76.0 - 91.2	83.0	Boeing 737-700
S-3	E 5th Avenue & Sunbury Road	57.1	11/11/2019	12:15pm – 1:15pm	Arrivals & Departures	11	71.9 - 86.1	84.2	Embraer E-175 LR
S-4	1095 Sunbury Road	47.2	11/12/2019	12:15pm – 1:15pm	Departures	10	69.3 - 88.4	79.1	Boeing 737-800
S-5	Lone Spruce Rd & Mountain Oak Road	44.1	11/12/2019	9:00am – 10:00am	Arrivals & Departures	21	63.9 - 90.4	80.0	Boeing 737-800
S-6	Delavan & Brentnell	61.6	11/12/2019	12:30pm – 1:30pm	Arrivals & Departures	10	73.0 - 87.7	82.2	Embraer E-175 LR
S-7	Joyce Avenue & Maynard Avenue	51.7	11/13/2019	11:45am – 12:45pm	Arrivals & Departures	10	71.1 - 86.6	77.2	Boeing 737-900
S-8	Thames Drive north of Argyle Drive	56.6	11/12/2019	10:30am – 11:30am	Arrivals & Departures	12	63.9 - 90.1	80.5	Boeing 737-900
S-9	Parkwood Ave & Pembroke Ave	48.8	11/11/2019	12:50pm – 1:50pm	Arrivals & Departures	7	54.5 - 79.1	75.7	Embraer E-175 LR
S-10	Eastlawn Cemetery	46.4	11/11/2019	10:58am – 11:58am	Departures	11	64.3 - 88.1	80.7	Boeing 737-800
S-11	Margaret Street & Drexel Ave	56.3	11/11/2019	3:25pm – 4:25pm	Departures	6	68.7 - 78.3	72.0	Cessna 525
S-12	Joyce Ave & Genessee Ave	49.3	11/11/2019	12:52pm – 1:52pm	Departures	12	64.5 - 85.9	77.3	Embraer E-175 LR
S-13	Mock Park - Mock Road & Bar Harbor Road	44.6	11/11/2019	2:02pm – 3:02pm	Departures	11	66.7 - 86.4	76.5	McDonnell-Douglas MD-90
S-14	Baylor Avenue & Pepper Street	50.3	11/11/2019	3:22pm – 4:22pm	Departures	5	68.4 - 85.9	69.5	Bombardier CRJ-900
S-15	Marina Drive west of Toni Street	45.5	11/12/2019	6:10am – 7:10am	Arrivals & Departures	14	45.6 - 86.8	79.1	Embraer E-175
S-16	American Addition Park	42.1	11/12/2019	6:20am – 7:20am	Departures	20	38.2 - 84.9	77.9	Boeing 737-800

Table B-3 Short Term Field Noise Measurement Program Summary *(continued)*

Site Number	Location	Ambient Noise Level (dB)	Date Monitored	Time Monitored	Type of Events	Number of Events	Aircraft SEL Range	Lmax (loudest noise event)	Loudest aircraft
S-17	Poppy Hills Drive & Keystone Ranch Court	45.4	11/11/2019	4:10pm – 5:10pm	Arrivals	6	64.5 - 73.5	63.9	Embraer E-170
S-18	Onyx Bluff Lane west of Stone Shadow Drive	45.8	11/12/2019	2:45pm – 3:45pm	Arrivals	12	62.8 – 83.3	74.7	Boeing 737-800
S-19	Rice Avenue & Spruce Hill Drive	42.1	11/12/2019	1:58pm – 2:58pm	Arrivals & Departures	12	61.5 – 86.5	80.0	Embraer E-175 LR
S-20	Hunters Run	45.6	11/12/2019	3:00pm – 4:00pm	Arrivals	7	62.5 – 75.6	74.9	Hawker 800
S-21	Tamara Drive & Helmbright Drive	43.8	11/13/2019	9:20am – 10:20am	Arrivals	8	52.0 – 62.8	54.0	Embraer E-175
S-22	Serenoa Dr & Endora St	54.0	11/13/2019	1:30pm – 2:30pm	Arrivals & Departures	12	47.6 – 79.4	74.6	Embraer E-175 LR
S-23	Olde Quarry Park	41.4	11/11/2019	12:50 PM – 1:59 PM	Arrivals	8	67.0 - 78.9	67.5	McDonnell Douglas MD90
S-24	Sherridon Drive & Streamwater Drive	38.7	11/13/2019	10:43am – 11:43am	Arrivals	14	57.6 – 78.9	73.3	Bombardier CRJ-701
S-25	Meadow Green Circle	38.4	11/13/2019	9:00am – 10:00am	Arrivals & Departures	16	42.1 – 77.7	71.5	Bombardier CRJ-200
S-26	Estate View Drive east of Taylor Station Road	48.8	11/12/2019	3:10pm – 4:10pm	Arrivals & Departures	13	52.5 – 80.9	75.7	Bombardier CRJ-701
S-27	Shepherd Church of the Nazarene	48.2	11/13/2019	12:02pm – 1:02pm	Arrivals	6	66.0 – 71.9	65.2	Boeing 737-700
S-28	Sand Bar Drive south of Headwater Drive	34.6	11/13/2019	1:10pm – 2:10pm	Arrivals	10	53.7 – 68.0	68.8	Cessna 560 Citation Excel
S-29	Lakes at Taylor Crossing Subdivision	42.8	11/12/2019	9:00pm – 10:00pm	Arrivals	11	59.0 – 86.9	80.7	Boeing 737-800
S-30	Forestview Drive & Revere Road	44.0	11/13/2019	10:16am – 11:16am	Arrivals & Departures	11	63.3 – 72.9	66.2	Airbus A319

Source: Landrum & Brown, 2019.

B.2 Permanent Noise Monitoring System

The CRAA maintains a permanent noise monitoring system at CMH which includes 16 permanent noise monitors (NMTs) located at various sites to the north, south, east, and west of the Airport. The locations of the NMTs are shown on Exhibit 1. The NMTs collect noise data 24 hours a day, seven days a week and that data is transmitted to the Airport Noise and Operations Monitoring System (ANOMS) which correlates noise data to aircraft operational data. This data is used to prepare monthly and annual noise reports for each of the NMT locations using the average day-night sound level (DNL) metric. The reports provide the number of noise events, the number of hourly summaries, airport DNL, community DNL, and total DNL for each NMT location.

Table B-4 shows the recorded aircraft DNL compared to the AEDT modeled DNL for the Existing (2020) Baseline period for each of the 16 monitoring sites.[19] The measured noise levels shows the average annual DNL for the Existing (2020) Baseline period. The Modeled DNL presents the DNL levels calculated by the AEDT for the Existing (2020) Baseline condition.

Table B-4 Noise Levels at Permanent Noise Monitor Sites

Monitor Number	Location	Measured DNL	Modeled DNL	Difference
P-1	Ohio Dominican University	61.7	62.4	0.7
P-2	Columbus School for Girls	60.6	59.8	-0.8
P-3	New Tabernacle Church	58.9	59.6	0.7
P-4	South Mifflin Elementary	60.4	60.3	-0.1
P-5	Oak Alley	58.5	61.1	2.6
P-6	AEP Business Park	62.5	63.0	0.5
P-7	McNeill Farms Apartment Complex	58.7	60.6	1.9
P-8	Blacklick Industrial Park	57.9	58.3	0.4
P-9	Goshen Lane Elementary	55.2	55.5	0.3
P-10	Gahanna Middle School South	49.9	51.5	1.6
P-11	Blacklick Elementary	42.7	44.3	1.6
P-12	Krumm Park	61.3	62.6	1.3
P-15	Lakes at Taylor Station Subdivision	58.4	60.2	1.8
P-16	Cardinal Park Apartments	50.6	54.2	3.6
P-17	Brentnell Recreation Center	60.9	61.6	0.7
P-18	13th Avenue	61.1	62.1	1.0
Average		59.3	60.1	0.8

Source: CMH Airport Noise and Operations Management System.
Note: Permanent Noise monitoring terminals 13 and 14 are located at Rickenbacker International Airport and are not listed in the above table.

[19] The Existing (2020) Baseline period for noise analysis is September 1, 2019 through August 31, 2019.

The comparison of measured to modeled noise in Table B-5 shows that at 14 of the 16 permanent noise monitor locations, the AEDT modeled noise levels were within 2.0 dB of the monitored noise levels at each of the locations.

The average noise level across all of the sites was modeled to be 60.1 DNL, while the average measured noise level was 59.3 DNL, for a difference of 0.8 dB. Because a difference of 1.5 dB is generally imperceptible to the human ear, it was determined that the modeled and monitored noise levels are within an acceptable tolerance.

The average noise level across all of the sites was modeled to be 60.1 DNL, while the average measured noise level was 59.3 DNL. The average difference between all the sites was +0.8 dB, meaning that overall the noise model was predicting higher levels than the measurement data. Because a difference of less than 3 dB is generally imperceptible to the human ear outside of laboratory settings, it was determined that the modeled and monitored noise levels are within an acceptable tolerance. It is not expected that the modeled DNL and the measured DNL levels will match exactly. The difference in measured and AEDT modeled noise levels can be attributed to various factors including the influence of non-aircraft (background) noise sources on the measurement data which can fluctuate from day to day and from site to site.

B.3 Comparison of Flight Profiles

The AEDT includes standard flight procedure data for each aircraft that represents each phase of flight to or from an airport. Information related to aircraft speed, altitude, thrust settings, flap settings, and distance are available and used by the AEDT to calculate noise levels on the ground. Standard aircraft departure profiles are supplied from the runway (field elevation) up to 10,000 feet above field elevation (AFE). Aircraft arrival profiles are supplied from 6,000 feet AFE down to the runway including the application of reverse thrust and rollout. The Federal Aviation Administration (FAA) requires that these standard arrival and departure profiles be used unless there is evidence that they are not applicable.

The AEDT uses the distance of flight as a surrogate for assigning departure profiles that determine aircraft weight, as well as speed, thrust, and altitude during different stages of flight. The AEDT groups trip lengths into eleven categories; these categories are:

Category	Stage Length
1	0-500 nautical miles
2	500-1000 nautical miles
3	1000-1500 nautical miles
4	1500-2500 nautical miles
5	2500-3500 nautical miles
6	3500-4500 nautical miles
7	4500-5500 nautical miles
8	5500-6500 nautical miles
9	6500-7500 nautical miles
10	7500-8500 nautical miles
11	8500+ nautical miles

A comparison of measured noise levels to AEDT modeled noise levels was conducted to verify the standard flight profile input data into the AEDT is consistent with actual conditions. For this analysis, measured noise events were collected from the NMTs closest to the departure corridors. Noise levels from single aircraft overflight events were correlated to radar data to determine the aircraft type that triggered the noise event. Average measured noise levels for the most common aircraft types at CMH were compared to modeled noise levels produced by AEDT at the same locations as the NMTs.

A comparison of measured to modeled noise levels was conducted for the most common aircraft at CMH. **Table B-5** presents comparison of the average measured and AEDT modeled noise levels from the noise measurement program. The modeled noise level represents the AEDT's predicted noise level for each representative aircraft type. As shown in Table B-4, the difference between the measured and modeled DNL levels ranged from -2.8 dB to +1.9 dB. The minimum change in the sound level of individual events that an average human ear can detect outside of controlled laboratory settings is about 3 dB.[20] A difference below that is generally imperceptible to the human ear in non-laboratory settings and is considered within the range of acceptable tolerance. Of the individual aircraft types that were compared, all had a difference between the measured and modeled noise levels of less than 3 dB. Analytical models (such as AEDT) often have a 95% confidence interval of ±3 dB to ±5 dB.[21] Therefore, a difference of less than 3.0 dB between an estimate from measurements and one from an analytical model is not considered significant.

Table B-5 Aircraft Noise Single Event Data

Aircraft Type	ANP ID	Engine ID	Operation Type	Measured Noise Levels	AEDT Modeled Noise Levels	Difference
Airbus A319-100	A319-131	3IA006	Arrivals	87.8	88.8	1.0
			Departures	86.6	85.7	-0.9
Airbus A320-200	A320-211	8CM055	Arrivals	88.9	89.1	0.2
			Departures	86.2	88.1	1.9
Airbus A320-200	A320-232	1IA003	Arrivals	88.0	88.1	0.1
			Departures	86.9	84.2	-2.7
Boeing 737-700	737700	3CM031	Arrivals	88.3	89.7	1.4
			Departures	87.4	87.5	0.1
Boeing 737-800	737800	11CM072	Arrivals	89.5	89.0	-0.5
			Departures	88.5	88.9	0.4
Bombardier CRJ-900	CRJ9-ER	6GE092	Arrivals	86.1	87.4	1.3
			Departures	85.6	82.8	-2.8
Embraer EMB175	EMB175	6GE094	Arrivals	87.0	88.2	1.2
			Departures	86.2	85.0	-1.2

Source: AEDT Version 3b, CMH ANOMS, Landrum & Brown analysis, 2020.

Because measured noise levels can be affected by other factors including non-aircraft (background) noise levels, it is expected that the measured and modeled noise levels will not match exactly. The comparison of measured and modeled single event noise levels are within an acceptable range of tolerance. The results of the temporary noise measurement program identified no significant inconsistencies between measured noise levels and AEDT modeled noise levels. Therefore, no adjustments were made to the existing aircraft noise profiles in the AEDT database for this Part 150 Noise Compatibility Study.

20 The Pennsylvania State University, Noise Basics, Online at https://www.noisequest.psu.edu/noisebasics-basics.html, Accessed on May 5, 2020.

21 Sec. 7.7.1, SAE ARP4721 – Part 1, *Monitoring Aircraft Noise and Operations in the Vicinity of Airports: System Description, Acquisition and Operation,* Issued 2006-08.

B.4 Noise Complaint History

Noise complaint records from 2007 to December 31, 2020 were gathered in a database format for analysis in this study. **Table B-6, *Summary of Noise Complaints*** provides a summary of the number of noise complaints received each year. The total annual number of noise complaints between 2007 and 2015 ranged from 14 to 64, with an average number of complaints per year of approximately 40. From 2016 thru 2018, complaint levels increased to over 200 per year. The increase in complaints since 2016 can be attributed to a high volume of calls from one resident in the Columbus area. As shown in Table B-6, the number of individuals making a complaint has ranged from 11 to 59 between 2007 and 2020.

Table B-6 Summary of Noise Complaints

Year	Number of Noise Complaints	Number of Individuals Submitting One or More Complaints
2007	46	36
2008	43	17
2009	43	11
2010	25	20
2011	14	42
2012	27	23
2013	59	36
2014	43	33
2015	64	55
2016	242	28
2017	246	14
2018	205	36
2019	156	37
2020	195	59

Source: Columbus Regional Airport Authority, 2021.

Exhibit B-2, *Location of Noise Complaints (2009 through 2020)*, illustrates the geographic locations of the noise complaints from January 2009 through December 2020. As the exhibit and tables illustrate, a majority of the complaints occur in the immediate vicinity of the Airport, distributed to the east and west in relation to the runways.

Exhibit B-2 Location of Noise Complaints (2009 – 2020)

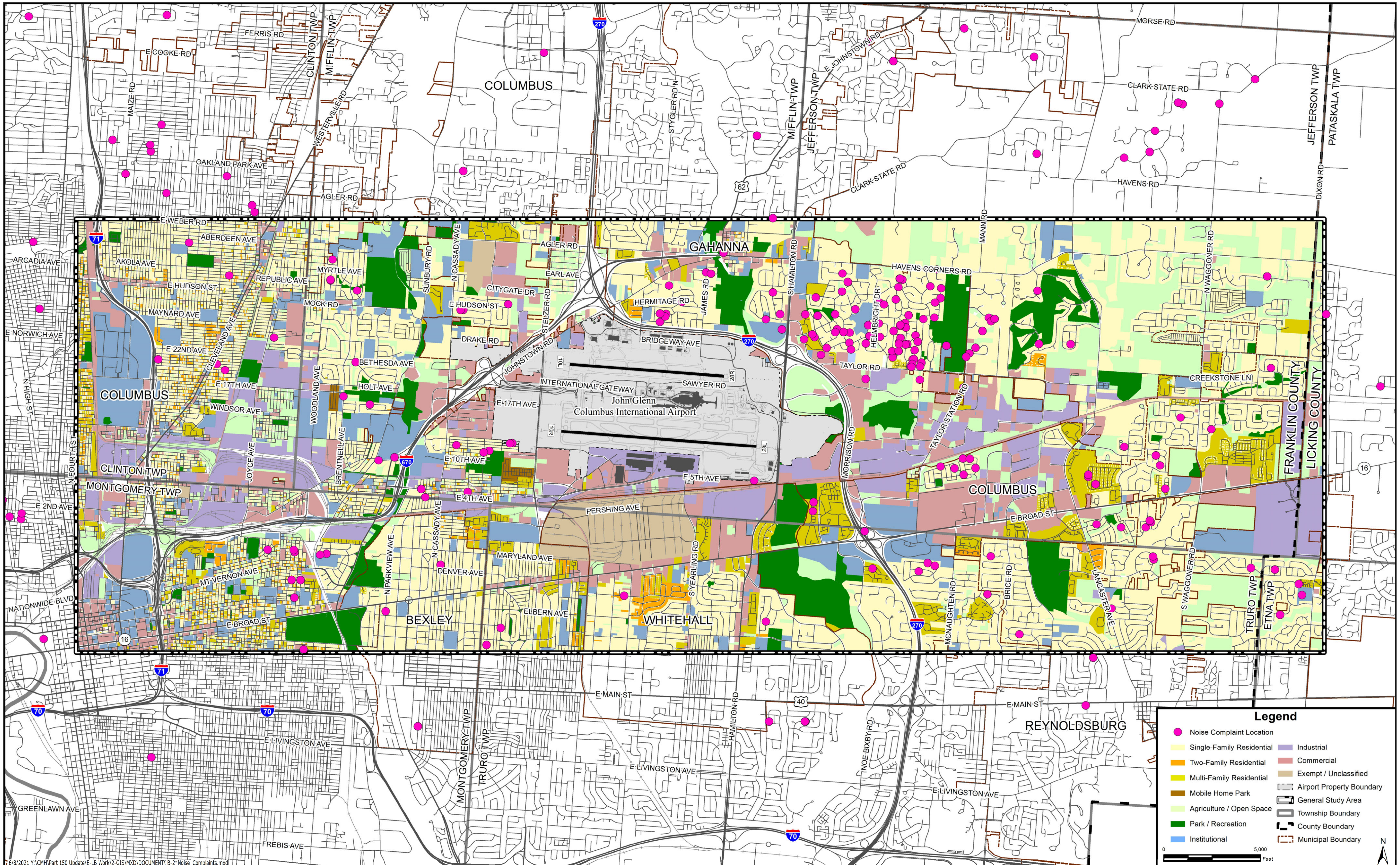

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Table B-7 summarizes the noise complaint data by time of day the noise event occurred that caused the complaint. As shown, a large number of complaints occur in the early morning hours of 5:00 a.m. to 7:00 a.m. This is likely due to the bank of scheduled commercial passenger departures that begins around 5:30 a.m. to meet the demand for air travel and customer preference to arrive at their destination early in the day.

Table B-7 Noise Complaints by Time of Day

Time of Day	Percent of Complaints
0:00 - 1:00	1.8%
1:00 - 2:00	1.2%
2:00 - 3:00	0.3%
3:00 - 4:00	0.9%
4:00 - 5:00	0.4%
5:00 - 6:00	11.9%
6:00 - 7:00	29.8%
7:00 - 8:00	10.5%
8:00 - 9:00	5.2%
9:00 - 10:00	2.2%
10:00 - 11:00	1.5%
11:00 - 12:00	3.3%
12:00 - 13:00	2.2%
13:00 - 14:00	2.5%
14:00 - 15:00	2.5%
15:00 - 16:00	2.3%
16:00 - 17:00	3.8%
17:00 - 18:00	3.0%
18:00 - 19:00	7.4%
19:00 - 20:00	3.5%
20:00 - 21:00	1.0%
21:00 - 22:00	1.3%
22:00 - 23:00	1.0%
23:00 - 0:00	0.7%
Total	100.0%

Source: CRAA Noise Complaint Logs, from January 1, 2016 through December 31, 2020

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Appendix C - Noise Methodology

C.1 Characteristics of Sound

Sound is created by a source that induces vibrations in the air. The vibration produces alternating bands of relatively dense and sparse particles of air, spreading outward from the source like ripples on a pond. Sound waves dissipate with increasing distance from the source. Sound waves can also be reflected, diffracted, refracted, or scattered. When the source stops vibrating, the sound waves disappear almost instantly and the sound ceases.

Sound conveys information to listeners. It can be instructional, alarming, pleasant, relaxing, or annoying. Identical sounds can be characterized by different people or even by the same person at different times, as desirable or unwanted. Unwanted sound is commonly referred to as “noise.”

Sound can be defined in terms of three components:

1) Level (amplitude)
2) Pitch (frequency)
3) Duration (time pattern)

C.1.1 Sound Level

The level or amplitude of sound is measured by the difference between atmospheric pressure (without the sound) and the total pressure (with the sound). Amplitude of sound is like the relative height of the ripples caused by the stone thrown into the water. Although physicists typically measure pressure using the linear Pascal scale, sound is measured using the logarithmic decibel (dB) scale. This is because the range of sound pressures detectable by the human ear can vary from 1 to 100 trillion units. A logarithmic scale allows us to discuss and analyze noise using more manageable numbers. The range of audible sound ranges from approximately 1 to 140 dB, although everyday sounds rarely rise above about 120 dB. The human ear is extremely sensitive to sound pressure fluctuations. A sound of 140 dB, which is sharply painful to humans, contains 100 trillion (10^{14}) times more sound pressure than the least audible sound. **Exhibit C-1, *Comparison of Sound***, shows a comparison of common sources of indoor and outdoor sounds measured on the dB scale.

By definition, a 10 dB increase in sound is equal to a tenfold (10^1) increase in the mean square sound pressure of the reference sound. A 20 dB increase is a 100 fold (10^2) increase in the mean square sound pressure of the reference sound. A 30 dB increase is a 1,000-fold (10^3) increase in mean square sound pressure.

A logarithmic scale requires different mathematics than used with linear scales. The sound pressures of two separate sounds, expressed in dB, are not arithmetically additive. For example, if a sound of 80 dB is added to another sound of 74 dB, the total is a 1 dB increase in the louder sound (81 dB), not the arithmetic sum of 154 dB (See **Exhibit C-2, *Example Addition of Two Decibel Levels***). If two equally loud noise events occur simultaneously, the sound pressure level from the combined events is 3 dB higher than the level produced by either event alone.

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Exhibit C-1 Comparison of Sound

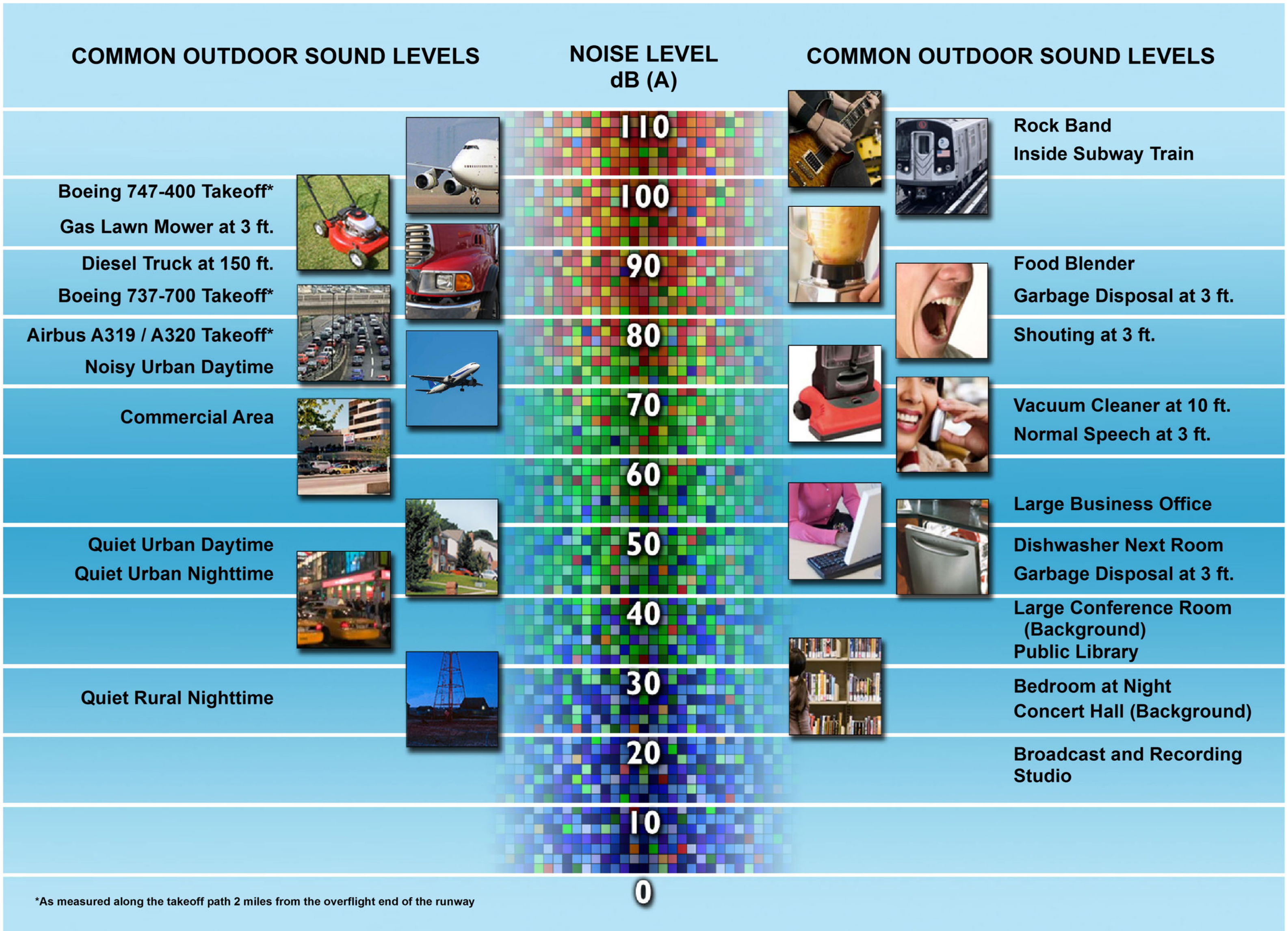

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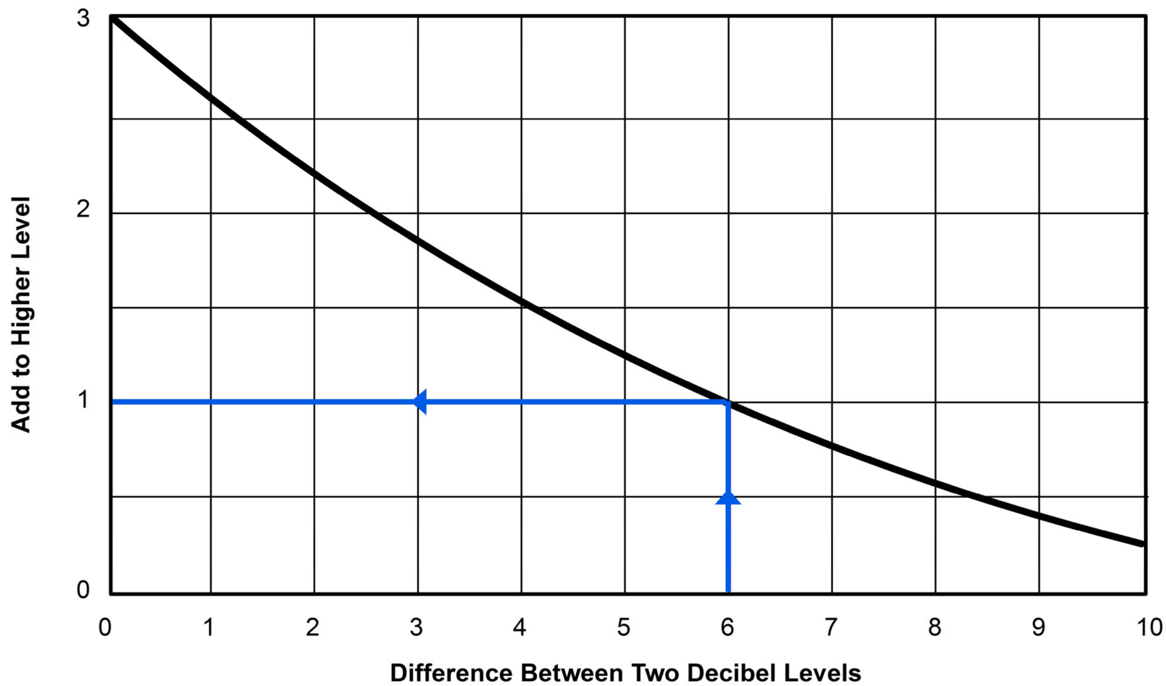
Exhibit C-2 Example Addition of Two Decibel Levels



Example:

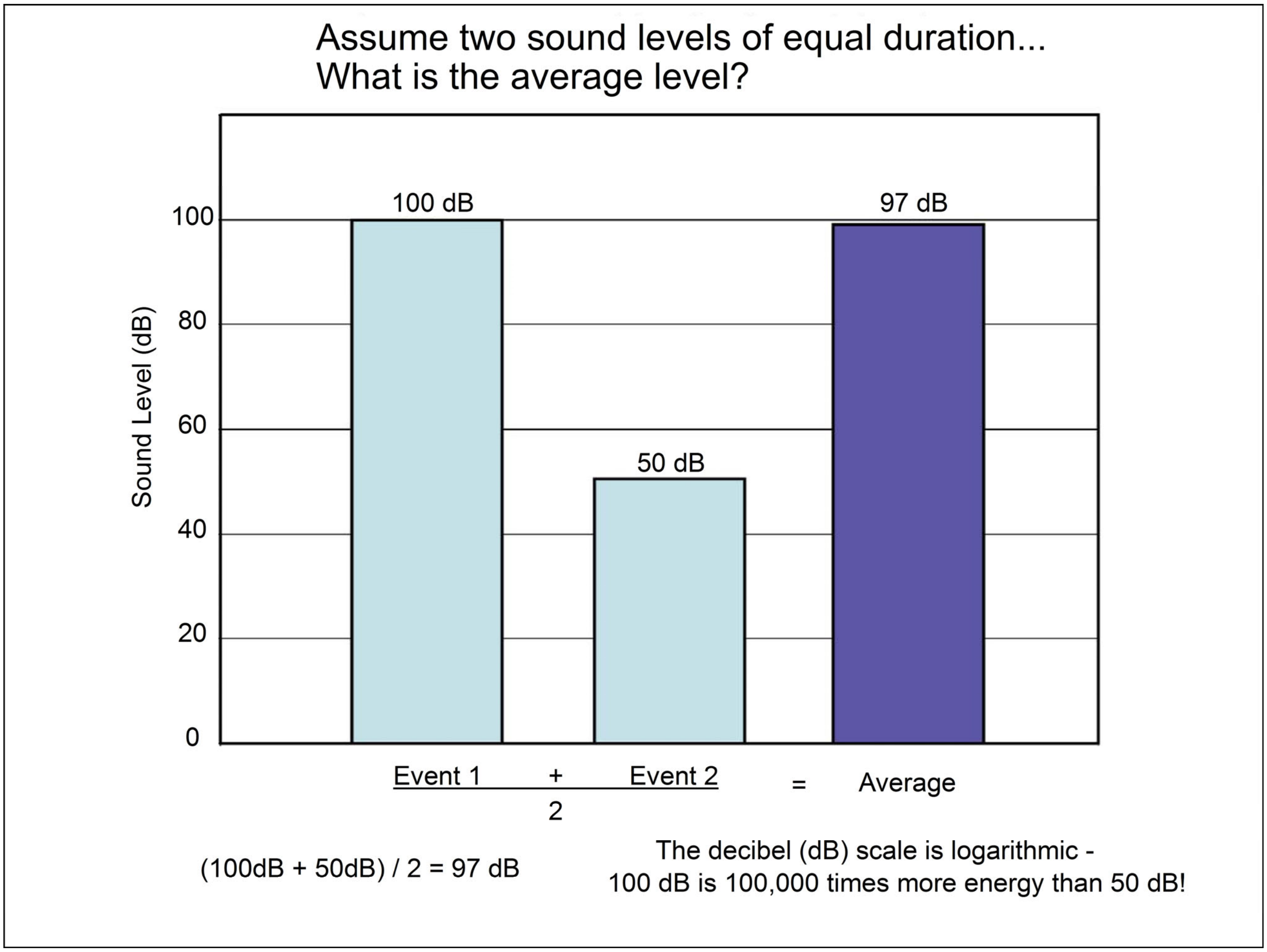
80 dB + 74 dB = 81 dB

Source: Information on Levels of Environmental Noise. USEPA. March 1974.

Logarithmic averaging also yields results that are quite different from simple arithmetic averaging. Consider the example shown in **Exhibit C-3, *Example of Sound Level Averaging***. Two sound levels of equal duration are averaged. One has a maximum sound level (Lmax) of 100 dB, the other 50 dB. Using conventional arithmetic, the average would be 75 dB. The true result, using logarithmic math, is 97 dB. This is because 100 dB has far more energy than 50 dB (100,000 times as much!) and is overwhelmingly dominant in computing the average of the two sounds.

Human perceptions of changes in sound pressure are less sensitive than a sound level meter. People typically perceive a tenfold increase in sound pressure, a 10 dB increase, as a doubling of loudness. Conversely, a 10 dB decrease in sound pressure is normally perceived as half as loud. In community settings, most people perceive a 3 dB increase in sound pressure (a doubling of the sound pressure or energy) as just noticeable. (In laboratory settings, people with good hearing are able to detect changes in sounds of as little as 1 dB.)

Exhibit C-3 Example of Sound Level Averaging



C.1.2 Sound Frequency

The pitch (or frequency) of sound can vary greatly from a low-pitched rumble to a shrill whistle. If we consider the analogy of ripples in a pond, high frequency sounds are vibrations with tightly spaced ripples, while low rumbles are vibrations with widely spaced ripples. The rate at which a source vibrates determines the frequency. The rate of vibration is measured in units called "Hertz" – the number of cycles, or waves, per second. One's ability to hear a sound depends greatly on the frequency composition. Humans hear sounds best at frequencies between 1,000 and 6,000 Hertz. Sound at frequencies above 10,000 Hertz (high-pitched hissing) and below 100 Hertz (low rumble) are much more difficult to hear.

When attempting to measure sound in a way that approximates what our ears hear, we must give more weight to sounds at the frequencies we hear well and less weight to sounds at frequencies we do not hear well. Acousticians have developed several weighting scales for measuring sound. The A-weighted scale was developed to correlate with the judgments people make about the loudness of sounds. The A-weighted decibel scale (dBA) is used in studies where audible sound is the focus of inquiry. **Exhibit C-4, *Sound Frequency Weighting Curves***, shows the A, B, and C sound weighting scale. The U.S. Environmental Protection Agency (USEPA) has recommended the use of the A-weighted decibel scale in studies of environmental noise.[22] Its use is required by the Federal Aviation Administration (FAA) in airport noise studies.[23] For the purposes of this analysis, dBA was used as the noise metric and dB and dBA are used interchangeably.

C.1.3 Duration of Sounds

The duration of sounds – their patterns of loudness and pitch over time – can vary greatly. Sounds can be classified as *continuous* like a waterfall, *impulsive* like a firecracker, or *intermittent* like aircraft overflights. Intermittent sounds are produced for relatively short periods, with the instantaneous sound level during the event roughly appearing as a bell-shaped curve. An aircraft event is characterized by the period during which it rises above the background sound level, reaches its peak, and then recedes below the background level.

C.1.4 Perceived Noise Level

Perceived noisiness is another method of rating sound that was originally developed for the assessment of aircraft noise. Perceived noisiness is the subjective measure of the degree to which noise is unwanted or causes annoyance to an individual. To determine perceived noise level, individuals are asked to judge in a laboratory setting when two sounds are equally noisy or disturbing if heard regularly in their own environment. These surveys are inherently subjective and thus subject to greater variability. For example, two separate events of equal noise energy may be perceived differently if one sound is more annoying to the listener than the other.

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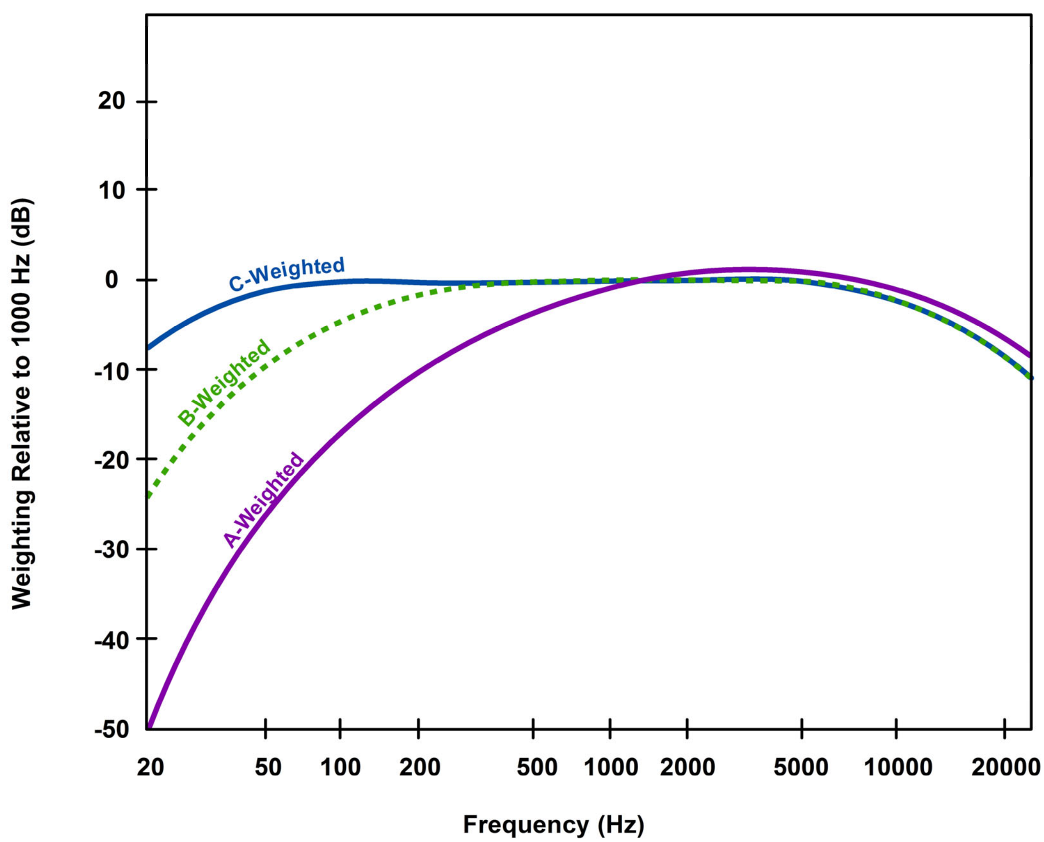
[22] Information on Levels of Environmental Noise Requisite to Protect Health and Welfare with an Adequate Margin of Safety. U.S. Environmental Protection Agency, Office of Noise Abatement and Control. 1974, P. A-10.

[23] "Airport Noise Compatibility Planning." 14 CFR Part 150, Sec. A150.3.

Exhibit C-4 Sound Frequency Weighting Curves



Source: Federal Highway Administration

C.1.5 Propagation of Noise

Outdoor sound levels decrease as a function of distance from the source, and as a result of wave divergence, atmospheric absorption, and ground attenuation. If sound is radiated from a source in an homogeneous and undisturbed manner, the sound travels as spherical waves. As the sound wave travels away from the source, the sound energy is distributed over a greater area, dispersing the sound energy of the wave. Spherical spreading of the sound wave reduces the noise level at a rate of 6 dB per doubling of the distance.

Atmospheric absorption also influences the levels that are received by the observer. The greater the distance traveled, the greater the influence of the atmosphere and the resultant fluctuations. Atmospheric absorption becomes important at distances of greater than 1,000 feet. The degree of absorption is a function of the frequency of the sound as well as the humidity and temperature of the air.

The rate of atmospheric absorption varies with sound frequency. The higher frequencies are more readily absorbed than the lower frequencies. Over large distances, the lower frequencies become the dominant sound as the higher frequencies are attenuated.

Turbulence and gradients of wind, temperature, and humidity also play a significant role in determining the degree of attenuation. Certain conditions, such as inversions, can also result in higher noise levels than would result from spherical spreading as a result of channeling or focusing the sound waves.

The effect of ground attenuation on noise propagation is a function of the height of the source and/or receiver and the characteristics of the terrain. The closer the source of noise is to the ground, the greater the ground absorption. Terrain consisting of soft surfaces such as vegetation provide for more ground absorption than hard surfaces. Ground attenuation is important for the study of noise from airfield operations (such as, thrust reversals) and in the design of noise berms or engine run-up facilities.

C.2 Factors Influencing Human Response to Sound

Many factors influence how a sound is perceived and whether or not it is considered annoying to the listener. These factors include not only physical (acoustic) characteristics of the sound but also secondary (non-acoustic) factors, such as sociological and external factors.

Sound rating scales are developed to account for the factors that affect human response to sound. Nearly all of these factors are relevant in describing how sounds are perceived in the community. Many of the non-acoustic parameters play a prominent role in affecting individual response to noise. Background sound (ambient noise) is also important in describing sound in rural settings. Some non-acoustic factors that may influence an individual’s response to aircraft noise include:

- Predictability of when the sound/noise will occur;
- How the noise affects certain activities;
- Fear of an aircraft crashing;
- Belief that aircraft noise could be prevented or reduced by aircraft designers, pilots, or authorities related to airlines or airports; and
- Sensitivity to noise in general.

Thus, it is important to recognize that non-acoustic factors such as those described above, as well as acoustic factors, contribute to human response to noise.

C.3 Standard Noise Descriptors

Given the multiple dimensions of sound, a variety of descriptors, or metrics, have been developed for describing sound and noise. Some of the most commonly used metrics are discussed in this section. They include:

1) Maximum Level (**Lmax**)
2) Time Above Level (**TA**)
3) Sound Exposure Level (**SEL**)
4) Equivalent Sound Level (**Leq**)
5) Day-Night Average Sound Level (**DNL**)

C.3.1 Maximum Level (Lmax)

Lmax is simply the highest sound level recorded during an event or over a given period of time. It provides a simple and understandable way to describe a sound event and compare it with other events. In addition to describing the peak sound level, Lmax can be reported on an appropriate weighted decibel scale (A-weighted, for example) so that it can disclose information about the frequency range of the sound event in addition to the loudness.

Lmax, however, fails to provide any information about the duration of the sound event. This can be a critical shortcoming when comparing different sounds. Even if they have identical Lmax values, sounds of greater duration contain more sound energy than sounds of shorter duration. Research has demonstrated that for many kinds of sound effects, the total sound energy, not just the peak sound level, is a critical consideration.

C.3.2 Time Above Level (TA)

The “time above,” or TA, metric indicates the amount of time that sound at a particular location exceeds a given sound level threshold. TA is often expressed in terms of the total time per day that the threshold is exceeded. The TA metric explicitly provides information about the duration of sound events, although it conveys no information about the peak levels during the period of observation.

C.3.3 Number of Events Above Level (NA)

Similar to TA, the Number of Events Above (NA) metric indicates the total number of aircraft events at particular location that exceed a given sound level threshold in dB. The NA metric explicitly provides information about the number of sound events, although it conveys no information about the duration of the event(s).

C.3.4 Sound Exposure Level (SEL)

The sound exposure level, or SEL metric, provides a way of describing the total sound energy of a single event. In computing the SEL value, all sound energy occurring during the event, within 10 dB of the peak level (Lmax), is mathematically integrated over one second. (Very little information is lost by discarding the sound below the 10 dB cut-off, since the highest sound levels completely dominate the integration calculation.) Consequently, the SEL is always greater than the Lmax for events with a duration greater than one second. SELs for aircraft overflights typically range from five to 10 dB higher than the Lmax for the event.

Exhibit C-5, *Measurement of Different Types of Sound*, shows graphs of instantaneous sound levels for three different events: an aircraft flyover, steady roadway noise, and a firecracker.

The Lmax and the duration of each event differ greatly. The pop of the firecracker is quite loud, 102 dB but lasts less than a second. The aircraft flyover has a considerably lower Lmax at 90 dB, but the event lasts for over a minute. The Lmax from the roadway noise is even quieter at only 72 dB, but it lasts for 15 minutes. By considering the loudness and the duration of these very different events simultaneously, the SEL metric reveals that the total sound energy of all three is identical. This can be a critical finding for studies where total noise dosage is the focus of study. As it happens, research has shown conclusively that noise dosage is crucial in understanding the effects of noise on animals and humans.

C.3.5 Equivalent Sound Level (Leq)

The equivalent sound level (Leq) metric may be used to define cumulative noise dosage, or noise exposure, over a period of time. In computing Leq, the total noise energy over a given period of time, during which numerous events may have occurred, is logarithmically averaged over the time period. The Leq represents the steady sound level that is equivalent to the varying sound levels actually occurring during the period of observation. For example, an 8-hour Leq of 67 dB indicates that the amount of sound energy in all the peaks and valleys that occurred in the 8-hour period is equivalent to the energy in a continuous sound level of 67 dB. Leq is typically computed for measurement periods of 1 hour, 8 hours, or 24 hours, although any time period can be specified.

Exhibit C-6, *Relationship Among Sound Metrics*, shows the relationship of Leq to Lmax and SEL. In this example, a single aircraft event lasting 18 seconds is represented. The instantaneous noise levels for the event range from 64 to an Lmax of 101 dBA. The area under the curve represents the sound energy accumulated during the entire event. The compression of this energy into a single second results in an SEL of 105 dBA. The Leq average of the sound energy for each second during the event would be 93 dB. If this event were the only event to occur during an hour, the aircraft sound energy for the other 3,582 seconds would be considered to be zero. When converted to an hourly Leq, the level would be nearly 70 dB of Leq. This again indicates the dominance of loud events in noise summation and averaging computations.

Leq is a critical noise metric for many kinds of analysis where total noise dosage, or noise exposure, is under investigation. As already noted, noise dosage is important in understanding the effects of noise on both animals and people. Indeed, research has led to the formulation of the “equal energy rule.” This rule states that it is the total acoustical energy to which people are exposed that explains the effects the noise will have on them. That is, a very loud noise with a short duration will have the same effect as a lesser noise with a longer duration if they have the same total sound energy.

C.3.6 Day-Night Average Sound Level (DNL)

The Day-Night Average Sound Level (DNL) metric is really a variation of the 24-hour Leq metric. Like Leq, the DNL metric describes the total noise exposure during a given period. Unlike Leq, however, DNL, by definition, can only be applied to a 24-hour period. In computing DNL, an extra weight of 10 dB is assigned to any sound levels occurring between the hours of 10:00 p.m. and 7:00 a.m. This is intended to account for the greater annoyance that nighttime noise is presumed to cause for most people. Recalling the logarithmic nature of the dB scale, this extra weight treats one nighttime noise event as equivalent to 10 daytime events of the same magnitude.

As with Leq, DNL values are strongly influenced by the loud events. For example, 30 seconds of sound of 100 dB, followed by 23 hours, 59 minutes, and 30 seconds of silence would compute to a DNL value of 65 dB. If the 30 seconds occurred at night, it would yield a DNL of 75 dB.

This example can be roughly equated to an airport noise environment. Recall that an SEL is the mathematical compression of a noise event into one second. Thus, 30 SELs of 100 dB during a 24-hour period would equal DNL 65 dB, or DNL 75 dB if they occurred at night.

This situation could actually occur in places around a real airport. If the area experienced 30 overflights during the day, each of which produced an SEL of 100 dB, it would be exposed to DNL 65 dB. Recalling the relationship of SEL to the peak noise level (Lmax) of an aircraft overflight, the Lmax recorded for each of those overflights (the peak level a person would actually hear) would typically range from 90 to 95 dB.

C.3.7 Federal Requirements to Use DNL in Environmental Noise Studies

As noted in **Appendix A**, Section A.1.11, the DNL metric is the standard noise metric for use in FAA studies and decision-making purposes. The FAA uses the DNL metric for purposes of determining an individual's cumulative noise exposure, for land use compatibility under 14 CFR part 150, and for assessing the significance of predicted noise impacts under NEPA. The FAA uses the DNL metric for purposes of determining an individual's cumulative noise exposure, for land use compatibility under 14 CFR part 150, and for assessing the significance of predicted noise impacts under NEPA. Ongoing research activities sponsored by the FAA and the broader research community are working to develop a greater understanding of other noise-related impact criteria. This research may expand the use of supplemental metrics, including new metrics designed to measure speech interference (N75), Percent Awakening, Learning (Leq(8)), and rattling from low frequency noise Lmax(c).[24]

[24] *Report to Congress, FAA Reauthorization Act of 2018 (Pub. L. 115-254), Section 188 and Sec 173.* Federal Aviation Administration, 2020.

Exhibit C-5 Measurement of Different Types of Sound

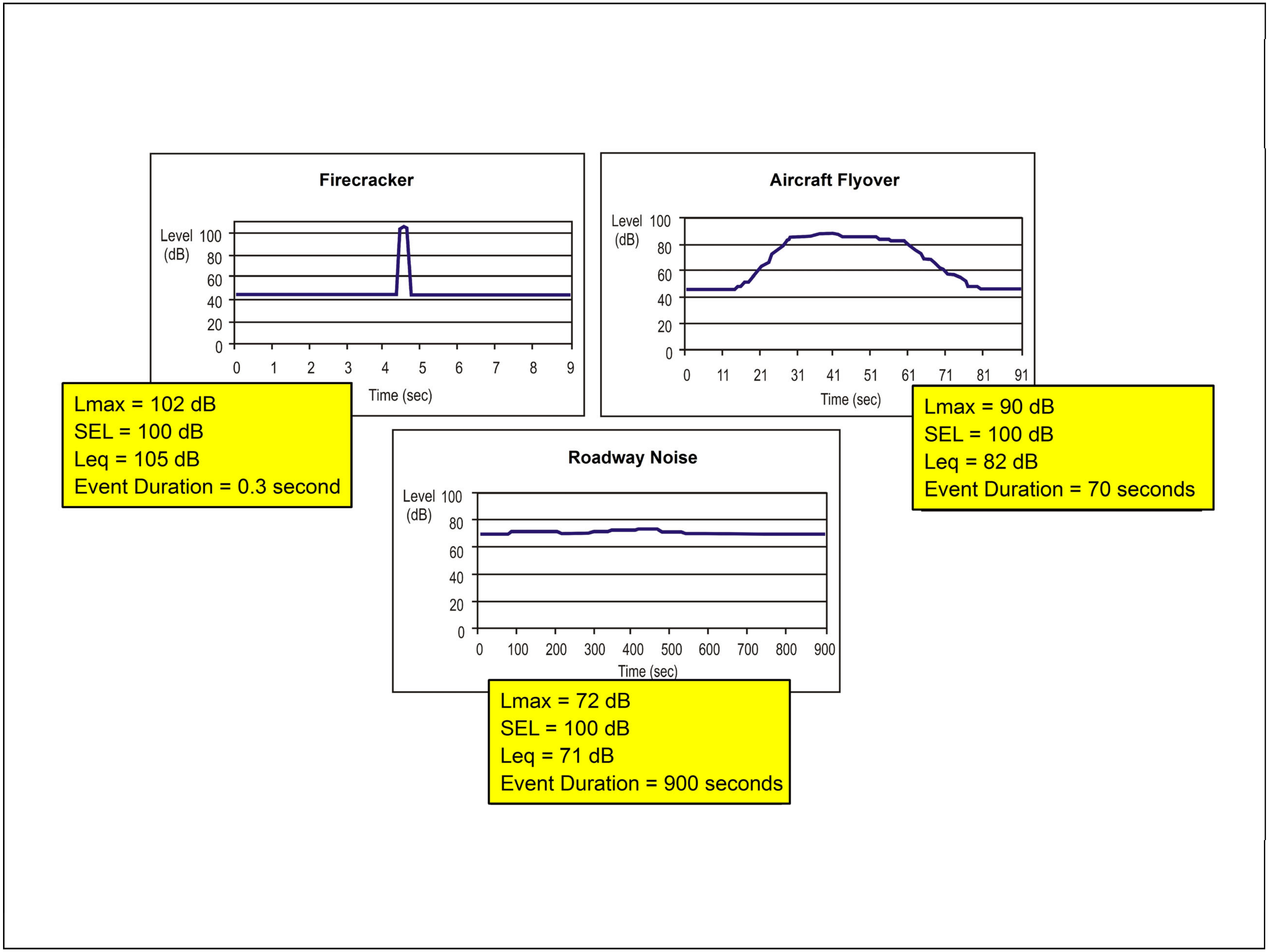


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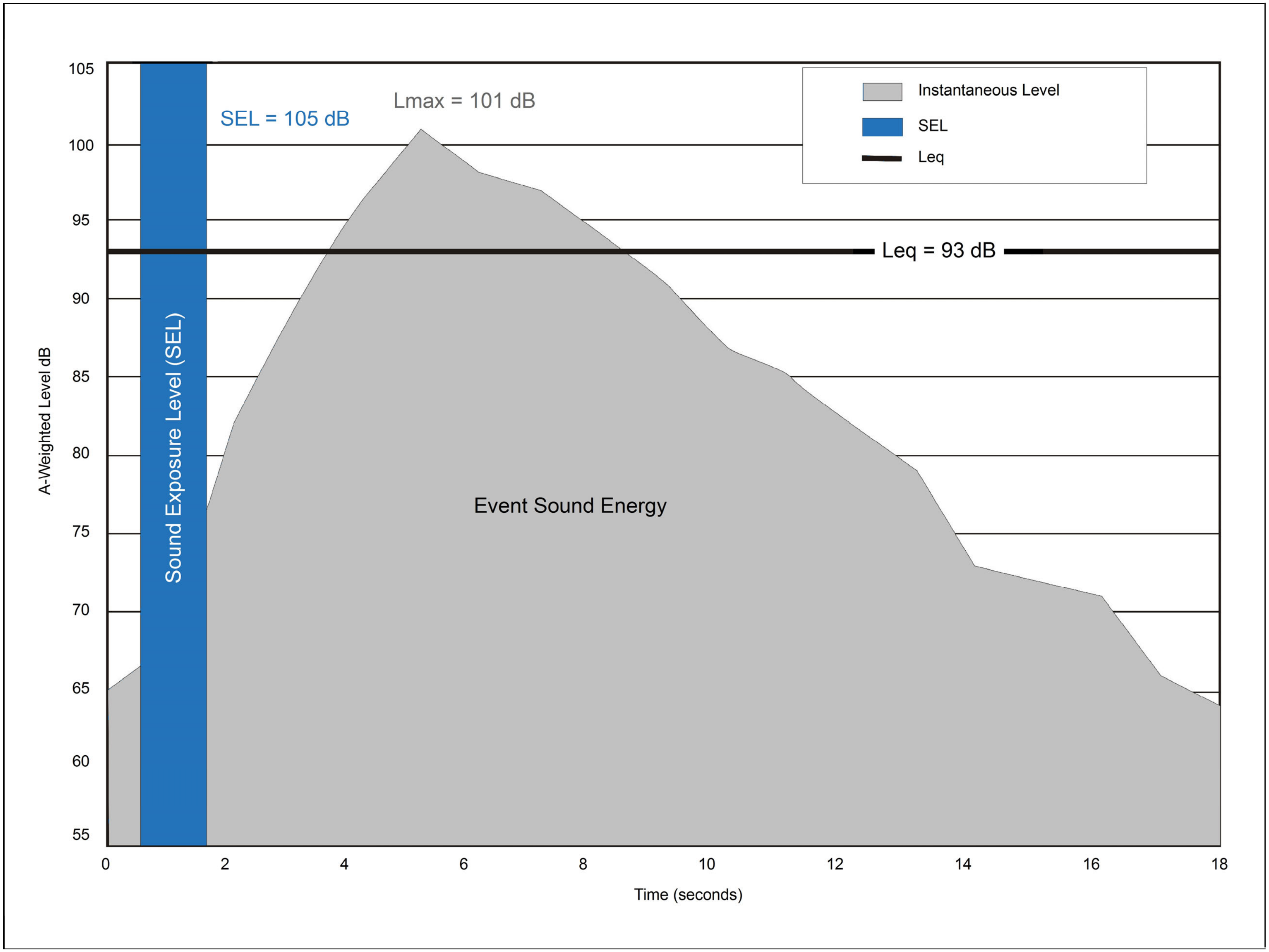
Exhibit C-6 Relationship Among Sound Metrics



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C.4 Health Effects of Noise

A considerable amount of research has been conducted to identify, measure, and quantify the potential effects of aviation noise on health. The various methods by which noise can be measured (e.g. single dose, long-term average, number of events above a certain level, etc.), and difficulties in separating other lifestyle factors from the analysis, increases the complexity of determining the health effects of noise, and has caused considerable variability in the results of past studies. The health effects of noise are often divided into the following topics: cardiovascular effects, hearing loss, sleep disturbance, and speech/communication interference.

C.4.1 Cardiovascular Effects

Several studies have suggested that increased hypertension or other cardiovascular effects, such as increased blood pressure, and change in pulse rate, may be associated with long-term exposure to high levels of environmental noise. When conducting cross-sectional studies of environmental noise exposure, it is difficult to control for other important variables. Subsequent reviews of past research have pointed out that such studies "…are notoriously difficult to interpret. They often report conflicting results, generally do not identify a cause and effect relationship, and often do not report a dose-response relationship between the cause and effect."[25] In 2018, the World Health Organization (WHO) published its Environmental Noise Guidelines report (WHO report) with reference to recent research related to aircraft noise and human response.[26] The WHO report references two ecological studies that provide information on the relationship between aircraft noise and incidence of ischemic heart disease (IHD); however, this "…evidence was rated low quality." Additionally, the WHO report reference one cohort study and several cross-sectional studies of the relationship between aircraft noise and hypertension. The WHO report noted "…inconsistency across studies" and the "…evidence was rated low quality." Similar studies of the relationship between aircraft noise and cases of stroke were reviewed. The WHO report noted that this "…evidence was rated very low quality." Therefore, it is difficult to draw any conclusions about the relationship between aircraft noise exposure and cardiovascular effects.

C.4.2 Hearing Loss

The potential for noise-induced hearing loss is commonly associated with occupational noise exposure from working in a noisy work environment or recreational noise such as listening to loud music. Recent studies have concluded that "because environmental noise does not approximate occupational noise levels or recreational noise exposures…it does not have an effect on hearing threshold levels." Furthermore, "aviation noise does not pose a risk factor for child or adolescent hearing loss, but perhaps other noise sources (personal music devices, concerts, motorcycles, or night clubs) are a main risk factor."[27] This conclusion is supported by the 2018 WHO Environmental Noise Guidelines which notes that "(n)o studies were found, and therefore no evidence was available on the association between aircraft noise and hearing impairment and tinnitus."[28] Because aviation noise levels near airports do not approach levels of occupational or recreational noise exposures associated with hearing loss, hearing impairment is likely not caused by aircraft noise for populations living near an airport.

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[25] Airport Cooperative Research Program, Transportation Research Board, Effects of Aircraft Noise: Research Update on Selected Topics, 2008.
[26] World Health Organization, Regional Office for Europe, Environmental Noise Guidelines for the European Region, 2018.
[27] Airport Cooperative Research Program, Transportation Research Board, Effects of Aircraft Noise: Research Update on Selected Topics, 2008.
[28] World Health Organization, Regional Office for Europe, Environmental Noise Guidelines for the European Region, 2018.

C.4.3 Sleep Disturbance

Sleep disturbance is a common complaint from people who live in the vicinity of an airport. A large amount of research has been published on the topic of sleep disturbance caused by environmental noise. This research has produced variable results due to differing definitions of sleep disturbance, different ways for measuring sleep disturbance (behavioral awakenings or sleep interruption), and different settings in which to measure it (laboratory setting or field setting).

In 1992, the Federal Interagency Committee on Noise (FICON) recommended an interim dose-response curve to predict the percent of the exposed population expected to be awakened (percent awakening) as a function of the exposure to single event noise levels expressed in terms of the Sound Exposure Level (SEL). This interim curve was based on statistical adjustment of previous analysis and included data from both laboratory and field studies. In 1997, Federal Interagency Committee on Aviation Noise (FICAN) recommended a revised sleep disturbance relationship based on data and analysis from three field studies.

Exhibit C-7, *Sleep Disturbance Dose-Response Curves*, show the results of the 1992 and 1997 analyses. The top graph shows a comparison of the 1992 FICON and 1997 FICAN curves. The 1997 FICAN curve represents the upper limit of the observed field data and should be interpreted as predicting the "maximum percent of the exposed population expected to be behaviorally awakened", or the "maximum percent awakened" for a given residential population.

In 2008, FICAN recommended the use of a revised method to predict sleep disturbance in terms of percent awakenings based on data published by the American National Standards Institute (ANSI).[29] In contrast to the earlier FICAN recommendation, the 2008 ANSI standard indicates that the probability of awakening is lower for a single noise event in cases where the population is exposed to the given noise source for a long period of time (more than one year) compared to the probability of awakening for sound that is new to an area. In Exhibit C-7, the lower graph shows these two relationships, with Equation 1 (blue dotted line) representing percent awakenings from long-term noise and Equation B1 (pink dashed line) representing percent awakenings from a new noise source based on the 1997 FICAN results. As shown in this exhibit, at an indoor Sound Exposure Level (SEL) of 100 dB, the probability of awakenings would be expected to exceed 15 percent for a new noise source; yet for long-term noise sources, the probability of awakening is expected to be less than 10 percent.

The numerous studies and reports that have been developed on the subject of sleep disturbance related to environmental noise over the past several decades have produced varied results. A review of past studies conducted by the Airport Cooperative Research Program suggests that in-home sleep disturbance studies clearly demonstrate that it requires more noise to cause awakenings than was previously theorized based on laboratory sleep disturbance studies.[30] The 2018 WHO Environmental Noise Guidelines references six studies that attempted to measure sleep disturbance at noise levels between 40 dB and 65 dB. Over 11% of the population was characterized as highly sleep-disturbed at nighttime levels of 40 dB. These studies were based on self-reporting and the "…evidence was rated moderate quality…" for an association between aircraft noise and probability of awakenings.[31]

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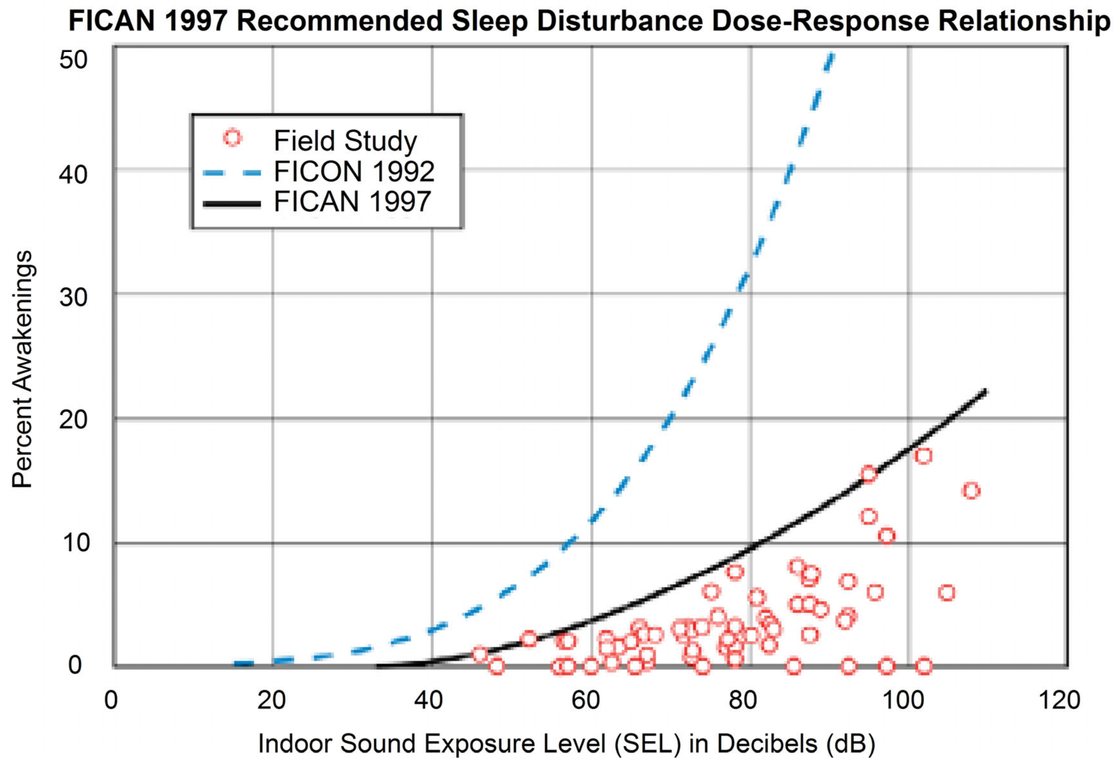
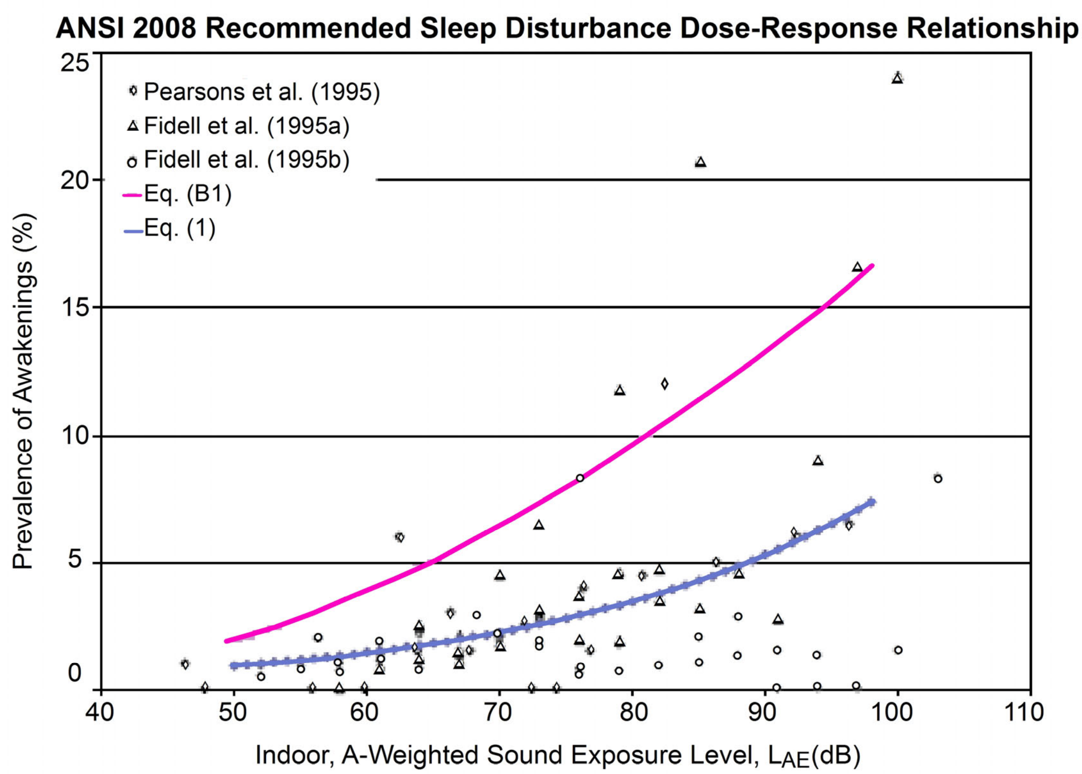
[29] ANSI S12.9-2008, Quantities and Procedures for Description and Measurement of Environmental Sound — Part 6: Methods for Estimation of Awakenings Associated with Outdoor Noise Events Heard in Homes, 2008.
[30] Airport Cooperative Research Program, Transportation Research Board, Effects of Aircraft Noise: Research Update on Selected Topics, 2008.
[31] World Health Organization, Regional Office for Europe, Environmental Noise Guidelines for the European Region, 2018.

Exhibit C-7 Sleep Disturbance Dose-Response Curves





Sources: Federal Interagency Committee on Aviation Noise (FICAN), June 1997; American National Standards Institute, 2008.

Due to the variability of study methodologies, particularly studies outside of a laboratory, and other influencing factors, it is difficult to determine the noise level at which a high percentage of the population would be expected to be awakened by aircraft noise. No definitive conclusions have been drawn on the percent of a population that is estimated to be awakened by a certain level of aircraft noise and recent studies have cautioned about the over interpretation of the data.[32]

C.4.4 Communication Interference

Communication interference can impact activities such as personal conversations, classroom learning, and listening to radio and television. Most studies have focused on communication interference due to continual noise sources. In 1974, the USEPA published *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*, which is one of the few studies to focus on intermittent noise. The study concluded that for voice communication, an indoor Leq of 45 dB allows normal conversation at distances up to 2 meters with 95 percent sentence intelligibility. **Exhibit C-8, *Noise Effects on Distance Necessary for Speech Communication***, shows the required distance between talker and listener based on the type of speech communication (normal voice, loud voice, etc.) and the environmental noise level from the 1974 USEPA report.

Noise can also impact communication between student and teacher necessary for learning in a classroom setting. It is usually accepted that noise levels above a certain Leq may affect a child's learning experiences. Research has shown a "decline in reading when outdoor noise levels equal or exceed Leq of 65 dBA."[33] Furthermore, a study conducted by FICAN in 2007 found: "(1) a substantial association between noise reduction and decreased failure (worst-score) rates for high-school students, and (2) significant association between noise reduction and increased average test scores for student/test subgroups. In general, the study found little dependence upon student group and upon test type."[34] A study of noise exposure and the effects on school test scores between 2000/01 and 2008/09 found "…statistically significant associations between airport noise and student mathematics and reading test scores, after taking demographic and school factors into account."[35] This study also found that schools that had been provided sound insulation had better test scores than schools that were not sound insulated. This Study made no recommendation regarding the noise level at which impacts upon learning may occur.

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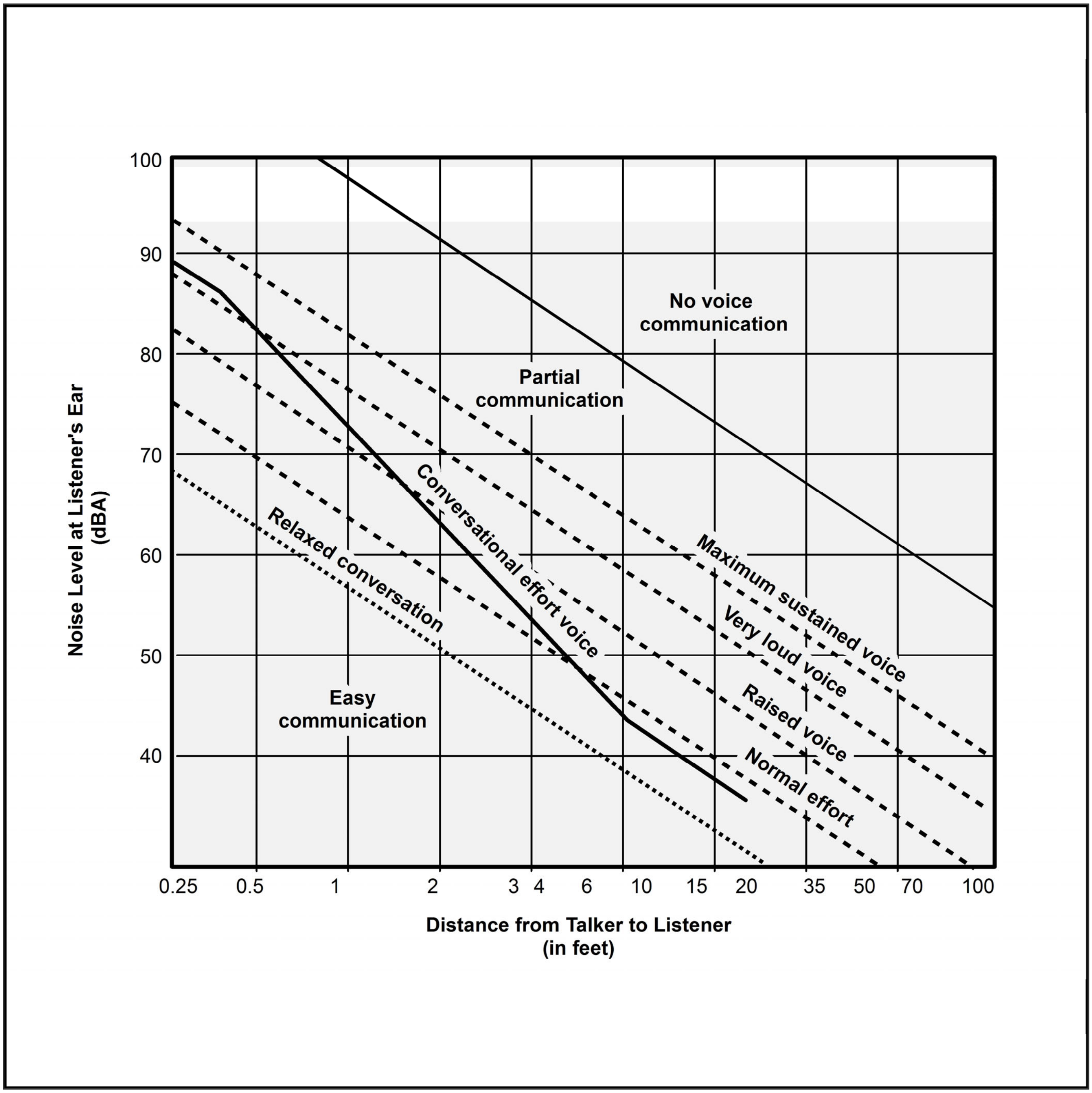
[32] Airport Cooperative Research Program, Transportation Research Board, Effects of Aircraft Noise: Research Update on Selected Topics, 2008.

[33] Airport Cooperative Research Program, Transportation Research Board, Effects of Aircraft Noise: Research Update on Selected Topics, 2008.

[34] Federal Interagency Committee on Aviation Noise (FICAN), Findings of the FICAN Pilot Study on the Relationship between Aircraft Noise Reduction and Changes in Standardized Test Scores, July 2007.

[35] National Academies of Sciences, Engineering, and Medicine; Assessing Aircraft Noise Conditions Affecting Student Learning, Volume 1: Final Report; 2014.

Exhibit C-8 Noise Effects on Distance Necessary for Speech Communication



Source: FICON, 1992; from USEPA, 1974.

C.5 Baseline Noise Modeling Methodology

The following sections describe the noise modeling methodology and assumptions for the Existing (2020) Baseline and Future (2025) Baseline Noise Exposure Contours for CMH, and presents the noise modeling results.

The analysis of noise exposure around CMH was prepared using the FAA Aviation Environmental Design Tool (AEDT) Version 3b, which was the current version at the time the noise modeling began. Inputs to the AEDT include runway definition, number of aircraft operations during the time period evaluated, the types of aircraft flown, the time of day when they are flown, how frequently each runway is used for arriving and departing aircraft, the routes of flight used when arriving to and departing from the runways, and departure profiles. The AEDT calculates noise exposure for the area around an airport and outputs contours of noise exposure using the Day/Night Average Sound Level (DNL) metric. Noise exposure contours for the levels of 60, 65, 70, and 75 DNL will be calculated to represent average-annual day conditions at CMH.

C.5.1 Existing (2020) Baseline Noise Exposure Contour Input Data

Runway Definition: CMH has two east/west parallel runways (10L/28R and 10R/28L) spaced approximately 3,400 feet apart. Runway 10R/28L is the longest runway on the airfield at 10,113 feet in length and is 150 feet wide and is equipped with a CAT-II ILS on both ends. Runway 10L/28R is 8,001 feet long and 150 feet wide and is equipped with a CAT-I ILS on both ends. **Exhibit C-9, *Current Airfield Layout*** shows the existing airfield layout. The following provides the current runways and lengths at CMH:

Runway	Length (feet)
10L/28R	8,001
10R/28L	10,113

Number of Operations and Fleet Mix: The number of annual operations at CMH was based on Air Traffic Control Tower (ATCT) counts for the period from September 2018 through August 2019.[36] During that period, 134,999 annual operations occurred at CMH. When divided by 365, the result is 369.9 average-annual day operations. Specific aircraft types and times of operation were developed from a combination of landing fee reports, Airport Noise and Operations Management System (ANOMS) data,[37] and Official Airline Guide (OAG) data for the same period. **Table C-1**, which provides a summary of the average annual day operations by aircraft category and time of day, shows that large passenger jets made up the majority (65 percent) of all operations at CMH for the Existing (2020) Baseline period. **Table C-2** shows the average daily number of arrivals and departures by the individual aircraft types. Aircraft that were most commonly flown at CMH during the Existing (2020) Baseline period include the Boeing 737-700 series and the Embraer EMB-170 series jets.

[36] See Section C.5.3 of this Appendix for a comparison of the baseline data collection period to current conditions.
[37] Data was obtained from the Airport Noise and Operations Management System (ANOMS) operated by the Columbus Regional Airport Authority (CRAA). The ANOMS receives radar data from the FAA's secure data clearinghouse and includes location, time, and operational information such as operation type, aircraft type, airline operator, and runway used for landing or takeoff.

Table C-1 Summary of Average-Annual Day Operations – Existing (2020) Baseline

Aircraft Type	Arrivals		Departures		Total	Percent of Total
	Daytime	Nighttime	Daytime	Nighttime		
Large Jets	93.5	26.7	97.8	22.4	240.3	65%
Regional / Air Taxi Jets	28.8	3.8	29.5	3.1	65.1	18%
Commuter / Air Taxi Props	2.2	1.2	2.9	0.6	6.9	2%
General Aviation Jets	16.4	1.8	16.5	1.7	36.4	10%
General Aviation Props	9.7	0.9	10.1	0.5	21.2	6%
Total	150.6	34.3	156.7	28.2	369.9	100%

Notes: Total may not equal sum total due to rounding.
Daytime = 7:00am – 9:59pm, Nighttime = 10:00pm – 6:59am.

Source: Federal Aviation Administration (FAA) Operations Network (OpsNet) data, CRAA Landing Fee Reports, CMH ANOMS data, Landrum & Brown analysis, 2020.

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Exhibit C-9 Current Airfield Layout

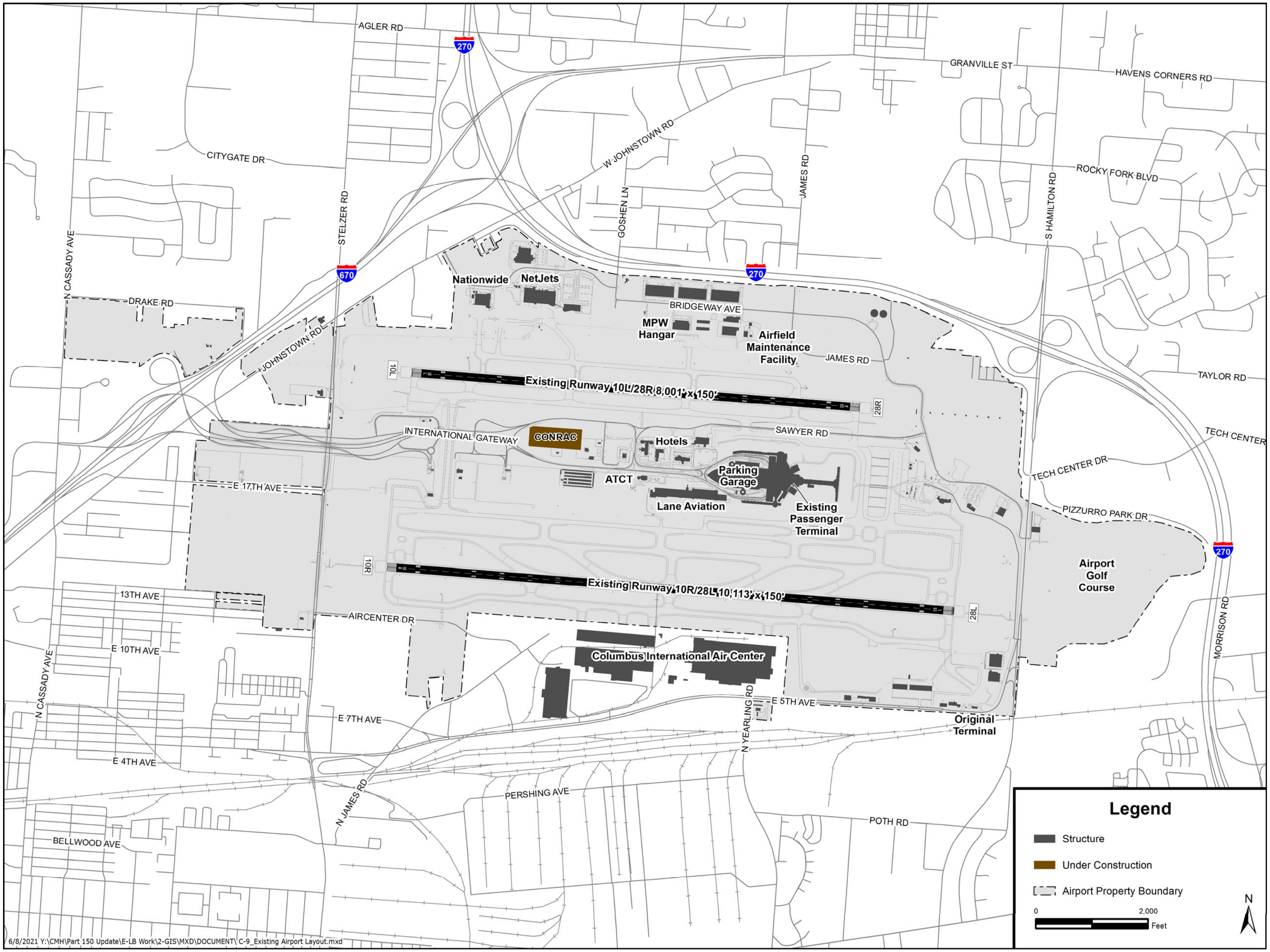

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Table C-2 Existing (2020) Average-Annual Day Operations by Aircraft Type

Aircraft Type	AED ANP Model ID	Arrivals		Departures		Total
		Day	Night	Day	Night	
Large Passenger Jets						
Boeing 717-200	717200	0.1	0.1	0.2	0.1	0.5
Boeing 737-400	737400	0.3	0.2	0.4	0.2	1.1
Boeing 737-700	737700	21.0	5.9	22.0	4.9	53.9
Boeing 737-800	737800	9.9	5.6	12.2	3.3	30.9
Boeing 737-800 MAX	737MAX8	0.4	0.1	0.4	0.0	0.8
Airbus A319-100	A319-131	3.9	2.5	4.9	1.4	12.7
Airbus A320-200	A320-211	0.5	0.3	0.7	0.1	1.6
Airbus A320-200	A320-232	3.8	2.1	5.1	0.8	11.7
Airbus A320neo	A320-271N	0.2	0.1	0.2	0.0	0.5
Airbus A321-200	A321-232	0.1	0.1	0.1	0.1	0.5
Bombardier CRJ-900	CRJ9-ER	13.3	2.7	13.6	2.3	31.8
Embraer EMB170	EMB170	10.3	2.7	10.8	2.2	26.0
Embraer EMB175	EMB175	23.4	4.1	20.5	6.9	54.9
Embraer EMB190	EMB190	0.2	0.0	0.2	0.0	0.4
McDonnell-Douglas MD80 Series	MD83	6.0	0.3	6.2	0.1	12.6
McDonnell-Douglas MD90 Series	MD9025	0.2	0.1	0.2	0.0	0.5
Subtotal		93.5	26.7	97.8	22.4	240.3
Regional / Air Taxi Jets						
Bombardier Global Express	BD-700-1A10	0.3	0.1	0.4	0.0	0.8
Bombardier CRJ-200 Regional Jet	CL600	8.3	0.8	7.9	1.3	18.3
Cessna 525C CitationJet	CNA525C	0.8	0.1	0.8	0.1	1.8
Cessna 550 Citation Bravo	CNA55B	1.5	0.1	1.5	0.1	3.2
Cessna 560 Citation Excel	CNA560XL	1.7	0.1	1.7	0.1	3.6
Cessna 680 Citation Sovereign	CNA680	2.2	0.2	2.2	0.2	4.8
Cessna 750 Citation X	CNA750	0.8	0.1	0.9	0.0	1.8
Embraer ERJ-145	EMB145	11.7	2.2	12.8	1.1	27.7
Gulfstream G5	GIV	0.3	0.0	0.4	0.0	0.7
Learjet 35	LEAR35	0.6	0.0	0.6	0.1	1.3
Mitsubishi MU-3001	MU3001	0.5	0.1	0.5	0.0	1.0
Subtotal		28.8	3.8	29.5	3.1	65.1
Commuter / Air Taxi Props						
Beech 58 Baron	BEC58P	0.3	0.4	0.3	0.4	1.5
Cessna 208 Caravan	CNA208	1.2	0.8	1.9	0.1	3.9
DeHavilland Dash 6 Twin Otter	DHC6	0.7	0.0	0.7	0.0	1.4
Subtotal		2.2	1.2	2.9	0.6	6.9

Table C-2 Existing (2020) Average-Annual Day Operations by Aircraft Type *(Continued)*

Aircraft Type	AED ANP Model ID	Arrivals		Departures		Total
		Day	Night	Day	Night	
General Aviation Jets						
Bombardier Global Express	BD-700-1A10	0.8	0.1	0.8	0.1	1.8
Bombardier Challenger 300	CL600	1.2	0.1	1.1	0.2	2.6
Cessna 525C CitationJet	CNA525C	4.0	0.6	4.0	0.7	9.2
Cessna 550 Citation Bravo	CNA55B	1.2	0.1	1.2	0.1	2.5
Cessna 560 Citation Ultra	CNA560U	0.7	0.1	0.7	0.1	1.4
Cessna 560 Citation Excel	CNA560XL	0.7	0.0	0.7	0.0	1.4
Cessna 680 Citation Sovereign	CNA680	0.6	0.1	0.6	0.1	1.3
Cessna 750 Citation X	CNA750	1.6	0.1	1.7	0.1	3.5
Eclipse Aerospace EA500	ECLIPSE500	0.5	0.0	0.5	0.0	1.0
Embraer ERJ-145	EMB145	0.8	0.2	0.9	0.1	1.9
Falcon 900	FAL900EX	0.3	0.0	0.3	0.0	0.6
Gulfstream G4	GIV	0.6	0.1	0.6	0.0	1.3
Learjet 35	LEAR35	2.6	0.2	2.6	0.3	5.7
Mitsubishi MU-3000	MU3001	1.0	0.1	1.0	0.1	2.2
Subtotal		16.4	1.8	16.5	1.7	36.4
General Aviation Props						
Beech 58 Baron	BEC58P	1.1	0.1	1.1	0.1	2.3
Cessna 172 Skyhawk	CNA172	1.2	0.0	1.2	0.0	2.5
Cessna 182 Skylane	CNA182	0.7	0.0	0.7	0.0	1.4
Cessna 208 Caravan	CNA208	0.7	0.4	1.1	0.1	2.3
Cessna 441 Conquest II	CNA441	0.8	0.1	0.8	0.0	1.6
Cirrus SR-22 Single-Engine Prop	COMSEP	1.8	0.1	1.7	0.1	3.7
General Aviation Single Engine Prop	GASEPF	0.2	0.0	0.2	0.0	0.4
General Aviation Single Engine Prop	GASEPV	1.5	0.0	1.5	0.0	3.1
Piper PA28 Cherokee	PA28	0.8	0.1	0.8	0.1	1.7
Piper PA31 Cherokee Six	PA31	1.0	0.1	1.0	0.0	2.1
Subtotal		9.8	0.9	10.1	0.5	21.2
Grand Total		**150.6**	**34.3**	**156.7**	**28.2**	**369.9**

Notes: Total may not equal sum total due to rounding.
Daytime = 7:00am – 9:59pm, Nighttime = 10:00pm – 6:59am.
* The 737-800 MAX was grounded by FAA on March 13, 2019. Prior to that the aircraft operated at CMH. Therefore, this aircraft is modeled for existing conditions based on usage from September 1, 2018 through March 12, 2019. The grounding was lifted by FAA on November 18, 2020.

Source: Federal Aviation Administration (FAA) Operations Network (OpsNet) data, CRAA Landing Fee Reports, CMH ANOMS data, Landrum & Brown analysis, 2020.

Runway End Utilization: Average-annual runway end utilization was derived from analysis of ANOMS data from September 2018 through August 2019. Runway use was derived for aircraft types and summarized by category. During the daytime (7:00 a.m. to 9:59 p.m.), the Airport is operated in one of two operating configurations—west flow (approximately 75 percent of the time) or east flow (approximately 25 percent of the time). The primary flow during the Existing (2020) Baseline period was west flow due to the prevailing southwest winds. When the airport operated in this configuration, aircraft arrive from the east heading west and depart to the west on Runways 28L and 28R. During east flow operations, aircraft arrive from the west heading east and depart to the east on Runways 10L and 10R. **Table C-3** summarizes the percentage of use by each aircraft category on each of the runways at CMH during the daytime (7:00 a.m. – 9:59 p.m.) and nighttime (10:00 p.m. – 6:59 a.m.) periods.

Table C-3 Existing (2020) Runway End Utilization

Aircraft Category	Runway End				Total
	10L	10R	28L	28R	
Daytime Arrivals					
Large Jets	11.8%	11.6%	36.3%	40.4%	100.0%
Regional / Air Taxi Jets	11.9%	11.2%	35.9%	41.0%	100.0%
Commuter / Air Taxi Props	1.3%	20.9%	71.7%	6.0%	100.0%
General Aviation Jets	6.2%	14.9%	57.3%	21.5%	100.0%
General Aviation Props	6.0%	17.1%	52.4%	24.5%	100.0%
Nighttime Arrivals					
Large Jets	8.6%	19.1%	50.5%	21.8%	100.0%
Regional / Air Taxi Jets	11.0%	16.7%	46.9%	25.5%	100.0%
Commuter / Air Taxi Props	1.0%	41.9%	55.8%	1.2%	100.0%
General Aviation Jets	5.5%	24.7%	57.6%	12.1%	100.0%
General Aviation Props	4.8%	35.7%	50.4%	9.1%	100.0%
Daytime Departures					
Large Jets	11.5%	12.1%	35.0%	41.5%	100.0%
Regional / Air Taxi Jets	12.2%	11.1%	34.7%	42.0%	100.0%
Commuter / Air Taxi Props	1.0%	21.1%	73.1%	4.8%	100.0%
General Aviation Jets	5.9%	15.7%	56.9%	21.5%	100.0%
General Aviation Props	4.9%	18.0%	56.1%	21.0%	100.0%
Nighttime Departures					
Large Cargo Jets	10.8%	12.4%	40.2%	36.6%	100.0%
Heavy Jets	11.5%	10.7%	38.4%	39.4%	100.0%
Passenger Jets	3.2%	23.4%	66.7%	6.7%	100.0%
General Aviation Jets	4.8%	20.6%	57.4%	17.2%	100.0%
General Aviation Props	3.7%	23.6%	64.6%	8.2%	100.0%

Notes: Daytime = 7:00 a.m. – 9:59 p.m., Nighttime = 10:00 p.m. – 6:59 a.m.
Total may not equal sum total due to rounding.
Source: CMH ANOMS data, Landrum & Brown analysis, 2020.

Flight Tracks: A flight track is the path over the ground as an aircraft flies to or from the airport. For this Part 150 Study, the existing flight tracks were evaluated to ensure that the flight tracks used in the modeling of aircraft noise are representative of where aircraft are flying at CMH. Flight tracks locations and percent distribution for the Existing (2020) Baseline Noise Exposure Contour was derived primarily from analysis of radar data from the ANOMS collected at CMH from September 2018 through August 2019. This data was analyzed to verify the location, density, and width of existing flight corridors. Consolidated flight tracks were developed from this radar data and used in the AEDT to model the flight corridors present around the Airport.

Exhibit C-10, Exhibit C-11, and **Exhibit C-12** depict the flight corridors representative of arrival and departure flight corridors in east flow operations for all large jets, regional jets and propeller aircraft, respectively. **Exhibit C-13**, **Exhibit C-14**, and **Exhibit C-15** depict flight corridors for west flow operations for these aircraft types. **Exhibit C-16** depicts flight tracks representative of touch-and-go operations that touch down and take off again as one continuous event. This activity is typically conducted by small aircraft for training purposes.

In order to model the flight corridors in AEDT, consolidated flight tracks were developed from this radar data. The tracks are composed of both backbone and sub-tracks that account for the dispersion of operations across a corridor of flight, rather than along a single constrained path. This is most useful at airports where wide flight corridors are present, such as are used by departures at CMH. The use of sub-tracks for the definition of baseline noise patterns allows a more definitive description of overall operating characteristics. **Table C-4**, **Table C-5**, and **Table 6** provide the proportion of operations assigned to each of the flight tracks indicated on the exhibits for the Existing (2020) Baseline condition.

Current procedures instruct departures by jet aircraft to follow runway heading until reaching five miles or 3,500 feet Mean Sea Level (MSL) before turning on course. This results in aircraft being at a higher altitude before turning over residential land uses. Propeller aircraft departures, in both east and west flow, turn as soon as directed by ATCT to allow jet aircraft to depart more quickly. The arrival corridors for jet and propeller aircraft generally follow a straight in procedure on their final approach for approximately five nautical miles.

Exhibit C-10 East Flow Large Jet Tracks

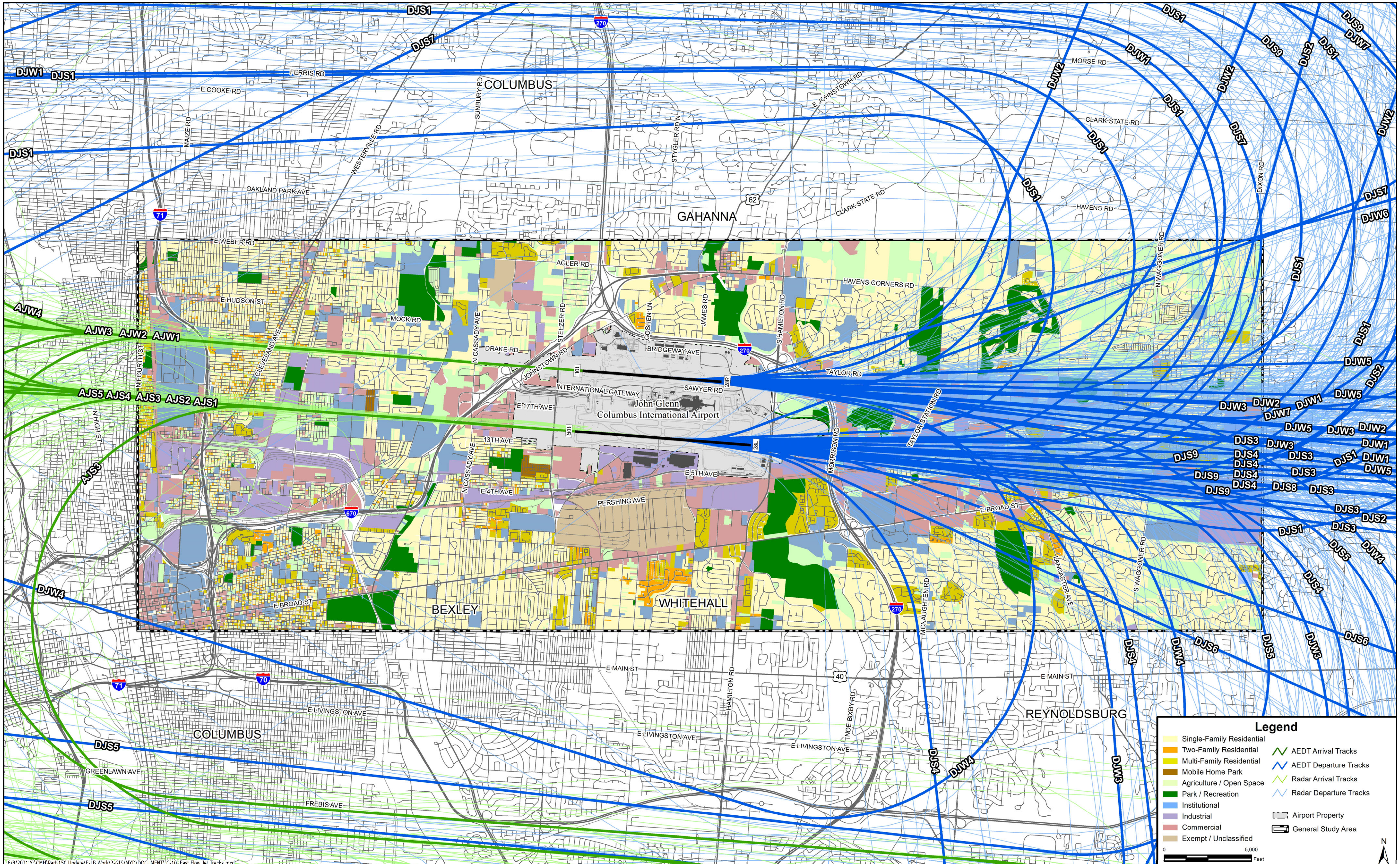

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Exhibit C-11 East Flow Regional Jet Tracks

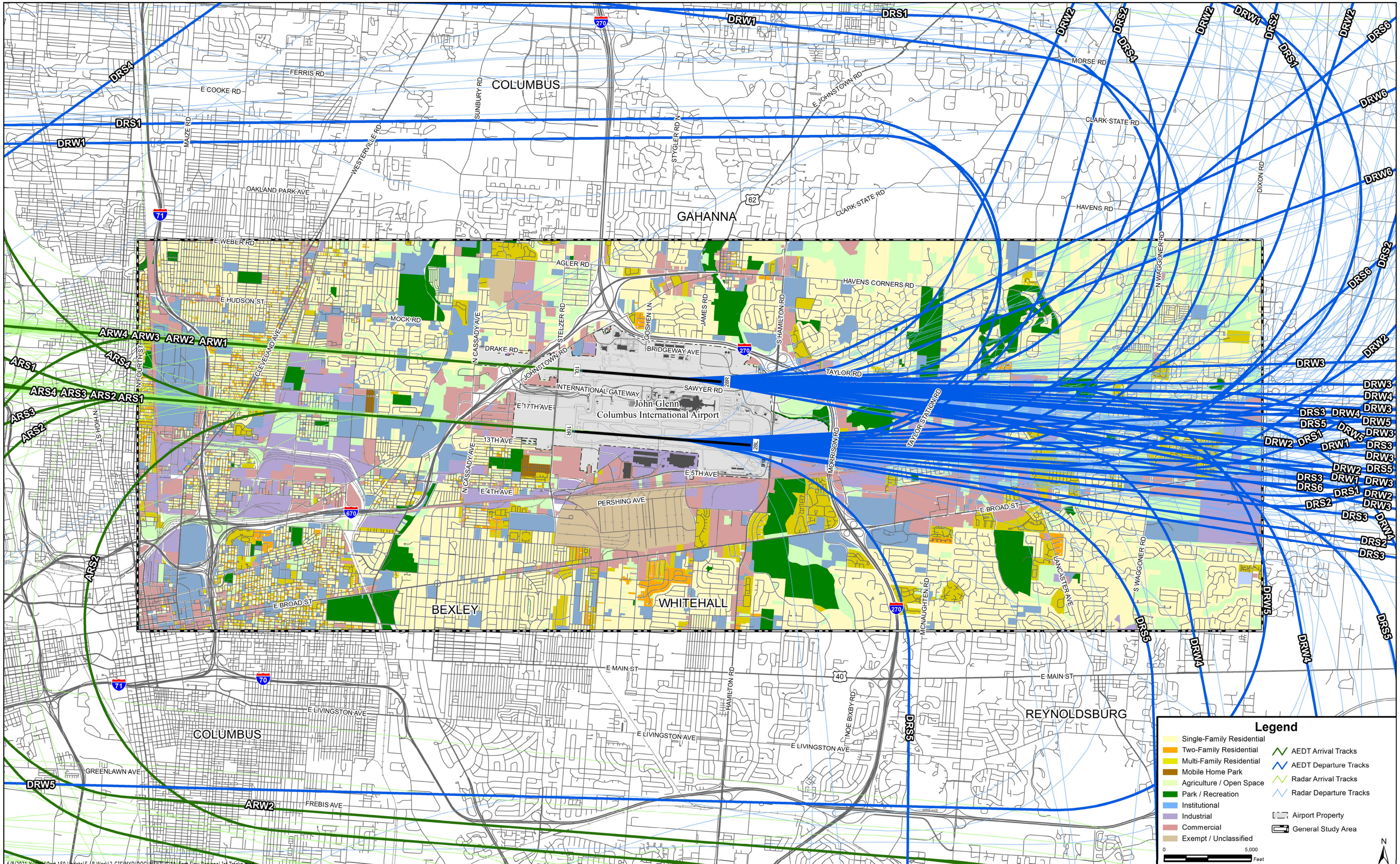

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Exhibit C-12 East Flow Prop Aircraft Tracks

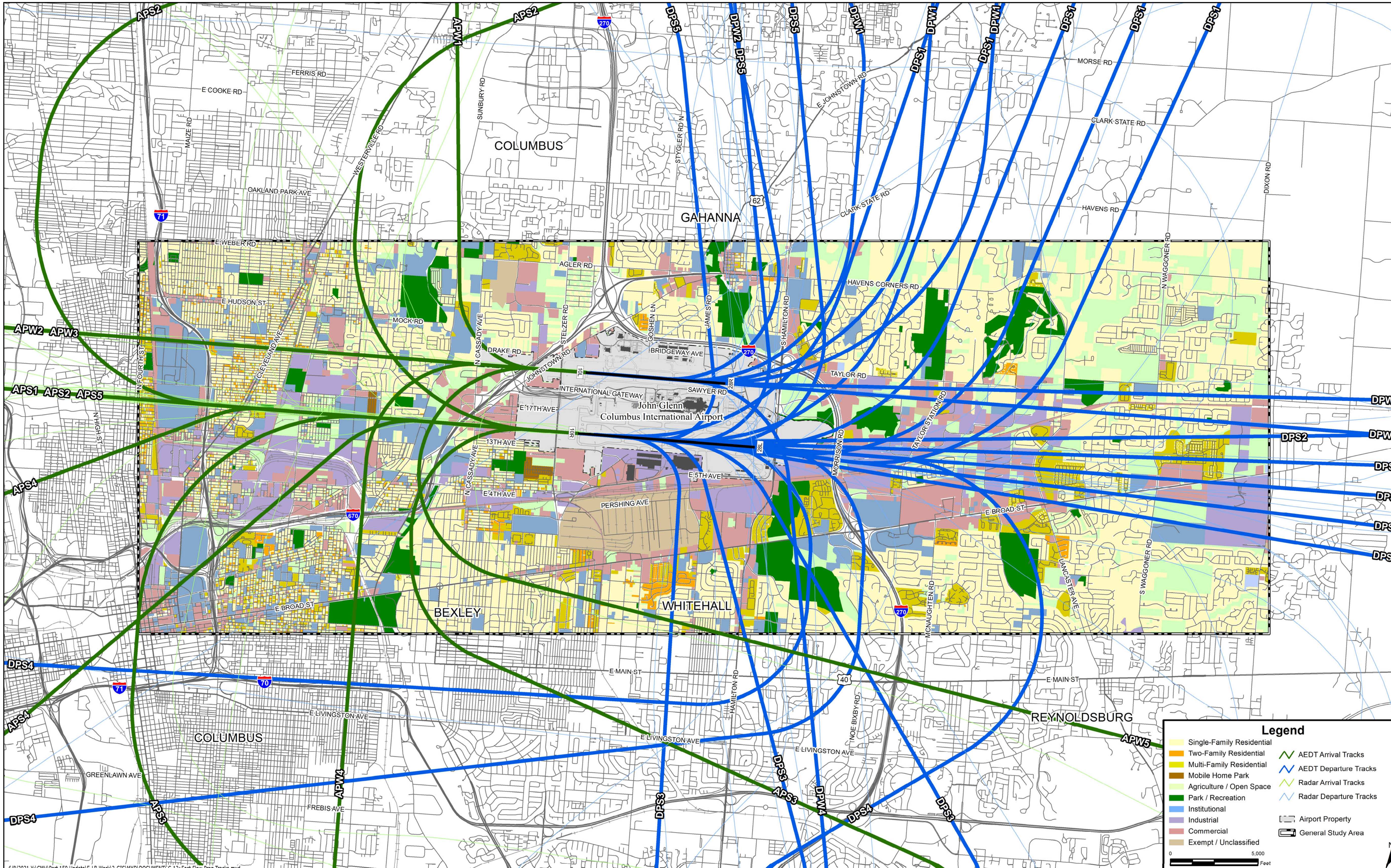

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Exhibit C-13 West Flow Large Jet Tracks

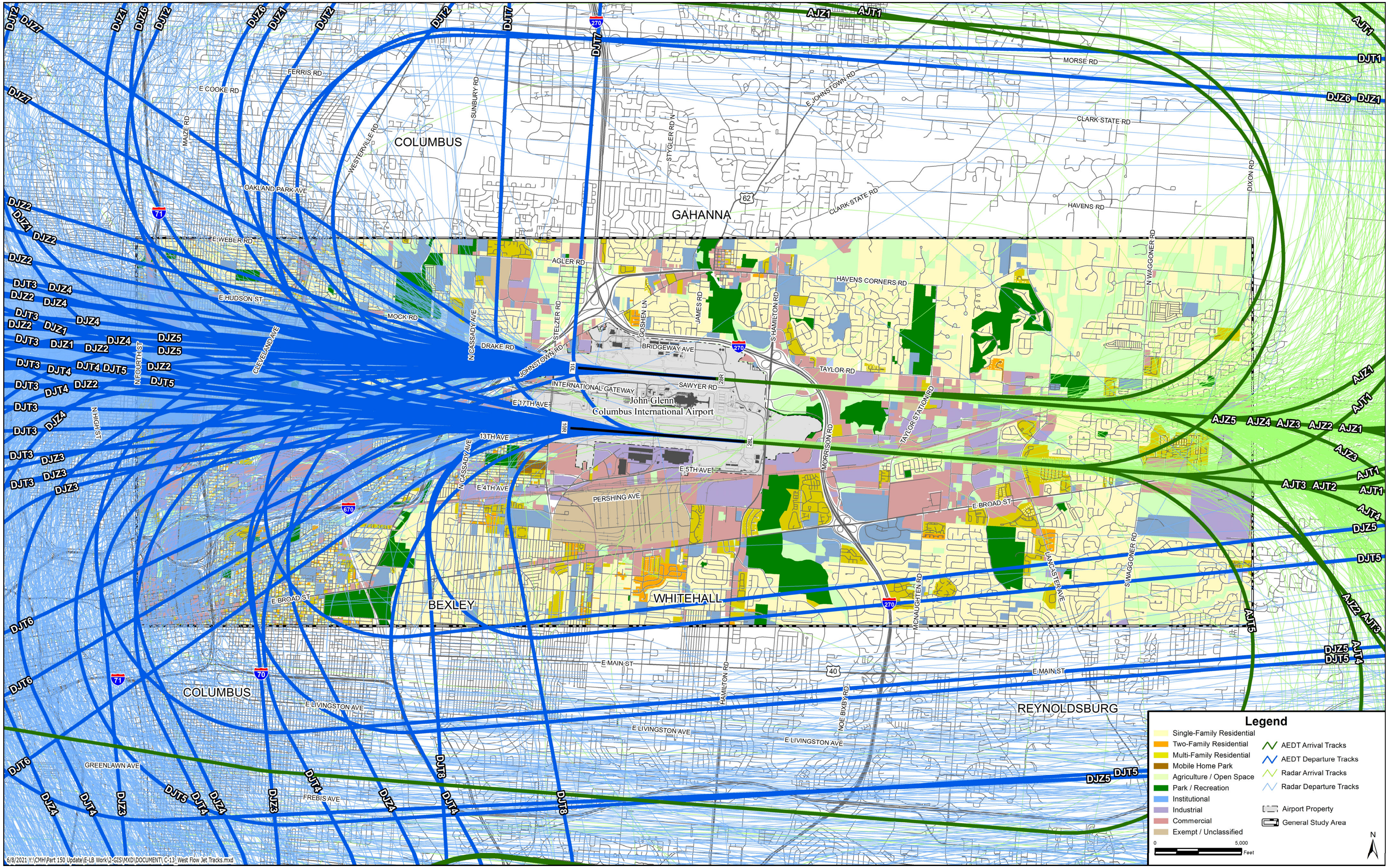

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Exhibit C-14 West Flow Regional Jet Tracks

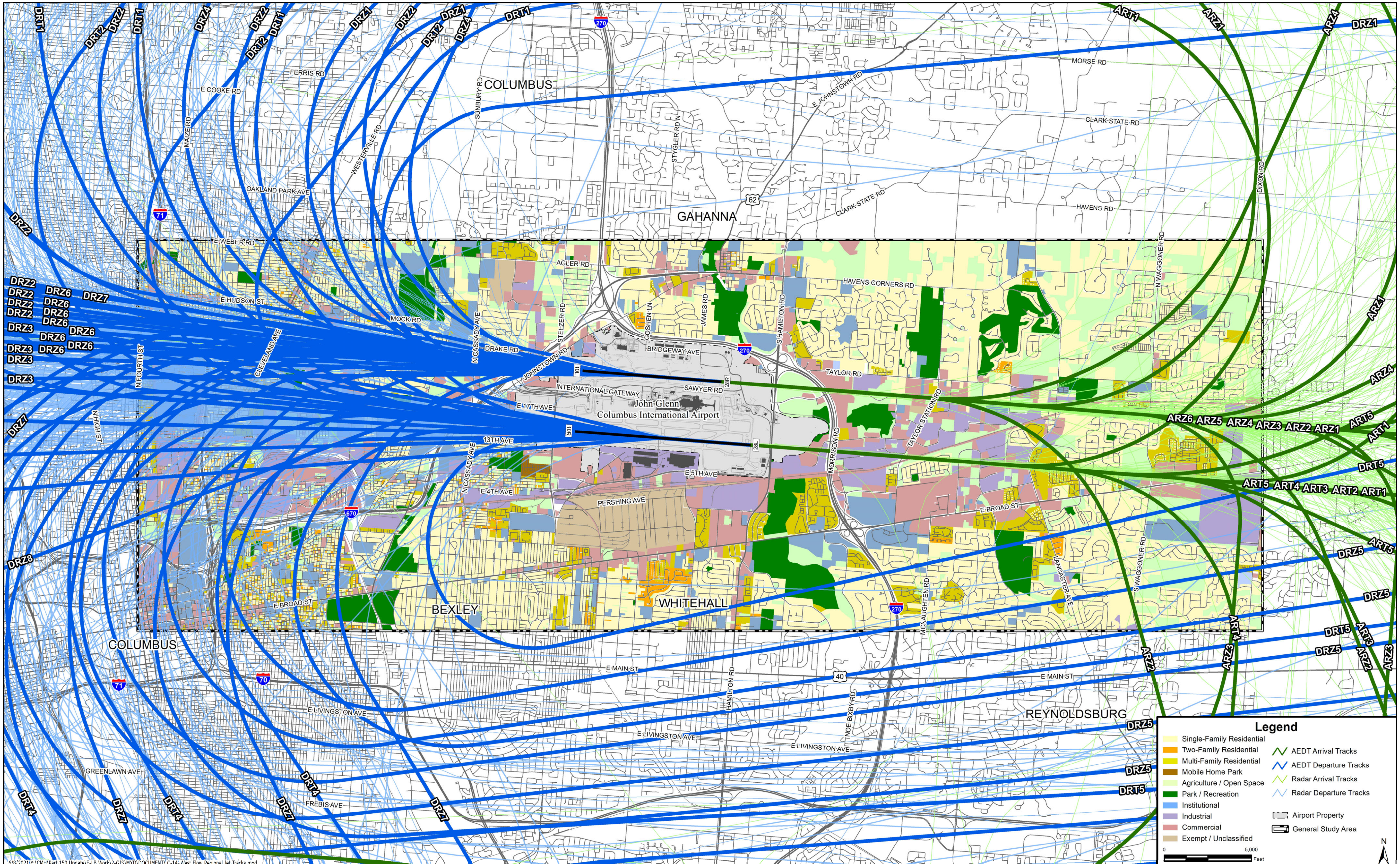

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Exhibit C-15 West Flow Prop Aircraft Tracks

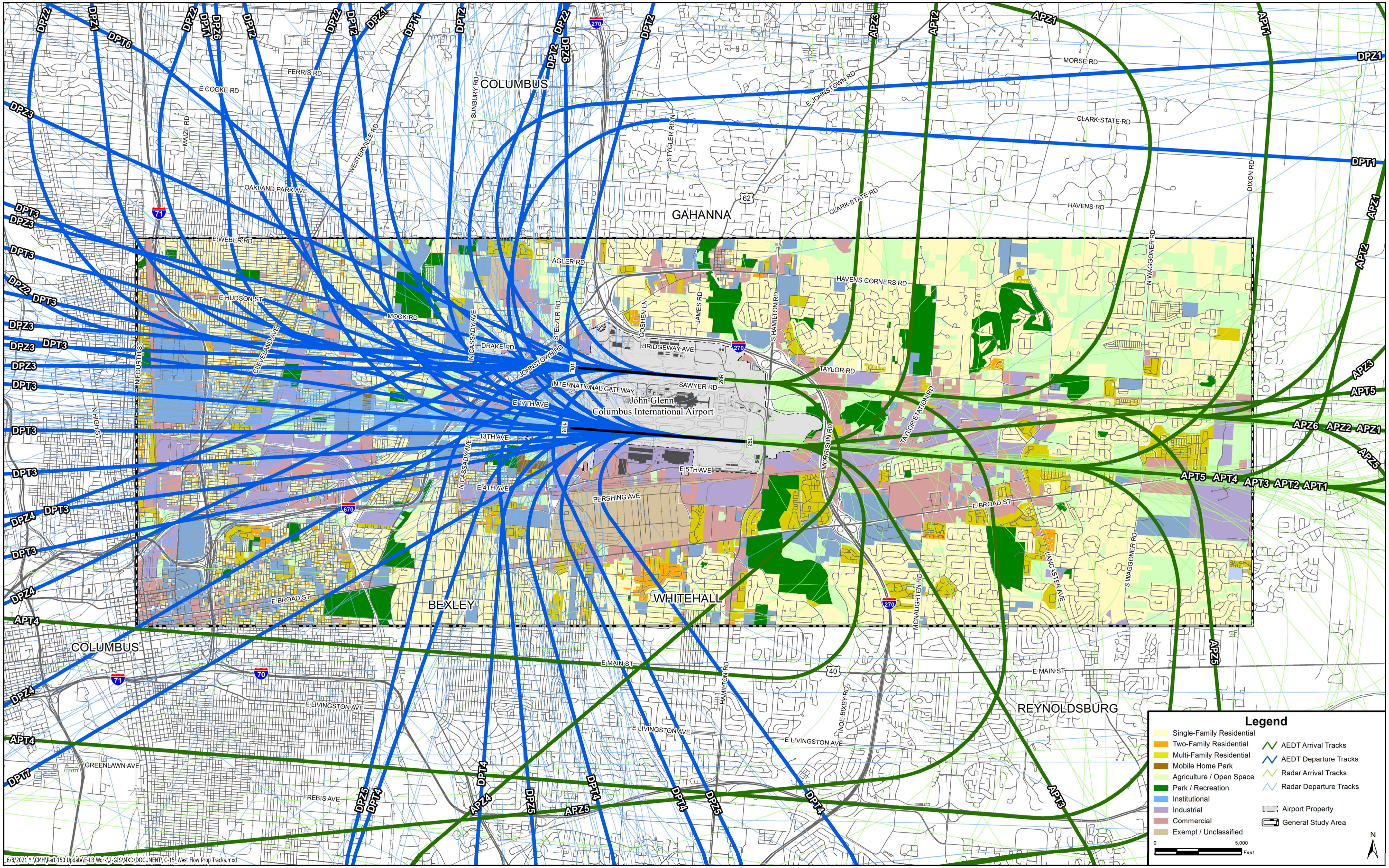

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Exhibit C-16 Touch-and-Go Tracks

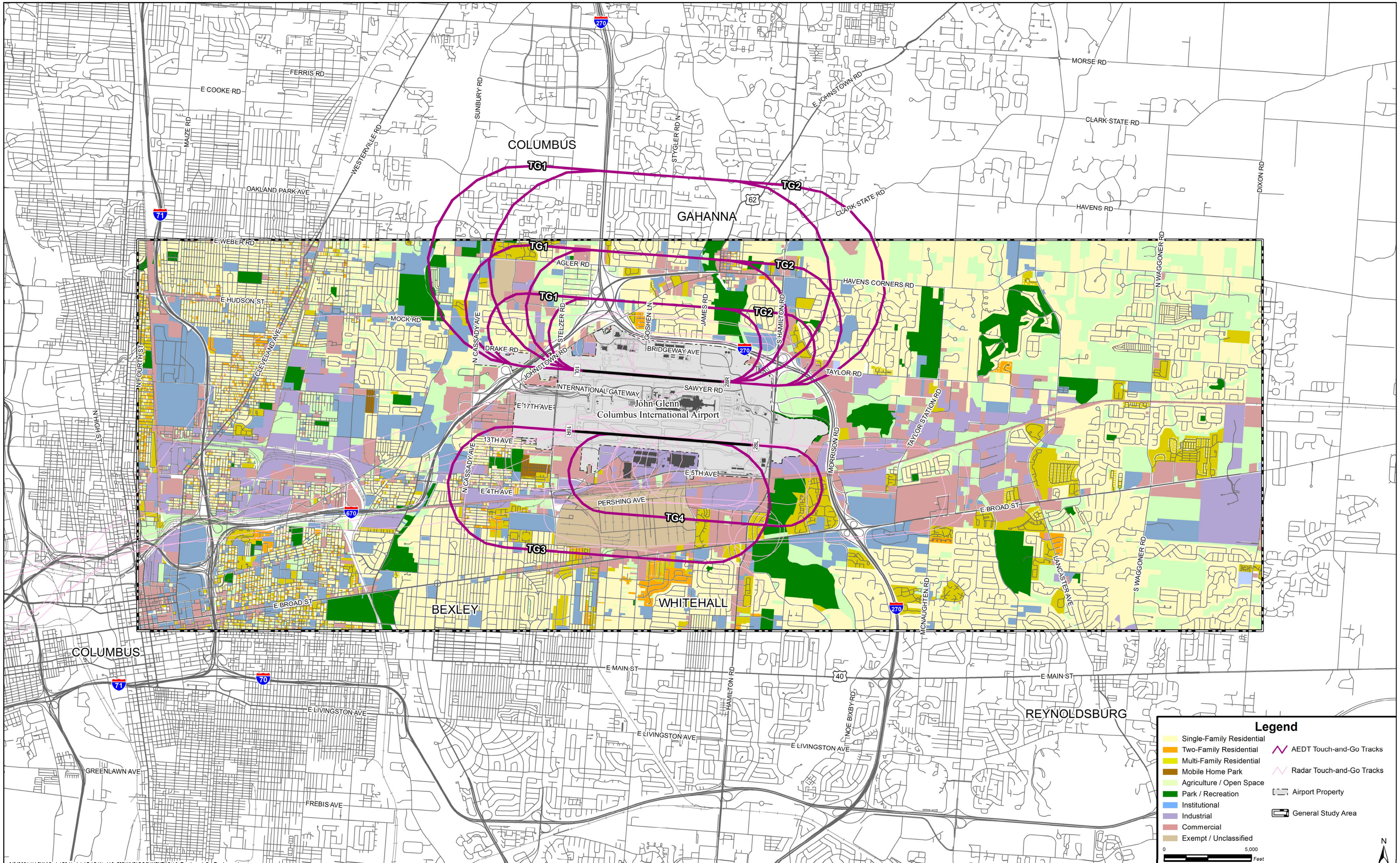

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Table C-4 Existing (2020) Arrival Flight Track Utilization

Runway End	Track ID	Aircraft Category				
		Large Jet	Regional / Air Taxi Jet	Commuter / Air Taxi Prop	General Aviation Jet	General Aviation Prop
10L	AJW1	3.8%	0.0%	0.0%	0.0%	0.0%
	AJW2	0.7%	0.0%	0.0%	0.0%	0.0%
	AJW3	5.8%	0.0%	0.0%	0.0%	0.0%
	AJW4	0.7%	0.0%	0.0%	0.0%	0.0%
	APW1	0.0%	0.0%	0.3%	0.0%	1.0%
	APW2	0.0%	0.0%	0.2%	0.0%	0.5%
	APW3	0.0%	0.0%	0.3%	0.0%	1.0%
	APW4	0.0%	0.0%	0.2%	0.0%	0.5%
	APW5	0.0%	0.0%	0.2%	0.0%	0.5%
	ARW1	0.0%	4.4%	0.0%	2.3%	0.8%
	ARW2	0.0%	3.9%	0.0%	2.0%	0.7%
	ARW3	0.0%	0.6%	0.0%	0.3%	0.1%
	ARW4	0.0%	2.9%	0.0%	1.5%	0.5%
28R	AJZ1	12.8%	0.0%	0.0%	0.0%	0.0%
	AJZ2	13.4%	0.0%	0.0%	0.0%	0.0%
	AJZ3	1.7%	0.0%	0.0%	0.0%	0.0%
	AJZ4	0.4%	0.0%	0.0%	0.0%	0.0%
	AJZ5	7.9%	0.0%	0.0%	0.0%	0.0%
	APZ1	0.0%	0.0%	1.3%	0.0%	3.8%
	APZ2	0.0%	0.0%	0.2%	0.0%	0.6%
	APZ3	0.0%	0.0%	0.6%	0.0%	1.6%
	APZ4	0.0%	0.0%	0.7%	0.0%	1.9%
	APZ5	0.0%	0.0%	0.8%	0.0%	2.2%
	APZ6	0.0%	0.0%	0.8%	0.0%	2.2%
	ARZ1	0.0%	10.5%	0.0%	5.5%	2.8%
	ARZ2	0.0%	18.1%	0.0%	9.5%	4.9%
	ARZ3	0.0%	0.8%	0.0%	0.4%	0.2%
	ARZ4	0.0%	8.1%	0.0%	4.3%	2.2%
	ARZ5	0.0%	1.6%	0.0%	0.8%	0.4%
	ARZ6	0.0%	0.1%	0.0%	0.1%	0.0%

Table C-4 Existing (2020) Arrival Flight Track Utilization, *(Continued)*

Runway End	Track ID	Aircraft Category				
		Large Jet	Regional / Air Taxi Jet	Commuter / Air Taxi Prop	General Aviation Jet	General Aviation Prop
10R	AJS1	3.8%	0.0%	0.0%	0.0%	0.0%
	AJS2	2.5%	0.0%	0.0%	0.0%	0.0%
	AJS3	5.9%	0.0%	0.0%	0.0%	0.0%
	AJS4	0.1%	0.0%	0.0%	0.0%	0.0%
	AJS5	1.0%	0.0%	0.0%	0.0%	0.0%
	APS1	0.0%	0.0%	0.9%	0.0%	0.5%
	APS2	0.0%	0.0%	6.2%	0.0%	3.7%
	APS3	0.0%	0.0%	7.1%	0.0%	4.2%
	APS4	0.0%	0.0%	5.3%	0.0%	3.2%
	APS5	0.0%	0.0%	8.9%	0.0%	5.3%
	ARS1	0.0%	1.9%	0.0%	2.5%	0.4%
	ARS2	0.0%	6.6%	0.0%	8.9%	1.3%
	ARS3	0.0%	2.5%	0.0%	3.4%	0.5%
	ARS4	0.0%	0.8%	0.0%	1.1%	0.2%
28L	AJT1	12.5%	0.0%	0.0%	0.0%	0.0%
	AJT2	0.3%	0.0%	0.0%	0.0%	0.0%
	AJT3	19.2%	0.0%	0.0%	0.0%	0.0%
	AJT4	6.5%	0.0%	0.0%	0.0%	0.0%
	AJT5	0.9%	0.0%	0.0%	0.0%	0.0%
	APT1	0.0%	0.0%	14.5%	0.0%	9.4%
	APT2	0.0%	0.0%	8.5%	0.0%	5.5%
	APT3	0.0%	0.0%	23.0%	0.0%	14.9%
	APT4	0.0%	0.0%	6.1%	0.0%	3.9%
	APT5	0.0%	0.0%	13.9%	0.0%	9.0%
	ART1	0.0%	6.7%	0.0%	10.4%	1.7%
	ART2	0.0%	2.6%	0.0%	3.9%	0.6%
	ART3	0.0%	10.9%	0.0%	16.8%	2.8%
	ART4	0.0%	3.8%	0.0%	5.8%	1.0%
	ART5	0.0%	13.3%	0.0%	20.5%	3.4%
Total		**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: CMH ANOMS data, Landrum & Brown analysis, 2020.

Table C-5 Existing (2020) Departure Flight Track Utilization

Runway End	Track ID	Aircraft Category				
		Large Jet	Regional / Air Taxi Jet	Commuter / Air Taxi Prop	General Aviation Jet	General Aviation Prop
10L	DJW1	1.9%	0.0%	0.0%	0.0%	0.0%
	DJW2	3.5%	0.0%	0.0%	0.0%	0.0%
	DJW3	3.1%	0.0%	0.0%	0.0%	0.0%
	DJW4	0.3%	0.0%	0.0%	0.0%	0.0%
	DJW5	2.0%	0.0%	0.0%	0.0%	0.0%
	DJW6	0.2%	0.0%	0.0%	0.0%	0.0%
	DJW7	0.4%	0.0%	0.0%	0.0%	0.0%
	DPW1	0.0%	0.0%	0.5%	0.0%	0.8%
	DPW2	0.0%	0.0%	0.3%	0.0%	0.5%
	DPW3	0.0%	0.0%	0.3%	0.0%	0.5%
	DPW4	0.0%	0.0%	0.3%	0.0%	0.5%
	DRW1	0.0%	3.0%	0.0%	1.4%	0.6%
	DRW2	0.0%	5.9%	0.0%	2.8%	1.2%
	DRW3	0.0%	1.3%	0.0%	0.6%	0.3%
	DRW4	0.0%	1.3%	0.0%	0.6%	0.3%
	DRW5	0.0%	0.4%	0.0%	0.2%	0.1%
	DRW6	0.0%	0.1%	0.0%	0.1%	0.0%
28R	DJZ1	9.3%	0.0%	0.0%	0.0%	0.0%
	DJZ2	13.6%	0.0%	0.0%	0.0%	0.0%
	DJZ3	1.3%	0.0%	0.0%	0.0%	0.0%
	DJZ4	9.2%	0.0%	0.0%	0.0%	0.0%
	DJZ5	5.2%	0.0%	0.0%	0.0%	0.0%
	DJZ6	1.8%	0.0%	0.0%	0.0%	0.0%
	DJZ7	0.2%	0.0%	0.0%	0.0%	0.0%
	DPZ1	0.0%	0.0%	0.9%	0.0%	1.9%
	DPZ2	0.0%	0.0%	0.7%	0.0%	1.6%
	DPZ3	0.0%	0.0%	1.2%	0.0%	2.5%
	DPZ4	0.0%	0.0%	1.0%	0.0%	2.1%
	DPZ6	0.0%	0.0%	1.3%	0.0%	2.7%
	DRZ1	0.0%	0.9%	0.0%	0.5%	0.2%
	DRZ2	0.0%	15.0%	0.0%	7.6%	3.3%
	DRZ3	0.0%	2.2%	0.0%	1.1%	0.5%
	DRZ4	0.0%	8.2%	0.0%	4.2%	1.8%
	DRZ5	0.0%	1.9%	0.0%	1.0%	0.4%
	DRZ6	0.0%	7.9%	0.0%	4.0%	1.8%
	DRZ7	0.0%	5.6%	0.0%	2.8%	1.3%

Table C-5 Existing (2020) Arrival Flight Track Utilization, *(Continued)*

Runway End	Track ID	Aircraft Category				
		Large Jet	Regional / Air Taxi Jet	Commuter / Air Taxi Prop	General Aviation Jet	General Aviation Prop
10R	DJS1	2.8%	0.0%	0.0%	0.0%	0.0%
	DJS2	0.7%	0.0%	0.0%	0.0%	0.0%
	DJS3	1.3%	0.0%	0.0%	0.0%	0.0%
	DJS4	4.6%	0.0%	0.0%	0.0%	0.0%
	DJS5	0.7%	0.0%	0.0%	0.0%	0.0%
	DJS6	0.1%	0.0%	0.0%	0.0%	0.0%
	DJS7	0.9%	0.0%	0.0%	0.0%	0.0%
	DJS8	0.1%	0.0%	0.0%	0.0%	0.0%
	DJS9	0.9%	0.0%	0.0%	0.0%	0.0%
	DPS1	0.0%	0.0%	6.3%	0.0%	4.5%
	DPS2	0.0%	0.0%	4.4%	0.0%	3.2%
	DPS3	0.0%	0.0%	5.1%	0.0%	3.6%
	DPS4	0.0%	0.0%	3.2%	0.0%	2.3%
	DPS5	0.0%	0.0%	2.5%	0.0%	1.8%
	DRS1	0.0%	1.2%	0.0%	1.7%	0.3%
	DRS2	0.0%	3.4%	0.0%	4.9%	0.9%
	DRS3	0.0%	1.3%	0.0%	1.9%	0.3%
	DRS4	0.0%	0.7%	0.0%	1.1%	0.2%
	DRS5	0.0%	3.8%	0.0%	5.5%	1.0%
	DRS6	0.0%	0.7%	0.0%	1.1%	0.2%
28L	DJT1	0.5%	0.0%	0.0%	0.0%	0.0%
	DJT2	1.9%	0.0%	0.0%	0.0%	0.0%
	DJT3	16.0%	0.0%	0.0%	0.0%	0.0%
	DJT4	13.2%	0.0%	0.0%	0.0%	0.0%
	DJT5	3.8%	0.0%	0.0%	0.0%	0.0%
	DJT6	0.4%	0.0%	0.0%	0.0%	0.0%
	DJT7	0.1%	0.0%	0.0%	0.0%	0.0%
	DPT1	0.0%	0.0%	13.6%	0.0%	8.8%
	DPT2	0.0%	0.0%	12.2%	0.0%	7.9%
	DPT3	0.0%	0.0%	25.3%	0.0%	16.4%
	DPT4	0.0%	0.0%	19.6%	0.0%	12.7%
	DPT7	0.0%	0.0%	1.4%	0.0%	0.9%
	DRT1	0.0%	1.1%	0.0%	1.7%	0.3%
	DRT2	0.0%	6.9%	0.0%	11.2%	2.0%
	DRT3	0.0%	9.0%	0.0%	14.7%	2.5%
	DRT4	0.0%	14.7%	0.0%	24.0%	4.2%
	DRT5	0.0%	3.3%	0.0%	5.4%	0.9%
Total		**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: CMH ANOMS data, Landrum & Brown analysis, 2020.

Table C-6 Existing (2020) Touch-and-Go Flight Track Utilization

Runway End	Track ID	Aircraft Category				
		Large Jet	Regional / Air Taxi Jet	Commuter / Air Taxi Prop	General Aviation Jet	General Aviation Prop
10L	TG1	n/a				18.0%
28R	TG2					57.0%
10R	TG3					6.0%
28L	TG4					19.0%

Source: Landrum & Brown, 2020.

Aircraft Weight and Departure Stage Length: Aircraft weight upon departure is a factor in the dispersion of noise because it impacts the rate at which an aircraft is able to climb. Generally, heavier aircraft have a slower rate of climb and a wider dispersion of noise along the flight route. Where specific aircraft weights are unknown, the AEDT uses the distance flown to the first stop as a surrogate for the weight, by assuming that the weight has a direct relationship with the fuel load necessary to reach the first destination. The AEDT groups trip lengths into eleven stage categories and assigns standard aircraft weights to each stage category. These categories are:

Stage Category	Stage Length
1	0-500 nautical miles
2	501-1000 nautical miles
3	1001-1500 nautical miles
4	1501-2500 nautical miles
5	2501-3500 nautical miles
6	3501-4500 nautical miles
7	4501-5500 nautical miles
8	5501-6500 nautical miles
9	6501-7500 nautical miles
10	7501-8500 nautical miles
11	8500+ nautical miles

Destinations within a stage length of one include Atlanta, Chicago, Detroit, New York, Philadelphia, and Washington, DC. Destinations within a stage length of two include Boston, Dallas, Houston, Minneapolis, and south Florida. Destinations within a stage length of three include Denver, Phoenix, and Salt Lake City. Destinations within a stage length of four include Las Vegas, Los Angeles, San Francisco, and Seattle. There are no scheduled operations at CMH to destinations with a stage length of five or greater.

The stage lengths modeled for the Existing (2020) Baseline Noise Exposure Contour are based upon a review of existing schedules and typical destinations for current conditions at CMH. **Table C-7** indicates the proportion of the operations that were modeled within each of the nine stage length categories for Existing (2020) Baseline Noise Exposure Contour.

Table C-7 Existing (2020) Stage Lengths

Stage Length Category	Large Jet	Regional / Air Taxi Jet	Commuter / Air Taxi Prop	General Aviation Jet	General Aviation Prop
1	60.9%	91.1%	100.0%	98.9%	100.0%
2	27.2%	8.9%	0.0%	1.1%	0.0%
3	6.0%	0.0%	0.0%	0.0%	0.0%
4	5.8%	0.0%	0.0%	0.0%	0.0%
5	0.0%	0.0%	0.0%	0.0%	0.0%
6	0.0%	0.0%	0.0%	0.0%	0.0%
7	0.0%	0.0%	0.0%	0.0%	0.0%
8	0.0%	0.0%	0.0%	0.0%	0.0%
9	0.0%	0.0%	0.0%	0.0%	0.0%
10	0.0%	0.0%	0.0%	0.0%	0.0%
11	0.0%	0.0%	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: Official Airline Guide (OAG) data, Landrum & Brown analysis, 2020.

Ground Run-up Noise: Engine run-ups are primarily performed on regional jet and general aviation jet aircraft for maintenance purposes. These run-ups occur at three locations at CMH described below and shown on **Exhibit C-17**. In order to model noise from aircraft engine run-ups, aircraft run-up locations and times were obtained from run-up logs collected by the CRAA. Standard practices require aircraft operators to log run-ups that occur at night (10:00pm to 6:59am). For modeling purposes, it was assumed an additional percentage of run-ups occur during the daytime. **Table C-8** shows the number, types, and the duration of engine run-ups that were modeled for the Existing (2020) Baseline conditions.

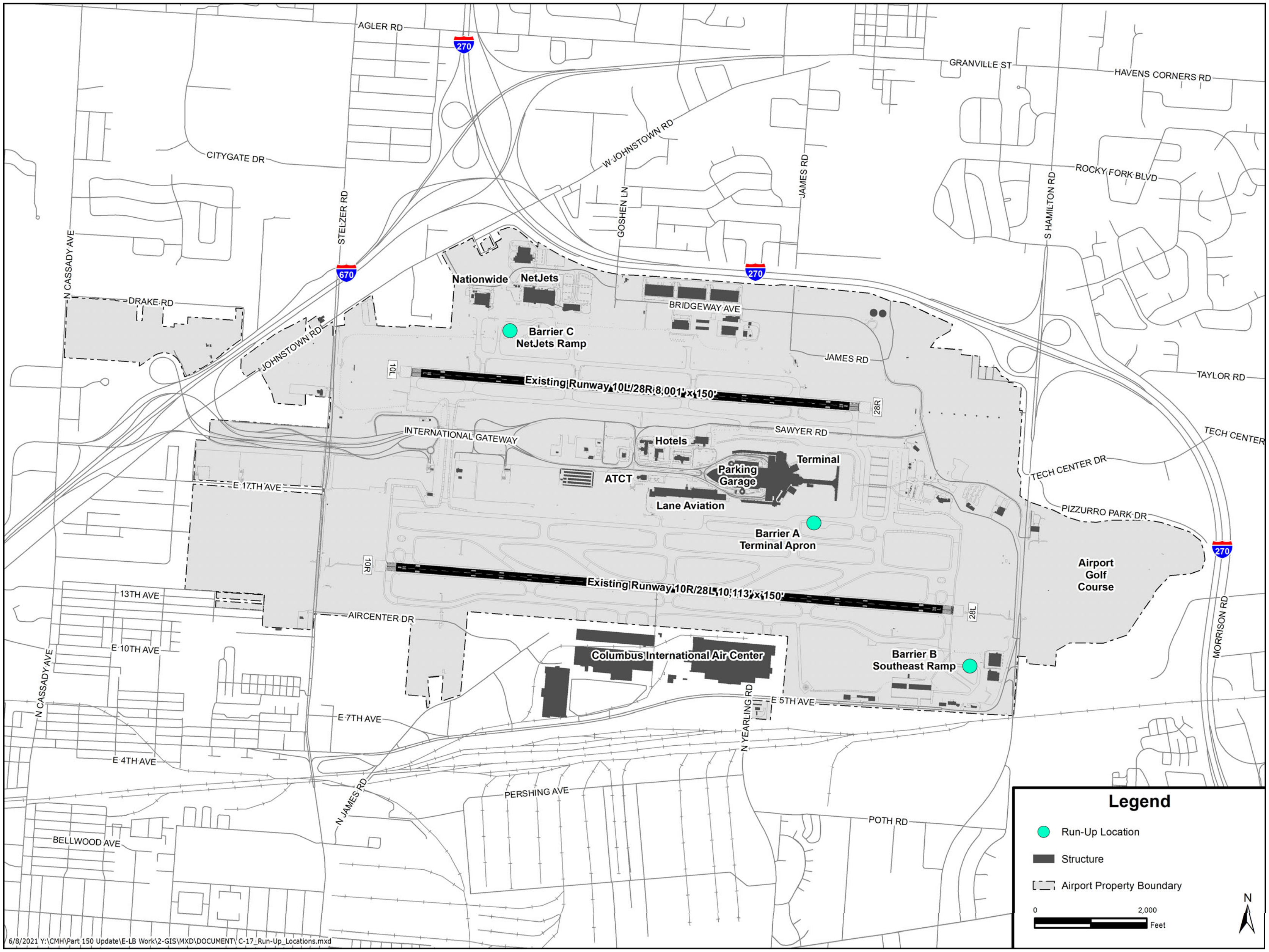
- **Barrier A / Southeast Ramp:** Located just north of the southeast end of Taxiway G. Aircraft face east (preferred) or west between the two sound barrier walls. The majority of run-ups occur here due to the proximity to the Republic Airlines maintenance hangar.
- **Barrier B / Terminal Apron:** Located to the south of Concourse B, along the south edge of the terminal apron. Aircraft face either east or west, parallel to the wall, and are positioned on the north side of the barrier.
- **Barrier C / NetJets Ramp:** Located on the north airfield near the NetJets ramp, north of Runway 10L/28R. Aircraft face either east or west, parallel to the wall, and are positioned on the south side of the barrier.

Table C-8 Existing (2020) Run-Up Operations

Run-Up Location	Aircraft ANP ID	Annual Runups			Duration (minutes)	Thrust Setting
		Daytime	Nighttime	Total		
Southeast Ramp Area	CRJ9-ER	55	18	73	5:11	80%
Southeast Ramp Area	EMB145	176	59	235	5:00	80%
NetJets Ramp Area	CNA560U	29	10	39	6:48	80%
NetJets Ramp Area	CNA680	52	17	69	4:15	80%
Terminal Apron	EMB145	39	13	52	9:27	80%
Terminal Apron	EMB175	21	7	28	4:10	80%
Total		**372**	**124**	**496**		

Source: CRAA Run-Up Logs, Landrum & Brown, 2020.

Exhibit C-17 Run-Up Locations



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C.5.2 Future (2025) Baseline Noise Exposure Contour Input Data

The following sections provide the input data for the Future (2025) Baseline Noise Exposure Contour.

Runway Definition: The runway layout is not expected to change by 2025 at CMH; therefore, the same runway layout discussed for the Existing (2020) Baseline Noise Exposure Contour will be used to model the Future (2025) Baseline Noise Exposure Contour.

Number of Operations and Fleet Mix: The Future (2025) Baseline Noise Exposure Contour operating levels are based upon the Forecast of Aviation Activity prepared for this Part 150 Study Update.[38] The forecast is based upon aviation industry trends and specific airline activity at CMH. The Future (2025) conditions include 150,140 annual operations or 411.5 average-annual day operations, an increase of 11.2 percent from the Existing (2020) Baseline Noise Exposure Contour operating levels. Some differences in fleet mix are expected to occur in 2025, notably the continued reduction in small regional jet flights (40-50 seat jets) and increase in large regional jets (greater that 50 seats) and larger passenger jets. **Table C-9** provides a summary of the average daily operations and fleet mix modeled for the Future (2025) Baseline Noise Exposure Contour, organized by aircraft category, operation type, and time of day.

Table C-9 Future (2025) Average-Annual Day Operations by Aircraft Type

Aircraft Type	AEDT ANP Model ID	Arrivals		Departures		Total
		Day	Night	Day	Night	
Large Passenger Jets						
Boeing 737-400	737400	0.1	0.1	0.1	0.1	0.4
Boeing 737-700	737700	24.8	6.9	26.0	5.8	63.5
Boeing 737-800	737800	11.4	6.3	14.0	3.7	35.4
Boeing 737-800 MAX	737MAX8	1.8	0.3	2.0	0.2	4.3
Boeing 737-900	737800	3.9	1.1	4.0	1.0	10.0
Airbus A220-100	737700	1.0	0.3	1.0	0.2	2.5
Airbus A319-100	A319-131	4.6	2.9	5.8	1.7	15.0
Airbus A320-200	A320-211	1.1	0.6	1.5	0.2	3.4
Airbus A320-200	A320-232	3.6	2.0	4.9	0.8	11.3
Airbus A320neo	A320-271N	0.7	0.3	0.9	0.2	2.1
Airbus A321-200	A321-232	0.2	0.2	0.2	0.2	0.8
Bombardier CRJ-900	CRJ9-ER	13.0	2.6	13.3	2.2	31.1
Embraer EMB170	EMB170	11.2	2.9	11.7	2.4	28.2
Embraer EMB175	EMB175	29.4	5.2	25.9	8.6	69.1
Embraer EMB190	EMB190	0.9	0.0	0.9	0.0	1.8
Subtotal		**107.7**	**31.7**	**112.2**	**27.3**	**278.9**

38 Aviation Activity Demand Forecast, Prepared for Columbus Regional Airport Authority, January 2020. The FAA Detroit Airports District Office approved the use of this forecast for the Part 150 Noise Compatibility Study Update on March 3, 2020. Additional information on the forecast and impacts of COVID-19 on the aviation industry are included in Section C.5.3 of this Appendix and in Appendix H.

Table C-9 Future (2025) Average-Annual Day Operations by Aircraft Type *(continued)*

Aircraft Type	AEDT ANP Model ID	Arrivals		Departures		Total
		Day	Night	Day	Night	
Regional / Air Taxi Jets						
Bombardier Global Express	BD-700-1A10	0.8	0.2	0.8	0.1	1.9
Bombardier CRJ-200 Regional Jet	CL600	3.3	0.3	3.2	0.5	7.3
Cessna 525C CitationJet	CNA525C	1.1	0.2	1.1	0.2	2.6
Cessna 550 Citation Bravo	CNA55B	2.2	0.2	2.2	0.2	4.8
Cessna 560 Citation Excel	CNA560XL	3.8	0.2	3.8	0.2	8.0
Cessna 680 Citation Sovereign	CNA680	3.2	0.3	3.2	0.3	7.0
Cessna 750 Citation X	CNA750	0.9	0.1	0.9	0.0	1.9
Embraer ERJ-145	EMB145	7.4	1.3	8.1	0.7	17.5
Gulfstream G5	GIV	0.6	0.1	0.6	0.0	1.3
Learjet 35	LEAR35	0.6	0.0	0.6	0.1	1.3
Mitsubishi MU-3001	MU3001	1.0	0.1	1.1	0.1	2.3
Subtotal		**24.9**	**3.0**	**25.6**	**2.4**	**55.9**
Commuter / Air Taxi Props						
Beech 58 Baron	BEC58P	0.4	0.5	0.4	0.5	1.8
Cessna 208 Caravan	CNA208	1.5	0.9	2.3	0.1	4.8
DeHavilland Dash 6 Twin Otter	DHC6	1.5	0.1	1.5	0.1	3.2
Subtotal		**3.4**	**1.5**	**4.2**	**0.7**	**9.8**
General Aviation Jets						
Bombardier Global Express	BD-700-1A10	0.9	0.2	0.9	0.1	2.1
Bombardier Challenger 300	CL600	6.1	0.6	5.7	0.8	13.2
Cessna 525C CitationJet	CNA525C	4.5	0.7	4.5	0.8	10.5
Cessna 550 Citation Bravo	CNA55B	1.3	0.1	1.3	0.1	2.8
Cessna 560 Citation Ultra	CNA560U	0.7	0.1	0.7	0.1	1.6
Cessna 560 Citation Excel	CNA560XL	0.8	0.1	0.8	0.1	1.8
Cessna 680 Citation Sovereign	CNA680	0.7	0.1	0.7	0.1	1.6
Cessna 750 Citation X	CNA750	1.8	0.2	1.9	0.1	4.0
Eclipse Aerospace EA500	ECLIPSE500	0.6	0.0	0.6	0.0	1.2
Embraer ERJ-145	EMB145	0.9	0.2	1.0	0.1	2.2
Falcon 900	FAL900EX	0.4	0.0	0.3	0.0	0.7
Gulfstream G4	GIV	0.7	0.1	0.7	0.0	1.5
Learjet 35	LEAR35	3.0	0.2	2.9	0.3	6.4
Mitsubishi MU-3000	MU3001	1.1	0.1	1.2	0.1	2.5
Subtotal		**23.5**	**2.7**	**23.2**	**2.7**	**52.1**

Table C-9 Future (2025) Average-Annual Day Operations by Aircraft Type *(continued)*

Aircraft Type	AED ANP Model ID	Arrivals		Departures		Total
		Day	Night	Day	Night	
General Aviation Props						
Beech 58 Baron	BEC58P	1.0	0.1	1.0	0.1	2.2
Cessna 172 Skyhawk	CNA172	1.2	0.0	1.2	0.0	2.4
Cessna 182 Skylane	CNA182	0.2	0.0	0.2	0.0	0.4
Cessna 208 Caravan	CNA208	0.7	0.4	1.1	0.1	2.3
Cessna 441 Conquest II	CNA441	0.7	0.1	0.8	0.0	1.6
Single-Engine Prop	COMSEP	0.5	0.0	0.5	0.0	1.0
General Aviation Single Engine Prop	GASEPF	0.2	0.0	0.2	0.0	0.4
General Aviation Single Engine Prop	GASEPV	1.4	0.0	1.4	0.0	2.8
Piper PA28 Cherokee	PA28	0.3	0.0	0.3	0.0	0.6
Piper PA31 Cherokee Six	PA31	0.5	0.0	0.5	0.0	1.0
Subtotal		6.7	0.6	7.2	0.2	14.7
Grand Total		**166.2**	**39.5**	**172.4**	**33.3**	**411.4**

Notes: Total may not equal sum total due to rounding.
Daytime = 7:00am – 9:59pm, Nighttime = 10:00pm – 6:59am.

Source: Federal Aviation Administration (FAA) Operations Network (OpsNet) data, CRAA Landing Fee Reports, CMH ANOMS data, Landrum & Brown analysis, 2020.

Runway End Utilization: Average-annual day runway end utilization in 2025 is expected to remain similar to 2020 conditions; however, ratio between east flow and west flow is expected to more similar to long-term averages which is based on wind conditions that can vary slightly from year-to-year. During the existing baseline period, the ratio was approximately 77.5 percent west flow and 22.5 percent east flow. A review of long-term average runway use based on operating and weather conditions over the past ten years reveals a split of approximately 72.5 percent west flow and 27.5 percent east flow. Therefore, runway end utilization percentages modeled for the Future (2025) conditions were modified to reflect long-term average conditions as shown in **Table C-10**.

Flight Tracks: No changes to flight tracks locations are expected to occur within the general study area by 2025.[39] Therefore flight track locations modeled for the Existing (2020) Baseline Noise Exposure Contour, and shown in Exhibits C-11 through C-16, remain the same for the Future (2025) Baseline Noise Exposure Contour modeling. Due to minor changes in runway use percentages, flight track percentages modeled for the Future (2025) Noise Exposure Contour will be expected to vary slightly from those modeled for the Existing (2020) Baseline Noise Exposure Contour. Flight track percentages modeled for the Future (2025) Baseline Noise Exposure Contour are shown in **Table C-11** and **Table C-12**. Touch-and-go flight track percentages are expected to remain similar to those modeled for the Existing (2020) Baseline Noise Exposure Contour shown in Table C-6.

[39] The Federal Aviation Administration (FAA) is in the process of redesigning and modernization of the National Airspace System through the use of satellite-based navigation. As part of this process, new Performance Based Navigation (PBN) procedures are being developed that will use satellite-based precision to fly more direct routes, saving fuel and time, increasing traffic flow, and resulting in fewer carbon emissions. The FAA is finalizing designs for new Standard Arrival Routes (STARs) at CMH. A review of new RNP procedure flight tracks was conducted which concluded that no changes in flight track locations would occur; and no changes to altitudes or descent gradients would occur, within the General Study Area for this Part 150 Noise Compatibility Study update.

Table C-10 Future (2025) Runway End Utilization

Aircraft Category	Runway End				Total
	10L	10R	28L	28R	
Daytime Arrivals					
Large Jets	14.1%	13.9%	34.1%	37.9%	100.0%
Regional / Air Taxi Jets	14.2%	13.8%	34.2%	37.8%	100.0%
Commuter / Air Taxi Props	1.7%	26.3%	66.4%	5.6%	100.0%
General Aviation Jets	8.2%	19.8%	52.3%	19.7%	100.0%
General Aviation Props	7.2%	20.8%	49.0%	23.0%	100.0%
Nighttime Arrivals					
Large Jets	8.7%	19.3%	50.3%	21.7%	100.0%
Regional / Air Taxi Jets	10.9%	17.1%	47.3%	24.7%	100.0%
Commuter / Air Taxi Props	0.7%	27.3%	70.4%	1.6%	100.0%
General Aviation Jets	5.1%	22.9%	59.5%	12.5%	100.0%
General Aviation Props	3.3%	24.7%	61.0%	11.0%	100.0%
Daytime Departures					
Large Jets	13.2%	13.8%	33.4%	39.6%	100.0%
Regional / Air Taxi Jets	13.9%	13.1%	33.7%	39.3%	100.0%
Commuter / Air Taxi Props	1.3%	25.7%	68.5%	4.5%	100.0%
General Aviation Jets	7.4%	19.6%	53.0%	20.0%	100.0%
General Aviation Props	5.8%	21.2%	53.1%	19.9%	100.0%
Nighttime Departures					
Large Cargo Jets	12.6%	14.4%	38.2%	34.8%	100.0%
Heavy Jets	13.6%	13.4%	36.9%	36.1%	100.0%
Passenger Jets	3.2%	23.8%	66.3%	6.7%	100.0%
General Aviation Jets	5.1%	21.9%	56.2%	16.8%	100.0%
General Aviation Props	3.7%	23.3%	64.8%	8.2%	100.0%

Notes: Daytime = 7:00 a.m. – 9:59 p.m., Nighttime = 10:00 p.m. – 6:59 a.m.
Total may not equal sum total due to rounding.

Source: CMH ANOMS data, Landrum & Brown analysis, 2020.

Table C-11 Future (2025) Arrival Flight Track Utilization

Runway End	Track ID	Aircraft Category				
		Large Jet	Regional / Air Taxi Jet	Commuter / Air Taxi Prop	General Aviation Jet	General Aviation Prop
10L	AJW1	4.5%	0.0%	0.0%	0.0%	0.0%
	AJW2	0.8%	0.0%	0.0%	0.0%	0.0%
	AJW3	6.8%	0.0%	0.0%	0.0%	0.0%
	AJW4	0.8%	0.0%	0.0%	0.0%	0.0%
	APW1	0.0%	0.0%	0.4%	0.0%	1.7%
	APW2	0.0%	0.0%	0.2%	0.0%	0.8%
	APW3	0.0%	0.0%	0.4%	0.0%	1.7%
	APW4	0.0%	0.0%	0.2%	0.0%	0.8%
	APW5	0.0%	0.0%	0.2%	0.0%	0.8%
	ARW1	0.0%	5.2%	0.0%	2.9%	0.3%
	ARW2	0.0%	4.6%	0.0%	2.6%	0.3%
	ARW3	0.0%	0.7%	0.0%	0.4%	0.0%
	ARW4	0.0%	3.4%	0.0%	1.9%	0.2%
28R	AJZ1	12.1%	0.0%	0.0%	0.0%	0.0%
	AJZ2	12.6%	0.0%	0.0%	0.0%	0.0%
	AJZ3	1.6%	0.0%	0.0%	0.0%	0.0%
	AJZ4	0.4%	0.0%	0.0%	0.0%	0.0%
	AJZ5	7.5%	0.0%	0.0%	0.0%	0.0%
	APZ1	0.0%	0.0%	1.3%	0.0%	5.7%
	APZ2	0.0%	0.0%	0.2%	0.0%	0.9%
	APZ3	0.0%	0.0%	0.6%	0.0%	2.4%
	APZ4	0.0%	0.0%	0.7%	0.0%	2.8%
	APZ5	0.0%	0.0%	0.8%	0.0%	3.3%
	APZ6	0.0%	0.0%	0.8%	0.0%	3.3%
	ARZ1	0.0%	9.7%	0.0%	5.1%	0.7%
	ARZ2	0.0%	16.8%	0.0%	8.8%	1.2%
	ARZ3	0.0%	0.7%	0.0%	0.4%	0.1%
	ARZ4	0.0%	7.5%	0.0%	3.9%	0.6%
	ARZ5	0.0%	1.5%	0.0%	0.8%	0.1%
	ARZ6	0.0%	0.1%	0.0%	0.0%	0.0%

Table C-11 Future (2025) Arrival Flight Track Utilization, *(Continued)*

Runway End	Track ID	Aircraft Category				
		Large Jet	Regional / Air Taxi Jet	Commuter / Air Taxi Prop	General Aviation Jet	General Aviation Prop
10R	AJS1	4.4%	0.0%	0.0%	0.0%	0.0%
	AJS2	2.8%	0.0%	0.0%	0.0%	0.0%
	AJS3	6.7%	0.0%	0.0%	0.0%	0.0%
	AJS4	0.1%	0.0%	0.0%	0.0%	0.0%
	AJS5	1.1%	0.0%	0.0%	0.0%	0.0%
	APS1	0.0%	0.0%	0.8%	0.0%	0.6%
	APS2	0.0%	0.0%	5.8%	0.0%	4.1%
	APS3	0.0%	0.0%	6.7%	0.0%	4.7%
	APS4	0.0%	0.0%	5.0%	0.0%	3.5%
	APS5	0.0%	0.0%	8.3%	0.0%	5.9%
	ARS1	0.0%	2.2%	0.0%	3.2%	0.4%
	ARS2	0.0%	7.9%	0.0%	11.2%	1.4%
	ARS3	0.0%	3.0%	0.0%	4.3%	0.5%
	ARS4	0.0%	1.0%	0.0%	1.4%	0.2%
28L	AJT1	12.0%	0.0%	0.0%	0.0%	0.0%
	AJT2	0.3%	0.0%	0.0%	0.0%	0.0%
	AJT3	18.4%	0.0%	0.0%	0.0%	0.0%
	AJT4	6.2%	0.0%	0.0%	0.0%	0.0%
	AJT5	0.8%	0.0%	0.0%	0.0%	0.0%
	APT1	0.0%	0.0%	14.9%	0.0%	9.9%
	APT2	0.0%	0.0%	8.7%	0.0%	5.8%
	APT3	0.0%	0.0%	23.6%	0.0%	15.7%
	APT4	0.0%	0.0%	6.2%	0.0%	4.1%
	APT5	0.0%	0.0%	14.3%	0.0%	9.5%
	ART1	0.0%	6.4%	0.0%	9.6%	1.0%
	ART2	0.0%	2.4%	0.0%	3.6%	0.4%
	ART3	0.0%	10.4%	0.0%	15.5%	1.7%
	ART4	0.0%	3.6%	0.0%	5.4%	0.6%
	ART5	0.0%	12.7%	0.0%	19.0%	2.1%
Total		**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: CMH ANOMS data, Landrum & Brown analysis, 2020.

Table C-12 Future (2025) Departure Flight Track Utilization

Runway End	Track ID	Aircraft Category				
		Large Jet	Regional / Air Taxi Jet	Commuter / Air Taxi Prop	General Aviation Jet	General Aviation Prop
10L	DJW1	2.2%	0.0%	0.0%	0.0%	0.0%
	DJW2	4.0%	0.0%	0.0%	0.0%	0.0%
	DJW3	3.5%	0.0%	0.0%	0.0%	0.0%
	DJW4	0.4%	0.0%	0.0%	0.0%	0.0%
	DJW5	2.3%	0.0%	0.0%	0.0%	0.0%
	DJW6	0.2%	0.0%	0.0%	0.0%	0.0%
	DJW7	0.5%	0.0%	0.0%	0.0%	0.0%
	DPW1	0.0%	0.0%	0.5%	0.0%	1.7%
	DPW2	0.0%	0.0%	0.3%	0.0%	1.1%
	DPW3	0.0%	0.0%	0.3%	0.0%	1.1%
	DPW4	0.0%	0.0%	0.3%	0.0%	1.1%
	DRW1	0.0%	3.5%	0.0%	1.8%	0.2%
	DRW2	0.0%	6.8%	0.0%	3.5%	0.3%
	DRW3	0.0%	1.5%	0.0%	0.8%	0.1%
	DRW4	0.0%	1.5%	0.0%	0.8%	0.1%
	DRW5	0.0%	0.4%	0.0%	0.2%	0.0%
	DRW6	0.0%	0.1%	0.0%	0.1%	0.0%
28R	DJZ1	8.8%	0.0%	0.0%	0.0%	0.0%
	DJZ2	13.0%	0.0%	0.0%	0.0%	0.0%
	DJZ3	1.2%	0.0%	0.0%	0.0%	0.0%
	DJZ4	8.8%	0.0%	0.0%	0.0%	0.0%
	DJZ5	4.9%	0.0%	0.0%	0.0%	0.0%
	DJZ6	1.7%	0.0%	0.0%	0.0%	0.0%
	DJZ7	0.2%	0.0%	0.0%	0.0%	0.0%
	DPZ1	0.0%	0.0%	0.9%	0.0%	3.0%
	DPZ2	0.0%	0.0%	0.7%	0.0%	2.4%
	DPZ3	0.0%	0.0%	1.1%	0.0%	3.9%
	DPZ4	0.0%	0.0%	0.9%	0.0%	3.3%
	DPZ6	0.0%	0.0%	1.2%	0.0%	4.2%
	DRZ1	0.0%	0.8%	0.0%	0.4%	0.0%
	DRZ2	0.0%	14.0%	0.0%	7.1%	0.8%
	DRZ3	0.0%	2.1%	0.0%	1.0%	0.1%
	DRZ4	0.0%	7.7%	0.0%	3.9%	0.4%
	DRZ5	0.0%	1.8%	0.0%	0.9%	0.1%
	DRZ6	0.0%	7.4%	0.0%	3.7%	0.4%
	DRZ7	0.0%	5.2%	0.0%	2.6%	0.3%

Table C-12 Future (2025) Arrival Flight Track Utilization, *(Continued)*

Runway End	Track ID	Aircraft Category				
		Large Jet	Regional / Air Taxi Jet	Commuter / Air Taxi Prop	General Aviation Jet	General Aviation Prop
10R	DJS1	3.2%	0.0%	0.0%	0.0%	0.0%
	DJS2	0.8%	0.0%	0.0%	0.0%	0.0%
	DJS3	1.5%	0.0%	0.0%	0.0%	0.0%
	DJS4	5.4%	0.0%	0.0%	0.0%	0.0%
	DJS5	0.8%	0.0%	0.0%	0.0%	0.0%
	DJS6	0.1%	0.0%	0.0%	0.0%	0.0%
	DJS7	1.0%	0.0%	0.0%	0.0%	0.0%
	DJS8	0.1%	0.0%	0.0%	0.0%	0.0%
	DJS9	1.0%	0.0%	0.0%	0.0%	0.0%
	DPS1	0.0%	0.0%	7.5%	0.0%	5.5%
	DPS2	0.0%	0.0%	5.2%	0.0%	3.9%
	DPS3	0.0%	0.0%	6.0%	0.0%	4.4%
	DPS4	0.0%	0.0%	3.7%	0.0%	2.8%
	DPS5	0.0%	0.0%	3.0%	0.0%	2.2%
	DRS1	0.0%	1.4%	0.0%	2.1%	0.3%
	DRS2	0.0%	4.0%	0.0%	6.0%	0.8%
	DRS3	0.0%	1.6%	0.0%	2.4%	0.3%
	DRS4	0.0%	0.9%	0.0%	1.3%	0.2%
	DRS5	0.0%	4.5%	0.0%	6.8%	0.9%
	DRS6	0.0%	0.9%	0.0%	1.3%	0.2%
28L	DJT1	0.5%	0.0%	0.0%	0.0%	0.0%
	DJT2	1.8%	0.0%	0.0%	0.0%	0.0%
	DJT3	15.3%	0.0%	0.0%	0.0%	0.0%
	DJT4	12.6%	0.0%	0.0%	0.0%	0.0%
	DJT5	3.7%	0.0%	0.0%	0.0%	0.0%
	DJT6	0.4%	0.0%	0.0%	0.0%	0.0%
	DJT7	0.1%	0.0%	0.0%	0.0%	0.0%
	DPT1	0.0%	0.0%	12.8%	0.0%	8.9%
	DPT2	0.0%	0.0%	11.5%	0.0%	8.0%
	DPT3	0.0%	0.0%	23.9%	0.0%	16.6%
	DPT4	0.0%	0.0%	18.6%	0.0%	12.9%
	DPT7	0.0%	0.0%	1.3%	0.0%	0.9%
	DRT1	0.0%	1.0%	0.0%	1.6%	0.2%
	DRT2	0.0%	6.7%	0.0%	10.5%	1.3%
	DRT3	0.0%	8.7%	0.0%	13.7%	1.6%
	DRT4	0.0%	14.3%	0.0%	22.4%	2.7%
	DRT5	0.0%	3.2%	0.0%	5.0%	0.6%
Total		**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: CMH ANOMS data, Landrum & Brown analysis, 2020.

Aircraft Weight and Departure Stage Length: The average aircraft departure weights modeled for the Future (2025) Baseline Noise Exposure Contour is based on forecasted departure trip lengths from the forecast of aviation activity prepared for this Part 150 Study Update. There are expected to be no significant changes in the destinations served by airlines from CMH, however changes in the number of operations and fleet mix results in small variations in the departure trip length distributions for the 2025 conditions as shown in **Table C-13**.

Table C-13 Future (2025) Stage Lengths

Stage Length Category	Large Jet	Regional / Air Taxi Jet	Commuter / Air Taxi Prop	General Aviation Jet	General Aviation Prop
1	59.9%	93.4%	100.0%	99.1%	100.0%
2	26.8%	6.6%	0.0%	0.9%	0.0%
3	6.6%	0.0%	0.0%	0.0%	0.0%
4	6.6%	0.0%	0.0%	0.0%	0.0%
5	0.0%	0.0%	0.0%	0.0%	0.0%
6	0.0%	0.0%	0.0%	0.0%	0.0%
7	0.0%	0.0%	0.0%	0.0%	0.0%
8	0.0%	0.0%	0.0%	0.0%	0.0%
9	0.0%	0.0%	0.0%	0.0%	0.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: Official Airline Guide (OAG) data, Landrum & Brown analysis, 2020.

Ground Run-up Noise: Engine run-up activity was projected for the 2025 conditions based upon the forecast increase in operations at CMH. Estimates of run-up times, durations and locations remained the same as described for the 2020 conditions. The number, types, durations and times of day of engine run-ups that were modeled for the Future (2020) Noise Exposure Contour are shown in **Table C-14**.

Table C-14 Future (2025) Run-Up Operations

Run-Up Location	Aircraft ANP ID	Annual Runups			Duration (minutes)	Thrust Setting
		Daytime	Nighttime	Total		
Southeast Ramp Area	CRJ9-ER	62	21	82	5:11	80%
Southeast Ramp Area	EMB145	199	66	266	5:00	80%
NetJets Ramp Area	CNA560U	33	11	44	6:48	80%
NetJets Ramp Area	CNA680	58	19	78	4:15	80%
Terminal Apron	EMB145	44	15	59	9:27	80%
Terminal Apron	EMB175	24	8	32	4:10	80%
Total		**421**	**140**	**561**		

Source: CRAA Run-Up Logs, Landrum & Brown, 2020.

C.5.3 Comparability of Conditions

The number of annual operations and fleet mix modeled for Existing (2020) Baseline Noise Exposure Contours are based on actual data from September 2018 through August 2019. The operating levels and fleet mix modeled for the Future (2025) Noise Exposure Contour is based upon the Forecast of Aviation Activity prepared for this Part 150 Study Update. The forecast was submitted to the FAA for review in January 2020. The FAA approved this Forecast on March 3, 2020. The forecasts for the CMH Part 150 were prepared and submitted to FAA prior to the COVID-19 public health emergency. It is acknowledged that the current impacts of the COVID-19 public health emergency resulted in a decline in air travel. However, it is anticipated that passenger and airline activity in the short-term will be lower than forecast but will recover with long-term forecast activity. More information about the forecast

Appendix D - Land Use Assessment Methodology

Identifying and evaluating land uses within the airport environs is an important step in the Part 150 process. This evaluation is necessary to identify residential and other noise-sensitive land uses that may be affected by airport noise and operations. The land use assessment includes examining land use classifications, zoning codes, and development trends within the airport environs; and applying the Federal Aviation Administration (FAA) Part 150 guidelines for land use compatibility and previous land use mitigation efforts conducted by the Columbus Regional Airport Authority (CRAA) at John Glenn Columbus International Airport (CMH or Airport). A Geographic Information System (GIS) land use database was developed to facilitate the identification of land uses that are incompatible with airport operations.

D.1 Airport Environs and General Study Area

The airport environs, as discussed in **Chapter 2, *Affected Environment***, refers to the regional area that may experience broader effects from the noise due to aircraft operations. The airport environs for CMH is shown in **Exhibit 2-1**, and depicts the area of northeast Columbus and other jurisdictions in eastern Franklin County and western Licking County. The map includes jurisdictional boundaries, local roads and major highways, the Airport property boundary, and other geographical features. The General Study Area (GSA) is defined as the area that experiences direct overflights of aircraft at lower altitudes. The GSA was determined by examining the boundaries of previous 65 Day-Night Average Sound Level (DNL) noise exposure contours (the FAA-defined threshold for significant noise impacts), and by reviewing flight tracks of aircraft operating at CMH.

D.2 Land Use Mapping

Land use data was collected and incorporated into a GIS database that includes jurisdictional boundaries, roads, bodies of water, and other physical features. The database was used to identify existing land use conditions within the airport environs and to identify areas impacted by noise per FAA guidelines. This section describes the methodology for collecting and analyzing land use data.

D.2.1 Land Use Classifications

Existing land use data was collected from the local governments within the GSA, including the City of Columbus and Franklin and Licking Counties. Land uses shown on the exhibits were categorized in terms of the general land use classifications presented in 14 CFR Part 150, which include residential (single, multi-family, and mobile homes), commercial, industrial (e.g., manufacturing and production), public uses, recreational, agricultural, and vacant/open space. These land uses were identified based on Franklin County's GIS database and supplemented by aerial photography and field verification. **Table D-1** shows the generalized land use categories and the specific land uses from the Franklin County GIS database that were grouped into these general land use categories. The existing land use patterns within the Airport Environs is shown in Exhibit 2-2, Generalized Existing Land Use in Chapter Two, Affected Environment. Property that was identified as under development or proposed for development is depicted as "transitional/mixed use" on the Future (2025) NEM.

Table D-1 Generalized Land Use Classifications

Generalized Land Use	Specific Land Use Types
Agricultural / Open Space	Vacant / Unplatted
	Property Used in Agricultural Operation[1]
One Family Residential	Single-Family Residential
Two-Family Residential	Two-Family Residential
Multi-Family Residential	Condominium
	Three-Family Dwelling
	Apartments (4 to 19 Family)
	Apartments (20 to 39 Family)
	Apartments (40+ Family)
	Commercial Rooming House
	Condo (4 to 19 Units)
	Condo (20 to 39 Units)
	Condo (40+ Units)
Manufactured Home Park	Mobile Home Park
Commercial	Sales
	Services
	Retail / Grocery
	Commercial Recreation
	Car Wash
	Commercial Storage Units
	Commercial Garage
	Restaurant / Food Service
	Bank
	Office
	Hotel / Motel
	Parking Structure
	Warehouse / Shop with Office
	Surface Parking Lot
Industrial	Distribution / Warehouse / Terminal
	Food Processing
	Foundry / Manufacturing
	Industrial Wholesale / Terminal
	Light Manufacturing
	Mining / Quarry
Institutional	Church / Place of Worship
	Day Care / Preschool
	Government Building / Facility
	Hospital
	Libraries
	Nursing Home / Care Facility

Table D-1 Generalized Land Use Classifications *(continued)*

Generalized Land Use	Specific Land Use Types
Park / Recreation	Golf Course
	Park
Exempt	Utilities
	Government non-Institutional

Notes:
1 Agricultural uses are classified as Manufacturing and Production under 14 C.F.R. Part 150 Guidelines but are identified separately for this Study for ease of understanding the land uses near the Airport.

D.2.2 GIS Data Compilation

Base mapping information; including roads, county and municipal boundaries, and land use; were compiled using ArcMap, version 10.7. ArcMap is an analytical software program that allows manipulation and analysis of spatial data from a variety of sources. The base map information is used for comparison to aircraft noise and operational data analyzed for this study. Flight track data obtained for this Study as described in **Appendix C, *Noise Methodology***, was overlaid onto the land use base map. Noise contours generated by the Aviation Environmental Design Tool (AEDT) were superimposed over the land use base map to produce the Noise Exposure Maps (NEMs) for this Study.

Land parcel and facility data was obtained from Franklin County and the City of Columbus in August 2019 and areas within the previous 65 DNL noise exposure contour for CMH were field verified in November 2019. The field verified parcel data was used to identify land uses that would be considered noise-sensitive land per FAA guidelines. The 2010 U.S. Census data, at the tract and block level, was combined with the parcel data to calculate total population based on average household size. An estimated ratio of persons per household was determined based on U.S. Census data and that ratio was applied to each parcel to estimate the population within each housing unit. The housing and population incompatibilities within each of the noise contours were determined by overlaying the noise contour and the parcel data using GIS software. The number of residential parcels/structures and population within each DNL noise contour level were then determined by an automated count using the GIS software's built-in capabilities. Land use data was further supplemented with review of aerial imagery and updated GIS data was conducted in May 2021.

D.2.3 Noise-Sensitive Public Facilities

Land uses that could be considered incompatible with airport operations include more than just residential uses. FAA guidelines define certain public facilities as noise-sensitive: places of worship, schools (and daycare facilities at which licensed education occurs), nursing homes, libraries, and hospitals. Detailed information on noise-sensitive facilities was collected within the GSA. A variety of sources were used to obtain GIS data showing the locations of noise-sensitive public facilities within the airport environs, including GIS data from Franklin County, the City of Columbus, aerial imagery and past studies at CMH. This data was supplemented using aerial imagery and field verification in November 2019.

Within this area there are 162 schools,[40] 230 places of worship, seven libraries, three hospitals, and fourteen nursing homes as shown on **Exhibit D-1, *Existing Noise-Sensitive Public Facilities***, which identifies each noise-sensitive facility by a unique alpha-numeric "Map ID" and Table D-2 which lists the facilities by name and corresponding Map ID.

[40] Includes daycare facilities were licensed education occurs as listed by the City of Columbus or Franklin County.

D.2.4 Development Trends

Development is also expected to occur to meet the demands for residential and commercial uses created by population growth. To the northwest, west, and southwest of CMH, infill development and/or redevelopment could occur along Stelzer Road and Cassady Avenue. To the south and east of the Airport, new residential development could occur through infill within existing neighborhoods and new subdivision development. The following new development is underway or expected to occur by 2025 within the GSA.

- Norton Crossing development is under construction in Whitehall, at the corner of South Hamilton Road and East Broad Street which will be a mixed use development including office, retail, and residential.[41]

- Homeport Development is under construction in Whitehall at the corner of South Hamilton Road and Etna Road which will include a 102-unit apartment complex and a 32-unit senior living complex.[42,]

- East of the Airport, Tech Center Drive was extended across I-270 and Hamilton Road, which has created access to land for more new development. The parcel north of Tech Center Drive and east of Hamilton Road is proposed for mixed use, including 240 apartments, office space, retail, residential, and recreations uses.[43, 44] The development application for the site known as Crescent at Central Park was submitted to the City of Gahanna and a zoning change and variance for the development was approved in February 2021.

- To the west of the Airport, several properties along Cassady Avenue are proposed for new development, including Woodfield Park, which would include a 240-unit apartment complex, and Cassady Avenue Development, which would include an ambulatory care facility, hotel and commercial space near the intersection of Cassady Avenue and Ackley Place.[45, 46]

- To the northwest of CMH, potential redevelopment includes Victoria Manor, a proposed new 480-unit housing development on Stelzer Road north of Agler Road.[47]

- To the southwest of CMH, proposed new development includes the Creekside Place Apartments, which would be located on Nelson Road north of Maryland Avenue.[48]

Properties that are under development or proposed for development are displayed as “transitional / mixed-use” on the Future (2025) NEM.

[41] Corvo, K. Residents will see big strides soon at Whitehall’s Norton Crossing, This Week News. March 26, 2019. Accessed online at: https://www.thisweeknews.com/news/20190326/residents-will-see-big-strides-soon-at-whitehalls-norton-crossing

[42] Navera, T. Two new housing developments approved for Whitehall, Columbus Business Journal. February 5, 2019. Accessed online at: https://www.bizjournals.com/columbus/news/2019/02/05/two-new-housing-developments-approved-for.html

[43] City of Gahanna, Planning Commission Meeting Minutes, September 23, 2020, Accessed online at: https://gahanna.legistar.com/Calendar.aspx

[44] ThisWeek Community News, Gahanna council OKs zoning change for Crescent at Central Park apartments to move forward, February 16, 2021.

[45] American City Business Journals, Columbus Business First, Developer proposes 41-acre mixed-use project near John Glenn Columbus International Airport, July 23, 2019, Accessed online at: https://www.bizjournals.com/columbus/news/2019/07/23/developer-proposes-41-acre-mixed-use-project-near.html.

[46] American City Business Journals, Columbus Business First, Metro Development plans 720 new apartments near Columbus airport, Easton, October 2, 2020, Accessed online at: https://www.bizjournals.com/columbus/news/2020/10/02/720-new-apartments-pitched-near-easton.html.

[47] Ibid

[48] American City Business Journals, Columbus Business First, May 24, 2019, Accessed online at: https://www.bizjournals.com/columbus/news/2019/05/24/slideshow-7-affordable-housing-projects-land-tax.html

Exhibit D-1 Existing Noise-Sensitive Public Facilities

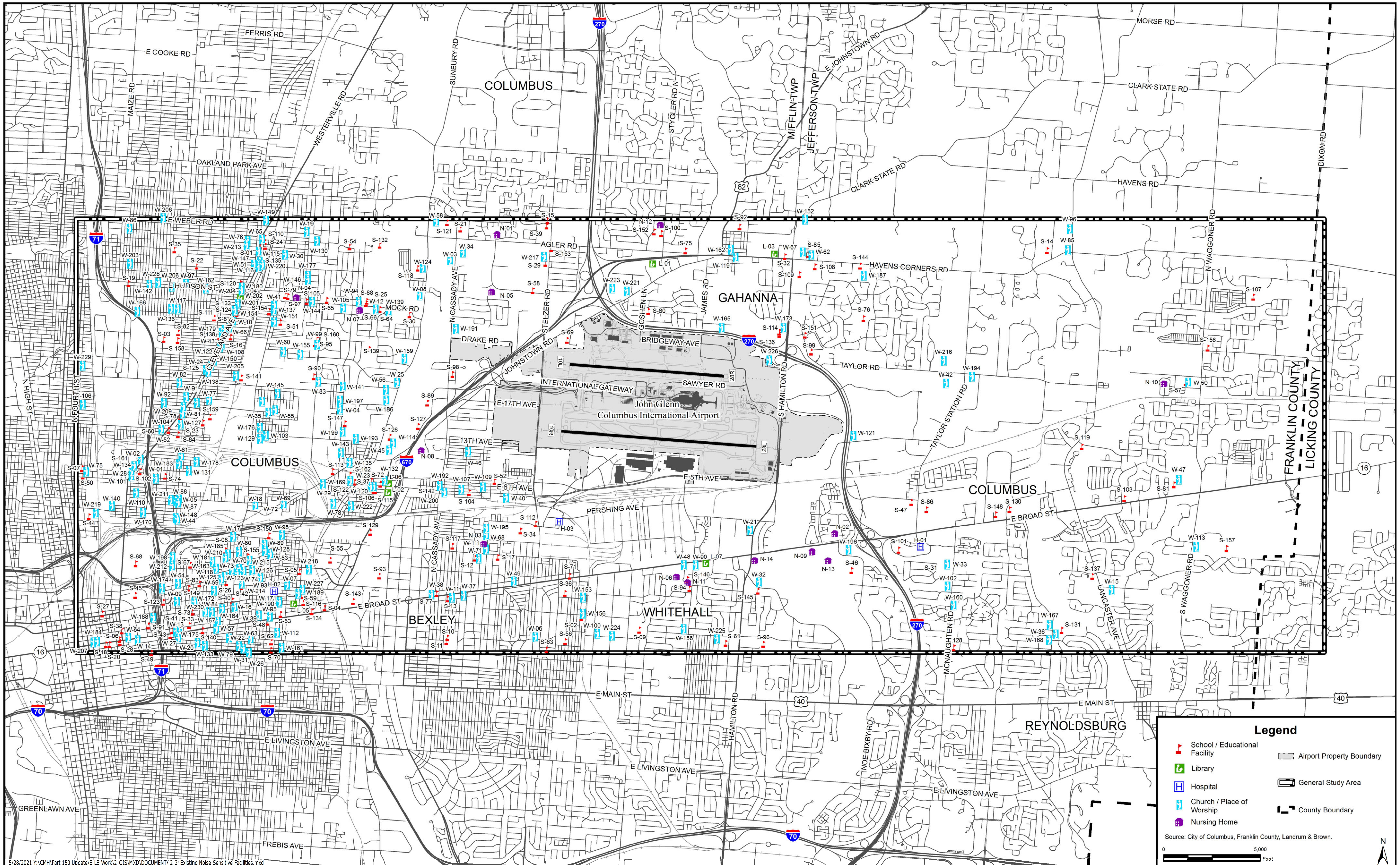

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Table D-2 Noise-Sensitive Public Facilities

MAP ID	NAME
	Schools
S-01	A Better Choice Childcare
S-02	A+ Arts Academy High School
S-03	Academic Acceleration Academy
S-04	Academy for Urban Scholars
S-05	Academy Kids Learning Center
S-06	ATM Education First
S-07	Battelle Learning Center
S-08	Beatty Park / Trevitt Elementary School
S-09	Beechwood Elementary School
S-10	Bexley High School
S-11	Bexley Middle School
S-12	Bexley Play & Learn Early Learning Center
S-13	Bexley United Methodist Preschool
S-14	Blacklick Elementary
S-15	Bradford School
S-16	Brightside Academy
S-17	Broadleigh Elementary School
S-18	C James Grothaus Child Care Center
S-19	Cambridge Daycare Center
S-20	Capital University Law School
S-21	Cassady Alternative Elementary School
S-22	CDC Linden Head Start
S-23	CDCFC Rosewind Head Start
S-24	Central Ohio Childcare
S-25	Cesar Chavez College Preparatory School
S-26	Champion Middle School
S-27	Child Development Council of Franklin County
S-28	ChildCare Wonderland
S-29	Children Achievers Faith Academy
S-30	Children's Sweet Paradise Learning Center
S-31	Church of The Redeemer United Methodist Preschool
S-32	Clark Hall – Gahanna Lincoln School District
S-33	Clearbrook Middle School
S-34	Columbus Africentric Early College
S-35	Columbus Alternative High School
S-36	Columbus City Preparatory School for Boys
S-37	Columbus City Schools Early Ed
S-38	Columbus College of Art and Design
S-39	Columbus Culinary Institute
S-40	Columbus Early Learning Centers
S-41	Columbus Early Learning Centers
S-42	Columbus Early Learning Centers
S-43	Columbus Learning Cooperative
S-44	Columbus Performance Academy

Table D-2 Noise-Sensitive Public Facilities *(continued)*

MAP ID	NAME
S-45	Columbus State Community College
S-46	Columbus Torah Academy
S-47	Creative Child Care
S-48	Crittenton Community School
S-49	Davis Center Youth Program
S-50	Daydream Daycare North
S-51	Duxberry Park Alternative Elementary School
S-52	East Columbus Elementary School
S-53	East High School
S-54	East Linden Elementary School
S-55	Eastgate Elementary School
S-56	Eastmoor Academy
S-57	Eastpointe Christian Preschool
S-58	Educational Service Center of Central Ohio
S-59	Eldon Ward YMCA Daycare
S-60	Elite Academy & Childcare Center
S-61	Etna Road Elementary YMCA Y Club
S-62	Fair Elementary School
S-63	Fairmoor Elementary School
S-64	FCI Academy Kindergarten Village
S-65	FCI Academy-North Campus
S-66	FCI Too Child Care Center
S-67	Felton School
S-68	Fort Hayes Arts & Academic HS and Career Center
S-69	Franklin County Developmental Disabilities
S-70	Franklin Middle School
S-71	Fresh Start Learning Academy
S-72	Future Leaders Learning Academy
S-73	Future Scholars Early Learning Center
S-74	G Tyree Learning Center
S-75	Gahanna Children's College
S-76	Gahanna Middle School South
S-77	Gan Ephraim
S-78	Giggles & Blessings Learning Center
S-79	Global Childcare Center
S-80	Goshen Lane Elementary
S-81	Grace Christian School
S-82	Hamilton STEM Academy
S-83	Hands on Learning Academy
S-84	Harambee Christian School
S-85	Havens Corners Kindercare
S-86	Heritage College
S-87	Hoggy's Play Pen North
S-88	iEducate Academy
S-89	Insight School of Ohio

Table D-2 Noise-Sensitive Public Facilities *(continued)*

MAP ID	NAME
S-90	IQRA Learning Center
S-91	Jefferson Center for Learning
S-92	Jefferson Elementary
S-93	Jeffrey Mansion Preschool
S-94	Jelly Bean Junction
S-95	Joyful Beginnings Children's Learning Academy
S-96	Kae Avenue Y-Club
S-97	Kids Castle Learning Center
S-98	Kids Zone Learning Center
S-99	KinderCare Learning Center
S-100	KinderCare Learning Center
S-101	KinderCare Learning Center
S-102	Kings and Queens Learning Center
S-103	La Petite Academy
S-104	Leaders Learning Center
S-105	Lending Hand Learning Center
S-106	Let the Children Come
S-107	LHW Elementary School
S-108	Lincoln Elementary
S-109	Lincoln High School
S-110	Linden Elementary School
S-111	Linden-McKinley STEM
S-112	Little Buckeye Learning Center
S-113	Little Gems Learning Place
S-114	Little Lambs Children's Center
S-115	Little Treasures Learning Academy
S-116	Mansion Day Elementary
S-117	Maryland School
S-118	Mee Maw's House of Learning
S-119	Michelle's Academy
S-120	Midnimo Cross Cultural Community School
S-121	Mifflin Middle School
S-122	Mother's Helper Child Care
S-123	Mother's Helper Child Care II
S-124	New Era Academy
S-125	New Journey Learning Center
S-126	Ohio Dominican University
S-127	Ohio Dominican University
S-128	Olde Orchard Elementary School
S-129	Our Play Station & Learning Center
S-130	Primrose School
S-131	Rosehill Elementary School
S-132	Rosemont Center School
S-133	Safe Haven Day Care & Learning Center
S-134	Salon Schools Group

Table D-2 Noise-Sensitive Public Facilities *(continued)*

MAP ID	NAME
S-135	School of Biblical Theology
S-136	Shepherd Christian Elementary School
S-137	Shining Stars Child Care
S-138	Sonshine Christian Academy
S-139	South Mifflin STEM Academy
S-140	St John Paul II Early Childhood Education Center
S-141	St Stephen's Christ Child Early Learning Center
S-142	St Thomas the Apostle School
S-143	St. Charles Preparatory School West Campus
S-144	St. Matthew School
S-145	Start 2 Finish Learning Academy
S-146	Start 2 Finish Learning Academy II
S-147	The Charles School
S-148	The Goddard School
S-149	The Ohio State University Branch
S-150	The Ohio State University Medical Branch
S-151	The Sunshine House
S-152	Treehouse Learning Center
S-153	Twinkle Star Child Care Center
S-154	United Childcare Center
S-155	Valor Preparatory School of Ohio
S-156	Waggoner Academy Learning Center
S-157	Waggoner Road Middle School
S-158	Welcome Center High School
S-159	Windsor Alternative School
S-160	Woodland Child Care Center
S-161	Youth Build Columbus Community School
S-162	YWCA Family Center Safe & Sound Child Care
Libraries	
L-01	Central Library Consortium
L-02	Columbus Metropolitan Library
L-03	Columbus Metropolitan Library - Gahanna
L-04	Columbus Metropolitan Library - Linden
L-05	Columbus Metropolitan Library - Martin Luther King
L-06	Columbus Metropolitan Library - Shepard
L-07	Columbus Metropolitan Library - Whitehall
Churches / Places of Worship	
W-01	Abundant Faith Church of God
W-02	Acts of Faith
W-03	Advent Church UCC
W-04	Aenon Missionary Baptist
W-05	Agape Outreach Ministries
W-06	All Nations Christian Church
W-07	Astbury United Methodist Church
W-08	Baha'i Faith

Table D-2 Noise-Sensitive Public Facilities *(continued)*

MAP ID	NAME
W-09	Bethany Presbyterian Church
W-10	Bethel AME Church
W-11	Bexley United Methodist
W-12	Born to Win Christian Center
W-13	Broad Street Presbyterian Church
W-14	Broad Street United Methodist Church
W-15	Brookside Baptist Church
W-16	Calhoun Temple Church
W-17	Calvary Tremont Baptist Church
W-18	Canaan Temple Church
W-19	Centenary United Methodist Church
W-20	Central Seventh Day Adventist Church
W-21	CharismaLife Ministries
W-22	Christ Bible Church
W-23	Christ Community Church
W-24	Christian Empowerment Center Ministries
W-25	Christian Outreach Ministries
W-26	Church of the Divine Kingdom Builders
W-27	Church - Corner of Garfield Ave and Capital St
W-28	Church In Jesus Christ
W-29	Church New Hope Church of God
W-30	Church of Christ
W-31	Church of Living God
W-32	Church of St. Edward
W-33	Church of The Redeemer
W-34	Columbus Christian Center
W-35	Columbus Family Worship Center
W-36	Community of Christ
W-37	Congregation Aguda Achim
W-38	Congregation Ahavas Sholom
W-39	Congregation Tifereth Israel
W-40	Corinthian Missionary Baptist Church
W-41	Cornerstone Pentecostal Church
W-42	Country Fellowship Church
W-43	Crackhouse Ministries
W-44	Deeper Life Bible Church
W-45	Dominican Sisters of Peace
W-46	East Mt. Olivet Baptist Church
W-47	East Side Grace Brethren Church
W-48	East Whitehall Baptist Church
W-49	Eastminster Presbyterian Church
W-50	Eastpointe Christian Church
W-51	Ebenezer Haician
W-52	Eliezer Church of Christ
W-53	Emmanuel Community Baptist Church

Table D-2 Noise-Sensitive Public Facilities *(continued)*

MAP ID	NAME
W-54	Emmanuel Tabernacle Baptist Church
W-55	Ephphatha Outreach Ministries
W-56	Eternal Life of Christ
W-57	Ethiopian Orthodox Tewahedo Church
W-58	Faith Ministries Church
W-59	Faith Missions United Holy Church
W-60	Faith Tabernacle Church of God in Christ
W-61	Faith Tabernacle Holiness Church
W-62	First Baptist Church of Gahanna
W-63	First Church of God
W-64	First Congregational Church
W-65	First Spiritualist Church
W-66	Fresh Oil Christian Center
W-67	Gahanna Community Church
W-68	Glory Evangelistic Ministries
W-70	God & Saints Christ Church
W-69	God's House of Prayer
W-71	Good Shepherd Lutheran
W-72	Goodwill Baptist Church
W-73	Gospel Tabernacle Church
W-74	Gospel Tabernacle Food Pantry
W-75	Grace Baptist Church
W-76	Grace New Covenant Apostolic
W-77	Greater 12th Ave Baptist Church
W-78	Greater Christ Temple
W-79	Greater Faith Temple Apostolic
W-80	Greater Glory Ministries
W-81	Greater Liberty Temple
W-82	Greater Linden Community Church
W-83	Greater St. Paul Church
W-84	Greater Vision Missionary Baptist
W-85	Havens Corners Church
W-86	Higher Dimensions
W-87	Higher Ground Always Abounding Assemblies
W-88	Higher Ground Family Life Center
W-89	Holy Miracle Church of God
W-90	Holy Spirit Catholic Church
W-91	Holy Temple Church of God
W-92	HOP Church
W-93	House of God
W-94	IbnuTaymiyah Masjid and Islamic Center
W-95	Islamic Center
W-96	Jehovah’s Witnesses
W-97	Jehovah's Witnesses
W-98	Jerusalem Tabernacle Baptist

Table D-2 Noise-Sensitive Public Facilities *(continued)*

MAP ID	NAME
W-99	Jordan Bible Church
W-100	Kingdom Christian Center
W-101	Kingdom Life Church
W-102	Laurel Canyon Church of Christ
W-103	Lee Avenue United Methodist Church
W-104	Linden Life Fellowship
W-105	Living Faith Apostolic Church
W-106	Living Hope Fellowship
W-107	Living Hope Omega Ministries
W-108	Living Waters Christian Fellowship
W-109	Living Word Ministries
W-110	Lord Jesus Christ's Church
W-111	Lord of Life Fellowship
W-112	Love Zion Baptist Church
W-113	Macedonia Orthodox Church
W-114	Martin De Porres Center
W-115	Masjid As-Sahaba Mosque
W-116	Masjid Ul Bayyinah
W-117	Maynard Ave Baptist Church
W-118	Meredith Temple Church of God
W-119	Mifflin Presbyterian Church
W-120	Miracle Cathedral
W-121	Mount Judia Church
W-122	Mount Zion International
W-123	Mt Calvary Holy Church
W-124	Mt Hermon Baptist Church
W-125	Mt Vernon Ave AME Church
W-126	Mt Vernon Missionary Baptist Church
W-127	Mt Victory Baptist Church
W-128	Mt Zion Church of God in Christ
W-129	Mt Zion Missionary Baptist Church
W-130	Mt. Nebo Baptist Church
W-131	New Covenant House of God
W-132	New Creation Missionary Baptist Church
W-133	New Faith Baptist Church
W-134	New Generation Church
W-135	New Genesis Baptist Church
W-136	New Haven Church
W-137	New Jerusalem MBC
W-138	New Journey Christian Ministries
W-139	New Life Church
W-140	New Life Empowerment Center
W-141	New Life Worship Center
W-142	New Palestine Baptist Church
W-143	New Season Christian Ministries

Table D-2 Noise-Sensitive Public Facilities *(continued)*

MAP ID	NAME
W-144	New Shiloh Full Gospel Missionary Baptist Church
W-145	New Tabernacle Church of Christ
W-146	New Tabernacle Church of Christ II
W-147	New Walk Church of God in Christ
W-148	New Wine Community Church
W-149	North Linden Baptist Church
W-150	Northside Church of God
W-151	Original Glorious Church of God in Christ
W-152	Peace Lutheran Church
W-153	Peace Missionary Baptist Church
W-154	Pentecostal House of Prayer
W-155	Philadelphia Baptist Church of Love and Faith
W-156	Philadelphia Deliverance Church of Christ
W-157	Pilgrim Baptist Church
W-158	Praise Temple Church of God
W-159	Praise Temple Community Church
W-160	Prince of Peace Lutheran Church
W-161	Promise Land Church
W-162	Rays of Light Church
W-163	Refuge Baptist Church
W-164	Rehoboth Temple Church of Christ
W-165	Resurrection Power Church of God
W-166	Revival Covenant Church
W-167	Reynoldsburg Alliance Church
W-168	Reynoldsburg Baptist Church
W-169	Rose International Center
W-170	Rose of Sharion Baptist Church
W-171	Saint Phillip Lutheran Church
W-172	Second Baptist Church
W-173	Shepherd Church of the Nazarene
W-174	Shiloh Baptist Church
W-175	Shiloh Christian Center
W-176	Sigsbee Avenue Church of God
W-177	So Help Me God Church of Christ
W-178	Solid Rock Baptist Church
W-179	Sound Doctrine Baptist Fellowship Church
W-180	St. Augustine & Gabriel Church
W-181	St. Dominic Church
W-182	St. James Baptist Church
W-183	St. John Baptist Church
W-184	St. Joseph Cathedral
W-185	St. Mark AME Church
W-186	St. Mary Orthodox Tewahdo Church
W-187	St. Mathews Apostle Church
W-188	St. Paul AME Church

Table D-2 Noise-Sensitive Public Facilities *(continued)*

MAP ID	NAME
W-189	St. Philip Episcopal Church
W-190	St. Philip Lutheran Church
W-191	St. Stevan-Dechani Serbian Church
W-192	St. Thomas the Apostle
W-193	Tabernacle Baptist Church
W-194	Taylor Station Church
W-195	Tears of Life Fellowship
W-196	Temple Israel
W-197	Temple of Faith
W-198	Temple of Praise
W-199	The Church of Christ of the Apostolic Faith
W-200	The Church of Columbus
W-201	The Church of Columbus
W-202	The Elevation Church
W-203	The Father's Heart International Church
W-204	The Good Shepherd Baptist Church
W-205	The House of God Church
W-206	The House of Prayer
W-207	The Roman Catholic Diocese of Columbus
W-208	The Way of Holiness Church, Inc.
W-209	Travelers' Rest Baptist Church
W-210	Trevitt New Life Ministries
W-211	Triedstone Missionary Baptist Church
W-212	Trinity Baptist Church
W-213	True Love Ministries
W-214	Union Grove Baptist Church
W-215	Union Tabernacle of God
W-216	United Baptist Church
W-217	United Faith International Baptist Church
W-218	United House of Prayer
W-219	Veritas Community Church
W-220	Victory Deliverance Church
W-221	Victory in Pentecost
W-222	Walk of Faith Christian Center
W-223	Walnut Creek Presbyterian Church
W-224	Whitehall Church of Christ
W-225	Whitehall United Methodist Church
W-226	Wonderland Community Church
W-227	Woodland Christian Church
W-228	Word at Work Ministries
W-229	Xenos Christian Fellowship
W-230	Yeshua is Lord Ministries

Table D-2 Noise-Sensitive Public Facilities *(continued)*

MAP ID	NAME
Hospitals	
H-01	Mount Carmel East Hospital
H-02	Ohio State University Hospital East
H-03	Veterans Affairs - Chalmers P. Wylie Ambulatory Care Center
Nursing Homes	
N-01	Agler Elderly Housing
N-02	Arbors East
N-03	Chandler Arms
N-04	Columbus Elderly Housing, LLC
N-05	Creative Housing
N-06	Eastway Village
N-07	Hegemon Crest Senior Housing
N-08	Kensington Place
N-09	Mother Angeline McCrory
N-10	National Church Residences
N-11	Pinewood Creative Housing
N-12	Stygler Village Senior Housing
N-13	Villas at St. Therese
N-14	Whitehall Assisted Living

Sources: City of Columbus GIS Open Data and Map Portal, Franklin County Auditor, Franklin County GIS Open Data, Landrum & Brown 2020.

D.2.5 Existing Historic Sites

Historic properties on or eligible for inclusion in the National Register of Historic Places (NRHP) should be identified on the NEMs per 14 CFR Part 150. The NRHP is the official list of historic places worthy of preservation in the U.S. as authorized by the National Historic Preservation Act of 1966. Within the GSA, there are 72 existing structures that are listed on or determined eligible for the NRHP. These historic sites are shown on Exhibit D-2, Historic Resources and listed in Table D-3, Historic Sites within General Study Area.

Exhibit D-2 Existing Historic Sites

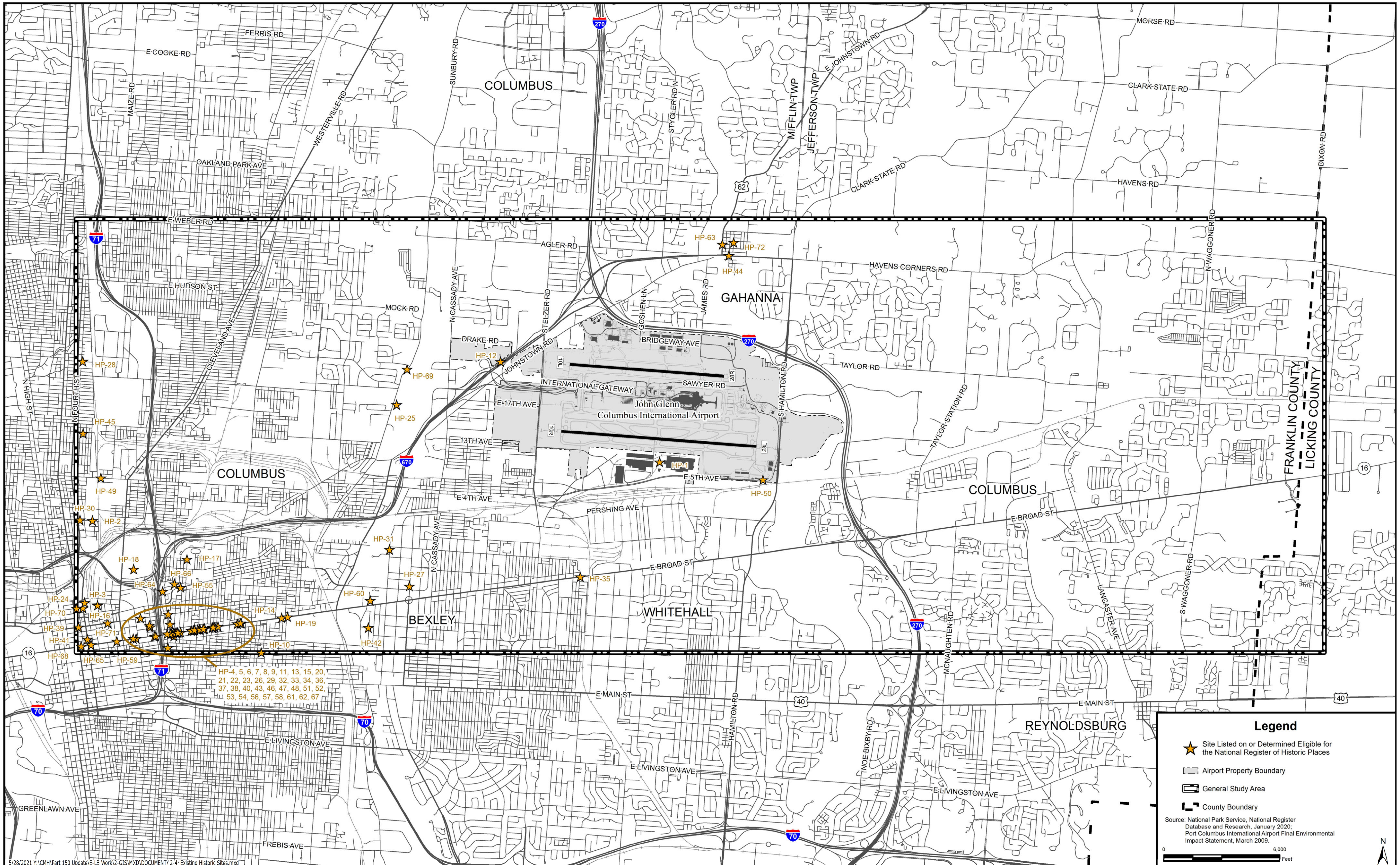

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Table D-3 Historic Sites within General Study Area

MAP ID	NAME
HP-1	Air Force Plant 85
HP-2	Berry Brothers Bolt Works
HP-3	Bradford Shoe Company Building
HP-4	Broad Street Apartments
HP-5	Broad Street Christian Church
HP-6	Broad Street United Methodist Church
HP-7	Cambridge Arms
HP-8	Central Assurance Company
HP-9	Columbus Gallery of Fine Arts
HP-10	Columbus Near East Side District
HP-11	Columbus Near East Side Historic District-Parsons Avenue
HP-12	Drake, Elam, House
HP-13	East Broad Street Commercial Building
HP-14	East Broad Street Historic District
HP-15	East Broad Street Presbyterian Church
HP-16	Engine House No. 16
HP-17	Felton School
HP-18	Fort Hayes
HP-19	Franklin Park Conservatory
HP-20	Garfield--Broad Apartments
HP-21	Hamilton Park Historic District
HP-22	Hanna House
HP-23	Heyne-Zimmerman House
HP-24	Higgins, H. A., Building
HP-25	House at 1388 Sunbury Road
HP-26	House at 753 East Broad Street
HP-27	Huntington, Franz, House
HP-28	Indianola Junior High School
HP-29	Jefferson Avenue Historic District
HP-30	Jeffrey Manufacturing Company Office Building
HP-31	Jeffrey, Malcolm, House
HP-32	Johnson--Campbell House
HP-33	Jones, W. H., Mansion
HP-34	Joseph-Cherrington House
HP-35	Kahiki, The
HP-36	Kauffman, Linus B., House
HP-37	Kaufman, Frank J., House

Table D-3 Historic Sites within the General Study Area *(continued)*

MAP ID	NAME
HP-38	Levy, Soloman, House
HP-39	Long and Third Commercial Building
HP-40	Lovejoy, Carrie, House
HP-41	Masonic Temple
HP-42	Miller, Frederick A., House-Broad Gables
HP-43	Morris, C. E., House
HP-44	Nafzger-Miller House
HP-45	New Indianola Historic District
HP-46	Ohio Farm Bureau Federation Offices
HP-47	Ohio Farm Bureau Federation Offices
HP-48	Old Governor's Mansion
HP-49	Old Port Columbus Airport Control Tower
HP-50	Old Port Columbus Airport Control Tower
HP-51	Pierce, Elijah, Properties
HP-52	Plaza Hotel
HP-53	Prentiss--Tulford House
HP-54	Prentiss, Frederick, House
HP-55	Pythian Temple and James Pythian Theater
HP-56	Saint Paul's Episcopal Church
HP-57	Schueller, Erwin W., House
HP-58	Scofield--Sanor House
HP-59	Seneca Hotel
HP-60	Sessions Village
HP-61	Sharp-Page House
HP-62	Shedd-Dunn House
HP-63	Shepard Street School
HP-64	Shiloh Baptist Church
HP-65	Smith, Benjamin, House
HP-66	St. Clair Hospital
HP-67	Thurber, James, House
HP-68	Trinity Episcopal Church
HP-69	Valley Dale Ballroom
HP-70	Welsbach Building
HP-71	Welsh Presbyterian Church
HP-72	Worthington United Presbyterian Church

Source: U.S. National Park Service, CMH Final Environmental Impact Statement, March 2009.

D.3 Preventative Local Land Use Controls

The following provides a brief discussion of the types of preventative land use controls available to the local jurisdictions to assist in reducing non-compatible land uses. Ultimately, it is the responsibility of the local jurisdictions to implement these land use controls. However, the CRAA is a willing partner in that effort and continually reaches out to the local jurisdictions to provide assistance.

Zoning

Zoning is one of the primary tools available to local communities to ensure land use compatibility. Zoning ordinances and regulations are intended to promote public health, safety, and welfare by regulating the use of the land within a jurisdiction based on factors such as land use compatibility and existing and expected socioeconomic conditions.

Subdivision Regulations

Subdivision regulations apply in cases where a parcel of land is proposed to be divided into lots or tracts, typically for the purpose of new development. Subdivision regulations are established to ensure the proper arrangement of streets, efficient movement of traffic, avoidance of congestion, adequate and convenient open space, sufficient and properly-located utilities, access for fire-fighting and rescue vehicles, and the orderly and efficient layout and use of land.

Subdivision regulations can be used to enhance noise-compatible land development by requiring developers to plat and develop land so as to minimize noise impacts or reduce the noise sensitivity of new development. The regulations can also be used to protect the airport proprietor from litigation for noise impacts at a later date. The most common requirement is the dedication of a noise or avigation easement to the airport owner by the land subdivider as a condition of development approval. The easement authorizes overflights of the property, with the noise levels attendant to such operations. This information is then attached to the property's plat notice so prospective buyers are made aware of the location of the property in relation to an airport.

Building Codes

Building codes regulate the construction of buildings, ensuring that they are built to safe standards. Sound attenuating properties may be required in new homes, offices, and institutional buildings to mitigate the effects of high aircraft noise levels. Building code requirements intended for energy efficiency also provide acoustical insulation benefits. Caulking of joints, continuous sheathing, dead air spaces, ceiling and wall insulation, solid core doors, and double-pane windows can attenuate aircraft noise while conserving energy used for home heating and cooling.

Not all sound insulation needs are met by typical energy-conserving building methods. For example, field research has found that some modern and highly energy-efficient storm window designs are less efficient for sound insulation than some older designs that allow for larger dead air spaces. Other sound insulation measures that may not be justifiable for energy efficiency are vent baffling and year-round, closed-window ventilation systems.

Building codes apply to existing buildings only when remodeling or expansion is contemplated. Amendments to building codes do not help to correct noise problems in developed areas. In developed areas, sound insulation must be applied retroactively to existing structures.

Capital Improvements Programs

Capital improvements programs are multi-year plans, typically covering five or six years, which list major capital improvements planned to be undertaken during each year. Most capital improvements have no direct bearing on noise compatibility; few municipal capital improvements are noise-sensitive.

The obvious exceptions to this are schools and, in certain circumstances, libraries, medical facilities, and recreational facilities.

Some capital improvements may have an indirect, but more profound, relationship to noise compatibility. For instance, sewer and water facilities may open up large vacant areas for private development of noise-sensitive residential uses. In contrast, the same types of facilities, sized for industrial users, could enable industrial development in a noise-impacted area that might otherwise be attractive for residential development.

Growth Risk Assessment

Before evaluating the impact of aircraft noise within the airport environs, it is important to understand the likelihood for the future development of residential and other noise-sensitive land uses, especially in the planning time frame. Understanding development trends in the airport vicinity is of critical importance in noise compatibility planning, because future residential growth can potentially constrain airport operations, if that growth occurs beneath aircraft flight tracks and within areas subject to high noise levels.

The growth risk analysis focuses primarily on undeveloped land which is planned and zoned for residential use. It is recognized that additional development may occur through in-filling and redevelopment of currently developed areas.

The methodology for analyzing potential growth risk is as follows:

- Identify all vacant, unplatted tracts of land zoned for future residential development with the greatest potential for being developed within the next five years.
- Calculate the area of the tracts; apply a factor accounting for development inefficiencies and the platting of streets; multiply by dwelling unit densities specified in the zoning ordinance; and multiply by household size to obtain the population holding capacity of presently vacant, unplatted land.
- Sum the above population holding levels to determine the total population holding capacity of the study area.

The final step in the growth risk analysis is to estimate whether the development is likely to occur before or after the year for which future noise exposure has been calculated. This tends to be quite speculative and should be regarded only as a general indicator of the potential risk of increases in land use incompatibility.

Fair Disclosure Policy

A method can be developed insuring that buyers of residential property within the airport environs receive fair disclosure of the location of the property relative to the airport by requiring that sellers of residential property in the airport environs deliver to buyers a purchase disclosure notice consisting of a copy of the Noise Overlay District Ordinance and Map with a statement that the property is located within the Airport Noise Overlay District. It may also require that all advertisements and listings for sale of residentially zoned or improved property in the Noise Overlay District include a statement about aircraft noise, such as -- “Not recommended for persons who may be easily disturbed by aircraft noise.” Finally, solicitation of voluntary inclusion of the notice in Multiple Listing Services by the real estate profession alerts potential buyers of property to the noise conditions.

D.3.2 Corrective Land Use Mitigation Alternatives

The following is a brief discussion of typical corrective or remedial land use mitigation alternatives included in Part 150 studies.

Sound Insulation

Sound insulation involves retrofitting an existing noise-sensitive structure with treatments designed to reduce interior noise levels. Typical treatments include installing additional insulation, baffling, sound-rated windows and doors, and sometimes installing central air conditioning to regulate interior temperature to allow windows to be kept closed in hot weather. A program for sound insulation of residences is always voluntary on part of the homeowner under a Part 150 program and is generally focused on residences located in a 65 DNL to 70 DNL noise contour. Other than the obvious benefit of reducing interior noise levels, a sound insulation program maintains the land use of the area and generally increases the value of the properties by maintaining the neighborhood continuity. Unfortunately, sound insulation treatments do not reduce the noise outside the residence and as such the benefits of the treatments are reduced when doors and windows are open.

Acquisition of Land or Interests in Land for Noise Compatibility

A program for property acquisition can be either voluntary (participation in the program is voluntary on the part of the property owner), or involve condemnation (local power of eminent domain). Acquisition as mitigation for noise impacts would always be voluntary under a Part 150 program. Acquisition programs can be designed to remove existing non-compatible land uses to convert the property to a compatible use, or to acquire undeveloped property to prevent it from being developed to a noise-sensitive use in the future.

Land Acquisition to Change Land Use

If the acquisition of property results in a change in land use, from incompatible to compatible with airport operations (e.g., airport/transportation, commercial, or industrial), the property owner would be eligible for relocation assistance and moving expenses, consistent with the *Uniform Relocation Assistance and Real Property Acquisition Policies Act*. The property would be acquired, residents would be relocated, and the property would be converted to a compatible land use. This would prevent further development of incompatible land uses. The land acquisition program should assure that the subsequent land use is consistent with local land use plans and policies, including compatibility with noise exposure levels in the area. Because the acquisition is to result in a change in land use, the local jurisdiction may decide to apply its power of eminent domain.

Land Acquisition without Change to Land Use

The acquisition of incompatible property where no change in land use would result would be a “voluntary” acquisition program, where participation in the program would be voluntary on the part of the property owner. The reason for such a voluntary program is most often due to the owner’s inability to the sell the property at fair market value. Acquisition procedures would be implemented in accordance with the *Uniform Relocation Assistance and Real Property Acquisition Policies Act;* however, because the program is voluntary, the owner selling the property would not be considered as displaced person and relocation benefits would not apply.

Purchase Assurance / Sales Assurance / Transaction Assistance

Purchase assurance, sales assurance, and transaction assistance are similar measures in which an airport sponsor provides assistance with the re-sale of a home to help homeowners that want to move out of an area near an airport. These measures would not change the land use and would typically also include sound insulation and conveyance of an avigation easement as a condition of the assistance.

Purchase assurance or guarantee is a program whereby the airport sponsor agrees to purchase a residence for fair market value should the owner be unable to sell the property on the open market because of noise levels. Participation in this program is voluntary on the part of the property owner and is implemented in areas where the land use is not going to change. The airport sponsor purchases the property at the appraised market value "as is" subject to airport noise. Typically, sound insulation is provided and the property is then listed and sold subject to the airport's avigation easement. A purchase assurance program requires an extensive property management and sales effort on the part of the Airport Operator and may be contracted with consultants and/or realtors.

Under sales assurance, the appraised market value of the homeowner's residence is guaranteed on a timely market sale; however, the airport does not acquire the property. Should the property sell for less than the appraised value, the selling owner is compensated for the shortfall by the Airport Operator. Property is appraised at its current market value "as is" subject to airport noise. The property is listed and sold subject to the airport's avigation easement that is conveyed to the Airport Operator at the sale of the property.

Transaction assistance generally involves an agreement by the Airport Operator to pay certain costs associated with the sale of residential property. Allowable costs are generally limited to the real estate sales commission. The property is listed and sold subject to the airport's avigation easement that is conveyed to the Airport Operator at the sale of the property.

The selling owner for purchase assurance/sales assurance/transaction assistance is not considered a "displaced person" and is not eligible for relocation assistance under the *Uniform Relocation Assistance and Real Property Acquisition Policies Act*.

Avigation Easements

Acquisition of avigation easements may be used to alleviate conflicts if no other land use controls are viable or in some cases, in lieu of outright acquisition of the land. The easement would be noted on the property deed and passed on to any subsequent owners of the property.

Amending local zoning and subdivision regulations to provide for the dedication of an easement to the airport sponsor as a condition of approval for residential rezoning or subdivision plats within the 65 DNL noise contour would alert developers, lenders, and prospective purchasers to the proximity of the airport and to the existence of a potential noise issue. The avigation easement would also protect the airport from future litigation by purchasers of the rezoned or subdivided property.

There is a constitutional issue raised by requiring dedication of an easement as well as imposing more vigorous and expensive standards for construction within the airport environs. Governments may not require a person to give up a constitutional right (i.e., a public use) in exchange for a discretionary benefit conferred by the government unless there is a reasonable relationship between a legitimate governmental objective and the condition that is imposed on the developer. Moreover, the exaction demanded by the permit or condition must be in proportion to the impact of the proposed development that is sought to be alleviated. Whether that balance exists requires an individualized determination. If it were determined not to meet these standards, then the legislation would either be unenforceable or its enforcement would constitute a taking requiring the payment of just compensation.

D.4 Existing Land Use Controls

Unlike many noise abatement measures, the implementation of Part 150 land use measures is not always under the control of the airport sponsor or the FAA. Therefore, it is necessary to understand the role local jurisdictions and planning organizations may play in implementing the Part 150 Noise Compatibility Program (NCP).

D.4.1 Role of Local Jurisdictions and Planning Organizations in Noise Compatibility Planning

Local planners and elected officials are typically responsible for local land use zoning and control. These entities and individuals prepare comprehensive plans, as well as review and implement zoning and land use regulations in a manner that may consider the effect of those actions as they relate to aviation activity and noise exposure.

The responsibility of regulating land use around an airport, in order to minimize existing and prevent future land use incompatibilities, is traditionally delegated to state and local governments. In addition to regulating land uses, local municipalities may facilitate the acquisition of property or the initiation of sound insulation programs as a means to mitigate and prevent future incompatible land uses resulting from airport noise. At airports with an approved Part 150 Study, an airport sponsor may apply directly to the FAA for funding of noise mitigation projects.

Local land use planners and elected officials were included in the membership of the Technical Advisory Committee (TAC) and participated in the study throughout the process. **Appendix G, *Public Involvement***, includes a summary of coordination with the land use planners and elected officials.

Implementation of the recommended land use measures LU-1, LU-2, and LU-10 is at the discretion of the CRAA and dependent upon FAA approval and funding. Implementation of the recommended measures LU-3 and LU-9 is solely at the discretion of the municipalities. Land use measure LU-12 requires coordination and approval by local jurisdictions.

D.4.2 Zoning Data Compilation

Specific zoning information from each jurisdiction within the GSA was collected and reviewed in order to identify tools for prohibiting incompatible development and encouraging compatible development near the Airport. The following sections summarize the zoning enforcement undertaken by each jurisdiction. **Table D-4** shows the generalized zoning categories (rural residential, low-density residential, medium to high-density residential, commercial, industrial, and recreational) as shown on the **Exhibit D-3** and the specific zoning classifications for each jurisdiction that are grouped into these generalized zoning categories.

Airport Environs Overlay

The previous Part 150 Study recommended the establishment of an Airport Environs Overlay (AEO) to assist in controlling residential development within the higher noise levels resulting from airport activity. Two jurisdictions within the GSA, the City of Columbus and Franklin County, have adopted the AEO to limit development within areas that are significantly impacted by airport noise. The local ordinances are based on model regulations developed by the Mid-Ohio Regional Planning Commission (MORPC) in 1991. The City of Columbus adopted the AEO in 1994 and Franklin County adopted a similar ordinance in 1996. Both ordinances added an overlay zone that established additional development standards and criteria for property within areas that are significantly impacted by noise. The AEO ordinances establish subdistricts according to the 65+, 70+, and 75+ DNL as indicated by the most recently published NEM. Within these subdistricts, land use is regulated to prevent non-compatible development that is incompatible with high levels of aircraft noise. The overlay zone boundary changes accordingly with updates to the Noise Exposure Map (NEM) and is therefore not a fixed boundary. Specific regulations from each jurisdiction’s zoning ordinance regarding the application of the AEO, if applicable, are discussed in the following sections.

Franklin County

Franklin County administers planning and zoning for the unincorporated areas including Mifflin and Truro Townships. Ohio Revised Code 303.02 enables County Commissioners to regulate building and land use in unincorporated territory for public purpose. The Franklin County Commissioners most recently amended and readopted the Franklin County Code in January 2014. In addition to standard overlay zones, the Franklin County Zoning Code includes the AEO District that restricts development of noise-sensitive land uses within noise impacted areas according to the latest published NEM.

City of Bexley

Zoning in the City of Bexley is set forth in the Codified Ordinances of Bexley, Part 12, Planning and Zoning Code which was last updated in November 2016. Much of the land in Bexley is zoned for either low to medium density residential. The City has no zoning regulations specific to airport noise compatibility.

City of Columbus

Land use development and zoning in the City of Columbus is guided by the City's Comprehensive Plan and neighborhood plans. Zoning restrictions are regulated by the Zoning Ordinance. Much of the area west of the airport is zoned medium density residential or industrial. Areas east of CMH have been annexed by the City of Columbus for the purpose of developing new residential subdivisions. The Columbus Zoning Ordinance includes an Airport Environs Overlay (AEO) zone that regulates development of noise-sensitive land uses corresponding to the most recently published NEM.

City of Gahanna

Zoning is guided by the City of Gahanna Land Use Plan, which was last updated in September 2019, and regulated by the Codified Ordinances of the City of Gahanna, Part Eleven, Planning and Zoning Code. Much of the city territory to the north and northeast of the airport is zoned as low- to medium-density residential. A business district is located to the north of the airport. To the east of the airport most of the land is zoned as commercial or industrial. The City has no zoning regulations specific to airport noise compatibility.

City of Reynoldsburg

The City of Reynoldsburg last amended its zoning code in February 2018. Much of the land within the General Study Areas is zoned low-density and medium-density residential. The City has no zoning regulations specific to airport noise compatibility.

City of Whitehall

The City of Whitehall zoning regulations are established by the Codified Ordinances of the City of Whitehall, Part Eleven, Planning and Zoning Code. There is a mix of residential, commercial and industrial areas within the City. The City has no zoning regulations specific to airport noise compatibility.

Jefferson Township

Jefferson Township administers its zoning code through its Zoning Resolution, which was last amended in October 2015. Most of the land within the Township is zoned as low-density residential with an industrial area centered along Reynoldsburg-New Albany Road and the railroad.

Exhibit D-3 Generalized Existing Zoning

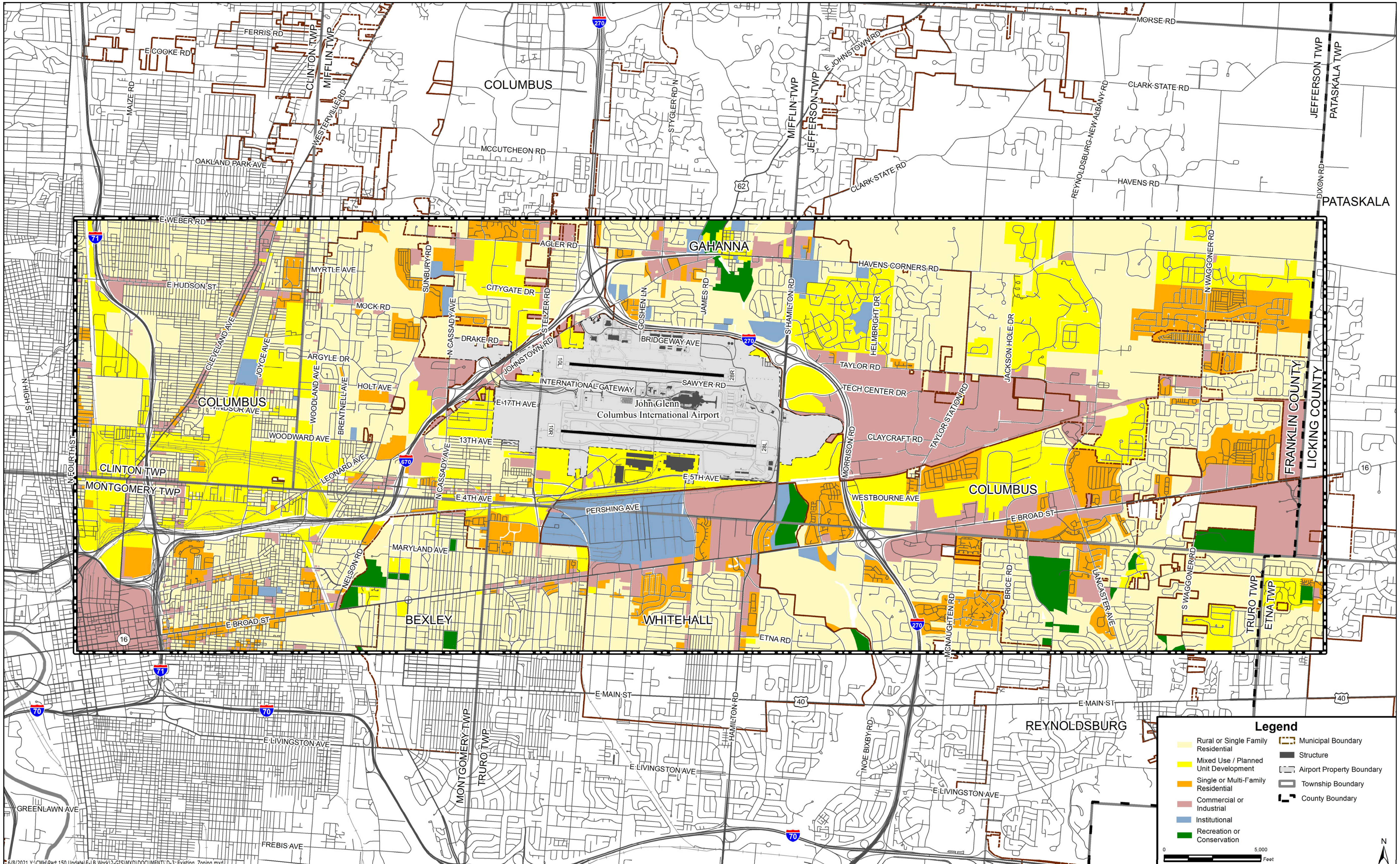

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Table D-4 Generalized Zoning Classifications

GENERALIZED ZONING	ZONING DISTRICT CODE
City of Bexley	
Commercial / Industrial	GC - General Commercial
Mixed Use / Planned Unit Development	PUR - Planned Unit Multi-Family Residential
	MUC - Mixed Use Commercial
Recreation / Conservation	OS - Open Space District
Single Family Residential	R-1 - Low Density Single Family Residential
	R-2 - Intermediate Single Family Residential
	R-3 - Medium Density Single Family Residential
	R-6 - High Density Single Family Residential
City of Columbus	
Commercial / Industrial	C1 - Commercial
	C2 - Commercial
	C3 - Commercial
	C4 - Commercial
	C5 - Commercial
	CPD - Commercial
	DD - Downtown District
	EQ - Excavation/Quarrying
	LC1 - Commercial
	LC2 - Commercial
	LC3 - Commercial
	LC4 - Commercial
	LC5 - Commercial
	LP1 - Parking
	LP2 - Parking
	NE - Neighborhood Edge
	NG - Neighborhood General
	P1 - Parking
	P2 - Parking
	TC - Town Center
Institutional	I - Institutional
	LI - Institutional
	NC - Neighborhood Center
Mixed Use / Planned Unit Development	EFD - East Franklinton District
	LM - Manufacturing
	LM1 - Manufacturing
	LM2 - Manufacturing
	LMHP - Manufactured Home
	M - Manufacturing
	M1 - Manufacturing
	M2 - Manufacturing
	MHD - Manufactured Home
	MHP - Manufactured Home

Table D-4 Generalized Zoning Classifications *(continued)*

Generalized Zoning	Zoning District Code
City of Columbus, *(continued)*	
Recreation / Conservation	LUCRPD - Research Park
	UCRPD - Research Park
Single Family Residential	LR - Residential
	LR1 - Residential
	LR2 - Residential
	LR2F - Residential
	LR4 - Residential
	LRR - Residential
	LRRR - Residential
	LSR - Residential
	PUD6 - Residential
	R - Residential
	R1 - Residential
	R2 - Residential
	R2F - Residential
	R3 - Residential
	R3 - Single Family
	R4 - Residential
	RR - Residential
	RRR - Residential
	SR - Residential
Single and Multi-Family Residential	AR1 - Multi-family
	AR12 - Multi-family
	AR2 - Multi-family
	AR3 - Multi-family
	AR4 - Multi-family
	ARLD - Multi-family
	ARO - Multi-family
	LAR1 - Multi-family
	LAR12 - Multi-family
	LAR2 - Multi-family
	LAR3 - Multi-family
	LAR4 - Multi-family
	LARLD - Multi-family
	LARO - Multi-family
	PC - Multi-family
	PUD2 - Multi-family
	PUD4 - Multi-family
	PUD6 - Multi-family
	PUD8 - Multi-family

Table D-4 Generalized Zoning Classifications *(continued)*

Generalized Zoning	Zoning District Code
City of Gahanna	
Commercial/ Industrial	CC - Community Commercial
	CC-2 - Community Commercial- Modified
	CS - Community Service
	NC - Neighborhood Commercial
	OCT - Office, Commerce, and Technology District
	PCC - Planned Commercial Center
	PID - Planned Industrial District
	SO - Suburban Office
Institutional	RID - Restricted Institutional District
	RID - Restricted Institutional District
Mixed Use / Planned Unit Development	CX-1 - Neighborhood Commercial Mixed Use
	OG-2 - Olde Gahanna Mixed Use Neighborhood District
	PCD - Planned Corporate Mixed-Use District
	PRCD - Planned Residential-Comm. Mixed Use District
	PUD - Planned Unit Development
	SCPD - Select Community Planned District
Recreation / Conservation	OG-3 - Olde Gahanna Recreation
Single Family Residential	ER-1 - Estate Residential
	ER-2 - Estate Residential
	OG-1 - Olde Gahanna Single Family Residential
	PRD - Planned Residential District
	R-4 - Single Family Residential
	SF-1 - Estate Residential
	SF-2 - Single Family Residential
	SF-3 - Single Family Residential
Single and Multi-Family Residential	MFRD - Multi-Family Residential
	MFRD - Multiple Family Residential
	MR-1 - Two Family Residential
City of Reynoldsburg	
Commercial / Industrial	CC - Community Commerce
	CS - Community Services
	GI - General Industry
	NC - Neighborhood Commerce
	RI - Restricted Industry
Mixed Use / Planned Unit Development	R-3;PD - Planned Development
Recreation/ Conservation	S-1 - Special
Single Family Residential	R-1 - Residence Single
	R-2 - Residence Single
	R-3 - Residence Single
Single and Multi-Family Residential	AR-2 - Residence Multiple
	AR-3 - Residence Multiple
	R-20 - Townhouse
	R-4 - Residence Single and Double

Table D-4 Generalized Zoning Classifications *(continued)*

Generalized Zoning	Zoning District Code
City of Whitehall	
Commercial / Industrial	OD - Office District
	GCD - General Commerce District
	LCD - Limited Commerce District
	I1 - Restricted Industrial District
	I2 - Limited Industrial District
Institutional	EU - Exceptional Use District
Mixed Use / Planned Unit Development	PAD - Planned Apartment District
Recreation / Conservation	FP - Flood Plain District
Single Family Residential	R0 - Residential Estate District
	R1 - Residential District
	R2 - Residential District
	R3 - Residential District
	R4 - Residential District
Single and Multi-Family Residential	A1 - Apartment District
	A2 - Apartment District
Jefferson Township	
Commercial / Industrial	CS - Community Service
	LI - Limited Industrial
	NC - Neighborhood Commercial
	PIP - Planned Industrial Park
	RI - Restricted Industrial
	SO - Suburban Office
Mixed Use / Planned Unit Development	EU - Exceptional Use
	PC - Planned Commercial
	PRD - Planned Residential District
	PRS - Planned Suburban Residential District
Single Family Residential	CSRD - Countryside Residential District
	RSRD - Restricted Suburban Residential District
Single and Multi-Family Residential	SPRD - Suburban Periphery Residential District
Mifflin & Truro Townships	
Commercial / Industrial	CS - Community Service
	NC - Neighborhood Commercial
	SO - Suburban Office
	SCPD - Select Commercial Planned District
	SPCD - Select Commercial Planned District
	LI - Limited Industrial
	PIP - Planned Industrial Park
	CC - Community Commercial
Mixed Use / Planned Unit Development	SO - Suburban Office and Institutional
Single Family Residential	R - Rural
	R-8 - Restricted Urban Residential
	R-12 - Urban Residential
Single and Multi-Family Residential	R-24 - Suburban Apartment Residential

D.5 FAA Land Use Planning Guidelines

While the FAA can provide assistance and funding to encourage compatible land development around airports, it has no regulatory authority for controlling land uses to protect airport capacity. The FAA recognizes that state and local governments are responsible for land use planning, zoning, and regulation including that necessary to provide land use compatibility with airport operations. However, pursuant to the Federal Airport and Airway Development Act, as a condition precedent to approval of an FAA-funded airport development project, the airport sponsor must provide the FAA with written assurances that "...appropriate action, including the adoption of zoning laws have been or will be taken, to the extent reasonable, to restrict the use of land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operations including landing and takeoff of aircraft...."[49] The Federal Government has enacted regulations and the FAA has implemented policies designed to improve airport land use compatibility as described in **Appendix A**.

[49] 49 U.S.C. § 47107(a)(10), formerly Section 511(a)(5) of the 1982 Airport Act

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Appendix E - Noise Abatement Alternatives

This Appendix provides information on the alternative noise abatement measures that were reviewed for inclusion in the John Glenn Columbus International Airport (CMH) Noise Compatibility Program (NCP). Each measure was evaluated for the anticipated benefits and drawbacks associated with its implementation.

E.1 Potential Noise Abatement Alternatives

The following list includes examples of the types of alternatives that were considered for inclusion in the NCP.

Flight Track Changes

- Potential divergent turns
- Alternate Corridors

Operational Procedures

- Preferential Runway Use – Direction East versus West flow
- Preferential Runway Use – North versus South runway
- Continuous descent approach
- Steeper departure profiles
- Flight management procedures
- Curfews

Facility Modifications

- Noise barriers
- Runup Locations

A list of noise abatement alternatives was developed based on discussion with CRAA, FAA ATCT, and Technical Advisory Committee (TAC) representatives, as well as a review of alternatives that were previously considered in the 2007 Part 150 Study. Some alternatives that were rejected in the 2007 Part 150 Study were re-evaluated to determine if conditions had changed that would make the alternative feasible. This evaluation took into account situations in which an alternative may shift overflights and noise from one area to another. The effect of shifting noise and overflights from one area to another was considered to not be a favorable solution. Other factors that were considered in the evaluation of alternatives were effects on airfield and airspace safety and efficiency.

The following pages provide a description of each alternative evaluated, along with an assessment of the benefits, drawbacks, and a recommendation. The list includes Measures NA-1 through NA-9, which are the currently approved noise abatement measures from the 2007 NCP Update. Measure NA-5 was previously withdrawn. Seven additional alternatives from the 2007 Part 150 Study were evaluated. These alternatives are labeled NA-A through NA-G.

E.2 Currently-Approved Land Use Measures

NOISE COMPATIBILITY PROGRAM ALTERNATIVE NA-1 (CURRENTLY APPROVED MEASURE)

Description: Amend the CMH Nighttime Aircraft Maintenance Run-Up Policy to designate an additional run-up location north of the airfield for the relocation of the NetJets' facility. This measure will provide attenuation of jet engine maintenance run-ups for adjacent residential areas located north of the Airport.

Status: This measure is currently implemented. Run-ups are performed at the NetJets facility.

Recommendation: Continue approved measure NA-1.

NOISE COMPATIBILITY PROGRAM ALTERNATIVE NA-2 (CURRENTLY APPROVED MEASURE)

Description: Construct a new run-up barrier at the north airfield, if the NetJets building does not adequately attenuate jet engine maintenance run-up noise for adjacent residential areas located north of the Airport.

Status: This measure is currently implemented. Implemented – A run-up barrier is used at the NetJets facility..

Recommendation: Continue approved measure NA-2.

NOISE COMPATIBILITY PROGRAM ALTERNATIVE NA-3 (CURRENTLY APPROVED MEASURE)

Description: Increase nighttime use of Runway 10L/28R and amend FAA Tower Order CMH ATCT 7110.1 to read as follows: Unless wind, weather, runway closure, or loss of NAVAIDS dictate otherwise, between the hours of 10:00 p.m. and 8:00 a.m. local time, Runways 28L or 10R are assigned jet aircraft; jet aircraft with Stage 3 engines may use Runway 10L/28R for arrival operations between the hours of 10:00 p.m. and 1:00 a.m., local time; and jet aircraft with Stage 3 engines may use Runway 10L or 28R after 6:00 a.m.

Status: This measure is partially implemented. The current Tower Order (CMH 7110.1L) includes a provision that unless wind, weather, runway closures, or loss of NAVAIDS dictate otherwise, Runway 10L/28R is a noise-sensitive runway. All arriving and departing aircraft must request Runway 10L/28R with an operational need between the hours of 10:00pm and 6:00am.

Recommendation: Continue approved measure NA-3.

NOISE COMPATIBILITY PROGRAM ALTERNATIVE NA-4 (CURRENTLY APPROVED MEASURE)

Description: Maximize east flow and amend FAA Tower order CMH ATCT 7110.1b and the Airport Facilities Directory to reflect implementation of the "east flow" informal preferential runway use system.

Status: This measure is partially implemented. Complex conditions at the Airport such as winds, flow control policies at destination airports, and taxi times have limited the use of this measure.

Recommendation: Continue approved measure NA-4.

NOISE COMPATIBILITY PROGRAM ALTERNATIVE NA-6 (CURRENTLY APPROVED MEASURE)

Description: Implement a 15-degree divergent turn off of Runway 28R, after crossing the runway end to a 295-degree heading, only during peak operating periods when traffic warrants.

Status: Implemented – This measure is used when traffic conditions warrant.

Recommendation: Continue measure with modification to include proposed Airport Land Use Management District (ALUMD). See Alternative LU-B for more information on the ALUMD.

NOISE COMPATIBILITY PROGRAM ALTERNATIVE NA-7 (CURRENTLY APPROVED MEASURE)

Description: Create performance-based overlay procedures for all existing and proposed arrival/departure procedures. (RNAV/RNP/GPS/CDA)

Status: Currently being implemented – RNAV/RNP procedures are being developed independently by the FAA and are expected to be implemented in April 2021.

Recommendation: Continue approved measure NA-7.

NOISE COMPATIBILITY PROGRAM ALTERNATIVE NA-8 (CURRENTLY APPROVED MEASURE)

Description: Construct a noise berm/wall on airport property along East 13th Avenue.

Status: In 2013 the CRAA completed construction of the relocated Runway 10R/28L, which was relocated 702 feet to the south of the old runway alignment runway. The FAA conducted an Environmental Impact Statement (EIS) to assess the impacts of the proposed project. As part of that EIS process, 35 homes on the north side of 13th Avenue in East Columbus were identified for removal to meet airport design standards. The homes were located within the relocated Runway Protection Zone (RPZ), which is an area around a runway that is required to be void of tall objects or places in which humans may congregate. The homes were purchased and the residents were relocated in accordance with the Uniform Relocation Assistance and Real Property Acquisition Act. During the EIS and 2007 Part 150 Study, the CRAA and FAA took into consideration effects of the removal of the 35 homes and relocation of the runway would have on the remaining homes in the area. In order to address this, the CRAA and FAA recommended a noise berm/wall be constructed to the north of 13th Avenue to help reduce noise and to minimize the visual impact of the removed homes. However, further investigation and surveys of property owners determined that a noise berm in the proposed location was not desirable. Therefore, this measure was not implemented.

Recommendation: Withdraw measure.

NOISE COMPATIBILITY PROGRAM ALTERNATIVE NA-9 (CURRENTLY APPROVED MEASURE)

Description: Replacement and potential relocation of Ground Run-up Barrier B (location/materials/size).

Status: This measure was not implemented. The Airport currently has three ground run-up barriers at CMH. Barrier A (located to the south of Concourse B), Barrier B (located north of the southeast end of Taxiway G), and Barrier C (located on the north airfield north of Runway 10L/28R). An assessment of these barriers was conducted which found that Barriers A and C are properly sized and located for the types of operations they serve. That study identified the potential need to relocate and/or expanded Barrier B to accommodate larger aircraft that would be associated with a potential maintenance hangar that was proposed for the southeast side of the airfield at CMH. Currently Barrier B can accommodate up to Design Group C-II aircraft. It was recommended to upgrade Barrier B to accommodate larger aircraft (i.e.: Airbus A-319, B-737), and relocate or construct a new barrier if the existing barrier could not be expanded beyond its existing capacity. However, the proposed new maintenance hangar was never constructed and aircraft larger than Design Group C-II can use Barrier A. Therefore, no changes were made to Barrier B.

Recommendation: Continue measure – Measure would be implemented in the event a larger run-up barrier is ever needed in the southeast airfield.

Table E-1 Future (2025) Baseline Housing, Population, and Noise-Sensitive Facility Incompatibilities

	60-65 DNL*	65-70 DNL	70-75 DNL	75+ DNL	65+ DNL
Housing Units					
Columbus	**4,034**	**1**	**0**	**0**	**1**
Mitigated	720	0	0	0	0
Sound Insulated	682	0	0	0	0
Easement	38	0	0	0	0
Unmitigated	3,314	1	0	0	1
Eligible for Sound Insulation but not Insulated	141	0	0	0	0
Not Previously Mitigated	3,173	1	0	0	1
Mifflin Township	**57**	**0**	**0**	**0**	**0**
Mitigated	35	0	0	0	0
Sound Insulated	35	0	0	0	0
Easement	0	0	0	0	0
Unmitigated	22	0	0	0	0
Eligible for Sound Insulation but not Insulated	11	0	0	0	0
Not Previously Mitigated	11	0	0	0	0
Gahanna	**313**	**1**	**0**	**0**	**1**
Mitigated	0	0	0	0	0
Sound Insulated	0	0	0	0	0
Easement	0	0	0	0	0
Unmitigated	313	1	0	0	1
Eligible for Sound Insulation but not Insulated	0	1	0	0	1
Not Previously Mitigated	313	0	0	0	0
Jefferson Township	**146**	**0**	**0**	**0**	**0**
Mitigated	12	0	0	0	0
Sound Insulated	0	0	0	0	0
Easement	12	0	0	0	0
Unmitigated	134	0	0	0	0
Eligible for Sound Insulation but not Insulated	0	0	0	0	0
Not Previously Mitigated	134	0	0	0	0
Total Housing Units	**4,550**	**2**	**0**	**0**	**2**
Population					
Total Population	9,920	5	0	0	5
Noise-Sensitive Facilities					
Churches / Places of Worship	20	0	0	0	0
Schools / Educational Facilities	8	1	0	0	1
Libraries	0	0	0	0	0
Hospitals	0	0	0	0	0
Nursing Homes	1	0	0	0	0

Notes:
* In accordance with 14 CFR Part 150 Land Use Compatibility Guidelines, all land uses are compatible with noise levels below 65 DNL. The counts of land uses within the 60-65 DNL noise contour are shown for informational purposes only.

Noise contours were generated using the FAA's AEDT, Version 3b computer model.

Housing counts are based on field verification.

Population numbers are estimated based on the housing counts multiplied by the average household size from the 2010 Census.

Source: Landrum & Brown, 2020.

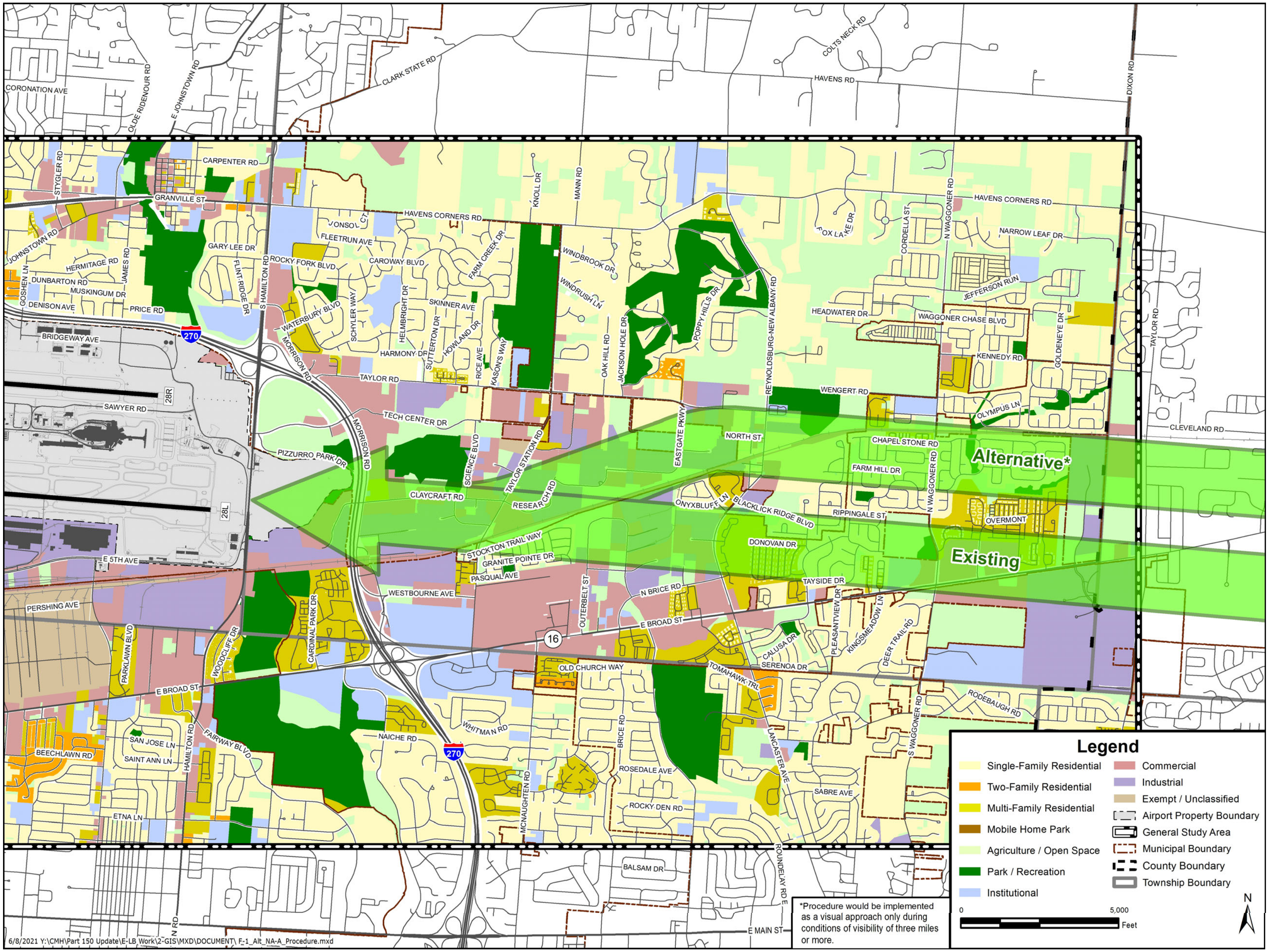
E.3 Consideration of Alternative Noise Abatement Measures

The following pages describe alternative noise abatement measures that were considered in this Part 150 Study. While not all alternatives may be practical or achievable, potential alternatives were considered in accordance with 14 CFR Part 150 §150.23(e) and §B150.7.

NOISE COMPATIBILITY PROGRAM ALTERNATIVE NA-A

TITLE:	When wind, weather, and operational conditions allow, nighttime (10:00 p.m. to 7:00 a.m.) arrivals use visual side step approach to Runway 28L.
BACKGROUND AND INTENT:	Current nighttime procedures recommend the use of Runway 10R/28L with the exception of pilot requests and during the morning hours. Standard approach procedures (straight-in from the outer marker) are used for nighttime jet arrivals. This alternative would modify the current nighttime procedures by implementing a side-step approach to Runway 28L. This would be implemented as a visual approach only during conditions where pilots could see both runways from three miles or more. The intent of this procedure is to direct aircraft over more compatible land uses during the nighttime. Review of the land uses east of the airport finds that the area aligned with the north runway is generally more compatible than the area aligned with the south runway.
BENEFITS:	This alternative would direct more overflights over a more compatible corridor (i.e. industrial uses and railroad alignment).
DRAWBACKS:	This alternative was reviewed in the 2007 Part 150 Study. Coordination with ATCT and pilots determined that the procedure was not desirable due to operational and safety factors.
COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures, and changing approach plates at radar positions would be the responsibility of the FAA.
EVALUATION METHOD:	Qualitative assessment
FINDINGS AND RECOMMENDATIONS:	Due to the concerns of ATCT and pilots, the alternative is **NOT RECOMMENDED** for further evaluation.

Exhibit E-1 Alternative NA-A Flight Corridor



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NOISE COMPATIBILITY PROGRAM ALTERNATIVE NA-B

TITLE:	Implement a 40-degree divergent turn off of Runway 10R, after crossing the runway end to a 140-degree heading, only during peak operating periods when traffic warrants.
BACKGROUND AND INTENT:	Current procedures instruct jet aircraft to fly runway heading until reaching five miles or 3,500 feet MSL. This alternative proposes a 40-degree right turn off of Runway 10R. It was recognized that this turn would only be used when air traffic warrants the need for an additional heading.
BENEFITS:	This procedure would increase capacity and reduce delays, during peak operating periods, by giving ATCT an additional heading.
DRAWBACKS:	The alternative was reviewed during the 2007 Part 150 Study which determined that it would cause airspace conflicts with Rickenbacker International Airport (LCK).
COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA.
EVALUATION METHOD:	Qualitative assessment
FINDINGS AND RECOMMENDATIONS:	Due to the conflicts with Rickenbacker International Airport, the alternative is **NOT RECOMMENDED** for further evaluation.

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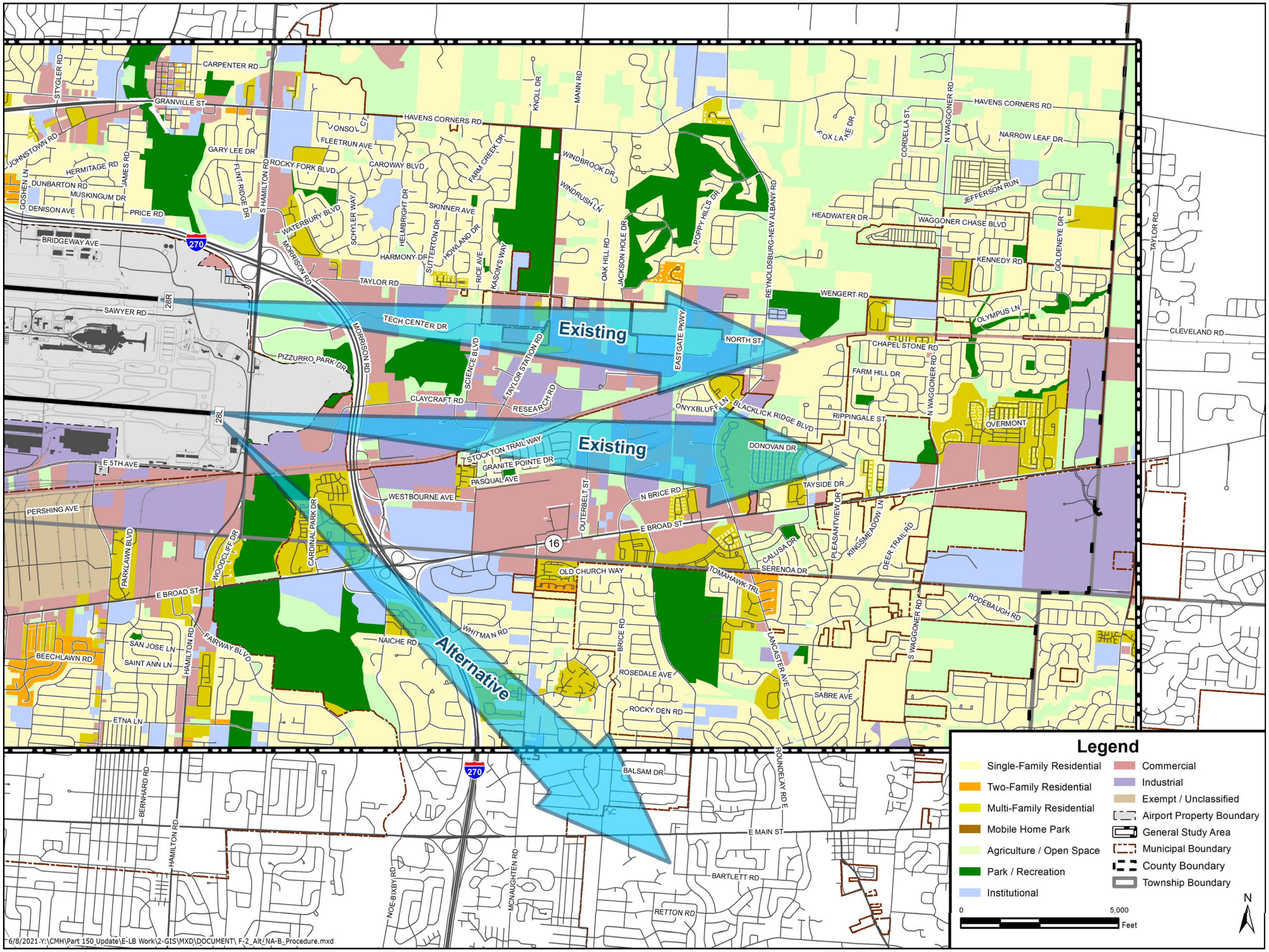
Exhibit E-2 Alternative NA-B Flight Corridor



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NOISE COMPATIBILITY PROGRAM ALTERNATIVE NA-C

TITLE:	All southbound traffic departing Runway 10R turn right and follow the Interstate 270 corridor.
BACKGROUND AND INTENT:	Current procedures instruct aircraft to fly runway heading until reaching five miles or 3,500 feet AGL. This procedure would take advantage of a more compatible corridor southeast of the airport along I-270.
BENEFITS:	This procedure would reduce overflights for those areas located along the Runway 10R centerline.
DRAWBACKS:	The alternative would cause airspace conflicts with Rickenbacker International Airport (LCK).
COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA.
EVALUATION METHOD:	Qualitative assessment
FINDINGS AND RECOMMENDATIONS:	Due to the conflicts with LCK, the alternative is **NOT RECOMMENDED** for further evaluation.

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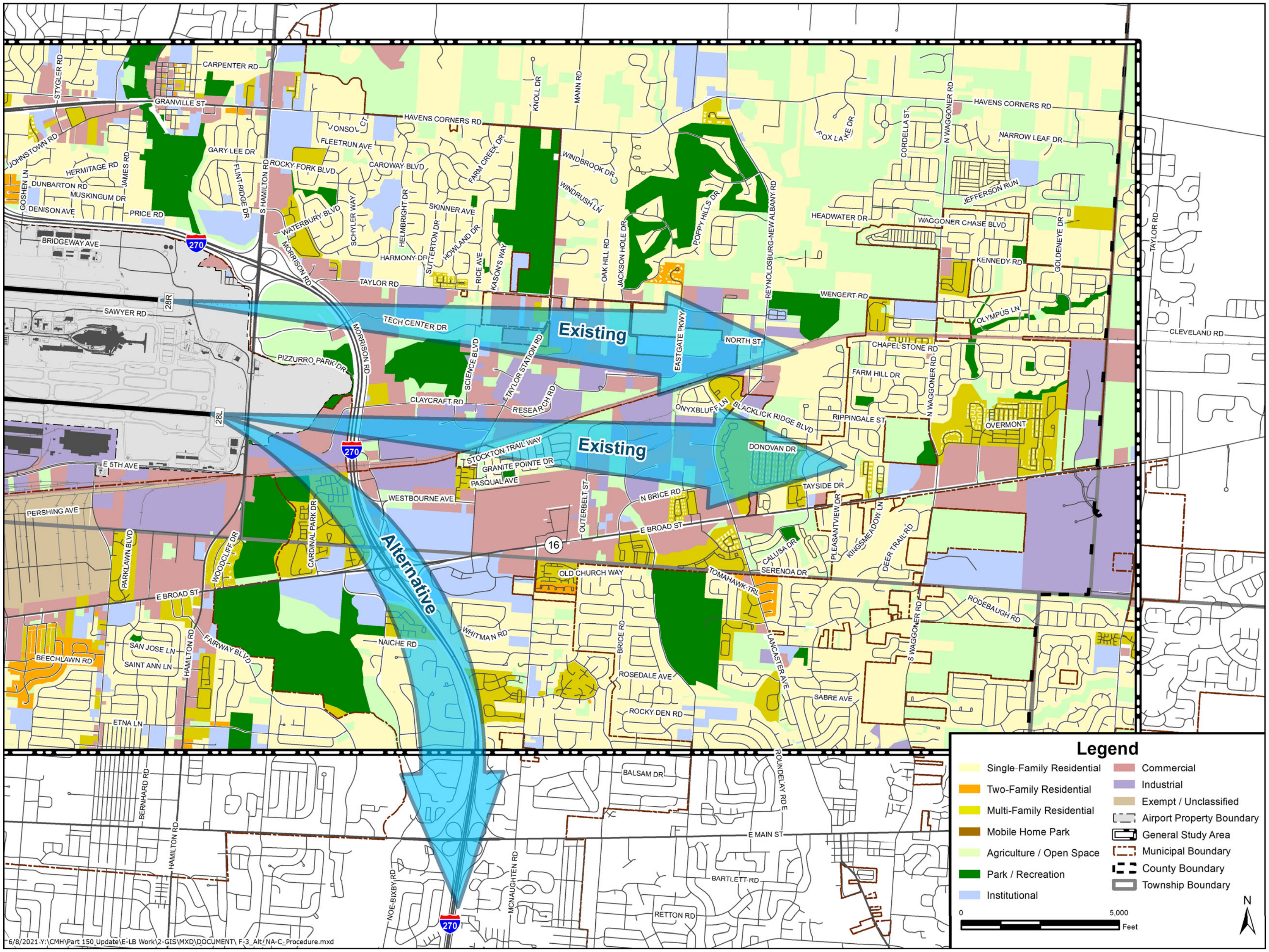
Exhibit E-3 Alternative NA-C Flight Corridor



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NOISE COMPATIBILITY PROGRAM ALTERNATIVE NA-D

TITLE:	All southbound traffic departing Runway 28L turn left and follow the I-670 / I-70 corridor.

BACKGROUND AND INTENT:	Current procedures instruct aircraft to fly runway heading until reaching five miles or 3,500 feet AGL. This procedure would route aircraft over the I-670 and I-70 corridors to take advantage of the more compatible corridor.

BENEFITS:	This procedure would reduce overflights for those areas located along the Runway 28L centerline.

DRAWBACKS:	The alternative would shift overflights from one area to another.

COST TO IMPLEMENT:	The cost for additional training, development, and publication of new procedures would be the responsibility of the FAA.

EVALUATION METHOD:	Qualitative assessment

FINDINGS AND RECOMMENDATIONS:	Due to shifting of overflights from one area to another, this alternative is **NOT RECOMMENDED** for further evaluation.

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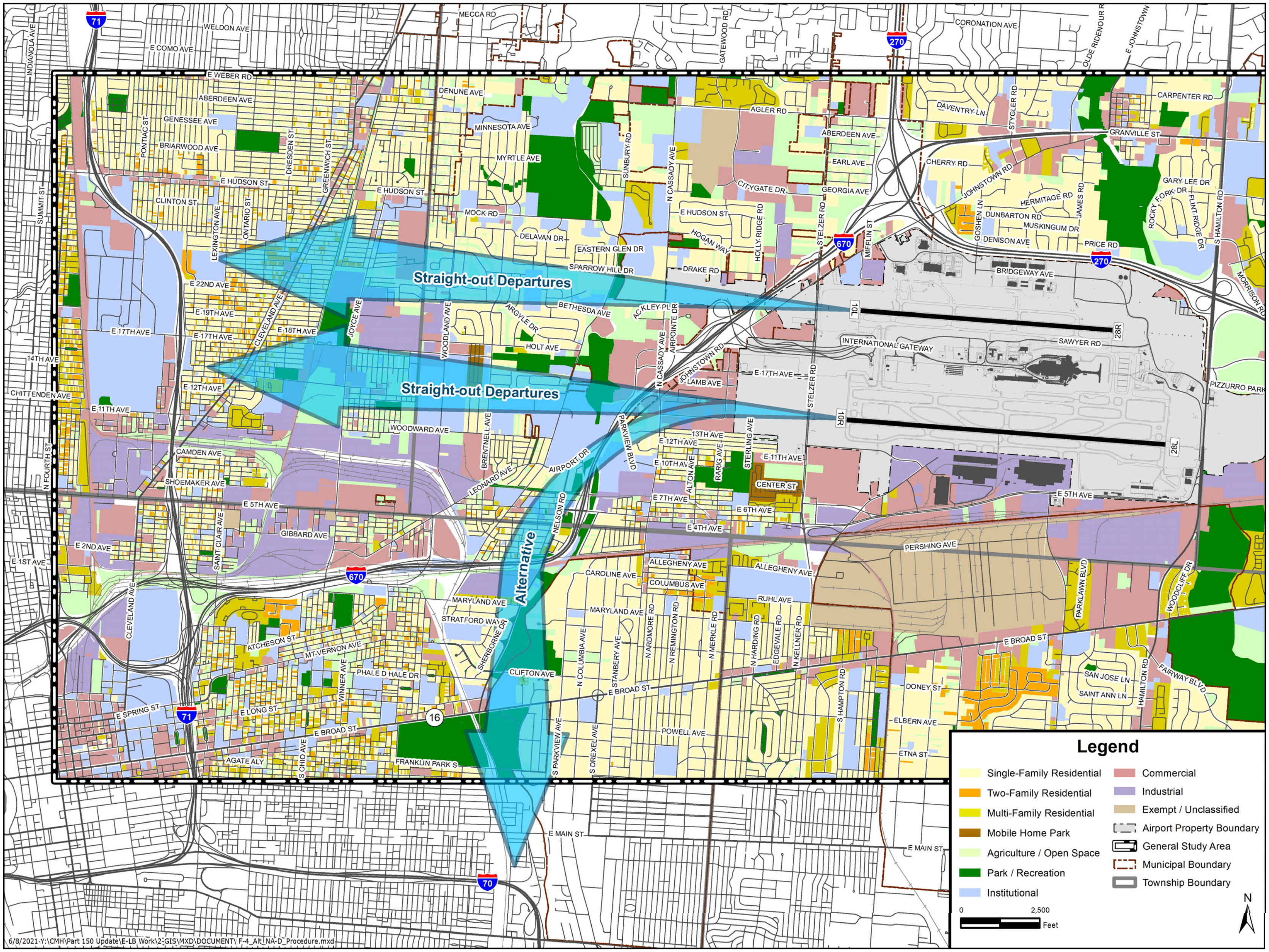
Exhibit E-4 Alternative NA-D Flight Corridor



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NOISE COMPATIBILITY PROGRAM ALTERNATIVE NA-E

TITLE:	Designate Runway 10L/28R as the preferential runway.
BACKGROUND AND INTENT:	At CMH, the selection of runway is based in large part on the length of the runway, the gate parking location, and the origin or destination of the flight. In general, airlines that are located on the north side of the terminal prefer the north runway and likewise for the airlines on the south side of the terminal. Heavier aircraft and those with farther destinations will prefer the longer runway (10R/28L). Based on these factors, Runway 10R/28L is currently the most heavily used runway. This alternative would identify Runway 10L/28R as the preferential runway. However, due to the length of Runway 10L/28R and its location in proximity to the terminal, it is unlikely that implementation would result in runway use notably different than what is currently occurring.
BENEFITS:	This alternative could reduce noise for the areas southeast and southwest of the airport if it was feasible to implement.
DRAWBACKS:	As mentioned above, it is unlikely that this alternative would result in any notable change in runway use. If it did however, the change would be a direct shift of noise from the communities in line with the south runway to the communities in line with the north runway.
COST TO IMPLEMENT:	None
EVALUATION METHOD:	Qualitative assessment
FINDINGS AND RECOMMENDATIONS:	Due to the effect of shifting noise from one area to another, this alternative is **NOT RECOMMENDED** for further evaluation.

NOISE COMPATIBILITY PROGRAM ALTERNATIVE NA-F

TITLE:	Designate Runway 10R/28L as the preferential runway.

BACKGROUND AND INTENT:	At CMH, the selection of runway is based in large part on the length of the runway, the gate parking location, and the origin or destination of the flight. In general, airlines that are located on the north side of the terminal prefer the north runway and likewise for the airlines on the south side of the terminal. Heavier aircraft and those with farther destinations will prefer the longer runway (10R/28L). Based on these factors, Runway 10R/28L is currently the most heavily used runway. This alternative would identify Runway 10R/28L as the preferential runway. However, due to the large number of airlines located on the north side of the terminal, it is unlikely that implementation would result in runway use notably different than what is currently occurring.

BENEFITS:	This alternative could reduce noise for the areas northeast and northwest of the airport if it was feasible to implement.

DRAWBACKS:	As mentioned above, it is unlikely that this alternative would result in any notable change in runway use. If it did however, the change would be a direct shift of noise from the communities in line with the south runway to the communities in line with the north runway.

COST TO IMPLEMENT:	None

EVALUATION METHOD:	Qualitative assessment

FINDINGS AND RECOMMENDATIONS:	Due to the effect of shifting noise from one area to another, this alternative is **NOT RECOMMENDED** for further evaluation.

NOISE COMPATIBILITY PROGRAM ALTERNATIVE NA-G

TITLE:	Implement Airport Operational Restrictions (Part 161).
BACKGROUND AND INTENT:	This alternative considers the potential for implementing airport access restrictions for noise abatement. These may include curfews or restrictions on aircraft types or groups. Any such action is subject to the provisions of Part 161, which requires extensive proof of benefits relative to costs prior to approval by the FAA. Typically, these types of studies have resulted in lawsuits and to date, none have been officially approved by the FAA.
BENEFITS:	These restrictions can resolve noise annoyance problems during the most sensitive periods or of the most annoying events.
DRAWBACKS:	Part 161 requires extensive additional evaluation, with little hope of approval, given the FAA's current stance on Part 161 actions.
COST TO IMPLEMENT:	A comprehensive Part 161 study would cost $3 to $5 million. Litigation could cost a similar amount.
EVALUATION METHOD:	Qualitative assessment
FINDINGS AND RECOMMENDATIONS:	Due to the high costs associated with conducting a Part 161 and the fact that the FAA has never officially approved a Part 161, the alternative is **NOT RECOMMENDED** for further evaluation.

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Appendix F - Land Use Alternatives

The subsequent pages provide information on the current land use management and mitigation measures from the previous Noise Compatibility Plan (NCP) and an additional measure that was considered for inclusion in the Updated Part 150 NCP. The implementation status of the current measures was determined and updates were recommended where appropriate. The proposed measure was evaluated for the anticipated benefits and costs associated with its implementation. The measures were reviewed with the membership of the Planning Advisory Committee (PAC). The local planning professionals were invited to meet with the consultant if they had any questions or concerns. Copies of all of the materials that were sent are located in **Appendix G, *Public Involvement***.

F.1 Potential Land Use Controls

Land use controls fall into two categories, preventative and corrective. Preventive land use management techniques seek to prevent the introduction of additional noise-sensitive land uses within existing and future airport noise contours. Corrective or remedial measures are intended to convert existing, non-compatible uses to compatible uses. These potential measures are discussed in **Appendix D** and summarized below:

Preventative

- Compatible Use Zoning
- Subdivision Regulations
- Building Codes
- Capital Improvement Programs
- Growth Risk Assessment
- Fair Disclosure Policies

Corrective

- Sound Insulation
- Land Acquisition
- Purchase Guarantee
- Avigation Easements

The following pages provide a description of each land use alternative evaluated, along with an assessment of the benefits, drawbacks, and a recommendation. Measures LU-1 through NA-12 are the currently approved land use measures from the 2007 NCP Update. Measure LU-11 was previously withdrawn.

F.2 Currently-Approved Land Use Measures

NOISE COMPATIBILITY PROGRAM ALTERNATIVE LU-1
(CURRENTLY APPROVED MEASURE)

Description: Offer a program for noise insulation of noncompatible structures for noncompatible residences within the 65+ DNL contour of the Future (2012) Noise Compatibility Program (NCP) condition, in exchange for an avigation easement.

Status: This measure was implemented. The boundary was updated based on the 2007 NEM/NCP Update. The CRAA has sound insulated nearly 800 housing units through this program. All homes eligible for sound insulation based on the 2007 NEM/NCP Update Study, have been sound insulated or have been offered sound insulation and the owner(s) declined or did not respond to the offer.

Recommendation: Continue measure with modification of program boundary based on the 65 DNL noise contour for the Future (2025) NEM/NCP Noise Exposure Contour. There are two housing units that are located within the 65+ DNL of the Future (2025) NEM/NCP Noise Exposure Contour. One housing unit is located in a commercial area on Taylor Station Road. The owner of this housing unit was offered sound insulation and did not respond or declined the offer. The other housing unit is located on Stockton Trail Way. The housing units in this area along Stockton Trail Way were constructed after the Noise Exposure Maps from the 2007 Part 150 Study were published. It is expected that these homes would have been constructed to meet the recommended interior sound attenuation guidelines and would already reduce noise to below acceptable levels. Therefore, these housing units are considered compatible and no housing units are recommended for sound insulation at this time.

NOISE COMPATIBILITY PROGRAM ALTERNATIVE LU-2
(CURRENTLY APPROVED MEASURE)

Description: Offer a program for noise insulation of noncompatible structures for noncompatible churches within the 65+ DNL contour of the Future (2025) Noise Compatibility Program (NCP) condition in exchange for an avigation easement

Status: This measure was implemented. Two churches were identified within the 65 DNL of the 2002 Part 150 noise compatibility study. One church, the Wonderland Community Church, is located to the northeast of CMH. The CRAA purchased an avigation easement on the property and it is now considered a compatible land use. The Mount Judia Church located east of CMH on Morrison Road was contacted for potential inclusion in the program and did not respond. No other churches were identified within the 65+ DNL contour of the Future (2012) NEM/NCP noise exposure contour from the 2007 Part 150 Study.

Recommendation: Continue approved measure LU-2. No churches are located within the 65+ DNL of the Future (2025) NCP Noise Exposure Contour

NOISE COMPATIBILITY PROGRAM ALTERNATIVE LU-3
(CURRENTLY APPROVED MEASURE)

Description: Seek cooperation from the City of Columbus and Franklin County to amend their land use compatibility standards to achieve the level of compatibility identified in the recommended land use compatibility guidelines.

Status: The measure was partially implemented. Both the City of Columbus and Franklin County have adopted land use development standards similar to what was recommended in the previous NCP. However, in some cases these standards are not as strict as was recommended.

Recommendation: Continue approved measure LU-3.

**NOISE COMPATIBILITY PROGRAM ALTERNATIVE LU-4
(CURRENTLY APPROVED MEASURE)**

Description: Seek cooperation from the City of Columbus and Franklin County to amend the boundaries of the Airport Environs Overlay (AEO) district to reflect the proposed Airport Land Use Management District (ALUMD).

Status: This measure was not implemented. Both Columbus and Franklin County set the AEO boundary at the 65 DNL contour.

Recommendation: Continue measure with modification to include proposed Airport Land Use Management District (ALUMD). See Measure LU-12 for more information on the ALUMD.

**NOISE COMPATIBILITY PROGRAM ALTERNATIVE LU-5
(CURRENTLY APPROVED MEASURE)**

Description: Seek cooperation from Franklin County, the City of Gahanna, and Jefferson Township to amend each jurisdiction's zoning resolution to require applicants for rezoning, change of use, or special use permit to convey an avigation easement to the appropriate airport.

Status: This measure was partially implemented. Section 660.07 of the Franklin County Zoning Resolution requires conveyance of avigation easements for variance or conditional use permits only.

Recommendation: Continue approved measure LU-5.

**NOISE COMPATIBILITY PROGRAM ALTERNATIVE LU-6
(CURRENTLY APPROVED MEASURE)**

Description: Seek cooperation from Jefferson Township and the City of Gahanna to adopt the proposed Airport Land Use Management District (ALUMD) as part of their official zoning regulations.

Status: This measure was not implemented. Coordination with local jurisdictions has occurred; however, zoning regulations have not been updated.

Recommendation: Continue approved Measure LU-6. See Measure LU-12 for more information on the ALUMD.

**NOISE COMPATIBILITY PROGRAM ALTERNATIVE LU-7
(CURRENTLY APPROVED MEASURE)**
Description: Seek cooperation from Franklin County, Jefferson Township, and the City of Gahanna to adopt subdivision codes applicable to the proposed Airport Land Use Management District (ALUMD).

Status: This measure was not implemented. Coordination with local jurisdictions has occurred; however, subdivision regulations have not been updated.

Recommendation: Continue approved Measure LU-7. See Measure LU-12 for more information on the ALUMD.

**NOISE COMPATIBILITY PROGRAM ALTERNATIVE LU-8
(CURRENTLY APPROVED MEASURE)**

Description: Seek cooperation from Franklin County, Jefferson Township, and the City of Gahanna to adopt building codes applicable to the proposed Airport Land Use Management District (ALUMD).

Status: This measure was not implemented. Coordination with local jurisdictions has occurred; however, building codes have not been updated.

Recommendation: Continue approved Measure LU-8. See Measure LU-12 for more information on the ALUMD.

NOISE COMPATIBILITY PROGRAM ALTERNATIVE LU-9
(CURRENTLY APPROVED MEASURE)

Description: Seek cooperation from the board of realtors to participate in a fair disclosure program for property located within the proposed Airport Land Use Management District (ALUMD).

Status: This measure was not implemented.

Recommendation: Continue approved Measure LU-9. See Measure LU-12 for more information on the ALUMD.

NOISE COMPATIBILITY PROGRAM ALTERNATIVE LU-10
(CURRENTLY APPROVED MEASURE)

Description: Periodically place advertisements in a variety of media outlets delineating the boundaries of the Airport Land Use Management District (ALUMD).

Status: This measure was not implemented.

Recommendation: The ALUMD has not been adopted. The CRAA makes the noise exposure maps and other noise compatibility information available on its website.

NOISE COMPATIBILITY PROGRAM ALTERNATIVE LU-12
(CURRENTLY APPROVED MEASURE)

Description: Develop an Airport Land Use Management District (ALUMD) based on the 2023 Noise Exposure Map/Noise Compatibility Program (NCP) noise contour, natural geographic and jurisdictional boundaries.

Status: This measure was not implemented. The intent of this measure was to eliminate changing boundaries set by the current noise exposure contours and establish a fixed boundary for consistency. The suggested fixed boundary was not implemented. The City of Columbus and Franklin County continue to apply an Airport Environs Overlay Zone, the boundaries of which correspond to the noise exposure contour from the previous Part 150 Noise Compatibility Study Update which is subject to periodic review and potential revision.

Recommendation: Continue approved measure LU-12.

F.3 Consideration of Alternative Land Use Measures

The following pages describe alternative land use measures that were considered in this Part 150 Study in accordance with 14 CFR Part 150 §150.23(e) and §B150.7.

NOISE COMPATIBILITY PROGRAM ALTERNATIVE LU-A

TITLE:	Purchase vacant properties within the 65+ DNL to prevent the development of new incompatible land uses.
BACKGROUND AND INTENT:	Several areas of vacant land have been identified within the 65+ DNL. Previous Part 150 Study Updates have recommended purchasing vacant property to prevent new incompatible development from occurring, including areas east of Hamilton Road to the south and southwest of I-270 in the City of Gahanna. Other areas of vacant property within the 65+ DNL occur along Taylor Station Road to the east of CMH in the City of Gahanna; and along Johnstown Road to the west of CMH in Franklin County (Mifflin Township).
BENEFITS:	This measure would prevent potential new incompatible development within the 65+ DNL.
DRAWBACKS:	This measure would be costly to implement because land is being sold in these areas at commercial values much higher than residential land value.
FINDINGS AND RECOMMENDATIONS:	Coordination is ongoing with the City of Gahanna and Franklin County as described in the existing land use measures to ensure any new development is compatible with airport operations. Due to costs and other planning efforts, acquisition is not recommended at this time. Therefore, this alternative is **NOT RECOMMENDED** for inclusion in the NCP.

NOISE COMPATIBILITY PROGRAM ALTERNATIVE LU-B

TITLE:	Modify the sound insulation program boundaries identified in approved measure LU-1 and LU-2 to reflect the Future (2025) NEM/NCP Noise Exposure Contour.

BACKGROUND AND INTENT:	This alternative recommends modification to Measure LU-1 and LU-2 to redraw the program boundary based on the 65 DNL noise contour for the Future (2025) NEM/NCP Noise Exposure Contour. There are two housing units that are located within the 65+ DNL of the Future (2025) NEM/NCP Noise Exposure Contour. One housing unit is located in a commercial area on Taylor Station Road. The owner of this housing unit was offered sound insulation and did not respond or declined the offer. The other housing unit is located on Stockton Trail Way. The housing units in this area along Stockton Trail Way were constructed after the Noise Exposure Maps from the 2007 Part 150 Study were published. It is expected that these homes would have been constructed to meet the recommended interior sound attenuation guidelines and would already reduce noise to below acceptable levels. Therefore, these housing units are considered compatible and no housing units are recommended for sound insulation at this time. There are no churches identified within the 65+ DNL of the Future (2025) NEM/NCP Noise Exposure Contour.

BENEFITS:	This measure continues the policy of the CRAA to provide sound insulation for eligible properties within the 65+ DNL. At this time no eligible properties have been identified.

DRAWBACKS:	Sound insulation does not alter the noise impacts outside the home.

FINDINGS AND RECOMMENDATION:	This alternative is **RECOMMENDED** for inclusion in the NCP, which would modify approved measures LU-1 and LU-2.

Appendix G - Public Involvement

The process of providing opportunities for public review and comment during the development of the Noise Exposure Maps (NEMs) and the Noise Compatibility Program (NCP) includes four techniques: committee meetings, focus group meetings, Public Information Workshops, and a formal Public Hearing. Each technique facilitates the active and direct participation of members of the public and the opportunity for them to submit comments to the Columbus Regional Airport Authority (CRAA).

This appendix provides the information related to the public involvement process undertaken during the Port Columbus International Airport (CMH) Part 150 Noise Compatibility Study Update and is divided into the following sections:

- Technical Advisory Committee (TAC)
  - Membership
  - Meetings
- Discussion of the Public Information Meetings
- Discussion of the Public Hearing
- Location of Study Documents for Public Review
- Public Hearing comments received and response to comments
- Noise Abatement Alternatives Coordination
- Land Use Alternatives Coordination

G.1 Technical Advisory Committee

A Technical Advisory Committee (TAC) was established by the CRAA and was composed of representatives of local agencies; Airport Traffic Control Tower (ATCT) staff; airport users; representatives from the local community; and CRAA staff. The TAC advised CRAA staff, and the Consultant Team on the analysis and recommendations of the Part 150 Noise Compatibility Study through meetings and review of analysis, findings, and recommendations. Table G-1 lists the TAC membership.

Table G-1 Technical Advisory Committee (TAC) Membership

Name	Title	Organization
Voda Layne	Airline Station Manager	Air Canada Express
Kyle Lewis	Regional Manager, Government Affairs & Airport Advocacy, Great Lakes	Aircraft Owners and Pilots Association (AOPA)
Duffy Cooper	Pilot Representative	Airline Pilots Association (ALPA)
Ken Copley	Pilot Representative	Airline Pilots Association (ALPA)
Laura Rinaldi McKee	Vice President, Airport Affairs	Airlines for America
Paul McGraw	Vice President, Operations and Safety	Airlines for America
Sherriale Fleming	Airline Station Manager	Alaska Airlines
Christiane Thinnes	Airline Station Manager	Alaska Airlines

Table G-1 Technical Advisory Committee (TAC) Membership, *(continued)*

Name	Title	Organization
Dilli Dhital	Airline Station Manager	American Airlines
Robert Walters	Airline Station Manager	American Airlines
Marci VanDusen	Airline Station Manager	American Airlines
Alfonso Hooper	Chair	Brittany Hills Civic Association
Ben Kessler	Mayor & Director of Development	City of Bexley
Carla Williams-Scott	Director, Department of Neighborhoods	City of Columbus
Todd Dieffenderfer	Deputy Director, Department of Neighborhoods	City of Columbus
DeLana Scales	Program Specialist, Department of Neighborhoods	City of Columbus
Tony Celebrezze	Assistant Director, Building and Zoning Services	City of Columbus
Rory McGuinnes	Deputy Director of Administration	City of Columbus
Talisa Dixon	Superintendent	Columbus City Schools
John Stanford	Deputy Superintendent	Columbus City Schools
Erik Roush	Policy & Government Affairs	Columbus City Schools
Michael Blackford	Planning and Zoning Administrator	City of Gahanna
Andrew Bowsher	Development Director	City of Reynoldsburg
Zach Woodruff	Director of Economic Development & Public Service	City of Whitehall Planning Commission
Christina White	Airline Station Manager	Delta Airlines
Faiz Syed	Airline Station Manager	Delta Airlines
Rashad Armstrong	Airline Station Manager	Delta Airlines
Michael Johnson	President	East Columbus Civic Association
Lamar Peoples	Member	East Columbus Civic Association
Katherine Delaney	Community Planner	FAA - Detroit Airports District Office
Mark Grennell	Program Manager	FAA - Detroit Airports District Office
Barry Payne	Air Traffic Manager	FAA CMH ATCT
Dave Neef	Air Traffic Manager	FAA CMH ATCT
Steve Mack	Air Traffic Manager	FAA CMH ATCT
Ronny Richards	Operations Manager	FAA CMH ATCT
James Schimmer	Director Economic Development & Planning	Franklin County
Matt Brown	Planning Administrator	Franklin County
Brad Fisher	Planner	Franklin County
Faz Riaz	Airline Station Manager	Frontier Airlines
Gib Harris	Chief of Maintenance	Nationwide Insurance Company
Kevin White	Airline Station Manager	Frontier Airlines
Mike Anderson	Development Director	Jefferson Township
Eric Bylaw	Director of Flight Operations	Lane Aviation Corporation
Chris Lottridge	Chief Pilot	Limited Brands

Table G-1 Technical Advisory Committee (TAC) Membership, *(continued)*

Name	Title	Organization
Dina Lopez	Strategic Projects Manager	Mid-Ohio Regional Planning Commission
Thea Walsh	Director of Transportation	Mid-Ohio Regional Planning Commission
Thomas Graham	Planner	Mid-Ohio Regional Planning Commission
Paige Kroner	Northeast Regional Representative	National Business Aviation Association
Dan Wolfe	Manager	Nationwide Insurance Company
Kenneth Trahan	Vice President, Repair Station Operations	NetJets
Matt Sturges	Government Affairs	NetJets
Artie Clark	Flight Operations Compliance Manager	NetJets
Eric Lange	Manager	NetJets
Carl Lee	Member	North Central Area Commission
Tiffany White	Chair	North Central Area Commission
Wallace McLean	Member	North Central Area Commission
Kenneth Van Pelt	Community Relations Officer	Northeast Area Commission
Elwood Rayford	Chair	Northeast Area Commission
James Bryant	Administrator	ODOT Office of Aviation
Jeff Lischak	Airline Station Manager	Republic Airways
Elwood Rayford	Chair	Northeast Area Commission
Jeff Talbert	General Manager	Signature Flight Support
Tim Cavanagh	Airline Station Manager	Southwest Airlines
Andrew Brasil	Airline Station Manager	Spirit Airlines
Yacobe Lemma	Airline Station Manager	Spirit Airlines
Ken Waite	Facility Manager	The Columbus International Air Center
Stephanie Morgan	Executive Director of the Air Transportation and Aerospace Campus	The Ohio State University Air Transportation/Aerospace Campus
Brian Kennedy	Airline Station Manager	United Airlines
LaThya Washington	Airline Station Manager	United Airlines
Vinnie Pestrichella	Airline Station Manager	United Airlines

TAC Meeting #1 – December 11, 2019
Emergency Operations Center, John Glenn Columbus International Airport
2:00 p.m. to 4:00 p.m.

TAC Meeting #2 – April 8, 2020
Conducted via Online Video Conference
10:00 a.m. to 12:00 p.m.

TAC Meeting #3 – September 2, 2020
Conducted via Online Video Conference
1:00 p.m. to 3:00 p.m.

TAC Meeting #4 – Scheduled for July 29, 2021
To be Conducted via Online Video Conference
3:00 p.m. to 4:00 p.m.

G.2 Public Information Meetings

Public Information Meetings were conducted to provide the public with opportunity to obtain information about the study process, to review the draft noise contour maps, flight track maps, and other study analysis. Due to the public health requirements to prevent the spread of COVID-19, the in lieu of the first public meeting, information was posted online and comments could be submitted via email. The second public meeting was conducted via online which consisted of a live presentation by the Study Team followed by a questions and answer session in which attendees could submit questions in writing using the webinar chat function.

A third public meeting is scheduled to occur following publication of this Draft Part 150 Noise Compatibility Update Study document. Information regarding this meeting is provided below. Copies of presentations, newspaper notices, and comments received are included in the pages following this section of this appendix.

Public Information Meeting #1 – April 8 & 9, 2020

Meeting was cancelled and all information was posted online

Public Information Meeting #2 – September 2, 2020

Meeting was conducted via online webinar with question and answer session

Public Information Meeting #3 – July 29, 2021

Public Information Meeting #3 is scheduled to be held virtually. It will be conducted concurrently with a public hearing as described in Section G.3.

G.3 Public Hearing

A duly advertised public hearing is scheduled to be held concurrently with the third public information meeting on July 29, 2021. The public hearing will provide an opportunity for public comment on the Draft Part 150 Noise Exposure Maps (NEMs) and Noise Compatibility Program (NCP) Update as specified in 14 CFR 150.23(e)(7). The public hearing will be conducted in an online format. Interested citizens are encouraged to attend the online meeting via weblink or dial-in telephone number and to testify or provide written comments through the meeting platforms chat box feature. A transcriptionist will be online to record oral comments during the public hearing. Comments are also being accepted online and via U.S. Mail. A transcript of the oral testimony and the written comments received at the Public Hearing will be included in the Final Part 150 Noise Compatibility Update Study document.

G.4 Availability of the Document for Public Review

Copies of the Draft Part 150 Noise Compatibility Update Study document are available for public review at the locations listed below and newspaper notices were published announcing the availability of the document for review and comment prior to the Public Hearing.

Locations for Draft Part 150 Document Review	
Columbus Regional Airport Authority John Glenn Columbus International Airport Administrative Offices 4600 International Gateway Columbus, OH 43219	Columbus Metropolitan Library Reynoldsburg Branch 1402 Brice Road Reynoldsburg, OH 43068
Columbus Metropolitan Branch Main Branch 96 South Grant Avenue Columbus, OH 43215	Columbus Metropolitan Library Shepard Branch 850 North Nelson Road Columbus, OH 43219
Columbus Metropolitan Library Gahanna Branch 310 Hamilton Road Gahanna, OH 43230	Columbus Metropolitan Library Whitehall Branch 4445 East Broad Street Columbus, OH 43213
Columbus Metropolitan Library Linden Branch 2223 Cleveland Avenue Columbus, OH 43211	Bexley Public Library 2411 East Main Street Columbus, OH 43209
Columbus Metropolitan Library Martin Luther King Branch 1467 East Long Street Columbus, OH 43203	Part 150 Study Website: www.airportprojects.net/cmh-part150/home/documents-reports/

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Public Information Meeting #1
April 8, 2009

This meeting was cancelled due to the COVID-19 outbreak and information was posted online.

Online Project Summary Handout

Online Display Boards

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John Glenn Columbus International Airport
Part 150 Noise Compatibility Study
Project Factsheet

What is a Part 150 Noise Compatibility Study?

The study gets its name from Part 150 of the Code of Federal Regulations, which provides guidance for airports choosing to prepare a Noise Compatibility Study. The purpose for conducting a Part 150 Study is to develop a balanced and cost-effective plan for reducing current noise impacts from airport operations, where practical, and to limit additional impacts in the future. There are two technical components to the study process. The first component is to develop the Noise Exposure Maps (NEMs) and the second is to develop a Noise Compatibility Program (NCP). The Columbus Regional Airport Authority (CRAA) periodically reviews and updates NEMs and NCP for the John Glenn Columbus International Airport (CMH) in order to further the goal of being a good neighbor to the surrounding communities.

Noise Exposure Maps (NEMs)

NEMs are the official noise contours for the Airport and are prepared for an existing condition and for a five-year future condition. The NEMs must be prepared according to Federal Aviation Administration (FAA) Part 150 guidelines in regards to methodology, noise metrics, identification of incompatible land uses, and public outreach. NEMs graphically show where significant levels of annual average noise exposure on incompatible land uses around the airport are anticipated.

Noise Compatibility Program (NCP)

The NCP sets forth measures intended to reduce or mitigate the impacts of noise exposure on land uses that are considered by the FAA as incompatible with significant levels of aircraft noise. Levels of significance are identified in the Code of Federal Regulations. Examples of land uses that may be incompatible with aircraft noise include: housing, schools, places of worship, libraries, hospitals, and nursing homes.

Previous and Ongoing Noise Compatibility Planning at CMH

There is a long history of noise compatibility planning at CMH. The first Noise Compatibility Study was conducted in 1987 and was updated in 1993, 1999, and 2007. In the 2007 update, the NEMs were updated to reflect the current noise exposure levels and new NCP recommendations were developed to mitigate noise impacts resulting from the relocation of the south runway (Runway 10R/28L). Mitigation efforts included a residential sound insulation program. To date, the CRAA has provided sound insulation for nearly 800 residences. In addition, the CRAA works with local jurisdictions to plan for compatible land use development around the Airport. The CRAA also maintains a Noise Program Office to provide information and address public inquiries about airport operations and noise compatibility.

John Glenn Columbus International Airport
Part 150 Noise Compatibility Study
Project Factsheet

Progress to Date

Since this Part 150 Study began in the Fall 2019, the study has concentrated on data collection and the development of preliminary noise contours for the existing condition (2020) and the five-year future condition (2025). The following lists the major tasks completed for this Study to date:

- Held kickoff meeting with Technical Advisory Committee
- Compiled and evaluated radar flight track and noise monitoring data
- Conducted field noise measurements (week of November 10th, 2019)
- Prepared preliminary existing (2020) and future (2020) baseline noise contours

Technical Advisory Committee

A Technical Advisory Committee (TAC) was established for this Part 150 Noise Compatibility Study to provide input into the process and review results and recommendations. The TAC is comprised of various stakeholders, including Airport Officials, FAA Air Traffic Controllers, Airport Users, Government Officials, and local Community Groups. Several meetings of the TAC are planned throughout the Study.

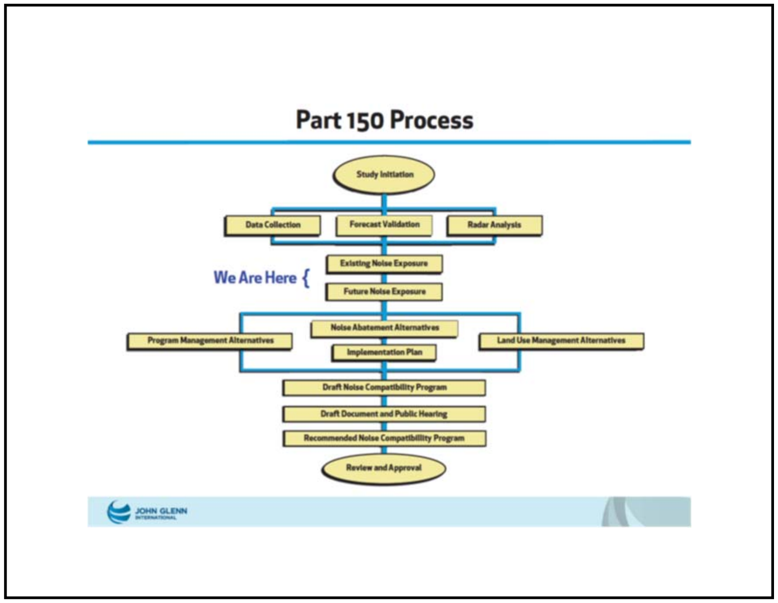
Public Participation

The Noise Compatibility Study process is designed to encourage the public to comment on the study process and findings. Public information workshops will be held throughout the Part 150 Study at key points. Due to recommended precautions to stop the spread of COVID-19, the first set of public meetings scheduled for April 8th and April 9th, 2020 were converted from in person meetings to an online open house. All meeting materials are posted online and comments and questions may be submitted through the website at www.airportprojects.net/cmh-part150.

Information available on the website includes several graphics that provide additional technical information on the development of the NEMs and the Preliminary Draft Noise Exposure Contours.

Next Steps

Additional opportunities for public review and comment are planned during the course of the Study. Comments are being accepted on the information presented on the website through May 31st, including comments on the Preliminary Draft Noise Exposure Contours. Once comments are received and addressed, a Draft set of NEMs and a Draft NCP will be published for public review, and a Public Hearing will be conducted. Following that Public Hearing, any additional comments will be addressed and the Draft NEMs and NCP will be submitted to the FAA for review. Once the NEMs are accepted by the FAA, they will become the official NEMs for CMH.


Part 150 Process
Study Initiation
Data Collection
Forecast Validation
Radar Analysis
Existing Noise Exposure
We Are Here {
Future Noise Exposure
Noise Abatement Alternatives
Program Management Alternatives
Implementation Plan
Land Use Management Alternatives
Draft Noise Compatibility Program
Draft Document and Public Hearing
Recommended Noise Compatibility Program
Review and Approval
JOHN GLENN
INTERNATIONAL

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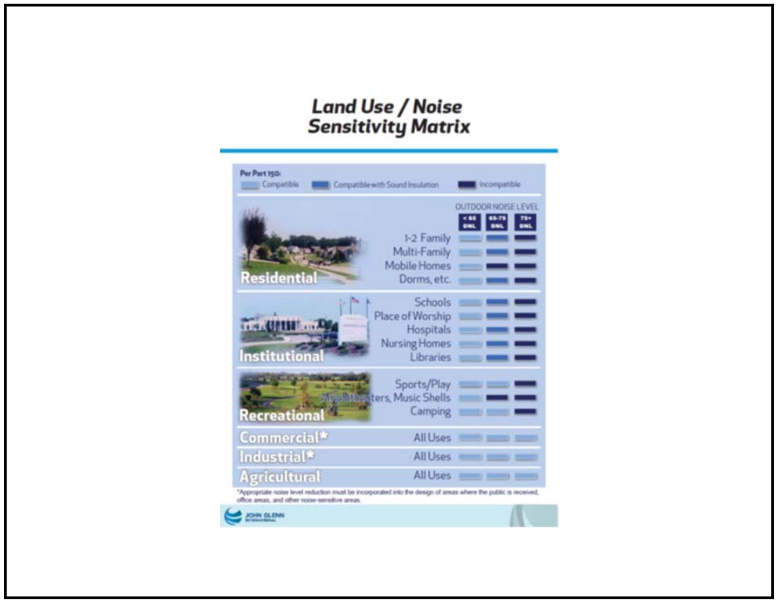
Land Use / Noise
Sensitivity Matrix
Per Part 150:
Compatible
Compatible with Sound Insulation
Incompatible
OUTDOOR NOISE LEVEL
Residential
1-2 Family
Multi-Family
Mobile Homes
Dorms, etc.
Institutional
Schools
Place of Worship
Hospitals
Nursing Homes
Libraries
Recreational
Sports/Play
ters, Music Shells
Camping
Commercial*
All Uses
Industrial*
All Uses
Agricultural
All Uses
*Appropriate noise level reduction must be incorporated into the design of areas where the public is received, office areas, and other noise-sensitive areas.
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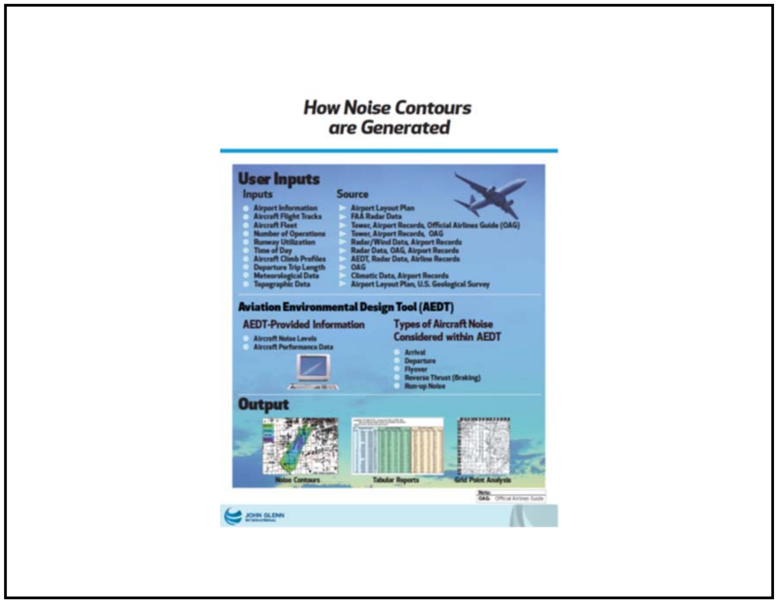
2


How Noise Contours
are Generated
User Inputs
Inputs
Airport Information
Aircraft Flight Tracks
Aircraft Fleet
Number of Operations
Runway Utilization
Time of Day
Aircraft Climb Profiles
Departure Trip Length
Meteorological Data
Topographic Data
Source
Airport Layout Plan
FAA Radar Data
Tower, Airport Records, Official Airlines Guide (OAG)
Tower, Airport Records, OAG
Radar/Wind Data, Airport Records
Radar Data, OAG, Airport Records
AEDT, Radar Data, Airline Records
OAG
Climatic Data, Airport Records
Airport Layout Plan, U.S. Geological Survey
Aviation Environmental Design Tool (AEDT)
AEDT-Provided Information
Aircraft Noise Levels
Aircraft Performance Data
Types of Aircraft Noise
Considered within AEDT
Arrival
Departure
Flyover
Reverse Thrust (Braking)
Run-up Noise
Output
Noise Contours
Tabular Reports
Grid Point Analysis
Note:
OAG: Official Airlines Guide
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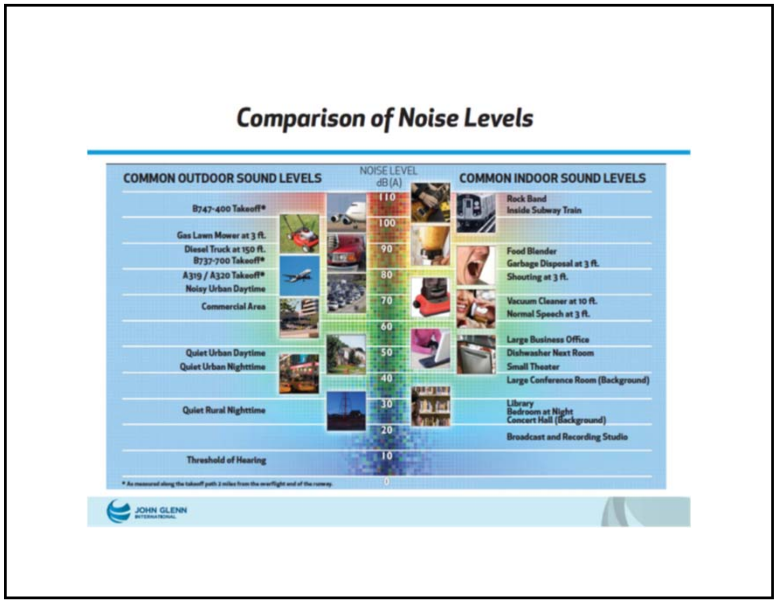
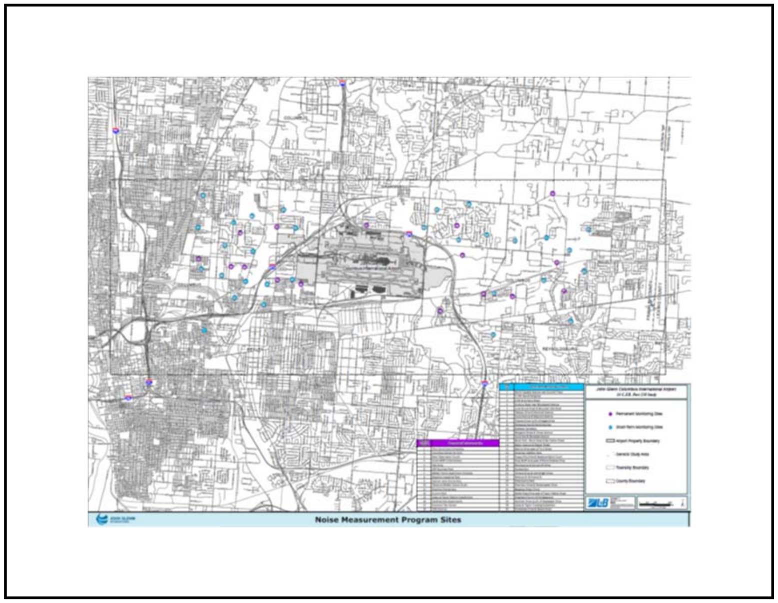
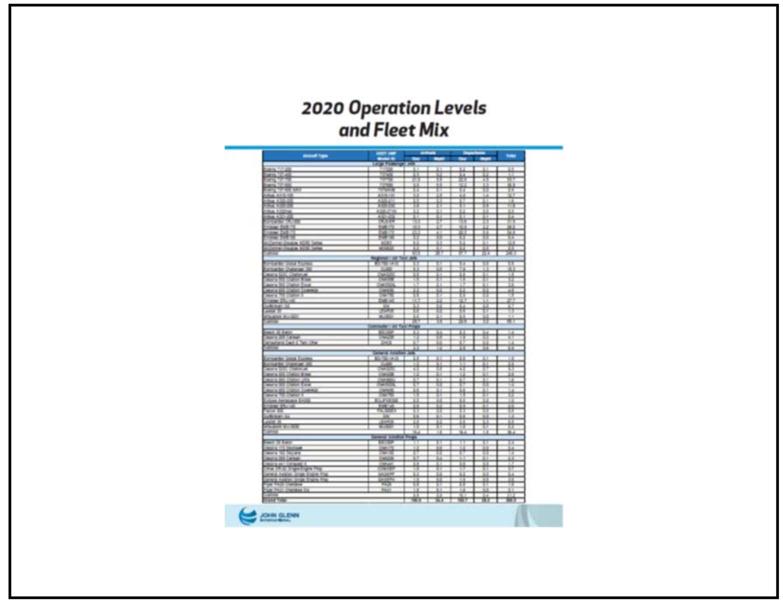
3


Comparison of Noise Levels
COMMON OUTDOOR SOUND LEVELS
NOISE LEVEL
dB (A)
COMMON INDOOR SOUND LEVELS
B747-400 Takeoff*
110
Rock Band
Inside Subway Train
100
Gas Lawn Mower at 3 ft.
Diesel Truck at 150 ft.
90
B737-700 Takeoff*
Food Blender
Garbage Disposal at 3 ft.
A319 / A320 Takeoff*
80
Shouting at 3 ft.
Noisy Urban Daytime
Commercial Area
70
Vacuum Cleaner at 10 ft.
Normal Speech at 3 ft.
60
Large Business Office
Quiet Urban Daytime
50
Dishwasher Next Room
Quiet Urban Nighttime
Small Theater
40
Large Conference Room (Background)
Quiet Rural Nighttime
30
Library
Bedroom at Night
Concert Hall (Background)
20
Broadcast and Recording Studio
Threshold of Hearing
10
0
JOHN GLENN
INTERNATIONAL

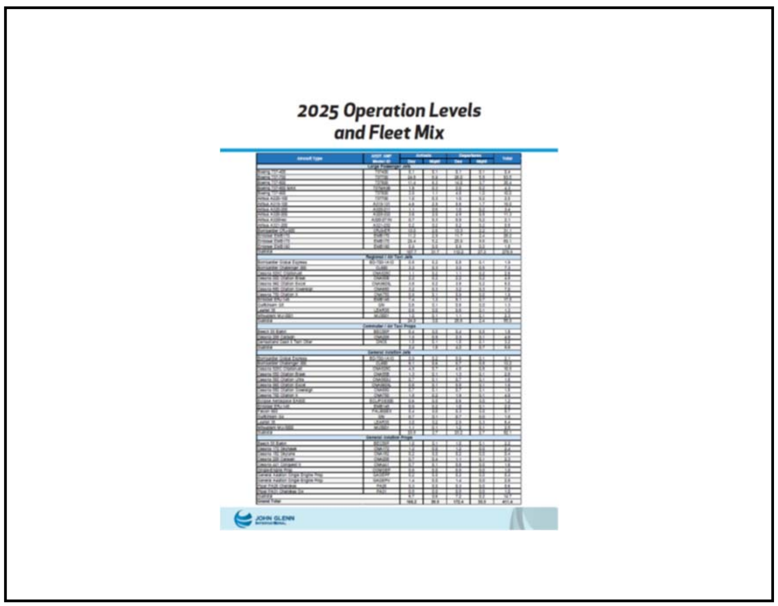
4


Noise Measurement Program Sites

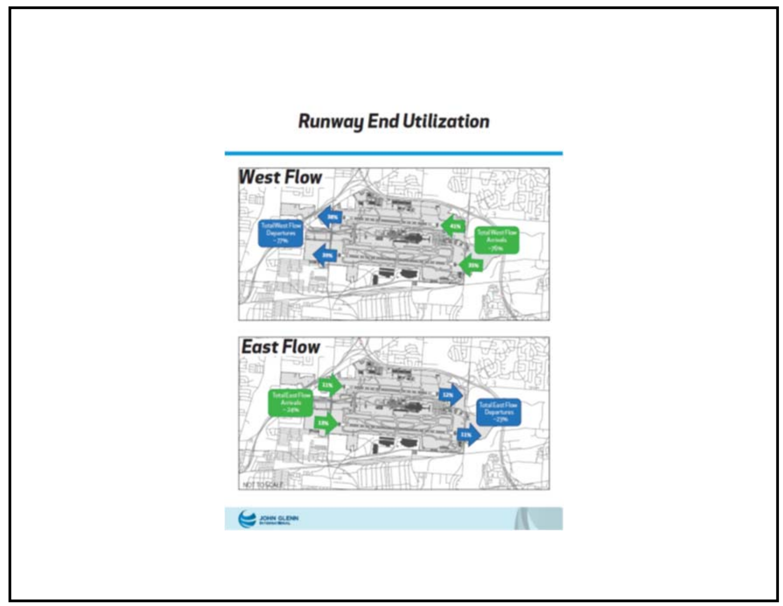
5


2020 Operation Levels
and Fleet Mix

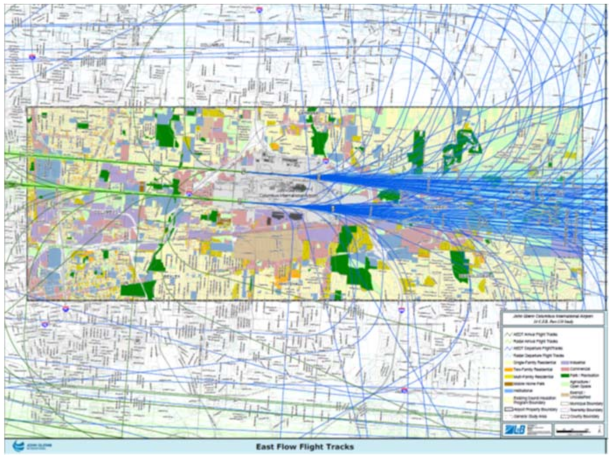
6


2025 Operation Levels
and Fleet Mix

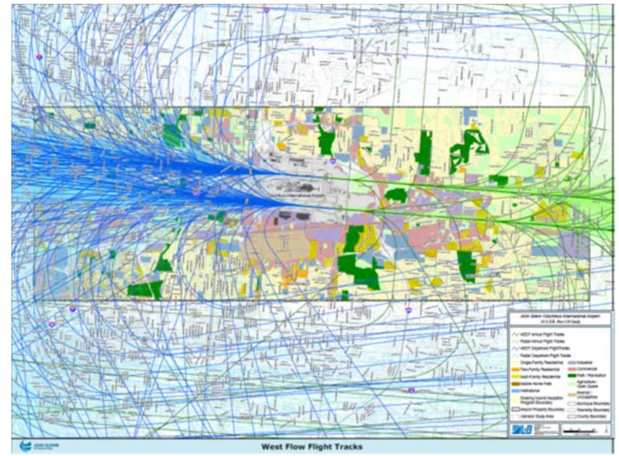
7


Runway End Utilization
West Flow
East Flow

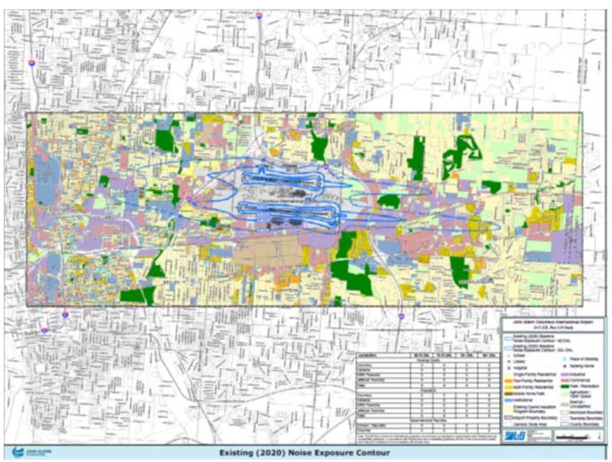
8


East Flow Flight Tracks

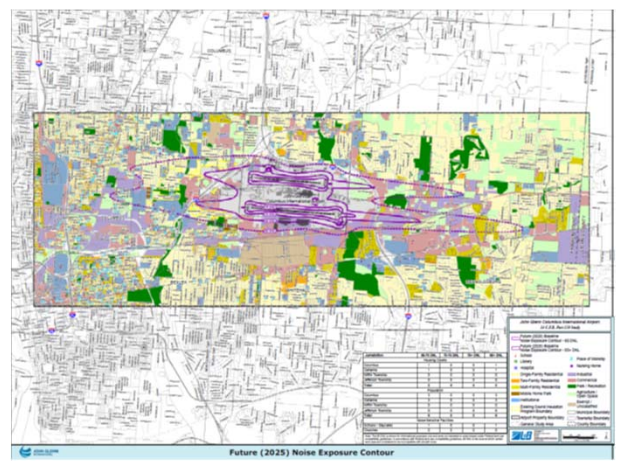
9


West Flow Flight Tracks

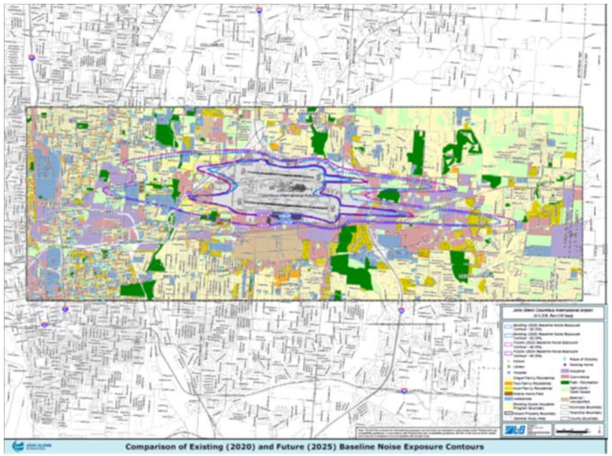
10


Existing (2020) Noise Exposure Contour

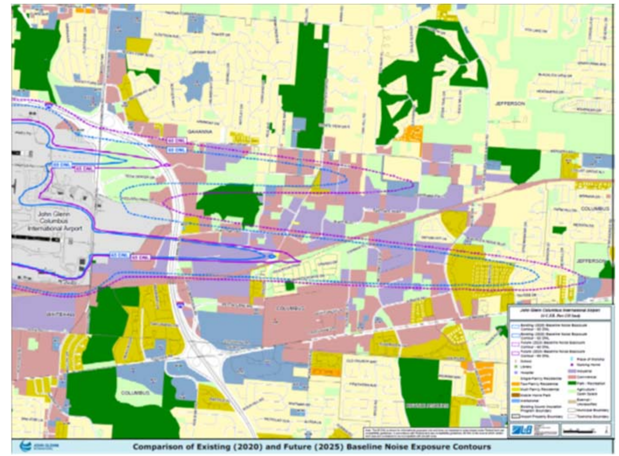
11


Future (2025) Noise Exposure Contour

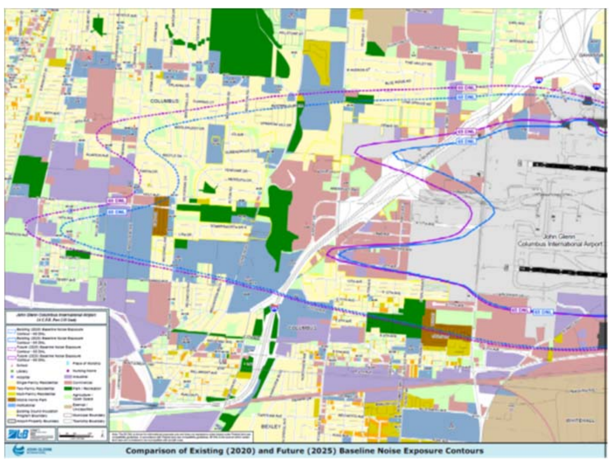
12



13



14



15

Comparison of Noise Contour Areas and Land Use Impacts

CONTOUR RANGE	AREA IN SQUARE MILES		
	2012 NEM/NCP (from 2007 Part 150 Study)	EXISTING (2020) BASELINE	FUTURE (2025) BASELINE
65-70 DNL	3.1	1.8	2.2
70-75 DNL	1.1	0.5	0.6
75+ DNL	1.1	0.4	0.5
65+ DNL	5.3	2.7	3.3
HOUSING UNITS			
65-70 DNL	473	0	2
70-75 DNL	0	0	0
75+ DNL	0	0	0
65+ DNL	473	0	2
POPULATION			
65-70 DNL	1,168	0	6
70-75 DNL	0	0	0
75+ DNL	0	0	0
65+ DNL	1,168	0	6

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Public Information Meeting #2
September 2, 2020

Newspaper Notices

Online Presentation

Meeting Transcript

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Ohio Dems: 'Don't mess with the USPS'

Randy Ludlow
The Columbus Dispatch | USA TODAY NETWORK

The steady arrival of masked patrons at the Oakland Park post office seemed to underline the points made by Joyce Beatty and others as they stood outside the entrance.

The U.S. Postal Service, they said, is a lifeline — a lifeline for the delivery of life-sustaining medications, correspondence from loved ones and perhaps a check to fix a car so a person in need can get to work.

But mail service also is a lifeline connecting people to their democracy through their right to vote, said the congresswoman and other Columbus Democrats.

They gathered at the post office Tuesday to denounce what they portrayed as deliberate moves by the administration of Republican President Donald Trump to suppress voting by mail ahead of the Nov. 3 election by slowing the machinery of the postal service.

"These are baseless and senseless attacks on the postal service," Beatty said at the news conference dubbed #DontMessWithUSPS. "We know they are doing this to have an effect on this election."

She vowed to return to Washington D.C. to fight for funding for the U.S. Postal Service to help ensure it can promptly handle mail involving absentee requests and mail ballots in the weeks before the fall election.

"They cannot delay our democracy," Beatty said. "This is about delaying your vote."

Franklin County Commissioner John O'Grady followed up to call Trump's defense of postal service changes as "lying and cheating."

"It's a manufactured crisis trying to foster doubt on election results" since Trump fears losing and wants to stay in power, O'Grady said.

Columbus City Council President Shannon Hardin agreed: "We know what this about: voter suppression."

Democrats claim Trump is undermining the U.S. Postal Service ahead of the Nov. 3 election in a bid to bolster his chances of re-election by suppressing mail ballots more often cast by Democrats.

The postal service warned Ohio and other states that absentee ballot requests and returned mail-in ballots submitted too close to the election may not be delivered in time to be counted.

With the COVID-19 pandemic expecting to cause many to shy away from in-person voting, a record number of mail ballots are expected to be submitted this fall, including in Ohio.

Despite no evidence, Trump claims mail balloting is rife with fraud, saying Monday that the only way he can lose this fall is if the election is "rigged," which might require another election. A struggle over post office funding is mounting in Congress.

Most of Beatty's Republican colleagues in Congress, in a joint letter, are asking the postal service to "implement procedures, in coordination with the state of Ohio, to ensure the timely and accurate delivery of election-related materials prior to the November elections."

U.S. Sen. Rob Portman joined U.S. Reps. Steve Stivers of Columbus and Troy Balderson of Zanesville in signing the letter.

Democrats led by U.S. Sen. Sherrod Brown are urging Republican Secretary of State Frank LaRose, meanwhile, to reconsider his decision permitting only one absentee ballot drop box in each county.

rludlow@dispatch.com
@RandyLudlow

Rep. Joyce Beatty demands the White House stop interfering with the United States Postal Service during a news conference outside the Oakland Park Station of the USPS in Columbus on Tuesday. [ADAM CAIRNS/DISPATCH]

LaRose to ask for $3 million to pay ballot postage

Rick Rouan
The Columbus Dispatch | USA TODAY NETWORK

Ohio Secretary of State Frank LaRose wants to use revenue from state business filings to pay for postage on absentee ballots.

The Republican secretary of state said in a news release Tuesday afternoon that he would ask the GOP-controlled state Controlling Board, which approves major spending proposals, for permission to use up to $3 million from the fund to pay for return postage.

LaRose had asked the Ohio General Assembly to allow him to use general revenue fund dollars to pay for postage. A bill passed in the Ohio House would have barred LaRose from paying for postage, but it has not passed the Ohio Senate.

Last week, LaRose said he still supported the idea of paying for postage on absentee ballots but needed additional action from lawmakers. The controlling board controls changes to the state budget and is made up mostly of state lawmakers.

"If the controlling board approves our request, they will effectively be making every mail box a drop box for millions of Ohioans, making it easier than ever to cast a ballot in a general election," LaRose said in a prepared statement. "No state (general revenue fund) or federal funds will be used to pay for it; instead we're ready to take it out of my office's own budget to get it done."

Last week, LaRose issued a directive to 88 county boards of elections telling them that they could use only one drop box, the one required in the 2020 primary conducted mostly by mail, for absentee ballots.

Democrats have lambasted LaRose over the decision, saying he was suppressing the vote by not allowing boards to expand the use of drop boxes while the U.S. Postal Service was warning him of slowdowns in mail service that could prevent ballots from being counted.

Sen. Sherrod Brown went as far as to accuse LaRose of doing the bidding of President Donald Trump, a critic of voting by mail.

LaRose made that decision after waiting weeks for a legal determination on his authority from Ohio Attorney General Dave Yost. LaRose withdrew his request for the legal opinion the day before issuing the directive, but Yost's office said it expected to issue the opinion that week.

Rep. Bride Rose Sweeney, a Cleveland Democrat who has worked on several elections bills, said she is encouraged that LaRose is willing to pay for postage but questioned why he would not use federal coronavirus relief funding that his office has received to pay for the effort.

Democrats contend LaRose already had authority from the Controlling Board to spend CARES Act funding on postage.

"He has made a decision to not allow boards of elections to expand their drop boxes. He keeps saying every blue box is like a drop box. That's only true if you pay for postage," she said.

More information about requesting an absentee ballot is available at https://www.ohiosos.gov/elections/voters/absentee-voting/.

rrouan@dispatch.com
@RickRouan

At 'luncheon,' Dems pin Ohio's problems on GOP

Rick Rouan
The Columbus Dispatch | USA TODAY NETWORK

Ohio Democrats are putting the blame for problems that plague the state squarely on the shoulders of Republicans who have ruled Ohio for most of the past several decades.

During a lunch-hour video conference with the party's presidential delegates, elected officials and party leaders blamed President Donald Trump for the pandemic and economic crisis, highlighted the Statehouse corruption scandal that has ensnared former Ohio House Speaker Larry Householder and GOP lobbyist Neal Clark, and slammed Ohio Secretary of State Frank LaRose for his decision to allow only one absentee ballot drop box in each county.

And, yes, they gave their solution for fixing the problems: Elect Democrats.

"We have to build back better. We need to turn Ohio blue because election day starts today. Every day from this day forward is election day," said U.S. Rep. Marcia Fudge of Cleveland. "We cannot wait until the last minute to make change. Change is who we are because we are the people's party."

Democrats have struggled in statewide elections during the last several cycles. Trump won Ohio by 8 percentage points in 2016. Republicans cleaned up in statewide non-judicial offices in 2018. Sen. Sherrod Brown's 7-point victory was an outlier for the party two years ago.

"They have had 25 years of a culture of corruption in this state," Brown said.

Brown asked the delegates to find people in their lives who likely wouldn't vote and to help educate them on the issues and how to vote. He blamed Republicans for inadequate school funding and inequitable tax policies, and he put the burden of the 170,000 who have died in the COVID-19 outbreak in the U.S. on Trump.

"When we win Ohio for Biden, and Harris it's going to mean an electoral college landslide. When we win Ohio it means we'll win Pennsylvania, Michigan and Wisconsin," he said.

The daily digital lunch gathering is the party's substitute for the breakfast meetings it would have at an in-person convention. Those have drawn a national cast of political speakers in the past.

They also have acted as a springboard for officeholders who are looking to run statewide campaigns two years later to introduce themselves to delegates around the state.

On Tuesday, Columbus City Attorney Zach Klein reassured the delegates that they have a chance to make changes at the ballot box. His remarks straddled both personal introduction and political rally for Democrats on the 2020 ballot.

He lamented what he said was Trump's "fanning the flames of divisions" and other failures while highlighting legal actions his office has taken to preserve city gun regulations and to fight the Trump administration on changes to the Affordable Care Act.

"It's like all the gains we made under President Obama and Vice President Biden are being squandered. I want you to know right now that hope is not lost," he said.

Klein and Dayton Mayor Nan Whaley, co-sponsors of the Tuesday lunch, both are seen as potential Democratic candidates to run for statewide elected office in 2022.

Recounting her experience leading a city through a mass shooting last summer, Whaley blamed Republicans for failing to act on gun control measures. After nine people were killed in Dayton a day after 23 died in a shooting in El Paso, Whaley said she was hopeful that change would follow.

So far, though, no action has been taken. Whaley called Gov. Mike DeWine's plan, which received a lukewarm reception in the Republican-controlled Ohio General Assembly, a "watered down" proposal.

rrouan@dispatch.com
@RickRouan

NOTARIAL SEAL
STATE OF OHIO

VERONICA HILL
Notary Public, State of Ohio
My Commission Expires 12-04-2023

Veronica Hill

New Albany resident Parker Smith, then 14, competes in Bexley's Splish, Splash & Dash Youth Triathlon in August 2017. This year's event will take a different form because of the COVID-19 coronavirus pandemic, according to Bexley Recreation and Parks Department officials. Rather than taking place on one day in one mass gathering, the 2020 event encourages participants to bicycle, swim or run on their own from Saturday, Aug. 22, to Sept. 22.
PAUL VERNON/THISWEEK

TRIATHLON

FROM >> A1

being offered virtually or in outdoor spaces at Jeffrey Mansion, 165 N. Parkview Ave., that accommodate social distancing, Mullin said.

"Anything has to be either online or outdoors," she said. "We've completely moved away from indoor spaces."

Sports leagues, such as flag football, have been postponed, replaced by online instruction in those activities, Mullin said.

"We've made changes, and I think they're for the positive," she said. "We trying to encourage people to stay active."

For more information and registration, go to bexley.org/ssd. For more information and registration for other activities, go to bexley.org/recreation-parks.

editorial@thisweeknews.com
@ThisWeekNews

DIVERSITY

FROM >> A1

entities, especially after the murder of George Floyd, we have to remember that race is not the only attribute that is cause for discrimination and bias," Ellyson said. "The amendments in Bexley's strategic plan take steps to be more inclusive of all in our community, as well as our neighboring communities and anyone who passes through our city."

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@ThisWeekNews

CAPITAL

FROM >> A3

The university will not permit university-related or international travel, including study-abroad programs. Nonessential university-related domestic travel also has been suspended, including recruiting and athletics travel. Athletics competitions have been suspended, but training and use of campus workout facilities will be permitted with state, local and U.S. Centers for Disease Control and Prevention guidelines under Capital's plan.

"All the fall sports have been postponed to spring," Kaufman said. "We're looking at engagement activities with the athletes."

Music programs and other extracurricular activities will be permitted, with safety precautions in place, Kaufman said. Students may opt to complete the entire academic year virtually, and instructors have undergone professional development over the summer to enhance online learning, he said.

"We hope that the virtual or online experience will be as good or even better than in person," he said.

For more information on Capital's reopening plan, go to capital.edu.

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TOP REAL ESTATE DEALS THIS WEEK

Which area of central Ohio has the hottest real estate market right now? How much did that house sell for down the street? How much are homes in your community compared to homes across town? You'll find the answers to those questions in ThisWeek's exclusive Top Real Estate Deals This Week. This list is a compilation of the area's top home and condominium transactions for a given week. All sales occurred within the ThisWeek circulation area.

Listed here is the address of the property sold, compiled by the Columbus Dispatch.

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4708 Hyatts Rd; $485,000; Kearl Leonard C
1525 State Route 203; $480,000; Boehme Kathryn G & Benjamin
294 Trace Dr; $450,000; Parker Andrew & Chelsea
934 Farmington Ln; $450,000; Visampalli Chamundeswari Harika & Chandrashekar Kola
412 Braumiller Crossing Dr; $419,000; Leroy Kirsten S & Jennifer M

Dublin

5953 Trafalgar Ct; $715,000; Harmanis Michael R & Lorenz Lindsey
6651 Baronscourt Lp; $557,500; Bruot Matthew R & Bruot Rachel C
7370 Linden Ln; $540,000; Maurer Bruce & Maurer Mary
5790 Crighton Dr; $500,000; Barrick R Kirby & Barrick Susan K
7913 Wiltshire Dr; $387,000; Wilson Richard J & Wilson Tracy R
9982 Allen Dr; $1,150,000; Justice Kevin & Leandra
7844 Tillinghast Dr; $880,000; Austin Adrienne J
5510 Stansbury Dr; $845,000; Pope Amanda & Patrick
10761 Dunraven Ln; $582,515; Midgley Charles Andrew & Jetta
6449 Martin Pl; $505,125; Galieti Anthony & Galieti Robin
7697 Heatherwood Ln; $469,800; Manohar Nirupa & Rajagopal Manoj
4992 Crossheven Ln; $446,500; Kefalonitis Andrew Jr & Kefalonitis Elizabeth Bricke
8285 Dublin Rd; $446,000; Meng Rui & Huang Bowen
6688 Cooperstone Dr; $415,000; Mittal Pranshu

Galena

5388 Red Bank Rd; $735,000; Ryan Thomas S & Lynette
5346 Red Bank Rd; $712,000; Griffiths Mary Lou
5125 Nyah Ct; $640,000; Pasbell Louis John & Emily J
5576 Plumb Rd; $475,000; Brown Erica M & Menhart John M
7525 Kerfield Dr; $458,000; Hilderbrand Erin & Adrian

Hilliard

6590 Marshview Dr; $624,777; Helderman Michael B & Helderman Amy
6185 Heritage Lakes Dr; $520,000; Kingseed Wyatt A
4618 Carrington Wy; $465,000; Korcal Andrew & Korcal Ashley R
5890 Morganwood Sq; $450,000; Lykins Cory & Lykins Molly
4121 Greenbelt Dr; $398,500; Jones Reginald & Jones Sherry D
2651 Bayshore Ct; $473,500; Van Daele David & Heather Joy

Lewis Center

3357 Farmers Delight Dr; $469,915; Bergfeld Eric J & Stephanie M
2960 Waterford Dr; $415,000; Walls Ramon C & Leslie D
2426 Pleasant Colony Dr; $412,500; Abbas Syed Mazahir & Shah J Tabinda
5964 Windward Ct; $390,000; Armstrong Scott P & Chrystal

New Albany

7518 Ogden Woods Bl; $885,000; Higgins Michelle & Higgins John
41 Keswick Woods; $665,000; Zimmerman Shawn D & Zimmerman Elizabeth G
7437 Ratchford Ct; $620,000; Higginbotham Carl N Jr & Higginbotham Sonya L
7087 Fernridge Dr; $525,000; Chernyak Denit V & Chernyak Amanda L

Powell

3860 Coldwater Loop; $650,000; Swords Tracy & Kevin
136 Cressingham Ln; $623,000; Hostnik Eric T & Laura Dunbar
411 Shale Ridge Ct; $575,000; Nore Evan J & Rebecca A
475 Woodard Pl; $502,000; Severt Gregg & Lauren
8429 Maple Leaf Ct; $485,000; Wheeling Robert H Trustee
4625 Cascade Dr; $465,000; Purcell Michael A & Molly C
387 Vinwood Ln; $451,000; Morse Trevor D & Erica M
4175 Daylily Dr; $435,000; Sheel Prashant & Gootha Anvita
4167 Daylily Dr; $433,000; Dasari Pramodh & Chelikonda Sai Haritha
4744 Stone View Ct; $414,900; Miles Kristen M & Ritze Brandon M
3439 Windy Forest Ln; $400,000; Lombardi Matthew & Brenda A
4181 Bishopsgate Way; $395,000; Trout Nancy B
7408 Avendale Dr; $385,000; Boltz Karyn C

Westerville

447 Buckthorn Ct; $585,000; Donovan Ryan S & Donovan Jessica A
6083 Gainey Ct; $475,000; Barker Michael Edward & Linda Phuong Thanh
6094 Haig Point Ct; $450,000; Busick Heather N & Patrick G
5414 Arecaia Ct; $412,000; Humbert Brett & Brittany
5788 Granby St; $499,000; Cook Margaret H & Womble Derek C
61 W South St; $460,000; Yee Helen H
6800 E Alloway St; $435,000; Gopalakrishna Veena
5797 Pioneers Ct; $397,000; Gilliam Catherine

Grove City

2684 Lori'S Wy; $427,940; Zeng Qiang & Li Jia
5325 Lambert Rd; $410,000; Spealman Thomas M & Spealman Susan D
Pickerington6607 Ludham Trl; $405,000; Diallo Aissatou
12359 Raintree Ave Nw; $399,900; Padgett Melanie

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957 Neil Av; $960,000; Aweis Mazen & Karve Amrita
34 - 36 W Fourth Av; $701,000; 34-36 W 4Th Ave Llc
976 Neil Av; $649,000; Presidge Melanie
119 S Ohio Av; $460,000; Enouen Matthew Carl & Enouen Jourdan Marie
889 Dennison Av; $439,999; Keller Stuart Alan & Britt Molly Mcclure

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494 E Whittier St; $405,000; Crugnale Emma & Warmouth Zachary

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2498 Fair Av; $720,000; Berger Kyle
2833 Elm Av; $625,000; Henley Jordan
3095 Dale Av; $470,000; Molnar Jason P & Molnar Adrienne M
200 S Chesterfield Rd; $385,000; Forence James

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1645 Andover Rd; $572,800; E & E Collective Llc
1867 West Fifth Av; $393,000; Klabunde Nathan & Klabunde Bevin M

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138 Arden Rd; $458,000; Glimcher Brandon
130 E Schreyer Pl; $428,000; Donnelly Sean T & Donnelly Laura
185 Sheffield Rd; $385,000; Blood Sean E & Decker Lauren M

Upper Arlington

2185 Sheringham Rd; $900,000; Tozbikian Gary H & Tozbikian Stephanie K
4130 Edgehill Dr; $699,900; Pathak Parag & Pathak Anagha
3725 Seaford Dr; $660,000; Runge Thomas M & Runge Kimberly A W
4201 Woodbridge Rd; $605,000; Sommers Richard @(3)
2498 Danvers Ct; $555,000; Merchant Owen & Kennedy Jean
2340 Middlesex Rd; $479,000; Berger Nicole & Berger Nicholas V
2276 Arlington Av; $608,000; Baillargeon Justin

Gahanna

650 Havens Corners Rd; $400,000; Garman Lucas J

Northwest Side

7530 Ravens Nest Ct; $550,000; Viggiano Robert & Viggiano Dawn
1306 Haran Av; $435,040; Miller Jennifer Anne & Miller Quinn G
1185 Bluffway Dr; $434,500; Grossman Andrew S Trustee
842 Skylark Ln; $420,000; Travis Marc A & Tarlton Tara D

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Veronica Hill

From Waste to Resources

SWACO grants help fund waste-diversion programs

Most people know that SWACO operates the Franklin County Sanitary Landfill.


Ty Marsh

However, we're just as committed to keeping waste out of the landfill as we are to managing the waste that goes into it. In fact, we've helped the county reach the point where we now are recycling more than half of the waste material created by residents and businesses.

But we don't want to stop there.

We're aiming to reach 75% diversion by 2032, which is why many of our programs and services focus on recycling, composting and other activities that divert waste from the landfill. This includes our grants program.

SWACO offers two competitive grants, which are designed to promote and support recycling and other waste-diversion initiatives in Franklin County.

Our Event Waste Reduction Grant reimburses organizations for their efforts to minimize waste generated at events through recycling, reducing and reusing.

Our Community Waste Reduction Grant is available to schools, communities, nonprofits and government entities to help fund waste reduction and diversion programs.

This year, we awarded 15 Community Waste Reduction Grants totaling $201,873. That's the highest number of grants we've awarded – and the most money awarded – since we overhauled and reintroduced our longstanding grants program in 2015.

These numbers are a testament to our community's collective desire to be better stewards of the environment.

Interestingly, more than half of the grant recipients we selected intend to reduce residential or commercially generated food waste.

These projects align with SWACO's efforts to cut food waste in half over the next decade and reflect our community's increasing commitment to reducing food waste.

We're excited about this trend, considering food waste is the top item, based on weight, thrown away in Franklin County and, as such, presents one of the biggest opportunities for waste diversion.

Here are the creative and interesting ways our grant recipients are using Community Waste Reduction Grants:

- The cities of Dublin, Hilliard, Upper Arlington and Westerville each are establishing or increasing the number of food-waste drop-off locations. Dublin's planned drop-off location is expected to serve up to 500 households and divert about 78,000 pounds of food waste from the landfill each year.
- A Reynoldsburg junior high school will establish a food-waste-composting program that turns cafeteria waste into compost for the school's gardens.
- Local Matters will provide hands-on nutrition and food-waste education and install a composting system capable of creating 100 pounds of compost each week, which will be used to nourish plants in its community gardens.
- The PAST Foundation will update its Garbology 2.0 curriculum used for teaching students in grades 5 through 12 about waste reduction, recycling and composting.
- Columbus Public Health is creating a food-waste-donation guide for restaurants and other businesses that serve food in Columbus.
- Food Rescue US will enhance its app to allow food donors to register available food, social-service agencies to communicate their food and delivery needs and volunteers to sign up to assist with rescuing and redistributing excess food.
- Habitat for Humanity will purchase a new truck to collect donations, which will help divert an estimated 696 tons of usable material from the landfill.
- Columbus City Schools will install water-bottle-filling stations in 31 buildings with no air-conditioning, with the goal of cutting the use of disposable water bottles in half.
- The Furniture Bank of Central Ohio purchased reusable bulk-collection containers to collect, store and transport household items so they can be distributed to families in need instead of thrown in the garbage.
- LifeCare Alliance purchased 10 recycling-sorting stations for use at its three facilities.
- Franklin Park Conservatory and Botanical Gardens is purchasing new recycling containers and signs to increase employee and visitor recycling.
- Franklin Township will purchase new recycling stations for its administration offices and its police and fire stations.

We're proud to be helping organizations and communities implement sustainable practices that protect the environment and ensure the long-term viability of the landfill. After all, the less material we put into the landfill, the longer it will last.

SWACO is accepting applications for its 2021 grant cycle until 5 p.m. Aug. 28. We invite schools, nonprofits and public entities to apply. The application form is available on swaco.org under the "Diversion" section.

Ty Marsh is executive director of SWACO. Questions about its operations can be directed to him at questions@swaco.org. His office provides this column to ThisWeek Community News.

Coming up

To add or update a listing, send an email to editorial@thisweeknews.com.

Support groups

NAMI Connection, a peer support group for adults living with mental illness of any kind, noon to 1:30 p.m. the last Saturday of each month at Ohio State University East, Talbot Hall, 1492 E. Broad St. This group is free and meets for 90 minutes once a month. NAMI Connection offers a casual environment and the facilitators are individuals who are in recovery themselves. No registration or enrollment is required. For more information, call NAMI Franklin County at 614-501-6264.

Alzheimer's Caregiver Support Group, sponsored by the Alzheimer's Association, Central Ohio Chapter, 6:30 p.m. the second Tuesday of the month at Redeemer Lutheran Church, 1555 S. James Road. Open to those caring for someone with memory loss. For information call the 24/7 Helpline at 800-272-3900.

Crohn's & Colitis Foundation of America, support groups for patients with Crohn's and ulcerative colitis as well as their family members, meeting in Reynoldsburg and Delaware. Visit ccfa.org/chapters/centralohio for times and dates or call 614-889-6060.

Caregiver Support Group, noon to 1 p.m. or 5:30 to 7 p.m., each third Wednesday of the month at the Central Ohio Area Agency on Aging, 3776 S. High St. Topics covered include the hiring of in-home help, qualifying for homecare programs and dealing with the everyday stresses of caregiving. Free and free parking is available. Registration is necessary; caregivers can contact the agency at 614-645-7250, 1-800-569-7277.

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Style Encore

FROM >> A4

items all day every day and receive cash on the spot. No appointment is needed to sell items at the location, she said.

Kasten said the goal is to offer an online store in September, with customers using PayPal so they can shop from the comforts of their own homes.

"We want to make sure they have a good experience," she said.

Rafol said her team takes the sanitation process seriously, and they're working to meet the customer's comfort level during the pandemic.

"Women like to have trendy, fashionable pieces in their closet for every occasion, so our goal is to make Style Encore the preferred store for fashionistas, bargain hunters and those who are recycling-conscious," she said.

"Style Encore provides women the resource to sell items they no longer wear, get paid cash on the spot and then turn around and purchase new items at a tremendous value – up to 90% off regular retail prices."

The business is open from 10 a.m. to 8 p.m. Mondays through Saturdays and noon to 6 p.m. Sundays.

Style Encore is franchised by Minnesota-based Winmark Corp., which also franchises Music Go Round, Once Upon a Child, Plato's Closet and Play It Again Sports.

For more information, go to style-encore.com/locations/gahanna-oh or call 614-289-3009.

mkuhlman@thisweeknews.com
@ThisWeekMaria

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VIRTUAL
PUBLIC MEETING

Learn about the John Glenn Columbus International Airport Part 150 Noise Compatibility Study

Wednesday, September 2, 2020
5 to 7 PM

Pre-registration required.

Register and send questions in advance at:

www.airportprojects.net/cmh-part150/home/public-meetings/

If special accommodations, such as audio or visual assistance, are required to participate in the online meeting, or if internet access is not available, please contact the Project Team at 513.818.0626 by August 26.

COLUMBUS REGIONAL AIRPORT AUTHORITY

JOHN GLENN INTERNATIONAL

Learn more at www.airportprojects.net/cmh-part150/

accuse LaRose of doing the bidding of President Donald Trump, a critic of voting by mail.

LaRose made that decision after waiting weeks for a legal determination on his authority from Ohio Attorney General Dave Yost. LaRose withdrew his request

pay for postage," she said.

More information about requesting an absentee ballot is available at https://www.ohiosos.gov/elections/voters/absentee-voting/.

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@RickRouan

At 'luncheon,' Dems pin Ohio's problems on GOP

Rick Rouan
The Columbus Dispatch | USA TODAY NETWORK

Ohio Democrats are putting the blame for problems that plague the state squarely on the shoulders of Republicans who have ruled Ohio for most of the past several decades.

During a lunch-hour video conference with the party's presidential delegates, elected officials and party leaders blamed President Donald Trump for the pandemic and economic crisis, highlighted the Statehouse corruption scandal that has ensnared former Ohio House Speaker Larry Householder and GOP lobbyist Neal Clark, and slammed Ohio Secretary of State Frank LaRose for his decision to allow only one absentee ballot drop box in each county.

And, yes, they gave their solution for fixing the problems: Elect Democrats.

"We have to build back better. We need to turn Ohio blue because election day starts today. Every day from this day forward is election day," said U.S. Rep. Marcia Fudge of Cleveland. "We cannot wait until the last minute to make change. Change is who we are because we are the people's party."

Democrats have struggled in statewide elections during the last several cycles. Trump won Ohio by 8 percentage points in 2016. Republicans cleaned up in statewide non-judicial offices in 2018. Sen. Sherrod Brown's 7-point victory was an outlier for the party two years ago.

"They have had 25 years of a culture of corruption in this state," Brown said.

Brown asked the delegates to find people in their lives who likely wouldn't vote and to help educate them on the issues and how to vote. He blamed Republicans for inadequate school funding and inequitable tax policies, and he put the burden of the 170,000 who have died in the COVID-19 outbreak in the U.S. on Trump.

"When we win Ohio for Biden, and Harris it's going to mean an electoral college landslide. When we win Ohio it means we'll win Pennsylvania, Michigan and Wisconsin," he said.

The daily digital lunch gathering is the party's substitute for the breakfast meetings it would have at an in-person convention. Those have drawn a national cast of political speakers in the past.

They also have acted as a springboard for officeholders who are looking to run statewide campaigns two years later to introduce themselves to delegates around the state.

On Tuesday, Columbus City Attorney Zach Klein reassured the delegates that they have a chance to make changes at the ballot box. His remarks straddled both personal introduction and political rally for Democrats on the 2020 ballot.

He lamented what he said was Trump's "fanning the flames of divisions" and other failures while highlighting legal actions his office has taken to preserve city gun regulations and to fight the Trump administration on changes to the Affordable Care Act.

"It's like all the gains we made under President Obama and Vice President Biden are being squandered. I want you to know right now that hope is not lost," he said.

Klein and Dayton Mayor Nan Whaley, co-sponsors of the Tuesday lunch, both are seen as potential Democratic candidates to run for statewide elected office in 2022.

Recounting her experience leading a city through a mass shooting last summer, Whaley blamed Republicans for failing to act on gun control measures. After nine people were killed in Dayton a day after 23 died in a shooting in El Paso, Whaley said she was hopeful that change would follow.

So far, though, no action has been taken. Whaley called Gov. Mike DeWine's plan, whch received a lukewarm reception in the Republican-controlled Ohio General Assembly, a "watered down" proposal.

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@RickRouan

CLASSIFIED

PUBLIC NOTICE

Division of the State Fire Marshal
Bureau of Underground Storage Tank Regulations

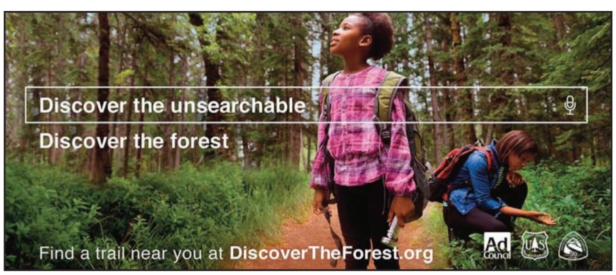
Pursuant to the rules governing the remediation of releases of petroleum from underground storage tank (UST) system(s), notice to the public is required whenever there is a confirmed release of petroleum from an UST system(s) that requires a remedial action plan. Notice is hereby given that a confirmed release of petroleum has occurred from the UST system(s) located at:

Former Certified Oil Company #217
5323 Westerville Road
Westerville, Ohio 43081
Franklin County
BUSTR Release Number: 25000771-N00001(2)

A proposed remedial action plan (RAP) dated July 22, 2020, was submitted by the owner and/or operator of the UST system(s) for the review and approval of the State Fire Marshal (SFM). Once the SFM has reviewed and approved the proposed RAP, the owner and/or operator of the UST system(s) will be required to implement the proposed RAP.

A copy of the proposed RAP, as well as other documentation relating to this release and the UST system(s) involved, is maintained by the Bureau of Underground Storage Tank Regulations (BUSTR), and are available for inspection and copying by the public. Requests for copies or for inspection of the proposed RAP and other related documentation should be made through the use of the "Public Information Request on UST facilities" link located on BUSTR's Resource Page at https://apps.com.ohio.gov/fire/otter/?tabid=2 or by calling our office at (614) 752-7938.

The SFM will accept written comments on this RAP for a period of 21 days from the date of publication of this notice. You may submit any comments regarding this site and the RAP, in writing, BUSTR, P.O. Box 687, Reynoldsburg, Ohio 43068. For further information, please contact David Israel at (614) 752-7225. Please reference release #25000771-N00001 when making all inquiries or comments.



VIRTUAL PUBLIC MEETING

Learn about the John Glenn Columbus International Airport Part 150 Noise Compatibility Study

Wednesday, September 2, 2020
5 to 7 PM

Pre-registration required.

Register and send questions in advance at:

www.airportprojects.net/cmh-part150/home/public-meetings/

If special accommodations, such as audio or visual assistance, are required to participate in the online meeting, or if internet access is not available, please contact the Project Team at 513.818.0626 by August 26.

COLUMBUS REGIONAL AIRPORT AUTHORITY — JOHN GLENN INTERNATIONAL

Learn more at www.airportprojects.net/cmh-part150/

Mobility Engineer

Franklin County Engineer Cornell Robertson is seeking a Mobility Engineer to manage the Mobility Department. Responsibilities include supervision of signing, signal, and route marking operations, plan review for proper traffic control, oversight of traffic and engineering studies, and departmental budget development and administration. Requires a Professional Engineering license. Successful candidates will bring a positive attitude and demonstrated experience. Interested applicants should submit a resume and application (available at www.franklincountyengineer.org) to the following address no later than Friday, September 11, 2020.

Franklin County Engineer
Human Resources Department
970 Dublin Road
Columbus, Ohio 43215
EOE

Part 150 Noise Compatibility Study

Public Information Meeting
September 2, 2020

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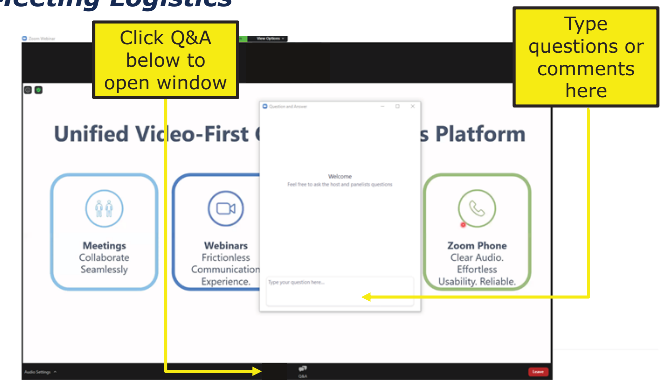
Meeting Logistics



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Agenda

- Welcome and Discussion of Virtual Meeting Resources
- The Value of CMH and Current Highlights
- Part 150 Noise Compatibility Study Process
- History of Noise Compatibility Planning
- Data Collection
- Existing and Future Baseline Noise Exposure Contours
- Noise Compatibility Program (NCP) Measures
- Next Steps

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"Driving Economic Growth, Connecting Ohio With the World"

How does CMH/CRAA Benefit the Community?

- Provided ~160 peak daily departures to 47 destinations pre-pandemic
  (~61 daily departures to 36 destinations, currently)
- Significant Impact to the Local Economy
  - Total Jobs: **33,360**
  - Total Annual Payroll: **$1.7 Billion**
  - Total Annual Economic Impact: **$5.3 Billion**

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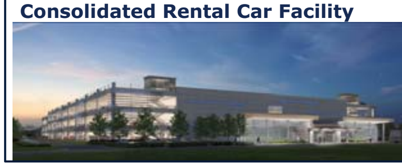
"Driving Economic Growth, Connecting Ohio With the World"

Ongoing Development at CMH

Consolidated Rental Car Facility



- Open to public in 3rd Quarter, 2021
- 2,500 Storage Spaces
- $140M Capital Investment ($95M in construction resulting in 1,600 jobs)

Residence Inn Hotel

- Opening Fall, 2020
- 122 Guest Suites on 4 Floors
- Meeting Space for up to 35 Guests

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"Driving Economic Growth, Connecting Ohio With the World"

How Has CRAA Managed the Pandemic?

Complimentary Mask Station Installed

Social Distant Queuing and Seating

PPE Vending Machines

First Facility in Columbus to be Awarded the Global Biorisk Advisory Council (GBAC) Star Accreditation for Facility Safety and Cleanliness

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Part 150 Noise Compatibility Study Process

What is a Part 150 Study?

- Part 150 studies are planning studies to identify airport noise and land use compatibility impacts
- Named for 14 CFR Part 150 of the Code of Federal Regulations
- Must follow Federal guidelines with regard to process and methodology
- Makes an airport eligible for funding for certain mitigation measures
- Funding is not guaranteed

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Part 150 Noise Compatibility Study Process

Essential Elements of a Part 150 Study

- Noise Exposure Maps (NEMs):
  - Description of the noise levels for existing and future (+5 years) conditions
- Noise Compatibility Program (NCP):
  - Recommendations for reducing, minimizing, and/or mitigating aircraft noise and land use conflicts
    - Noise Abatement
    - Land Use Mitigation
    - Program Management Measures
- Public Involvement

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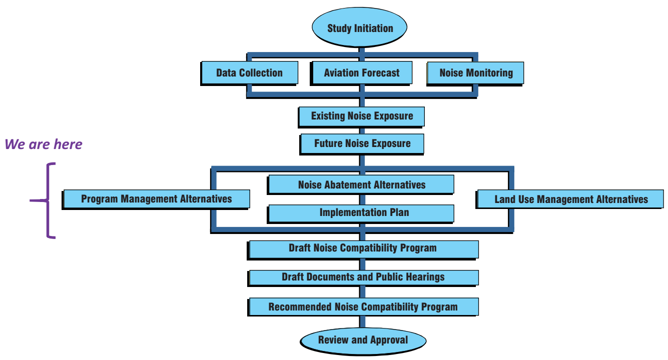
Part 150 Noise Compatibility Study Process



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History of Noise Compatibility Planning

Previous Part 150 Studies Completed at CMH

- 1987 Part 150 Study (original)
- 1993 Part 150 Study Update
- 1999 Part 150 Study Update
- 2001 Noise Exposure Map Update
- 2007 Part 150 Study Update (FAA Record of Approval in 2008)
  - Conducted concurrently with the Environmental Impact Statement (EIS) for relocation of the south runway

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History of Noise Compatibility Planning

Mitigation Program Measures

- Residential Sound Insulation
  - CRAA has provided sound insulation to nearly 800 homes
- Acquisition Program
  - Acquisition of 35 homes impacted by relocation of the south runway
  - Provided relocation assistance to affected residents
- Tracking and Measuring Noise
  - Operates WebTrak System with 16 permanent noise monitors
  - Allows staff and the general public the ability to track flight activity and noise levels
- Noise Complaint & Inquiries
  - Dedicated staff to respond to complaints and inquiries about aircraft operations and noise
- Proactive planning
  - Adhere to both federal and local regulations
  - Maintain transparent communication
  - Provide information to land use planners, developers, and the general public

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Data Collection

Comparison of Noise Levels

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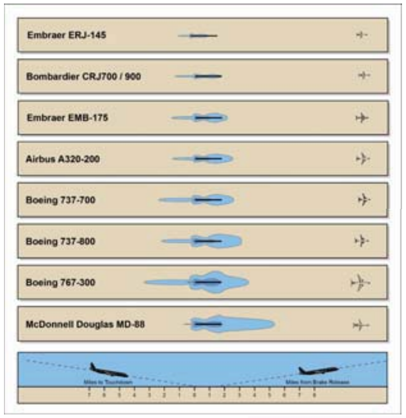
Data Collection

Aircraft Noise Footprints

- Represent single event noise levels.
- Overhead view of noise from arrival landing from the left and departure to the right.
- Older and larger aircraft such as the 767-300 and MD-88 have been or are being phased out at CMH.
- Newer aircraft have a smaller noise footprint.



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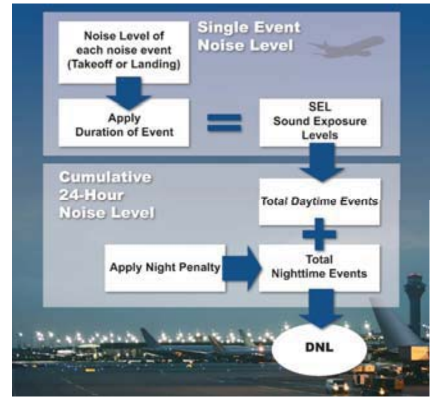
Data Collection

What is DNL

- Day-Night Average Sound Level
- Represents the average noise level over a 24-hour period
- Applies a 10 decibel "penalty" to nighttime noise events (between 10:00pm and 6:59am)
- Required metric for Federal noise studies



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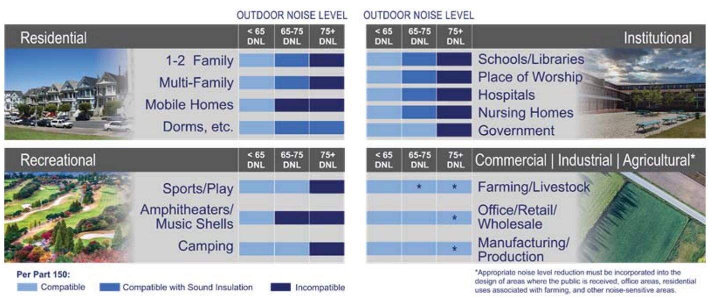
Part 150 Noise Compatibility Study Process

Land Use / Noise Sensitivity Matrix



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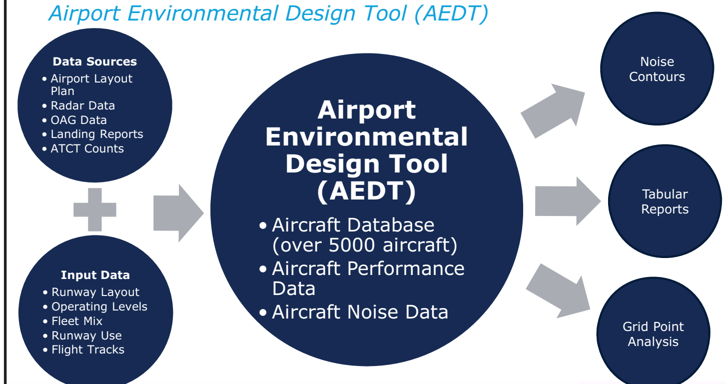
Data Collection

Airport Environmental Design Tool (AEDT)



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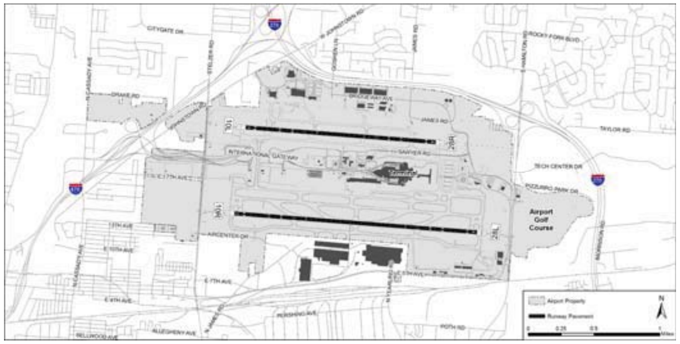
Data Collection

Runway Layout



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Data Collection

Operating Levels

- Existing (2020) Operations
  - Actual based on FAA Air Traffic Control Tower records for September 2018 through August 2019
  - Reflects operating levels prior to decrease resulting from COVID-19 pandemic

Aircraft Category	2020 Existing Operations		
	Actual	Average Annual Day	Percent
Air Carrier & Commuter	113,961	312	84.4%
General Aviation	20,294	56	15.0%
Military	744	2	0.6%
Total	134,999	370	100.0%

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Data Collection

Operating Levels

- Future (2025) Operations
  - Based on aviation activity forecast prepared for this Part 150 Study
  - The forecast was prepared and approved by the FAA prior to COVID-19 outbreak. Although the current outlook may differ, the forecast provides a conservative projection of future noise conditions.

Aircraft Category	2025 Forecast Operations		
	Forecast	Average Annual Day	Percent
Air Carrier & Commuter	128,580	352	85.6%
General Aviation	20,930	57	13.9%
Military	630	2	0.4%
Total	150,140	411	100.0%

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Existing Data Collection

Runway Use – West Flow

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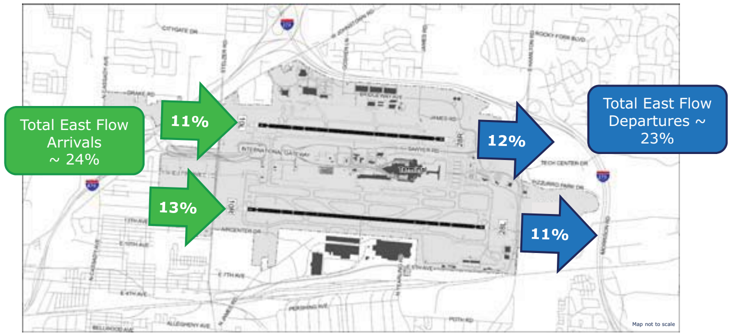
Existing Data Collection

Runway Use – East Flow



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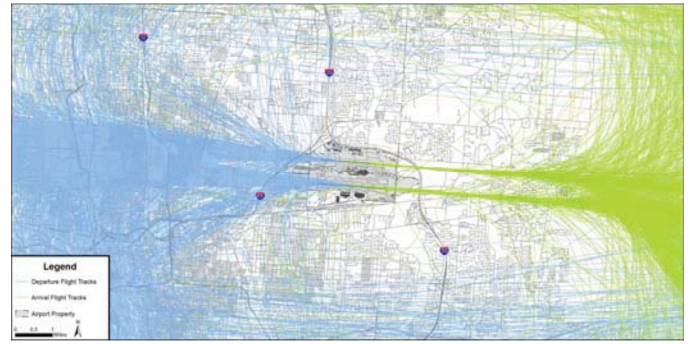
Existing Data Collection

West Flow Flight Tracks



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Existing Data Collection

East Flow Flight Tracks

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Existing Data Collection

Noise Monitoring Program

- Validate/verify the input data in the AEDT (focus on departures)
- Obtain "real-life" noise measurements to assist in understanding the total noise environment
- Conducted the week of November 11, 2019
- Collected noise readings at 30 sites (approx. 1 hour at each site)

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Existing Data Collection

Noise Monitoring Program

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Noise Monitoring Program

Results

- Summary Results
  - Loudest aircraft recorded included, Boeing 737-800/900 and Embraer ERJ-175 aircraft
  - Average number of aircraft observed at each site was 11 to 12
  - Some aircraft noise events were combined with community noise sources such as intermittent car/truck traffic
  - Measured single event data was determined to be consistent with aircraft noise profiles modeled in AEDT

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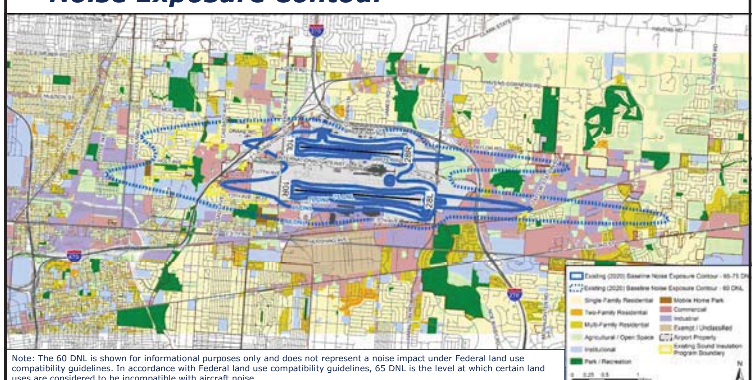
Existing (2020) Baseline Noise Exposure Contour



Note: The 60 DNL is shown for informational purposes only and does not represent a noise impact under Federal land use compatibility guidelines. In accordance with Federal land use compatibility guidelines, 65 DNL is the level at which certain land uses are considered to be incompatible with aircraft noise.

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Existing (2020) Baseline Noise Exposure Contour

Jurisdiction	65-70 DNL	70-75 DNL	75+ DNL
Housing Counts			
Columbus	0	0	0
Gahanna	0	0	0
Mifflin Township	0	0	0
Jefferson Township	0	0	0
Total	0	0	0
Population			
Columbus	0	0	0
Gahanna	0	0	0
Mifflin Township	0	0	0
Jefferson Township	0	0	0
Total	0	0	0
Noise-Sensitive Facilities			
Schools / Daycares	0	0	0

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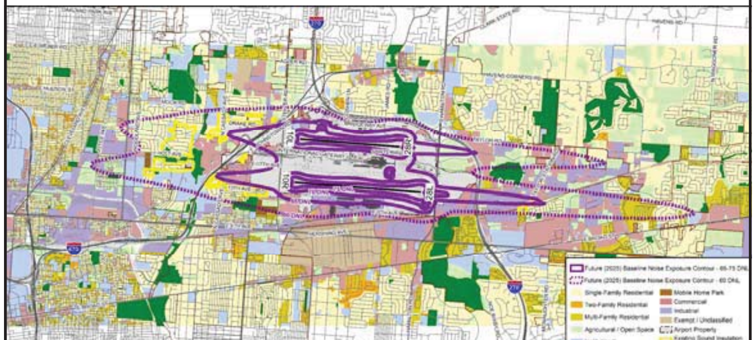
Future (2025) Baseline Noise Exposure Contour



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Future (2025) Baseline Noise Exposure Contour

Jurisdiction	65-70 DNL	70-75 DNL	75+ DNL
Housing Counts			
Columbus	1	0	0
Gahanna	1	0	0
Mifflin Township	0	0	0
Jefferson Township	0	0	0
Total	**2**	**0**	**0**
Population			
Columbus	3	0	0
Gahanna	3	0	0
Mifflin Township	0	0	0
Jefferson Township	0	0	0
Total	**6**	**0**	**0**
Noise-Sensitive Facilities			
Schools / Daycares	1	0	0

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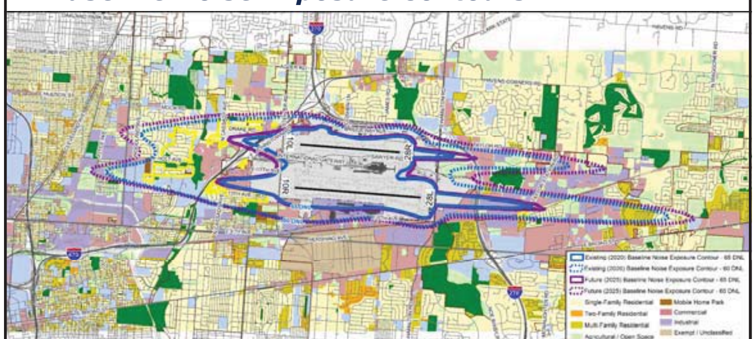
Existing (2020) compared to Future (2025) Baseline Noise Exposure Contours



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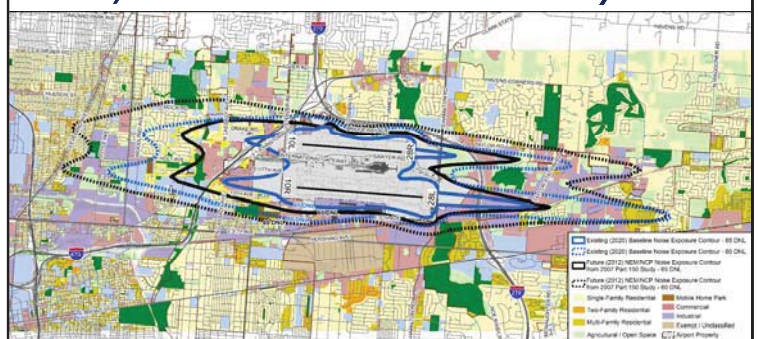
Existing (2020) compared to Future (2012) NEM/NCP from the 2007 Part 150 Study



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Existing (2020) compared to Future (2025) Baseline Noise Exposure Contours

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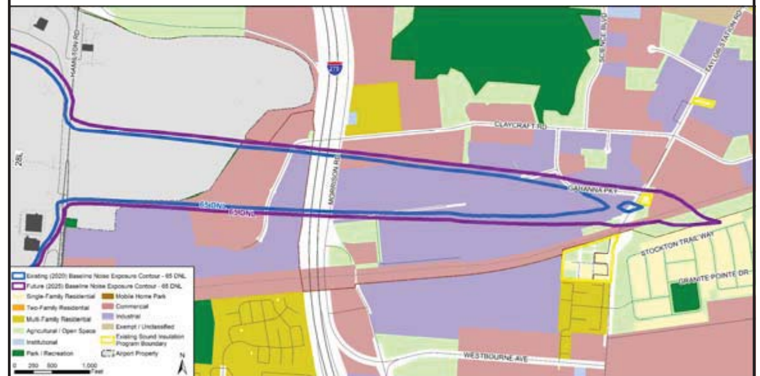
Existing (2020) compared to Future (2025) Baseline Noise Exposure Contours



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Existing (2020) compared to Future (2025) Baseline Noise Exposure Contours

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Existing (2020) compared to Future (2025) Baseline Noise Exposure Contours

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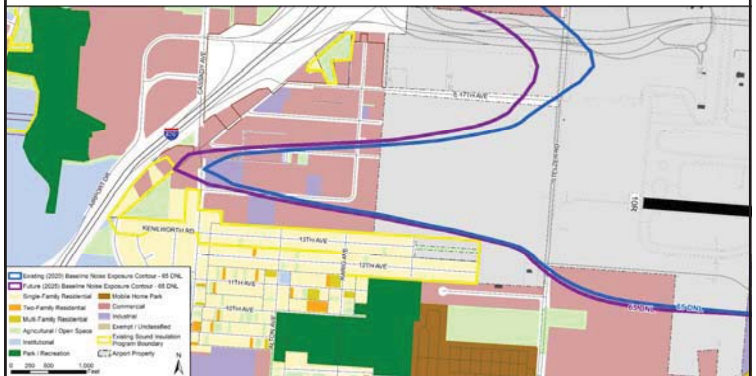
Existing (2020) compared to Future (2025) Baseline Noise Exposure Contours



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Noise Compatibility Program

Types of Program Measures

- Noise Abatement Measures
  - Examples include preferential runway use, flight track adjustments, profile/thrust settings
- Corrective Land Use Measures
  - Examples include property acquisition and sound insulation
- Preventative Land Use Measures
  - Examples include compatible use zoning and noise standards in building codes
- Program Management (Implementation) Measures
  - Designed to assist with the implementation and management of the Noise Compatibility Program (NCP)
  - Examples include Airport staff dedicated to program management and outreach

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Next Steps

Part 150 Process

- Review public comments
- Publish Draft Part 150 Noise Compatibility Program
- Public Hearing Winter 2020

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How to submit questions or comments?

- Using the Q&A function during the meeting until 7pm
- Online: www.airportprojects.net/cmh-part150/contact
- Mail:

  Landrum & Brown
  Attn: Chris Sandfoss
  4445 Lake Forest Drive, Suite 700
  Cincinnati, OH 45242

- Please submit comments by October 2, 2020
- Printed copies of the presentation are available at the CRAA office by request
- A recording of this presentation will be available online following this meeting

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Thank You!

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JOHN GLENN COLUMBUS INTERNATIONAL AIRPORT

Part 150 Noise Compatibility Study

Public Workshop #2

September 2, 2020 (held online)

MEETING TRANSCRIPT

Marie Keister: Welcome, everyone. My name is Marie Keister and I'm with Engage Public Affairs and Murphy-Epson and I will be helping to moderate this evening. We're going to give a few more minutes for people to log in. But you are in the right place. If you want to hear about the Part 150 noise compatibility study for the John Glenn International Airport and the meeting will begin very soon.

So while you're waiting. I'm going to give you some logistics instructions in just a little bit. But while we wait for a couple more people to log in. I'll just note at the bottom of your screen that you have a Q and A box so while you are all muted today, you can write your question or your comments and then we'll be asking our panelists to respond. So I'll be watching those and we will be able to respond to those both in writing in and also verbally as well.

Okay, it's 5:02 so just introducing myself again. I am Marie Keister and I'm part of the Project Team and with me today is number of folks.

We have Justin Anderson, who is the Project Manager with Columbus Regional Airport Authority. We have Chris Sandfoss who you're going to hear from in just a little bit. He's the Project Manager for Landrum & Brown. He is also accompanied by Rob Adams with Landrum & Brown, and Gaby Elizondo. And so this is the group of folks, including Mark Kelby and Nick Hoffman, who are behind the scenes, who are here to support us and be able to answer any questions or comments you might have. So thank you so much for coming.

So you are here for the Part 150 Noise Compatibility Study and to kick us off, Justin Anderson will take it away.

Justin Anderson: Awesome, thanks. Marie and good evening, everybody.

Like Marie said, my name is Justin Anderson. I'm the Project Manager here at the Columbus Regional Airport Authority for the Part 150 Noise Compatibility Program Study

I really hope everyone is staying safe and healthy through these times. And before we begin, I truly just want to send out a big thank you for taking the time to join us tonight. I know we're all busy and I really want to thank you for hopping on and seeing what's happening at the Airport and what we're doing with our noise management service.

Typically these meetings would be held in a large room where the project team would be standing next to boards containing information from the project and the public would be able to walk around and ask questions about the project, face-to-face, but given our current restrictions, in an effort to mitigate the congregation of a large amount of people we opted to go virtual with this public information meeting.

Although we are in this virtual setting today. I do want the participants to feel free to ask questions and participate as much as possible through the Zoom’s common functions which we will get into here shortly on how to do so.

So what are we doing here tonight. Well, this Project Team, which consists of the Columbus Regional Airport Authority, Landrum & Brown, which is an aviation planning consulting firm based out of Cincinnati, and also Murphy Epson in which is where Marie Keister is part of based here in Columbus, we are going to provide an update on the Part 150 Noise Compatibility Program study that is currently ongoing here at John Glenn Columbus International Airport.

Chris will be taking a deeper dive into what this study entails. But the goal for tonight is just to introduce the public to what this study is, provide the history of noise management at the Airport and discuss our current and future noise exposure here at John Glenn

Here at the Columbus Regional Airport Authority, one of our core values is to be a trusted community partner and we really want to be sure we live up to that during this project.

Again, I urge you to participate. If you have any questions or comments during this presentation, I hope you find tonight informational as you continue our efforts to determine the noise exposure at John Glenn

And all of today's material and a recording of the presentation can be found on the project's website starting sometime next week after we have time to review the transcript; although links to the project website will be found on the last page of this presentation. With that, I'll hand it back over to Marie to go over some media logistics.

Marie Keister: Thank you so much, Justin. And so you do have both a chat and a Q and A function on your screen.

We'd like to direct you to the Q and A function which is on the bottom.

And you open the window and you type your question in there. Rob Adams who you see on the screen is standing by to respond to those questions and so please use the Q and A function, not the chat function, however, I'll be monitoring both of those.

Just in case. And I already have a couple questions that have come in on the chat box those questions by the way, they're not as related to the noise study. So we'll hold those questions till the end and focus on the noise study first.

The other thing I want to make note of is that this is being recorded so as Justin said it will be posted later. But we wanted you to be aware of that.

Our timeframe is from five to seven tonight. But if we get done sooner then will still be standing by, even if the bulk of the presentation is over. So with that, I will turn it over to Chris

Chris Sandfoss: Thank you, Marie.

So just a quick overview of our Agenda for tonight **(see Slide #3)**, we've covered the meeting resources and the method for submitting questions and comments to the Q and A function next Justin will discuss the value of the John Columbus international Airport or CMH going by the three digit airport code; and some of the current highlights and things happening at CMH.

And then I'll get into the discussion of the noise compatibility study process; and the history of noise compatibility planning at CMH; and some of the data collection; for this ongoing study, as well as the, the draft noise exposure contours for the existing and future five year outlook conditions that have been developed for this study and are under review at this point.

And then we'll talk a little bit about some of the program management measures that are already in place at CMH; and talk about the next steps going forward for updating that that plan and finalizing and re approving that plan going forward.

So with that, I'll turn things back over to Justin to talk about some of the activities and recent things happening at CMH.

Justin Anderson: Thanks, Chris. So where are currently? Before we dive into the Part 150, I do want to highlight some notable statistics at CMH **(see Slide #4)**. 2019 was our busiest year ever handling over 8.6 million annual passengers, we were on a very similar trend. This year prior to the pandemic.

Pre pandemic, we were providing air service to about 247 destinations over an average of 160 daily departures.

These numbers here at CMH and across the nation have significantly dropped in the spring, and we are now serving around 36 destinations with an average of 61 daily departures. Although we are about 56% down in traffic from last year, averaging around 4,000 departing passengers a day.

We remain above the national average, which is about 71% down at other airports nationwide.

From an economic perspective CMH continues to be a major supporter to this local community based on our most recent economic impact study, we have generated roughly 33,360 jobs in the community; had about $1.7 billion in annual payroll and $5.3 billion in total economic impact. The Airport Authority has and always will strive to be a valuable asset to the community.

From a development standpoint, we are in the middle of two major construction currently in our midfield area projects **(see Slide #5)**, one being the 2,500-space consolidated a rental car facility which will house all of our rental car companies and rental car storage. This project has resulted in close to 1,600 construction jobs and is expected to open to the public and the third quarter of 2021

Additionally, we have the Residence Inn that's being constructed in the midfield area which will provide an additional lounging option for guests traveling to or from the Airport. The 122-guest suite hotel will open this fall.

And then, of course, with the pandemic, we are doing the best we can here at CRAA to make passengers feel comfortable enough to not only travel but use our facility when doing so **(see Slide #6)**.

We have been recently awarded the star accreditation for facility safety and cleanliness by GBAC, which is the Global Biorisk Advisory Council.

Due to our extensive extra efforts on keeping our facility clean and sanitized we have in the first facility which we are very proud of in Columbus, to receive this award. We're also taking the standard measures of social distancing through the terminal offering complimentary face masks and installing PPE vending machines. We really want to show that when you're ready to fly again we are ready to have you.

Now I'm going to turn it back to Chris. So we can start talking about noise and get into the Part 150 study

Chris Sandfoss: Okay, so the first thing I'm going to talk about is just what is a Part 150 study **(see Slide #7)** and why are we conducting a Part 150 Noise Compatibility Study. Now, some of you might remember the last time the Part 150 study was conducted at CMH was back in in 2007.

But I'll give a little bit more background for those of you that are less familiar with this process. So Part 150 refers to 14 CFR Part 150 of the Code of Federal Regulations, where the process and requirements for a noise compatibility study for an airport are laid out.

So we'll use that term Part 150 quite a bit. And so, you know, it comes from the Code of Federal Regulations.

A Part 150 Study is a process to identify airport noise and land use compatibility impacts through a planning process and it makes an airport eligible for certain funding for certain mitigation measures. Now the funding is not necessarily guaranteed. The funding is only contingent upon the availability of local match and federal grant access through the program.

Some of the elements of a Part 150 Study **(see Slide #8)** include the preparation of noise exposure maps or NEMs and these are the official maps, once approved become the official maps showing the noise patterns around the airport; and they're prepared for an existing condition and a future a condition that looks five years out based on a forecast of aviation activity.

One of the other components of a Part 150 study is a noise compatibility program or NCP which includes recommendations for reducing, minimizing, or mitigating aircraft noise impacts upon noise sensitive land uses.

An NCP is typically broken down into three main categories of measures noise abatement measures which address aircraft noise at the source, land use measures which address mitigating impacts upon the land uses or preventing introduction of new incompatible land uses in certain areas; and program management or implementation measures that assist with the operation and implementation and the day to day conduct of the actual measures.

And then one of the final elements is a public involvement process to gain public comment and input on the study; and this event tonight represents one of the steps in that public involvement process for this study.

Just a quick diagram that shows kind of the steps that we follow when conducting a Part 150 noise compatibility study **(see Slide #9),** and the steps are laid out for us in the regulations that that describe and guide us through the process that we must follow when conducting this study.

The study I should mention it is a voluntary study. Airports are not required to undertake a Part 150 study but airports like here at CMH have chosen to conduct the study and have a long history of conducting as such as this at CMH but again it is a voluntary process. The Airport Authority has decided to undertake and has continued to undertake for several decades.

So this current study we're right about in the middle of the study. We began this study late last fall with an initiation process that that included data collection and preparation of the forecast for the five year future noise contour. It included a noise monitoring program where we measured noise levels in the field. And then began to prepare the existing noise exposure contour and the future noise exposure contour. Now we're at the phase where we've reviewed the contours, the land use impacts and the current measures that were approved for the last study in 2007 and we're reviewing those measures and making recommendations for moving forward with existing measures and identifying potential new measures for inclusion in the study going forward.

So once that process is done. The measures that are recommended for inclusion after they go through this public review process and other stakeholder review will be packaged up into a draft Noise Compatibility Program that will be presented once again in an event, It'll likely be another online event like this, depending on whether or not we can have an in person meeting, that is yet to be seen if that will likely occur, towards the end of this year, where a draft study and document will be published for review and a public hearing will be held to take comment on the draft study prior to it being submitted to the Federal Aviation Administration with request for review and approval.

So I talked a little bit about the history of noise compatibility planning at CMH **(see Slide #10)**. And as Justin mentioned, it is a core goal to be proactively planning for the noise compatibility around the airport. The original study under the Port 150 regulation was conducted at CMH in 1987 and since then the Airport Authority has periodically updated the study in 1993, 1999, 2001, and then most recently in 2007. That 2007 study was conducted concurrently with the Environmental Impact Statement or EIS that analyzed the potential impacts for relocating the south runway. Back in 2007 or prior to 2007 there were plans to relocate that south runway to provide additional space between the runways and additional efficiency on the airfield.

That runway relocation was finalized and opened in late 2013. That runway was relocated approximately 700 feet further south from its original location so that Part 150 study in 2007 and EIS looked at the noise and other impacts of relocating that runway.

Some of the other measures that have been implemented over the course of the Part 150 noise compatibility studies **(see Slide #11).** since it was first started in 1987 at CMH include the residential sound insulation program. The Airport Authority, since that program has been implemented provided sound insulation packages to nearly 800 homes around the Airport.

There were an additional 35 homes that were identified for acquisition because they were in an area that was impacted by the relocation of South runway; and those homes relocated and relocation assistance was provided to the residents.

The Airport Authority also operates their flight tracking and noise measurement system called their WebTrak system, which includes 16 permanent noise monitors that measure noise levels around the airport, 24 hours a day, 365 days a year.

And there is a web component to that system where anyone can log on to the system and view the noise levels and see aircraft in basically real time as they fly to and from the Airport and see what the noise levels are of those aircraft as they overfly those 16 permanent noise monitors.

The system also records the data and has the ability to correlate the noise data to radar data and that data can be researched if there's ever a question or complaint about particular aircraft activity. The staff at the Airport Authority can research that and provide a response as to what caused the noise event or other information about that activity and the Airport Authority has dedicated staff to do that.

And this is part of the Airport Authority's proactive effort to be a good neighbor and respond to community concerns about noise and land use issues and also provide relevant information for decision makers for land use planning and future development around the Airport.

So the next few slides will just provide a little bit of background information about aircraft noise; what it means, what the experience is for people that live around the airport. This chart shows an example of some common indoor and outdoor sound levels in comparison to typical aircraft departures **(see Slide #12),** and as you can see at the top of the chart, one of the loudest events is a Boeing 747 takeoff. And now, Boeing 747s rarely operate at CMH, there are a few that may still operate at Rickenbacker as cargo aircraft but passenger airlines in the US phased those out as the for newer aircraft that are more efficient from a fuel burn standpoint. Some of the more common aircraft that you see at CMH are the Airbus A320 and Boeing 737-700 that are a little bit quieter than, than the 747 and maybe about as loud as a lawn mower, or a large diesel truck, or heavy urban traffic, and even maybe as loud as a blender or a vacuum cleaner that would be in use in in someone's home. So this is just to give a little bit of perspective about just how loud aircraft are on departure, as measured just two miles from the end of a runway.

And this graphic shows a comparison of some of the typical and historic aircraft events or aircraft types that have operated at CMH. It shows an example of eight different aircraft types and the noise footprint that would be modeled by the computer noise model that is used to predict noise levels around an airport **(see Slide #13)**. The graphics of these aircraft include an Embraer 145, a CRJ-700 or 900, an Embraer 175, an Airbus A320, a Boeing 737-700 or 800 a Boeing 767, and an MD88. These all show the noise footprints from those aircraft types as if you're looking over top of the aircraft landing on the runway. So it would be an approach from the left-hand side of your screen and then a departure to the right-hand side of your screen. As you as you can see, for the most part, these aircraft get louder and louder is as you look down the list and some of the louder aircraft shown on this list are the Boeing 767-300 and the McDonnell Douglas MD-88. Those have been phased out of commercial fleets at CMH to no longer operate and they have been replaced with some of the quieter aircraft newer and quieter aircraft like the CRJ700 and the Embraer 175. And that's important when we get to looking at the noise exposure contours and comparing those back to noise exposure contours that were developed for previous studies will see that the reduction in noise from the phase out of some of these older louder aircraft has had an effect of reducing the size of the current contours at CMH.

So we'll talk a lot about the noise metrics and methodology for measuring and analyzing noise at the airport and one of the most important topics is the noise metric that is actually used for discussing noise impacts and generating the noise contours that will show here in a bit. And the metric that is used per federal requirement is called the Day-Night Average Sound Level or DNL **(see Slide #14)**. So we'll talk about DNL that's an acronym that you'll probably hear a lot throughout this study, but basically the DNL metric is the average noise level over a 24-hour period. So it basically takes all the noise from aircraft events, you'll have all the all the peaks when the events occur and then all the valleys when there is no aircraft event and it's averaged out over a 24-hour period. And typically for a noise study such as this, the DNL will represent an average-annual day. So all the aircraft activity over a 12-month period divided by 365 to get an average-annual day.

Now with the DNL there is an additional 10 decibel penalty that's applied to aircraft events or noise events that occur at night or between the hours of 10:00pm, and 6:59 am. That is to account for the additional annoyance of noise levels at night when people are home and generally sleeping. So because the decibel scale is logarithmic a penalty of 10 decibels is like counting an aircraft event as if it occurred 10 times.

As I mentioned, the DNL is the required metric to use for federal noise studies and it is the metric that the Federal Aviation Administration requires as well as other Federal agencies that recognize it as the preferred metric for federal noise and environmental studies, including the EPA and the US Department of Housing and Urban Development.

So the graphic in this slide just shows kind of a simple view of how the DNL metric is calculated. So you take all the noise levels of all the aircraft events that occur during that 24-hour period. You apply the nighttime penalty to any nighttime events after 10:00pm up through 6:59am and it's mathematically averaged over that 24-hour period to determine the actual DNL level of for a location or for an area.

So noise compatibility study also looks at land use and determines whether or not certain land uses are compatible with different levels of aircraft noise and based on the regulations contained in 14 CFR Part 150. This graphic shows a rough summary of the land use compatibility for different land uses or different land use types within different noise levels now based on federal guidelines that are that are currently in place **(see Slide #15)**. 65 DNL is the limit at which certain noise sensitive land uses are considered potentially incompatible without certain treatments or testing. All and uses under Part 150 guidelines are considered compatible with noise levels below 65 DNL. Certain residential uses would start to become incompatible with levels above 65 DNL without sound insulation. So a lot of residences can be sound insulated to reduce interior noise levels to below acceptable levels, per the federal guidelines; although mobile homes cannot be effectively sound insulated so mobile homes are considered incompatible at levels above 65 DNL and then most other permanent residences would be considered incompatible at noise levels above 75 DNL.

Some other types of land uses also have noise compatibility guidelines under the Part 150 regulations. Most recreational uses are compatible up to 75 DNL. Although outdoor amphitheaters or music shells would be considered incompatible at levels above 65 DNL.

Some institutional uses or noise-sensitive public facilities such as schools, places of worship, other educational facilities, or medical facilities like hospitals and nursing homes would start to be considered incompatible levels at 65 DNL unless the construction of those facilities reduced interior noise levels to acceptable levels, which is generally around 45 decibels. And then, commercial and industrial and agriculture uses are typically compatible with noise levels above, up to and including 75 DNL with the exception that certain office uses where the public may congregate or public use would be considered or recommended to have some sound insulation or sounded attenuation within those areas that the public are received; and then any residential uses associated with a farm like a farm house would fall under the residential use category and would also be recommended to be a sound attenuated at or above 65 DNL.

So next, I'll talk a little bit about the methodology and process for generating the noise exposure contours that we'll show here tonight.

And the contours are generated using the computer noise model that's approved by the federal government and it's the, the current computer model is the FAA Airport Evironmental Design Tool or the AEDT **(see Slide #16)**. There's a great deal of data and input that goes into the AEDT model to generate a set of computer generated noise contours for an airport and that's the process that we've been conducting for the past several months. When this study began with collecting that data and input it into the noise model to prepare the noise contours following the guidance and requirements for generating those contours that are set forth by the FAA. So we look at a lot of data sources and collect data from a lot of various sources for input into the computer model, including airport layout, radar data that shows the aircraft in flight and flight tracks and aircraft types.

We look at data from the Official Airline Guide that provides data on commercial airline schedules that gives a lot of information about flight activity and the scheduled aircraft operations at CMH, as well as data from the FAA airport traffic control tower or a ATCT that provides an account of aircraft operations by aircraft type, time of day and the runway end that was used to and from the airport. So all that data is input into the computer model and the computer model the AEDT includes a database of over 5000 aircraft and it includes a very robust database of the performance of those aircraft in flight upon departure and arrival to an airport. So the data is plugged into the model and the model basically simulates how those aircraft fly and the noise levels that would be audible along the flight path of those aircraft to and from the airport and it outputs the set of computer noise contours as well as other information, tabular reports, and other data that are useful in in describing the noise conditions around the airport.

Some of the specific data collection for CMH which included the actual runway layout **(see Slide #17)**, and this is a graphic that shows the runway layout and airfield at CMH. For those of you that aren't familiar with how the airport is laid out there two parallel runways that run in an east-west direction and they're labeled based on the compass heading, if you assume that 360 degrees is due north then 90 degrees would be due east, 180 degrees would be to South, and 270 degrees would be to the west.

So the runways are labeled in 10-degree increments. So the runways at CMH are labeled 10 and 28, meaning there are approximately 100 degrees and 280 degrees, so almost not quite exactly east to west. And then the two runways are designated with an L and R for left and right. So at CMH you have runway 10 left / 28 right, is the runway on the north side and then you have runway 10 / right

28 left on the south side with the terminal in the midfield area in the middle. So if you're traveling to CMH from I-670 you get off on International Gateway and drive toward the terminal, you'd be in the midfield area and the two runways would be to your left and right, and this is the area that that Justin mentioned some of the new development is ongoing, including the consolidated rental car facility and the residence in right there in the midfield. Just, just a little bit west of the existing terminal.

So some of the other data we collect includes a lot of data on aircraft operations. And this is just a very high level summary of the number of aircraft operations that occurred during our baseline data collection period that will represent the existing noise exposure contour for conditions based on actual operating levels between September 2018 through August 2019 **(see Slide #18)**. And it's important to note that time period predates the slow down due to the COVID-19 pandemic so we thought it was important to continue using that data that was prior to the slowdown rather than using newer data that would show lower operating levels and thus lower noise levels. So this is a conservative approach to show noise conditions prior to the pandemic. So during that time period for our 2020 existing conditions, a total of 130,499 operations occurred at CMH. And for an average annual day when divided by 365 that results in approximately 370 average-annual day operations. So that would be the, the total input, the total number of operations that would be input into the computer model for the existing baseline noise exposure contour. And then we further break that down by the number of aircraft types by category and other factors like the time of day to apply the DNL penalty for aircraft operations that occur between 10:00pm and 6:59am; and other factors like runway use and flight tracks which I'll show some graphics that show those conditions as well.

So this is just a high level, but we break down the actual aircraft operations by actual aircraft types, the number 737-700, the number of a A-320s, so it gets it gets very detailed and once the actual document is published later this year, there'll be plenty of tables that show the actual detailed inputs into the noise exposure contour.

A similar effort is undertaken for the future noise exposure contour, although it's based on a forecast of aviation activity that was prepared for this study and looks five years out into the future to the year 2025 **(see Slide #19)**. And that forecast takes into account trends at the Airport, as well as economic conditions in the region and nationwide.

And similar to the existing contour the forecast was prepared for future conditions prior to the Outbreak. Therefore, it's, it's probably an over count of activity that may occur as we've seen aircraft activity has been reduced at CMH and around the country and it's likely to grow steadily, you know, once the outbreak is over but maybe a little bit lower conditions or operations may not reach the levels that we forecast, you know, five, five months ago to occur in 2025 but we decided to use this this forecast just to be conservative and overstate the noise, rather than understate the noise. Based on this forecast, it was expected that 150,140 total annual operations would occur in 2025 and when divided by 365 that equals approximately 411 average annual day operations. So, that that is the input number of operations that goes into the production of the future baseline noise exposure contour for 2025 conditions and then it's also broken down based on the forecast by aircraft type and other factors.

So we also looked at runway use which primarily comes from the radar data. And it's also based on radar data that shows actual flight operations and the runway that the aircraft landed to or took off from that baseline period of September 2018 through August 2019. And during that time period, the airport operated in one of two configurations either east flow or west flow. West Flow **(see Slide #20)**, meaning the aircraft landed from the east denoted by the, the green arrows on this map and then departed to the west noted by the blue arrows on this map. The airport operated in that configuration approximately 76 to 77% of the time in the baseline period. And that's further broken down by the percent of time each individual runway was used. So, of that 77% of departures in West flow, 38% used the North runway or departed off of runway 28 right, and approximately 39% departed off of 28 left

You see a similar split of arrivals to runway 28 right and left 35% of aircraft landed on 28 right and 41% of aircraft landed on runway 28 left.

And conversely, when the airport is in East Flow **(see Slide #21)**, meaning the aircraft are arriving from the west side of CMH and then departing to the west, which occurs approximately 23 to 24% of the time you'll see the breakdown or split of departures and arrivals to and from runways 10 left and 10 right.

And it's important to note that the direction of flow is primarily dictated by the wind patterns at CMH and in the Columbus region and the winds primarily come from the west and since aircraft need to take off into the wind to generate lift for departure, that's why the West flow configuration is used more often than the East flow configuration to maximize the benefits of the winds coming from the west so aircraft, get the most lift and get better efficiency upon departure.

So we also looked at actual flight tracks to see where aircraft were flying to and from upon approach and departure at CMH and this graphic shows a typical snapshot of aircraft flight tracks landing in West Flow **(see Slide #22)**. So, the green lines on the map show arrivals landing to runways 28 right and 28 left and then the blue line show departures from runways 28 right and 28 left in West flow. And we review this radar data and then input data into the computer noise model to represent these flight tracks. So we have wide coverage around the area and can actually model aircraft as they fly to and from the airport according to the density along each of these flight tracks. You see the flight tracks are very dense in the straight out pattern from the two runways and then you have various aircraft that are turned sometimes a little bit early, but for the most part they aircraft primarily maintain a straight out course for several miles to and from the runway ends at CMH.

You see a similar pattern, albeit a little bit less dense pattern, in East Flow because East flow operations occur less often **(see Slide #23)**. But you see the straight in approaches depicted by the green lines on the map from the west side heading eastward to land on runways 10 left and 10 right and then to departures into the East direction from runways 10 left and 10 right at CMH.

So we also conducted a noise monitoring or noise measurement program as part of this study and this this program was intended to verify the input data into the noise model to confirm that it was representing actual local conditions at CMH **(see Slide #24)**. I mentioned that the AEDT or the Aviation Environmental Design Tool includes a database of aircraft performance and noise for thousands of aircraft that are in use around the country and the input data into the model was verified to confirm that the actual single event noise levels that are predicted by the model that are modeled in the AEDT were accurate and reflected true real life conditions at CMH. So this noise measurement program was conducted during the week of November 11th. So again, it was, it was prior to the slow down from the COVID-19 Pandemic. The program included conducting noise measurements at approximately 30 sites around CMH for about an hour at each site **(see Slide #25)**. And this graphic shows the different locations, using the, the green dots on the map show the different locations from which aircraft noise measurements were taken around the airport on a short-term basis. And it also shows the location of the 16 permanent noise monitoring terminals around CMH depicted by the purple triangles. So as I mentioned, as part of the Airport’s WebTrak system they maintain that system of 16 permanent noise monitors that record aircraft noise levels 365 days a year 24 hours a day continuously and provide that data that airport staff can review and research. And just a quick note if you count up the monitors or if you look at the numbers, they're numbered one through 12 and then 15 through 18, but noise monitors number 13 and 14 are at Rickenbacker International Airport. So there's 16 Noise monitors at CMH, but the numbering goes up to 18

Justin Anderson: Hey Chris, just real quick on this map. The short term noise monitors were placed strategically. We did also consider the location of where we were receiving a lot of noise complaints and we wanted to make sure that we captured those complaints by placing a monitor in or near that area. We also wanted to place these monitors next to land uses that are noise-sensitive, such as residential, daycares, or schools. We wanted to place these monitors next to those facilities as well to see what type of noise exposure they were experiencing.

Chris Sandfoss: Yes, thank you, thank you, Justin. And as you see, we, we tried to map out a wide range of locations and get a wide dispersion of data collection and the, the land use is shown or generalized land uses shown as part of the base to this map and the light yellow color represents single family residential and you have multi family residential in the orange and kind of ochre colors and then other uses, industrial and commercial represented by the purple and red color so we definitely try to focus on some of the residential areas and some of the other noise sensitive uses. So why you don't see a lot of dots in the more heavily commercial and industrial areas.

So just a quick summary of results from that noise monitoring program **(see Slide #26)**, some of the louder aircraft that were recorded at any of the sites included the Boeing 737-800 and 900 and the Embraer 175 which was expected because those are two of the most common aircraft at CMH,

And as mentioned before, a lot of the older louder aircraft have almost been completely phased out of commercial fleets at CMH. The average number of aircraft events that was recorded and observed at each site for the short-term noise measurement program. Staff were on site and operated the equipment, the entire time we were out there. So we were able to observe what was going on and match up what was being recorded by the field noise measurement equipment we could actually match that to what we were seeing in the field and then further match that to the radar data. So the average number of operations or overflights that was observed and recorded at each site was approximately 11 1/2 or somewhere between 11 and 12 events per site. And some events were combined with community noise events such as traffic and dogs barking or other community and non-aircraft events and those events were taken into consideration when comparing the recorded noise levels to the noise model's calculation of single events by aircraft type and the results of that comparison showed that the measure data that was collected by the 30 short term sites and the 16 permanent noise monitors around CMH was consistent with the aircraft noise profiles in the Aviation Environmental Design Tool Model that is used to predict or generate the noise contours and that was important to confirm that the noise model is actually accurately predicting or was consistent with actual noise levels around the Airport.

So the next couple of slides will show the results of the noise contour modeling and the existing and future baseline noise contours that are still draft contours at this at this phase that have been generated for this study and will be submitted to the FAA to request review for approval.

This exhibit shows the Existing 2020 Noise Exposure Contour based on the baseline period through late 2019 prior to the COVID-19 slow down **(see Slide #27)**. The noise contour using the DNL metric is depicted by the solid and dotted blue lines on the map over top of the land use base map. The solid lines represent the 65, 70, and 70 DNL noise contours and remember 65 DNL is the level at which noise sensitive land uses are considered incompatible with aircraft noise. The 60 DNL is depicted using the dotted blue line, and it's shown here for planning purposes; although, below 65 DNL all uses are considered compatible. So the 60 DNL doesn't show that land uses are incompatible per Part 150 regulations, but it's just shown as a planning tool and for informational purposes, to show where the noise levels may be a marginal impact outside the 65 DNL, but does not show land uses that would be considered significantly impacted per Part 150 guidelines.

So we also do a count of the number of land uses that are noise sensitive within the (Existing 2020) Noise Contour within the different levels **(see Slide #28)**. The 65 to 70, the 70 to 75, and 75 plus DNL noise contours and as you can see on this chart. There's zero noise sensitive land uses within the 65 DNL of the existing noise exposure contour and that does represent a reduction from the number of noise-sensitive land uses including residences and other noise sensitive facilities that were in the contour for the 2007 study due to the reduction in some of the older louder aircraft that used to operate at CMH back in the mid-2000s.

So this graphic shows the noise contour the Baseline Noise Contour for the Future 2025 Conditions using the purple line so similar to the existing contour **(see Slide #29)**, this shows with the solid purple line, the, 65, 70, and 75 DNL for future 2025 conditions and then the dotted line shows the 60 DNL contour that shown for informational and planning purposes for future conditions overlaid over the same land use base map the contour also shows areas in the bright yellow outline that had been previously in sound insulated through the previous Airport Authority's residential sound insulation program. And as you can see that the sound insulation program boundary extended well beyond the 65 DNL contour for both existing and future conditions because as you'll see on one of the

next slides, the noise contours that that program was previously based on where a lot larger than they are for this study due to the phase out of older louder aircraft that have occurred at CMH.

So, similar to the existing baseline contour we prepared a chart of land use impacts within the Future 2025 Contour and there are a total of two housing units that would be located within the 65 DNL of the future contour **(see Slide #30)**, both on the east side of the airport, one of which was previously offered sound insulation and the owner of that house didn't respond or declined the offer. And then the other home is a newer home that was built after the previous contour was published, and would be expected to already attenuate sound based on newer construction techniques and would be considered ineligible for future sound insulation. There's also one daycare facility that was identified within the future noise exposure contour.

So this graphic shows a comparison of the Existing and Future 2025 Baseline Noise Exposure Contours **(see Slide #31)**. It shows the 60 DNL with the dotted blue and purple lines and the 65 DNL using the solid lines and as you can see and would expect the future noise exposure contour would grow slightly compared to the existing contour due to the forecasted increase in aircraft operations that were forecast to occur by the year 2025

And in comparison, this graphic shows the Existing (2020) Noise Exposure Contour compared to the Future (2012) Baseline Noise Exposure Contour that was prepared for the last Part 150 study in 2007 that was generated for a forecast condition expected to occur in 2012 **(see Slide #32)**, and that's depicted using the dotted and solid black lines on the map. And as you can see the 65 DNL of that contour was much larger than the noise exposure contour for our existing conditions for this study, and again, that is primarily due to the phase out of older louder aircraft that used to operate at CMH since the airlines have replaced some of those aircraft with newer, quieter aircraft. In addition, there's been some upgauging of aircraft at CMH where an airline that may have flown three operations of 50 seat jet maybe that's been replaced by one operation of a 150 seat jet to accommodate the same number of passengers with less operations, which also has an effect of reducing noise levels.

Justin Anderson: On this slide it's important to note that the 2012 65 DNL noise contour encompassed 5.2 square miles while the 2020 65 DNL noise contour encompassed 2.7 square miles. So our noise contours are shrinking, almost by half, due to the reasons that Chris has stated.

Marie Keister: Yeah, and I wanted to jump in because there have been some comments and questions about how noise affects certain locations in certain neighborhoods and so forth and Rob has been responding to those questions. And so I'm not going to recap them all right here, except to say that this map is going to be available online. And so you can study it in more detail if you like after the public meeting. And later on, everybody. I will recap verbally what those questions have been so everybody can hear that. But I, I'll do that later.

Chris Sandfoss: Thank you. So the next couple of slides do zoom in to some of the areas to the east and west of the airport, just to show kind of a close up look of the noise contours extending out from each of the four runways. And so this this particular slide shows the noise contour the existing and future baseline noise exposure contours of 65 DNL to the northeast of Columbus or around the area of the intersection of 270; and you can see the noise contour the future, 65 DNL, barely extends out beyond I-270 near where the Techcenter drive overpass is at I-270 **(see Slide #33)**.

This map shows the southeast area of the contour a little bit south on I-270 **(see Slide #34)**. The contour extends a little bit further than the interstate primarily over commercial and industrial areas, but this is the area where there are two residences that have been identified that would be within the future 65 DNL for the future 2025 conditions near the intersection, or just south of the intersection Taylor Station Road and Claycraft Road.

And then as we zoom in to the west side of the Airport **(see Slide #35)**. This shows the northwest side near the area of Drake Road and Cassidy Avenue and as you can see the noise contour primarily remains over airport property depicted by the gray color on the map and just extends out over some of the commercial areas just west of the airport along the I-670 corridor **(see Slide #36)**.

And then a little bit further south on the southwest side, you can see the contour extends almost to 670 to the west of runway 10 right / 28 left and just north of the neighborhood around 13th and 12th Avenue just east of Cassidy Avenue **(see Slide #37)**.

So again, these maps will be online so that people can get a better look at them.

So now we'll talk a little bit about the next steps of the study and the process to update the noise compatibility program or NCP and now that we've generated the noise exposure maps and identified land use impacts or the lack of land use impacts within the 65, the next step is to identify the noise compatibility program measures that are recommended for carrying forward with through the study. The first step was to identify the existing measures that were developed for the previous studies and were approved or included in the, in the last NCP update in 2007, identify any measures that are recommended for continuation or any measures that have been completed and are no longer necessary and withdrawn, or any other modifications to the program.

So we talked a little bit about noise compatibility program measures and the different types of measures and measures basically fall into four main categories or three categories with a couple of subcategories **(see Slide #38)**. So you have noise abatement measures which include measures that address aircraft noise at the source; either measures that that affect aircraft operations or effect airport facilities such as preferential runway use, adjustment to flight track, adjustments to departure profiles and a lot of these measures are already in place at CMH and so we reviewed the effectiveness of those measures to determine if there are any changes warranted to those measures.

The next types of measures are land use measures and those generally fallen in two subcategories: corrective land use measures, which are sometimes referred to as remedial measures, which fix or correct existing land use incompatibilities. Example of that include property acquisition or sound insulation and as, as mentioned the Airport Authority has previously sound insulated nearly 800 homes around the Airport since the their residential sound insulation program began and also approximately 35 homes were acquired and the residents were relocated based on federal guidelines due to the relocation of the South runway that was completed in 2013.

Other land use measures include preventative measures which do just that they their intended to prevent the development of new incompatible uses around the Airport in areas where noise levels are elevated and examples of those measures include compatible use zoning, noise attenuation standards for building codes so new uses already reduced interior sound levels to below acceptable levels so new uses aren't incompatible with the noise levels around the Airport. And then the other type of measure that can be included in an NCP are the program management or implementation measures that just provide assistance to the Airport Authority with the management and implementation and monitoring of the program and provide elements for public outreach coordination and assistance in responding to requests and complaints from the public about the noise program and noise conditions at the airport. So those are our basic types of noise compatibility program measures that that are under review.

The final or not final, but the draft noise compatibility program that includes all the recommended measures from the previous study that are recommended for carrying forward in this study plus any new measures will be packaged up into a document that will be available for public review likely later this year. And we're accepting public comments on the measures, any, any recommendations that we should look at during this study at this meeting tonight and through the rest of the year until those measures are published for additional public review sometime later this year. So the next steps in this process as I mentioned, we're accepting public comments on the conduct of the study and any recommendations that this study should look at for inclusion in the draft NCP that will be presented for final review and approval later this year **(see Slide #39)**.

We will likely have a public hearing to accept comments. Once that study is published likely early on in the winter or late in 2020

Depending on social distancing requirements, it's yet to be known if we'll be able to have an in-person meeting or if there'll be another online event like this where we can present information and gather public comments in a virtual online meeting and also accept comments by email and other means.

Marie Keister: So Chris, I want to, I want to give your voice a break a little bit and we've had a number of comments and questions so before we wrap up on additional information on how to submit and so forth, I'm going to read these questions that have been posted and ask them to share them I think they've been just great comments from the public who are listening in and we sure appreciate your participation.

So there's been a number of comments about people living in specific locations specific communities. And Dave asked questions about how do I register a noise complaint or is there a noise reducing strategy specific to my high level. Can you give some responses?

Rob Adams: So the Airport has a noise hotline that we can provide you that information. There's also the WebTrak system, which is a great tool that I posted the website address for that in the Q and A box to several requests. The WebTrak allows anyone to go online and review the flight tracks of specific aircraft, you can look at very specific time periods. You can see where you live in relationship to those aircraft, you can understand the altitude of the aircraft as well so you can you can get a lot of information. I think about what's happening through that, as well as the airports systems that they use for this for reporting noise and other information on their website and in terms of the programs that have been put in place.

This idea of Part 150 planning at the airport is not new, they've been conducting Part 150s for nearly 20 years, or maybe even over 20 years at this point and through that time there's been several different types of measures that have been put in place that Chris has gone through all of those are designed to help reduce noise or to help mitigate the impact of noise from aircraft.

So I know there was a lot of questions about what types of programs are being put in place and I think as we move through the study will be able to answer those questions a little more directly but know that there are several of those programs in place today and we're evaluating those as we speak, but we don't have any conclusions, we're just testing.

Marie Keister: Another question was about flight tracks potentially changing. In the last couple years there's one community that feels like they've seen more traffic over their homes in the last two years than they did before. Is there anything that is changed significantly in the operation the last two years that could account for that.

Justin Anderson: From an operational standpoint, our operations have gradually increased over the past couple of years. Operationally, the FAA dictates how the aircraft are going to arrive into and depart the Airport. As Chris mentioned earlier, the weather dictates the what direction aircraft will depart or arrive. Aircraft perform better taking off and landing into the wind. Once aircraft depart they are directed to designated corridors in the sky that are defined by the FAA. And then the same thing when arriving. They have corridors identified in the procedures that they will be flying into the Airport until they reach their assigned runway. Those haven't changed here at CMH in some time. We are working with the FAA Air Traffic Office right now on implementing what they call RNAV or RPN routes. Those routes are planned to be implemented in April 2021 and we went out to the public in the fall of 2017 to advise the public of these changes. A note on that though, those impacts won't be noticed from residences or businesses within a five to six nautical mile radius of the Airport.

Marie Keister: And then one last question and then Chris will continue.

Somebody wants to know what the status of the parking garages. So I'm not sure if Justin, you can answer that.

Justin Anderson: Yeah, I can. I can take care of that. So I'm assuming they're talking about the consolidated rental car facility which is currently under construction. We're looking to open in the third quarter of 2021. So it is well underway. We are excited about that. And we're going to be able to relocate the rental cars out to that new facility and we are going to be able to offer more parking space in our existing garage.

Marie Keister: Thanks, Justin. OK. Back to you, Chris.

Chris Sandfoss: Okay, so just wanted to go over the next steps and process to submit comments if you haven't submitted a comment tonight and think of something later on there's still time to get comments to us to be included as we consider updates to the Noise Compatibility Program. So if you are unable to submit a comment tonight. You can still go online to the website there and through there you can just submit a comment using the online form and that will be emailed directly to the Project Team **(see Slide #40)**.

Or you can even send comments in through the mail to my office address listed there. We'll accept written comments through the mail or emailed comments. We ask that you submit any comments, based on the presentations tonight by October 2 just to keep our study on schedule. And so that we can include and address those comments and consider those comments when we publish the actual draft noise compatibility study document and draft noise compatibility program later this year.

I think Marie mentioned that copy of the presentation and recording will be available on the website. So if you go to the website at airportprojects.net/CMH-part150 there's a page for the public meetings and there's a copy of the web, the presentation there as well as there will be a link to the recording of this presentation once that recording is available. so please get any additional comments to us by the beginning of October. If you have any and then look for information about a future event that will likely coincide with the publication of the draft Part 150 study document and NCP that will likely occur towards the end of this year and that will coincide with a another public meeting and public hearing to accept official comments on that plan. Once it is published for public review and comment and then once that Draft Part 150 study is published, and comments are received and addressed a final Part 150 study would be submitted to the Federal Aviation Administration likely in early 2021 with a request for review and approval of the updated plan. And once that plan is reviewed and approved by the FAA, It is anticipated though they'll accept the noise exposure contours after their review and those noise exposure contours will be become the official noise exposure maps for the Airport.

So with that, unless we have any other questions we're willing to stick around to see if there's any other any other questions come through, but just want to thank everyone for listening in and participating and providing their input on our study.

Marie Keister: So there are just a couple more questions. So here's another opportunity to jump in on that.

Somebody asked: There used to be a restriction on night flights in Columbus and what happened to that if that was the case, this person really does not like overnight flight and would like to know.

What restrictions might have been in the past.

Chris Sandfoss: I can answer that.

There is no prohibition on nighttime flights and that's per federal policy, the Airport must remain open 24 hours a day. You may hear about restrictions at other airports, particularly there's few airports in California and possibly one on Long Island in New York that have restrictions on nighttime flights, they basically have a curfew and those were grandfathered in before the federal government passed the law restricting those kind of nighttime curfews and it was a it was a federal law that was enacted as a trade off that that law also implemented the phase out requirement of some of the, the very old, the very loudest aircraft it phased out are required hush kitting of some of the 727s and DC9s that used to fly in the mid-90s and early 2000s. So right now, there's no restrictions on nighttime flights at CMH the airlines are that's up to their scheduling preference and when people want to fly.

Marie Keister: Justin, did you want to make a comment on that as well, or do you want me to go on to the next question.

Justin Anderson: Chris, you did a great job answering that I was just going to add on, you know, we do have in our current Noise Compatibility Program. We do have some recommended measures that pertain to preferential runaway use like Chris mentioned, but, you know, pilots they have the right to ask for operational need to use a runway and if it's going to improve the safety of the flight, usually the tower will give that preference to the pilot. So even if even if, if the measure is identified to use a certain runway, but a pilot needs to use the other one way for an operational need he'll be granted that right so that there may be some nights flights or some early departures in the morning that have occurred because of that operational need from pilots.

Marie Keister: Thanks, Justin.

Chris Sandfoss: And I'll mention that the DNL metric that's used for the study does apply that that penalty to nighttime flights because you know we're aware of that and the federal agencies that developed the methodology were aware that nighttime flights are more disruptive so that penalty it’s applied to nighttime flights when we prepare the noise contour so that that is also taken into account.

Justin Anderson: Thank you.

Marie Keister: And then there's this question. Not as much about the noise wanting to know the status of short term and long-term parking. So Justin the question is a little vague, but can you figure out

Justin Anderson: I'm going to assume that you are talking about the status of our parking lots. Right now, given the pandemic, our passenger numbers have been down as, as you've probably seen in the news and that's across the nation at all airports. So we have also closed some of our parking lots due to the lower numbers. Our Red Lot remains open as a long-term lot but our Blue Lot that has closed, but our short-term parking garage is also open as well.

Marie Keister: So there are a couple more questions about the map and the noise contour. And so, you know, some people have some very specific questions based on where they live. What I would suggest is that well, Rob. I'm going to call on you. What would you suggest I think your responses obviously, we're going to relay every one of your comments to Justin and the Airport Team. We will be responding to these questions, not only through the transcript but the meeting summary will also address the questions as well. Rob, Do you want to add anything to that.

Rob Adams: No, I mean I think just for the audience listening there's several comments about the experience that people are having at their homes, and I'll just sort of paraphrase. There's flights that are disruptive there there's you know that increase that recently, though, you know, those kinds of comments and then questions about why they hear a lot of aircraft at their house, but they're not inside the 65 DNL level, Why is that? So I think we can generally respond to those Marie as you suggested, and we certainly take that information as we are finalizing the noise contours and making sure that we're looking at all of the areas that people live. So, you know, we really want to focus on those areas, in particular, so that we're not missing anything. So, we appreciate the comments and we will try to respond as best we can individually, but that would be in later summary.

Marie Keister: Thank you. So really the content portion of the presentation this evening is completed and so we are still here, we're willing to answer questions. So I'm going back to the open question box to see what we haven't tackled yet. And by the way, there are some of you who are providing personal private information. And so we're going to respond to you, independently, so that we don't transmit your private information to everybody. And so we will, we are capturing those comments. The other thing is in the chat box, we have listed those links where you'll be able to find the this presentation and also provide additional comment until October 2nd.

All right, let's see here. Here's a new question. I understand what the day-night level contour does, but is there a peak there have been times when military aircraft have completely crushed the volume.

Justin Anderson: Chris, I can take, I can take a stab at this one. So we do have times when we do have a non-standard operation that the airport, you know, some especially with military aircraft and they will come into they'll come into CMH to refuel or to drop troops off and they'll fly the C130s or C17s. We have fighter jets to especially when there's an air show up in Cleveland, sometimes the Blue Angels like to stop by and fuel up at our FBO and then go to Cleveland, and those are extremely loud.

Justin Anderson: We do get noise complaints for those, but we do identify those as non-standard or unusual operations. We also have back in June, we had the gypsy mosquito spray, an aircraft that goes around the State of Ohio and that generates a lot of noise complaints, because it also is an aircraft that flies low and It just goes through the city and in a pattern that may not be ordinary for the average person who looks up. So there are some times when we do have unusual operations at the airport, that's just that sometimes are louder than the normal aircraft.

Chris, you want to get into how does, how does, how does that impact the DNL?

Chris Sandfoss: Yes, so since the DNL is an average. It doesn't mean that If you're outside of 65 DNL, let's say you live at 64 DNL, it doesn't mean that aircraft events won't exceed 64 decibels on a peak reading.

The DNL is a combined function of the loudness of the events and the number of events. So if you, if you look at, consider like a line graph, you'll have peaks on the graph. And you'll have valleys on the graph, And then you'll draw a line across, you know, straight line across the average to get your average. So that's your average but you have peaks that are above the average and then you'll have low points that are below the average so there, there would be some levels above 65 dB outside the

65 DNL contour because the DNL is both a function of the loudness of each event and the number of events.

Marie Keister: I'm going to shift to a noise abatement question that Rob already answered online. But let's cover it again. Is there a noise abatement on takeoff.

Rob Adams: Yes. So Marie since I answered it online, I'll go ahead and answer it again there is as part of the Airport’s and Noise Compatibility Program that they've developed over the years, there are a number of things that that they have put in place to address aircraft noise, some of which are the noise abatement procedures. So there are flight procedures that dictate where aircraft will fly so that so they fly primarily runway heading, but then they have other options where they can fly.

And turn off of the end of the runway. But those locations had been selected to try to be as in the least populated areas as it can be.

There's also the runway use program that again, as was discussed; I think earlier during the early morning in particular and overnight trying to limit the use of the northern runway. There's also an east-west runway flow which is you know which direction they're departing, there are some preferences on that as well. So there are some things that are currently in the program to reduce noise that we would call noise abatement. There's some other on the ground facilities that help to reduce noise. There's barriers that that have been constructed for aircraft that are testing their engines while they're on the ground to help reduce the noise in the communities nearby. So there definitely are some things that have been done and you know we'll continue to look to see if those are still relevant. And if there needs to be additional ones through the study

Marie Keister: I think really we've covered the bulk of the questions and we had received some emails in advance, but they are very close to what we've already heard one comment we got was have the flight paths then relaxed over the last year and I think you already covered this Justin that you're working with the FAA on some of these things, but it goes on to say commercial jets have been cutting the path short mostly upon take off but also over our subdivision. So again, I think it comes back to what kind of changing patterns, you're seeing. And if you would just respond to that question again.

Justin Anderson: Yeah, so it's a pattern. A lot of the procedures that aircraft and pilots have to fly are dictated by the FAA and air traffic control. It is our job as the Airport to help make those procedures as safe as possible. And that's at the Airport as well as in the community too. So as part of this planning and as part of our overall effort of being a good neighbor. We work with our local cities and counties to help with development efforts to ensure land use is as compatible as possible to minimize noise impacting the surrounding community. From an operational standpoint, our procedures haven’t changed in some time. Air traffic control may vector aircraft in times of convective weather or if pilots request to improve the safety or operation of the flight. In this case we don’t have too much flexibility on revising these procedures.

Marie Keister: Great. Well, I don't see any new questions that we haven't already tackled either verbally or online and we've recap the themes that have come to us through the Q and A box; although a new question just popped up. So let me just look at that.

Marie Keister: Looking at the 2012 report, was any work done or picking up and starting again. So I'm not sure I entirely understand that question.

Maybe you do Rob or Justin.

Justin Anderson: Yeah, I can. So if we're talking about construction, since we did the last noise study and we did the environmental impact study for the relocation of runway when 10 right to 28 left was relocated the FAA put in our Record of Decision for that Environmental Impact Study that we would conduct a Part 150 noise study. So before we did that, before we did the Part 150 noise study, we decided to also rehabilitate the pavement our North runway, 10 left / 28 right, the one that sits near Gahanna.

So the FAA allowed us to wait until both runways were done with all the construction work before we did this Part 150 noise study. And that's where we are today. So we did the runway rehabilitation for runway 10 / left 28 right which finished up in 2016, so both of our runways are in good shape. so now we are studying the noise from our new our new layout. . We have done taxiways and we've redone payment on taxiways and aprons and those are projects that really aren't obvious to the average passengers, but we have done a lot of construction on pavement. So I'm hoping that answers that question. There was a reason why there was a gap between the 2007 study and this study.

Marie Keister: Great.

Justin Anderson: Great looks like that answer the question.

Marie Keister: Yeah, thank you.

Melanie who's asking great questions. We appreciate all these questions. Well, you know, I just watching that Q and A box to see if any other questions pop up.

If you have had your questions answered by all means, you know you're welcome to stick around till seven but you're also welcome to adjourn too. Either one is fine with us. Alright, let me look at another question. I think I think Melanie can keep us hopping with more questions so far away, Melanie, you got us till seven o'clock. So go for it. Now we'll just challenge her to see how quickly she can type

And maybe just to read it reiterate, you know, Justin's your guy, everybody. He is going to be doing a lot of the follow up on some of the specific questions that have come up and the website that posted on this slide that you see right now if you have, if you won't have any comment or if you want to set up a phone call.

Justin Anderson: Feel free to make a comment. We do have a comment section on this project website and those emails come straight to Chris and myself, and we will set something up with you to discuss, you know, if you want to discuss your property. Specifically, or if you want to discuss an overall scenario, the Airport or operational procedure. We'd be happy to do so. So if you if you think it'd be easier to do that. So there's one means of getting a hold of us through that project website. Another one is from the FlyColumbus.com on our website. Our noise hotline is on that website and we monitor that all the time. So feel free to submit a noise complaint through that and then we can get in touch with you.

Marie Keister: Chris, how are you doing? we've given you a little bit of a break on your voice. Now, but do you have anything to add, based on some of the questions.

Chris Sandfoss: I Don't have anything else to add, it looks like we've got another comment about a specific location.

Justin Anderson: Yeah, it looks like Hey Chris, can you know, can you go back to the slide where that's by Ohio Dominican University out on the northwest.

Chris Sandfoss: This slide shows Ohio Dominican **(see Slide #37)**. I think that's their property in the blue color just west of Airport Drive anything blue on the map is institutional. I think that's the eastern-most part of their campus. The contour in that direction the 65 DNL doesn't extend beyond Airport Drive. I can show the 60 DNL not zoomed in but so, so basically the Ohio Dominican campus is just above the I-670 highway shield on this map **(see Slide #35)**. So it would be, it would likely be within the or is within the 60 DNL, but outside the 65 DNL.

Marie Keister: And how far or close to Sunbury and Airport Drive. Answer that question.

Justin Anderson: Sunbury and Airport Drive those, those roads aren't located on the map. So I'm looking on Google Earth right now and seeing if I can give you a better answer.

Chris Sandfoss: I think this is Sunbury if you can see the blue annotations and then this I think is Airport Drive. So this is the area that I think the commenter is asking about approximately, but we'll have these maps will be on online and with some better, when the when the study is produced will have a lot more road labels. And people will have the ability to zoom in closer. We're kind of limited on how many labels we can show on this and still be able to see what's underneath.

Justin Anderson: Yeah, and that's why if we were if we were in face to face right now we would have a board that we had planned it didn't show a lot of the road label so we hope, hopefully we can get that that opportunity to do a face-to-face. At one point in our public hearing. But yeah, Chris. These will be online to help out and you can zoom in to your preference.

Marie Keister: Rob are there any other question I haven't reiterated

Rob Adams: No, I think you I think you've pulled out the ones that seem to be representative

Justin Anderson: All right, for those of you who are still on. We thank you for joining us tonight. Like, we're going to be here until 7:00 but we thank you we look forward to working with you guys as we continue as we proceed with this study.

Chris Sandfoss: I did see one question that we got by email. A couple days ago, I don't see the person that sent the email but it was asking about minimum altitude. And so I'll answer. Similar to the flight procedures and location of flight. The, the altitudes are part of the procedures and they're designed by FAA to maintain clearance from the ground as well as separation from other aircraft in flight. So yeah, those, those altitudes are going to vary by location distance from the airport in and slightly vary by, particularly on departure. They vary depending on the climb rate of the aircraft some aircraft can climate slightly quicker rate, but depending on the procedure, they're flying there's basically a window that they're trying to hit so they maintain the correct a vertical spacing depending on the procedure that they're flying.

Marie Keister: We received a nice comment thanking us for the meeting. I won't necessarily help their specific noise issue, but they appreciate understanding the research that goes in behind us. So thank you for that comment.

Marie Keister: And if you have any other observations about this webinar virtual meeting. We'd love to hear it. You know, I think we're all learning virtual meetings and so forth. So would love to just get your impressions of that as well.

Marie Keister: So we still have some people hanging in there and we appreciate the thank you' s. By the way, and if any of those who are still on with us or can think of a question or a comment. We'd love to see it.

Think I just got another one.

Oh thank you no technical issues, noticed with zoom during the meeting. Appreciate that. We all triple checked our sound before we got on board this evening.

Justin Anderson: So I see here that if you guys are on, any questions that we can answer please feel free to comment.

Marie Keister: Comment. So years ago there was a study done in the Brentnell area and Teakwood residents got doors and windows. I've been looking at where they're supposed to be equipment to test the levels. I think noise levels and have not found one very close to me as indicated, who can show me where this equipment is as it may have been there, years ago, but today it is not.

Marie Keister: So I think the question is where are the locations of those noise monitors and is there one in the Brentnell Teakwood area.

Justin Anderson: Chris, would you be able to go back to that map that you had on the monitoring locations **(see Slide #25).**

Chris Sandfoss: Yeah, I'm wondering if they're talking about the permanent monitors or the actual testing equipment that's used to test the interior levels to see if it meets the interior sound attenuation requirements, because that's pretty specific equipment. That was a pretty extensive eligibility testing that would have been done prior to the program implementation.

Justin Anderson: So looks like I'm looking at remember up by number four of the permanent monitors.

And looks like that's something the Brentnell Avenue area. That would probably be your closest one. And then we also had some short-term monitors as well. Number six, and 13 looks like those are up there for a couple of days as well. But yeah, if you're referring to what Chris was describing then I imagine I'm not sure.

Chris Sandfoss: There's a two-step process for determining eligibility and the first step is the land use within the 65 DNL But then there's, there's the additional into your testing and the prior programming implementation. Usually I a sample of residences are tested to see if they already reduce noise below that the 45 DNL interior level, and if not, where should the treatments be applied to the home to improve the performance of the attenuation of that the home for that they use similar equipment to what we use for the field noise monitoring program, but we actually will set up a speaker that will blast pink noise at the house or the residence and you'll test outside and inside to see what the difference is before the sound insulation and then after the sound insulation to see if it achieved what it was intended to achieve.

Marie Keister: Actually she's located very close to 17th and Joyce Avenue, so I think your answers have been helpful, but she may want to know, you know, if somebody could direct her, specifically, you know, and show her about equipment that might be helpful.

Justin Anderson: Yeah, we can we can give you the exact location of that permanent terminal.

Marie Keister: Right now there's a chance there's somebody that just joined us. And if that's the case, I just wanted to let you know that we've actually completed the full-blown presentation, which is also available online. And now we're answering questions and if you go to the Q and A box please, we encourage you to write your question or your comment down so we can really get to what issue is of concern to you. And then also, if you look at the answered questions, you'll see the other questions that have been asked this evening. All of this information will be transcribed and posted online. It may be a few days before we can make sure you know and the transcript is done automatically through the technology, you have to go and clean it up because sometimes the technology misinterprets words. So we have to get that done. But then everything will be available online. The presentation is actually online now.

Marie Keister: Just another comment that the planes do seem to be too close. So we appreciate your comment.

So we have about seven minutes left, so please let us know if you have any other questions and comments.

Chris Sandfoss: And I'll go back to the slide that shows how you can submit comments **(see Slide #40)** after tonight.

Marie Keister: Perfect.

Marie Keister: Yeah, so this is now your last chance you have until October 2 so if you're the type of person that really wants to study the slides and see what additional questions or comments you might have. We encourage you to do that. We encourage you to share this information with your friends. They are welcome to go online as well. And I think by next week we'll have the recorded version on there as well.

Marie Keister: So we just have maybe another 60 seconds if you want to post a question; we might have time to just answer. One last one.

Alright, so not seeing any final questions. I think I just want to thank all of our panelists, Justin. Thank you, too, for giving direct instructions on how to get ahold of you as well. And Chris and Rob and mark and Nick behind the scenes and Gaby. So thank you very much, everybody. Have a great evening.

Justin Anderson: Thank you guys very much.

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Public Information Meeting #3 / Public Hearing
July 29 , 2021

To be provided in the Final Document: Newspaper Notices

Online Presentation

Meeting Transcript

Public Comments

Responses to Comments

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Technical Advisory Committee (TAC) Meeting #1
December 11, 2019

Invitation Letters

Meeting Registration

Presentation

Meeting Summary

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COLUMBUS
REGIONAL AIRPORT AUTHORITY

November 6, 2019

Name
Title
Organization
Address
CSZ

RE: John Glenn Columbus International Airport Part 150 Noise Compatibility Update Study Technical Advisory Committee Meeting

Dear Stakeholder,

This letter is to inform you that the Columbus Regional Airport Authority (CRAA) is updating the Part 150 Noise Compatibility Study for the John Glenn Columbus International Airport (CMH). The purpose of a Part 150 Study is to identify aircraft noise impacts through the creation of Noise Exposure Maps (NEMs); and, if necessary, to develop mitigation measures to help minimize noise impacts on the surrounding community. In support of the Part 150 Study update, a Technical Advisory Committee (TAC) is being formed to provide input and comments throughout the study process. On behalf of the CRAA, I would like to invite you to participate as a member of the TAC to provide input into the Part 150 Study. The first TAC meeting is scheduled for the following time and location:

Date:	Wednesday, December 11, 2019
Time:	2:00 p.m. to 4:00 p.m.
Location:	John Glenn Columbus International Airport Emergency Operations Center

The Emergency Operations Center can be accessed by an elevator located adjacent to the food court on the ticketing level of the passenger terminal. There will be signage near this elevator directing you to the meeting location. Please park in the Short-Term Parking Garage and bring your parking ticket to the meeting with you for validation. If the short term garage is full, additional parking is available in the Blue Lot or the Walking Lot.

At this meeting we will discuss the Part 150 Noise Compatibility Process and the role of the TAC. A copy of the meeting agenda is enclosed.

Your participation in this study would be greatly appreciated. Please let us know if you are able to attend the December 11th meeting by responding to Ms. Marie Keister at (614) 565-2819 or mkeister@engagepublicaffairs.com by December 2nd. If you have any questions about this study, please do not hesitate to contact Mr. David Wall at (614) 239-4063 or dwall@columbusairports.com.

Sincerely,

Tom McCarthy

Tom McCarthy
Chief Planning & Engineering Officer
Columbus Regional Airport Authority

Technical Advisory Committee Invite List - December 11, 2019

Name	Title	Organization
Voda Layne	Airline Station Manager	Air Canada Express
Andrew Cooper	Representative	Airline Pilots Association
Paul McGraw	Vice President, Operations and Safety	Airlines for America
Laura Rinaldi McKee	Vice President, Airport Affairs	Airlines for America
Sherriale Fleming	Airline Station Manager	Alaska Airlines
Robert Walters	Airline Station Manager	American Airlines
Mike Filucci	Vice President, Pilot Information Center, Flight Operations, and Member Services	AOPA - Airports Division
Shelia Tillman	Member	Brittany Hills Civic Association
Ben Kessler	Mayor & Director of Development	City of Bexley
Mark Dravillas	Planning Administrator	City of Columbus
Talisa Dixon	Superintendent	City of Columbus Schools
Anthony Jones	Director of Planning & Development	City of Gahanna
Andrew Bowsher	Development Director	City of Reynoldsburg
Zach Woodruff	Director of Economic Development & Public Service	City of Whitehall Planning Commission
Mark Kelby	Airport Planner	Columbus Regional Airport Authority
Justin Anderson	Deputy Project Manager	Columbus Regional Airport Authority
Tom McCarthy	Chief of Planning and Engineering	Columbus Regional Airport Authority
Luke Curtis	Operations Supervisor	Columbus Regional Airport Authority
Todd Carter	Sr. Manager, Business Development & Customer Experience	Columbus Regional Airport Authority
Kristen Easterday	Director of Communications and Public Affairs	Columbus Regional Airport Authority
Casey Denny	Chief Operations Officer	Columbus Regional Airport Authority
Karen Richardson-Rogers	President	Cumberland Ridge Civic Association
Faiz Syed	Airline Station Manager	Delta Airlines
Michael Johnson	President	East Columbus Civic Association
Barry Payne	Manager	FAA CMH ATCT
Dave Neff	Manager	FAA CMH ATCT
Katherine Delaney	Community Planner	Federal Aviation Administration - Detroit Airports District Office
James Schimmer	Director Economic Development & Planning	Franklin County
Matt Brown	Planning Administrator	Franklin County
Kevin White	Airline Station Manager	Frontier Airlines
Jeff Palm	Township Administrator	Jefferson Twp.
Robert Adams	Principal	Landrum and Brown
Chris Sandfoss	Environmental Project Manager	Landrum and Brown
Eric Bylaw	Director of Flight Operations	Lane Aviation Corporation
Mike Wilkinson	Director of Flight Operations	Limited Brands
Thea Walsh	Director of Transportation	Mid-Ohio Regional Planning Commission
Dan Wolfe	Manager	Nationwide Insurance Company
Alan Bobo	EVP, Flight Operations	NetJets
Tiffany White	Chair	North Central Area Commission
Elwood Rayford	Chair	Northeast Area Commission
James Bryant	Aviation Administrator	Ohio Office of Aviation
Jeff Lischak	Airline Station Manager	Republic Airways
Jeff Talbert	General Manager	Signature Flight Support
Tim Cavanagh	Airline Station Manager	Southwest Airlines
Andrew Brasil	Airline Station Manager	Spirit Airlines
Ken Waite	Facility Manager	The Columbus International Air Center
Stephanie Morgan	Executive Director	The Ohio State University Air Transportation and Aerospace Campus
LaThya Washington	Airline Station Manager	United Airlines
Brian Kennedy	Airline Station Manager	United Airlines

CRAA - CMH Part 150 Noise Study

Technical Advisory Committee (TAC) Meeting #1

Wednesday, December 11, 2019 | 2:00 p.m.

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SIGN-IN SHEET | PLEASE PRINT

	NAME	ORGANIZATION
1	Stephanie Morgan	"The" Ohio State
2	Kyle Lewis	AOPA
3	Eric Lange	Net Jets
4	Artie Clark	NetJets
5	[illegible]	ODOT
6	Gib Harris	Nationwide
7	Luke Curtis	CRAA
8	Benjamin Kirtley	CRAA
9	Casey Denny	CRAA
10	Mark Kelby	CRAA
11	Wallace O McLean	NCAC
12	Chris Lottridge	Lbrands
13	Duffy Cooper	ALPA
14	Dilli Dhital	American Airlines.
15	Connie Tracy	CRAA
16	Michael Blackford	Gahanna

CRAA - CMH Part 150 Noise Study

Technical Advisory Committee (TAC) Meeting #1

Wednesday, December 11, 2019 | 2:00 p.m.

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SIGN-IN SHEET | PLEASE PRINT

	NAME	ORGANIZATION
17	Betsy Taylor	CRAA
18	Thomas Graham	MORPC
19	Kevin White	Trego-Dugan
20	Tim Cavanagh	SWA
21	Ben Kessler	Bexley
22	TOM MCCARTHY	CRAA
23	Kristen Easterday	CRAA
24	KENNETH VanPelt	NE Commission
25	BARRY PAYNE	FAA CMH ATCT
26	Tony Celebrezze	City Columbus
27		
28		
29		
30		
31		
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Part 150 Noise Compatibility Study

Technical Advisory Committee Meeting #1
December 11, 2019

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1

Agenda

- Welcome and Introductions
- Part 150 Noise Compatibility Study Process
- Role of the Technical Advisory Committee
- History of Noise Compatibility Planning
- Existing Data Collection
- Types of Noise Compatibility Program Measures
- Schedule and Next Steps
- Group Discussion

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Part 150 Noise Compatibility Study Process

Overview

- Code of Federal Regulations (14 CFR) Part 150
  - Established requirements for airport owners who choose to submit noise exposure maps and develop noise compatibility planning programs for FAA review and approval
  - Part 150 Studies undertake an in depth and public oriented approach to noise and compatible land use
- Part 150 Studies Are Planning Studies
  - Identify noise and land use impacts that exist today and in the future
  - Work to develop solutions within the FAA's framework
- Part 150 Studies can open funding sources
  - Following 14 CFR Part 150 guidelines makes airport eligible to apply for grants for implementing recommendations of the study
  - Funding is subject to availability and not guaranteed

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Part 150 Noise Compatibility Study Process

Overview

- Part 150 Studies do not:
  - Recommend closing an airport or implementing mandatory restrictions on aircraft
  - Give environmental approval for implementing noise abatement or land use programs

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Part 150 Noise Compatibility Study Process

Essential Elements of a Part 150 Study

- Noise Exposure Maps:
  - Description of the noise levels for existing and future (+5 years) conditions
  - Future condition should take into account any changes (physical or operational) that may have an effect on the noise levels around the airport
    - Examples of physical changes may include: runway threshold relocation, changes in terminal/gate layout, new aircraft parking facilities
    - Examples of operational changes may include: changes in aircraft operating levels, and fleet mix, new flight tracks, new destinations
- Noise Compatibility Program:
  - Recommendations for reducing, minimizing, and/or mitigating aircraft noise and land use conflicts
    - Noise Abatement
    - Land Use Mitigation
    - Implementation Measures

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Part 150 Noise Compatibility Study Process

Essential Elements of a Part 150 Study

- Public Involvement:
  - Technical Advisory Committee – Group of stakeholders affected by, or having oversight responsibilities for, issues covered by the Part 150 Study Update
    - Airport Authority officials
    - Aircraft operators
    - Government Officials / Land Use Planners
    - Community Groups
    - Air Traffic Controllers
  - Public Workshops - Open house, informational meetings to discuss and gather comments on potential aviation noise, land use, and other mitigation measures
  - Public Hearings - to receive comments (either oral or written) from the public on the Draft Part 150 Study Update document
  - Project Website / Social Media
    - Project website and social media will be updated with study information, including images and documents pertinent to the study
    - Posting of all meeting notices
    - Posting of study process and draft findings

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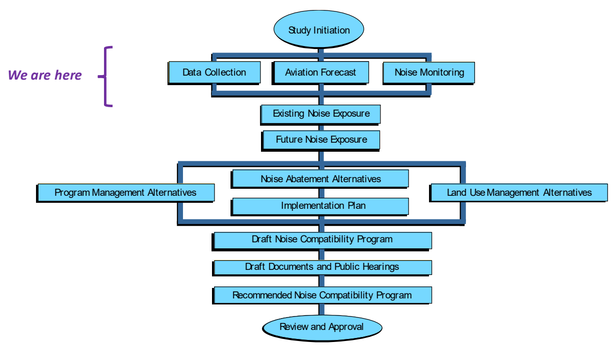
Part 150 Noise Compatibility Study Process



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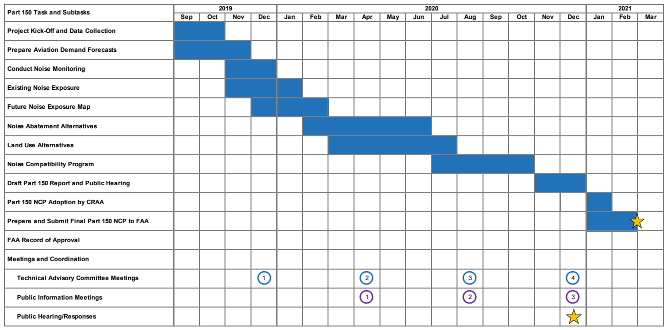
Part 150 Noise Compatibility Study Process



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Technical Advisory Committee

- Role of the Technical Advisory Committee (TAC)
  - Sounding Board
  - Link to the Community
  - Technical Review
  - Aid to Implementation
- TAC Meeting Schedule
  - Meeting #1 – December 2019
  - Meeting #2 – Spring 2020
    - Review preliminary noise exposure maps, forecast, and results of noise measurement program
  - Meeting #3 – Summer/Fall 2020
    - Analysis of noise abatement measures
  - Meeting #4 – Winter 2020
    - Review Draft Noise Compatibility Program

History of Noise Compatibility Planning

Federal Regulations and Guidelines

- Jet Age + Rapid Expansion of Airports + Continued Suburban Development/Sprawl = Adverse Noise Impacts
- Aviation Noise Abatement Policy of 1976
- Aviation Safety and Noise Abatement Act of 1979
  - 14 CFR Part 150 (1981) established requirements for airport owners who choose to submit noise exposure maps and develop noise compatibility planning programs to the FAA for review and approval.
  - Typically voluntary on the part of the sponsor and is not an automatic requirement of the Federal government.
- Airport Noise and Capacity Act of 1990
  - Established phase-out timeline of Stage 2 aircraft (Commercial aircraft >75,000 lbs.)
  - Restricted airports from imposing locally based, non-voluntary restrictions without first completing a Part 161 Study. (To date no Part 161 restrictions request has been submitted and fully approved by the FAA)
- FAA Final Policy on Part 150 Noise Mitigation Measures (Oct 1, 1998)
  - New homes constructed within an FAA-approved and published noise exposure contour are NOT eligible for remedial noise mitigation.

History of Noise Compatibility Planning

Previous Part 150 Studies Completed at CMH

- 1987 Part 150 Study (original)
- 1993 Part 150 Study Update
- 1999 Part 150 Study Update
  - 5 Noise Abatement Measure Recommendations
  - 11 Land Use Management Recommendations
  - 6 Implementation Management Recommendations
- 2001 Noise Exposure Map Update
  - Updated Noise Contours to 2001/2006 conditions
  - Extended the Sound Insulation Program boundary
- 2007 Part 150 Study Update (FAA Record of Approval in 2008)
  - Concurrent with EIS for relocation of the south runway
  - Extended the Sound Insulation Program boundary and reviewed other noise abatement measures
  - Proposed the "Airport Land Use Management District" fixed boundary for land use compatibility planning

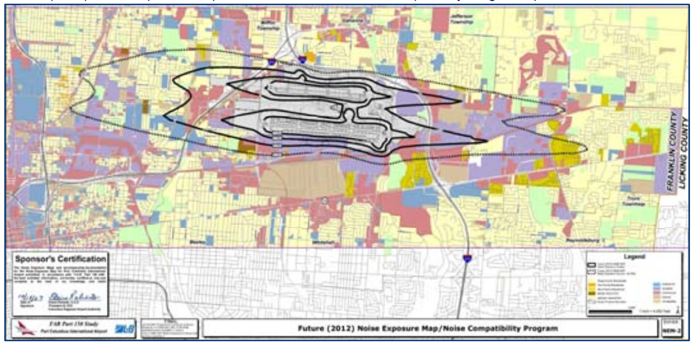
History of Noise Compatibility Planning

Current Part 150 Study Update

- Continuation of CRAA's commitment to proactive noise compatibility planning and goal to be a "Good Neighbor" to the surrounding community
- Commitment of the 2009 Environmental Impact Statement and Record of Decision for the relocation of the south runway at CMH
  - Relocated runway opened in August 2013
  - Delayed start of Part 150 while north runway underwent rehabilitation in 2016

History of Noise Compatibility Planning

Future (2012) Noise Exposure Map from 2007 Part 150 Noise Compatibility Program Update



History of Noise Compatibility Planning

Current Part 150 Study Update

- Residential Sound Insulation
  - CRAA has provided sound insulation to nearly 800 homes
- Acquisition Program
  - Acquisition of 35 homes impacted by relocation of the south runway
  - Provided relocation assistance to affected residents
- Tracking and Measuring Noise
  - Operates WebTrack System with 16 permanent noise monitors
  - Allows staff and the general public the ability to track flight activity and noise levels
- Noise Complaint & Inquiries
  - Dedicated staff to respond to complaints and inquiries about aircraft operations and noise
- Proactive planning
  - Adhere to both federal and local regulations
  - Maintain transparent communication
  - Provide information to land use planners, developers, and the general public

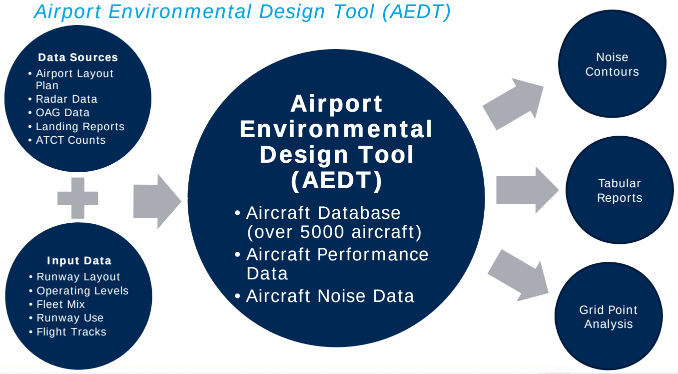
Existing Data Collection

Technical Requirements

- Represents an annual-average day (1 year of operations/365 days).
- Described with a set of continuous lines that represent equal levels of noise.
- Prepared using the FAA's Airport Environmental Design Tool (AEDT) Version 3b
- Must use specific noise metric: Day-Night Average Sound Level (DNL)
  - DNL represents 24-hour average noise level
  - Penalty for nighttime (10:00 p.m. - 6:59 a.m.) flights (x 10)
  - National standard for all Federal agencies
  - 65 DNL identified as threshold for impact to noise sensitive land uses

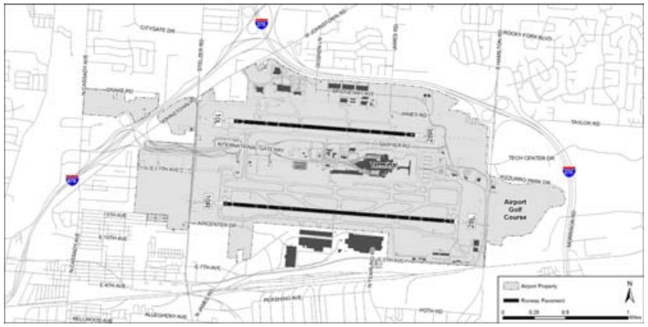
Existing Data Collection

Airport Environmental Design Tool (AEDT)



Existing Data Collection

Runway Layout



Existing Data Collection

Operating Levels

- Existing 2018/19 Operations
  - Actual based on FAA Air Traffic Control Tower records for September 2018 through August 2019

Aircraft Category	2018 Existing Operations		
	Actual	Average Annual Day	Percent
Air Carrier & Commuter	113,961	312	84.4%
General Aviation	20,294	56	15.0%
Military	744	2	0.6%
Total	134,999	370	100.0%

Existing Data Collection

Operating Levels

- Forecasted 2025 Operations
  - Based on aviation activity forecast prepared for this Part 150 Study

Aircraft Category	2025 Forecast Operations		
	Forecast	Average Annual Day	Percent
Air Carrier & Commuter	128,580	352	85.6%
General Aviation	20,930	57	13.9%
Military	630	2	0.4%
Total	150,140	411	100.0%

Existing Data Collection

Fleet Mix

- Types of aircraft that operate at the airport
- Input Data Based on most recent 12 months of data from the following sources:
  - Airport Landing Reports
  - Official Airline Guide
  - Radar Data
- Air Carrier operations primarily made of:
  - Airbus 319 / 320 / 321
  - Boeing 737-700 / 737-800
  - Embraer E170 / 175
  - Bombardier CRJ-700 and CRJ-900
- Air Taxi/General Aviation operations include business jets, turboprops, and piston engine propeller aircraft

Existing Data Collection

Runway Use

- West Flow (arrive and depart Runways 28L and 28R)
  - Historically: approximately 75% of the operations
- East Flow (arrive and depart Runways 10L and 10R)
  - Historically: approximately 25% of the operations
- Runway Direction is dictated by wind, weather, and other operational factors
- South runway (10R/28L) is longer and used slightly more often
- Input data based on the most recent 12 months of available flight tracking data

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Existing Data Collection

Runway Use – West Flow

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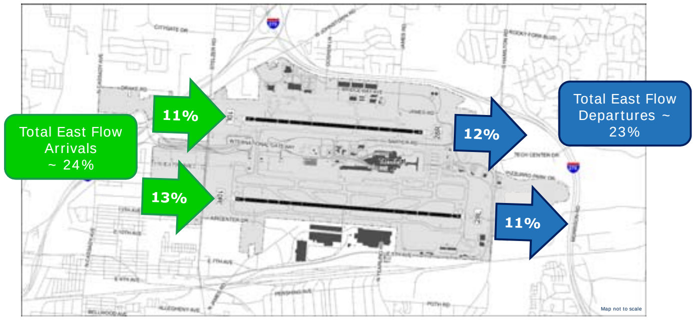
Existing Data Collection

Runway Use – East Flow



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Existing Data Collection

Flight Tracks

- Flight tracks are lines that represent the ground path of an aircraft as it arrives or departs the airport
- AEDT applies a 3-dimensional profile to each track that includes altitude, speed, thrust, and flap settings to calculate aircraft noise along each flight route
- Radar data was collected from the Airport's Flight Tracking System representing each season
- Representative tracks were created in the AEDT to model operations

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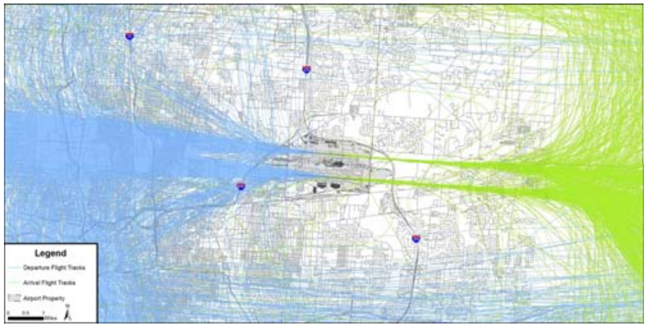
Existing Data Collection

West Flow Flight Tracks



Existing Data Collection

East Flow Flight Tracks

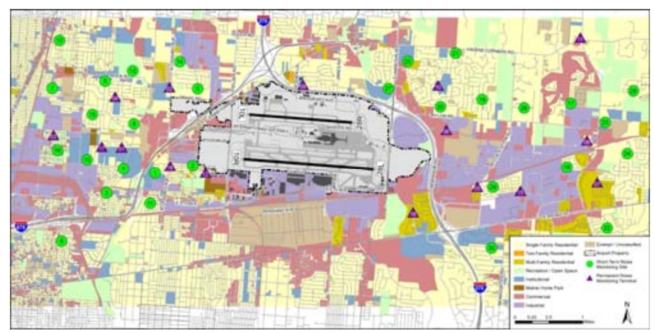
Existing Data Collection

Noise Monitoring Program

- Purpose
  - Validate/verify the input data in the AEDT (focus on departures)
  - Obtain “real-life” noise measurements to assist in understanding the total noise environment
- Conducted the week of November 11, 2019
- Collected noise readings at 30 sites (approx. 1 hour at each site)
  - Sites selected to provide wide coverage within residential areas and areas of noise complaints
  - Three person team
  - Used ANSI Type 1 Sound Level Meters
- Preliminary Results
  - Loudest aircraft recorded was an Embraer ERJ-175
  - Average number of aircraft observed at each site was 11 to 12
- Next Steps
  - Further analysis to be completed
  - Incorporate data from permanent noise monitors
  - Compare to AEDT noise database
  - Final results to be presented at next TAC meeting

Existing Data Collection

Noise Monitoring Program



Types of Noise Compatibility Measures

Noise Abatement Measures

- Measures to control noise at the source (i.e. aircraft)
- Examples
  - Flight location (e.g., departure flight corridors)
  - Runway use program (e.g., how often runway ends are used)
  - Ground activity restrictions (e.g., run-up locations/time)
  - Facility modifications (e.g., runway extensions, berms)
  - Flight management (e.g., mandatory curfews / restrictions -- would require Part 161 Study)

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Types of Noise Compatibility Measures

Land Use Measures

- Preventive strategies
  - Prevent the introduction of additional noise-sensitive land uses within existing and future noise exposure contours
  - May also be applicable outside of the 65 DNL noise contour
  - Examples:
    - Zoning Codes
    - Subdivision Regulations
    - Airport Environs Overlay Zone
- Corrective strategies
  - Mitigate existing and projected future unavoidable noise impacts in areas of existing incompatible land use
  - Applicable to 65+ DNL noise contour
  - Examples
    - Property acquisition
    - Sound Insulation
    - Avigation Easements

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Types of Noise Compatibility Measures

Implementation Measures

- Measures designed to assist with the implementation and management of the Noise Compatibility Program (NCP)
  - Examples:
    - Noise Program Office and Staff Support
    - Flight tracking / Noise Monitoring System
    - Focus Groups / Roundtables
    - Periodic Review / Update to the Program

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Next Steps

- Complete review of Noise Measurement Data
- Submit Aviation Activity Forecast to FAA for Review & Approval
- Prepare the Existing and Future Noise Exposure Contours
- Identify Preliminary Noise Abatement, Land Use Management, and Implementation Alternatives
  - Analysis and discussion of potential alternatives
- Next TAC Meeting – Spring 2020

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Group Discussion

Question #1:

- What issues / concerns do you have related to airport noise compatibility?

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Group Discussion

Question #2:

The TAC includes representatives from airport users, planning and zoning officials, and area neighborhoods. Is there anyone else you would recommend be included? If so, who?

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Group Discussion

Question #3:

Does your organization have any data that might be helpful to this study – e.g. growth projections, proposed developments in the area? If so, what?

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Group Discussion

Question #4:

How can you help get the word out when we are ready to promote public meetings?

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Group Discussion

Other Questions or Comments to aid this process

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John Glenn Columbus International Airport
Part 150 Noise Compatibility Update Study

Technical Advisory Committee Meeting 1

Date: Wednesday, December 11, 2019
Time: 2:00-4:00 P.M.
Location: John Glenn Columbus International Airport
Emergency Operations Center
4600 International Gateway, Columbus, OH 43219

Meeting Summary

Meeting Purpose

- To review:
  - The Part 150 Noise Compatibility Study process
  - Role of the Technical Advisory Committee
  - History of noise planning at the airport
  - Existing data, alternative, schedule and next steps
- To gather input and ask questions about the study

Welcome and Introductions

Justin Anderson, Columbus Regional Airport Authority (CRAA) Project Manager, welcomed everyone to the Technical Advisory Committee (TAC) meeting and thanked them for participating. He mentioned that one of CRAA's goals is to be a great neighbor to the Airport's surrounding communities, residents and businesses. He hopes that by holding these TAC meetings, this goal is further fulfilled, through being open and honest with the Airport's neighbors and partners with the information and process of the noise study.

Rob Adams, L&B Principal-in-Change, introduced himself and then asked for everyone in the room to introduce themselves. Rob acknowledged the diverse perspectives and different voices in the room, stating this is how we'll work together to uncover and solve any issues that may arise during the Part 150 Noise Compatibility Study.

Part 150 Noise Compatibility Study

Rob gave an overview of federal regulations, requirements and process of the Part 150 Noise Compatibility Study – discussing what a Part 150 Study is and is not. A Part 150 is similar to a master planning process in that it starts with looking at existing conditions, forecasts for the future, and then planning for the future. In this case, we are focused specifically on noise compatibility. By following federal guidelines, airports are able to apply for grants to implement study recommendations. Part 150 studies do not recommend closing an airport or implementing mandatory restrictions on aircraft or give environmental approval for implementing noise abatement or land use programs. The three main elements of a Part 150 Study include:

1. ***Noise Exposure Maps*** – represents noise levels around the airport and includes an existing conditions map and a map forecasting future noise contours five years in the future. There are very specific Federal Aviation Administration (FAA) criteria the study must follow.
2. ***Noise Compatibility Program*** – this is a group of recommendations, which can include noise abatement measures (what can be done at the source), land use measures (e.g. sound insulation) and implementation measures (designed to assist the program implementation – e.g. noise monitoring systems, noise complaint system, etc.). These might be eligible for FAA funding.
3. ***Public Involvement*** – Includes TAC meetings, public meetings with open house format, public hearings, project website and social media (outreach campaign).

Rob then provided an overview of the study process and schedule, discussing the steps from study initiation to review and approval. He also noted the schedule includes four TAC meetings, two public information meetings and one public information meeting/public hearing.

Role of the Technical Advisory Committee

Rob briefly discussed the role of the TAC and during this discussion he reiterated that the project team would like the TAC to serve as a sounding board. The TAC is a link to the community, which provides technical input and review and helps implement the program. Four TAC meetings will be held over the course of the study.

History of Noise Compatibility Planning

Chris Sandfoss, L&B Project Manager, provided a history of noise compatibility planning nationally and locally at CMH. The first Part 150 study at the Airport was in 1987, while the most recent was completed in 2007 concurrently with an Environmental Impact Statement for relocating the south runway. The 2007 study recommended expanding the sound insulation program boundary and proposed an Airport Land Use Management District for noise compatibility planning. The south runway was relocated and opened in August 2013. The north runway was rehabilitated in 2016. FAA asked CRAA not to conduct another Part 150 study until those two projects were completed.

This study is a continuation of CRAA's commitment to be a good neighbor and proactively plan for the future. While the last Part 150 was completed in 2007, it included a Future 2012 Noise Exposure Map, which Chris shared.

Chris explained that DNL stands for average Day-Night Average Noise Level. This metric reflects the average level of noise over 24-hours. Nighttime events (between 10:00 pm and 6:59 a.m.) have a penalty applied of 10 decibels. The noise model mathematically averages out the noise over 24 hours. In addition to the DNL metric, we are able to display maps that shows maximum levels and time above levels (such as how many hours a day an area has above 65 decibels over 24-hours), which is a little easier for some people to understand.

Over the years, CRAA has provided sound insulation to nearly 800 homes through Part 150 programs and acquired 35 homes impacted by the south runway relocation. CRAA operates a WebTrack System with 16 permanent noise monitors, allowing staff and the public the ability to track flight activity and noise levels. CMH has staff to respond to complaints and inquiries about aircraft operations and noise. A noise hotline is utilized to collect noise complaints.

Existing Data Collection

Chris reviewed the data collection to date, stated the technical requirements for the study and discussed the Airport Environmental Design Tool (AEDT). The AEDT is a computer model which lets the team input a plethora of data and data sources into a model that provides future noise contours, tabular data and analysis. He also explained the type of data that this study will collect, which includes flight operations, fleet mix, and runway use. The FAA Air Traffic Control Tower provides the team additional information on existing operations.

During this discussion several TAC members had questions relating to the data being collected for the study:

Tony Celebreeze (City of Columbus) asked if other factors than weather affect flight operations and direction of land use? Chris Sandfoss (L&B) and Barry Payne (FAA): Runway direction is dictated primarily by weather – mostly wind.

Barry Payne (FAA) asked if the Part 150 accounts for magnetic variation. Will you allow for that? Five years from now the magnetic headings will change slighty. Will your noise study account for that? Chris Sandfoss (L&B): if there is a change in flight path or waypoints. Rob Adams (L&B): a couple of years ago here at CMH, we looked at that to see what the change was. There wasn't a real notable change, but we have seen that at other airports, particularly to the south. At Ft. Lauderdale it was a full five-degree difference, which also affected runway naming. Chris noted there is a difference between magnetic north and true north. It's less of an issue in the Midwest. Usually less than three or four degrees off from true north. It's more pronounced on the coasts. The magnetic field does change over time. It's not as big of an issue here.

Duffy Cooper (ALPA) asked if one end of the airport is more sensitive to noise concerns over the other? Chris Sandfoss (L&B): more residential properties are to the west, so that area is more sensitive than to the east of the airport. The east and west ends get the bulk of the noise because arrivals and departures come from east and west.

Barry Payne (FAA): Looking at the noise contour, how can I differentiate the penalty for nighttime? Is there any difference in the noise contour at all? Chris Sandfoss (L&B): without the penalty for nighttime operations that we've already account for here, the contour would be smaller. We don't have a map that shows that. We'd have to look at night operations to determine that. We could demonstrate what that increase would be.

Jim Bryant (ODOT): do you collect any data that shows the when the/where the maximum exposure is? Chris Sandfoss (L&B): yes, we published that in the 2007 document. We had a map and table that showed what the noise levels were – from maximum and actual DNL level, including the time above the 65 and 85 Decibels. Jim asked if you can show the impacts of the maximum DBL. Rob Adams (L&B): we have compared OSHA standards to the noise exposures. We look at the noise exposure levels and during certain times. None of those would extend off the airport area.

Kyle Lewis (AOPA): Regarding fleet mix, what is the largest aircraft? Justin Anderson (CRAA) said we've had 757s, 767s are the largest and MD80s and MD90's are the loudest, but industry is retiring them. Even larger aircraft are quieter now. Tom McCarthy (CRAA) noted they are usually not as loud as military jets. Kyle: is there a difference between jet noise, piston engine and turbo prop noise considered? Chris Sandfoss (L&B): yes, the noise model has the noise generated by the various types of aircraft. The model has the ability to account for those different engine types.

Casey Denny (CRAA): On the fleet mix, you collect how many aircraft operate here with those types of engines, and then your model pulls the specific info on what noise is generated. Will we get to see that? Chris Sandfoss (L&B): Yes. The 2007 Part 150 goes into detail on this methodology and is available on the website if you are interested and the same level of detail will be provided for this Study.

Chris also discussed how flight tracks are modeled for noise impacts too. The maps showed how most of the operations operate to the west (about 75 percent of all operations). Chris then explained noise monitoring was also conducted via portable noise monitors in 30 locations for approximately one hour at each location. While the model has a database of aircraft, the team will compare the real data collected onsite to the modeled data as a way to validate the model input. This was conducted during the week of November 11, 2019. The loudest aircraft recorded happened to be an Embraer ERJ-175. We observed around 11 or 12 operations per site, per hour. Final results will be presented to the TAC at an upcoming meeting.

Types of Noise Compatibility Program Measures

Chris then discussed noise abatement measures and shared that one goal for the study was to identify measures that should be retained or introduced to CMH. Land use measures, both preventive and corrective, could also be implemented. This is where local planners and zoning officials could provide information to inform this discussion. He noted the City of Columbus has an Overlay Zone which requires the city to notify future buyers of properties within the zone.

Next Steps

Chris then reviewed the next steps (shown below) before ending the meeting with a group discussion.

- Complete review of Noise Measurement Data
- Submit Aviation Activity Forecast to FAA for Review & Approval
- Prepare the Existing and Future Noise Exposure Contours
- Identify Preliminary Noise Abatement, Land Use Management, and Implementation
- Alternatives
- Analysis and discussion of potential alternatives
- Next TAC Meeting – Spring 2020

During this review of action items, TAC member Kyle Lewis (AOPA) asked: how many noise complaints do you receive a year? Luke Curtis (CRAA) said they've received approximately 150 complaints a year (including Rickenbacker and Bolton Field) with about 80 of them coming from one caller in 2019.

Kenneth Van Pelt (Northeast Area Commission) then asked for electronic copies of the presentation to share with others from their organization. Marie Keister (MurphyEpson) replied that we would send a PDF out to all members of the TAC.

Group Discussion

Marie Keister, Murphy Epson engagement lead, then facilitated an interactive discussion with TAC participants asking them to write down on Post-it Notes what issues or concerns they or their constituents may have regarding noise compatibility. A list of themes which emerged from the discussion is listed below.

- Potential federal changes to DNL standards and guidance and impacts for nearby communities
- Impacts of noise to residential and non-residential uses
- Confusion between a Part 150 Study and a noise insulation program
- Will future forecasting of operations (additional carriers) be taken into consideration?
- Effects to airline operation disruptions over potential noise curfews and maintaining 24-hr access
- Impacts to pilots/aircraft safety if traffic patterns are changed
- New modes of air mobility (i.e. drone delivery, 'Uber' air buses etc.)
- Changes in nearby land use policies or zoning
- Is any specific data needed for a successful Part 150 plan? (i.e. land use or from airline operators)

These themes will assist the project team while they develop and implement the Part 150 Noise Compatibility Study.

Conclusion

As the end of the meeting drew near a few more questions and comments were given by TAC members and project team staff.

A discussion was held discussing a potential federal change to decibel level requirements from 65 to 60 DNL. A TAC member asked if a 60 DNL boundary would be shown on mapping for this study and the project team confirmed. This led to a conversation on the evaluation of noise contours and how additional a noise insulation study isn't guaranteed as an outcome of this study. A CRAA representative mentioned that most of the affected homes and residences have been fitted with noise cancelling doors and windows inside the required areas. In fact, 30-plus homes within the 65 DNL boundary were purchased during the last planning study and CMH.

A TAC member asked the team for the distance of the study area and a Chris replied the study area is approximately 4.5 miles east and west of the CMH and 1 mile north and south. The current 65 DNL is located within this study area.

Concerns were raised if recommendation were made that changed airspace take-off and landings which resulted in possible safety concerns for pilots? This could also affect noise levels for residences around CMH. Chris replied that the AEDT model would be able to take all this information and data into consideration as well as the ability to forecast five years into the future. It was mentioned that future FAA route changes would be published in September 2020. A TAC member asked if Future modes, like Uber Air, were being considered. Chris mentioned that they are not being considered because they currently don't exist and aren't included as an aircraft in the model. Though once they do exist their data, or a similar substitute aircraft would be added to the model.

Marie Keister asked if there were any planning or zoning representatives were in the room and two TAC members raised their hands. She asked Chris and Rob, if the team still needed any additional land use data or modeling. Chris replied no, but their expertise would be needed in reviewing the results and data collected for the study.

Justin Anderson closed the meeting and thanked everyone for attending. He also mentioned that the next TAC meeting would occur in April 2020 in which the group would be discussing forecasts and baseline data. He also asked if there were any other groups or organization not at the meeting that should be invited in the future as part of the TAC. None of the current TAC members raised any concern and the meeting was adjourned.

Meeting Participants

The following participants were in attendance at the meeting:

Duffy Cooper	Airline Pilots Association (ALPA)
Dilli Dhital	American Airlines
Kyle Lewis	Aircraft Owners and Pilots Association (AOPA)
Ben Kessler	City of Bexley
Tony Celebrezze	City of Columbus
Michael Blackford	City of Gahanna
Justin Anderson	Columbus Regional Airport Authority
Luke Curtis	Columbus Regional Airport Authority
Casey Denny	Columbus Regional Airport Authority
Kristen Easterday	Columbus Regional Airport Authority
Mark Kelby	Columbus Regional Airport Authority
Benjamin Kirtley	Columbus Regional Airport Authority
Tom McCarthy	Columbus Regional Airport Authority
Betsy Taylor	Columbus Regional Airport Authority
Connie Tracy	Columbus Regional Airport Authority
Barry Payne	FAA CMH ATCT
Kevin White	Frontier Airlines
Robert Adams	Landrum and Brown
Chris Sandfoss	Landrum and Brown
Chris Lottridge	Limited Brands
Thomas Graham	Mid-Ohio Regional Planning Commission
Gib Harris	Nationwide Insurance
Artie Clark	NetJets
Eric Lange	NetJets
Wallace McLean	North Central Area Commission
Kenneth Van Pelt	Northeast Area Commission
James Bryant	ODOT Office of Aviation
Tim Cavanagh	Southwest Airlines
Stephanie Morgan	The Ohio State University Air Transportation/Aerospace Campus
Marie Keister	Engage Public Affairs
Nick Hoffman	MurphyEpson Inc.

Technical Advisory Committee (TAC) Meeting #2
April 8, 2020

Invitation Letters

Presentation

Meeting Summary

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Technical Advisory Committee Invite List - April 8, 2020

Name	Title	Organization
Voda Layne	Airline Station Manager	Air Canada Express
Kyle Lewis	Regional Manager, Government Affairs & Airport Advocacy, Great Lakes	Aircraft Owners and Pilots Association (AOPA)
Andrew Cooper	Representative	Airline Pilots Association
Sherriale Fleming	Airline Station Manager	Alaska Airlines
Christiane Thinnes	Airline Station Manager	Alaska Airlines
Dilli Dhital	Airline Station Manager	American Airlines
Robert Walters	Airline Station Manager	American Airlines
Ben Kessler	Mayor & Director of Development	City of Bexley
Tony Celebrezze	Assistant Director, Building and Zoning Services	City of Columbus
Todd Dieffenderfer	Deputy Director, Department of Neighborhoods	City of Columbus
Carla Williams-Scott	Director, Department of Neighborhoods	City of Columbus
Rory McGuinnes	Deputy Director of Administration	City of Columbus Department of Development
Michael Blackford	Planning and Zoning Administrator	City of Gahanna
Andrew Bowsher	Development Director	City of Reynoldsburg
Zach Woodruff	Director of Economic Development & Public Service	City of Whitehall Planning Commission
Talisa Dixon	Superintendent	Columbus City Schools
Scott Varner	Executive Director of Strategic Partnerships	Columbus City Schools
Justin Anderson	Deputy Project Manager	Columbus Regional Airport Authority
Todd Carter	Sr. Manager, Business Development & Customer Experience	Columbus Regional Airport Authority
Luke Curtis	Supervisor, Airport Operations	Columbus Regional Airport Authority
Casey Denny	Chief Operations Officer	Columbus Regional Airport Authority
Kristen Easterday	Director of Communications and Public Affairs	Columbus Regional Airport Authority
Mark Kelby	Airport Planner	Columbus Regional Airport Authority
Ben Kirtley	Operations Coordinator	Columbus Regional Airport Authority
Tom McCarthy	Chief of Planning and Engineering	Columbus Regional Airport Authority
Betsy Taylor	Airline Business Development	Columbus Regional Airport Authority
Connie Tracy	Senior Communications Specialist	Columbus Regional Airport Authority
Sarah McQuaide	Manager, Communications & Media Relations	Columbus Regional Airport Authority
Christina White	Airline Station Manager	Delta Airlines
Michael Johnson	President	East Columbus Civic Association
Katherine Delaney	Community Planner	FAA - Detroit Airports District Office
Dave Neef	Manager	FAA CMH ATCT
Matt Brown	Planning Administrator	Franklin County
James Schimmer	Director Economic Development & Planning	Franklin County
Kevin White	Airline Station Manager	Frontier Airlines
Mike Anderson	Development Director	Jefferson Township
Eric Bylaw	Director of Flight Operations	Lane Aviation Corporation
Chris Lottridge	Chief Pilot	Limited Brands
Mike Wilkinson	Director of Flight Operations	Limited Brands
Dina Lopez	Strategic Projects Manager	Mid-Ohio Regional Planning Commission
Thea Walsh	Director of Transportation	Mid-Ohio Regional Planning Commission
Paige Kroner	Northeast Regional Representative	National Business Aviation Association
Gib Harris	Chief of Maintenance	Nationwide Insurance Company
Dan Wolfe	Manager	Nationwide Insurance Company
Artie Clark	Flight Operations Compliance Manager	NetJets
Eric Lange	Manager	NetJets
Wallace McLean	Member	North Central Area Commission
Tiffany White	Chair	North Central Area Commission
Elwood Rayford	Chair	Northeast Area Commission
Kenneth Van Pelt	Community Relations Officer	Northeast Area Commission
James Bryant	Aviation Administrator	Ohio Office of Aviation
Jeff Lischak	Airline Station Manager	Republic Airways
Jeff Talbert	General Manager	Signature Flight Support
Tim Cavanagh	Airline Station Manager	Southwest Airlines
Stephanie Morgan	Executive Director	The Ohio State University Air Transportation and Aerospace Campus
Brian Kennedy	Airline Station Manager	United Airlines
LaThya Washington	Airline Station Manager	United Airlines

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Part 150 Noise Compatibility Study

Technical Advisory Committee Meeting #2
April 8, 2020

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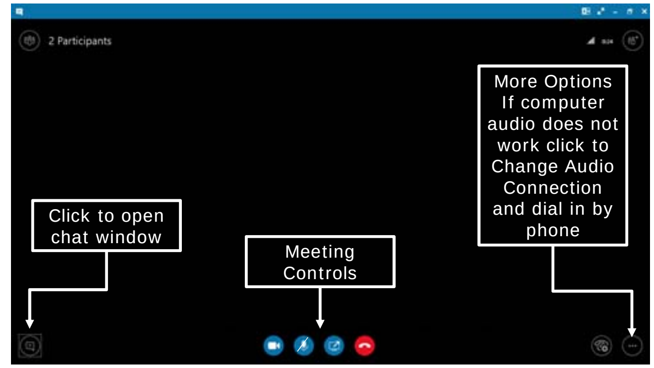
1

Meeting Logistics



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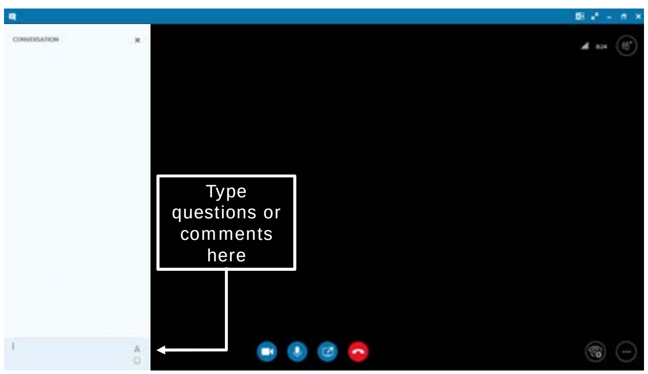
2

Meeting Logistics



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3

Agenda

- Welcome and Discussion of Virtual Meeting Resources
- Part 150 Noise Compatibility Study Process and Schedule
- Noise Monitoring Program Results
- Review of Noise Modeling Data and Methodology
- Existing and Future Baseline Noise Exposure Contours
- Discussion of Noise Compatibility Program (NCP) Measures
- Schedule and Next Steps

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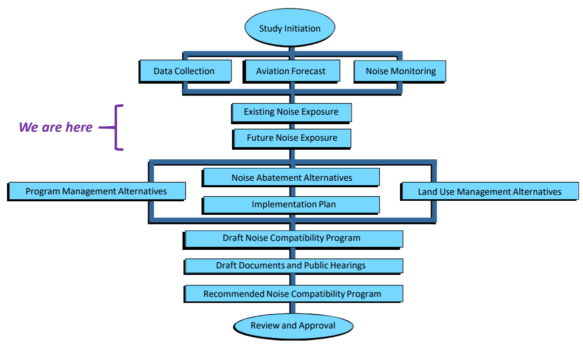
4

Part 150 Noise Compatibility Study Process



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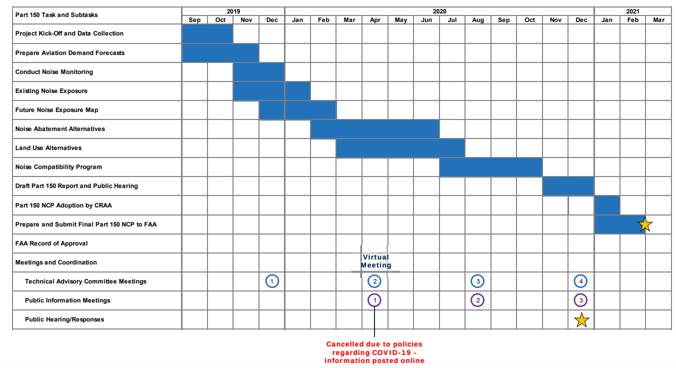
Part 150 Noise Compatibility Study Schedule



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Noise Monitoring Program

Process and Description

- Purpose
  - Validate/verify the input data in the Aviation Environmental Design Tool (AEDT) with a focus on departures
  - Obtain "real-life" noise measurements to assist in understanding the total noise environment
- Conducted the week of November 11, 2019
- Collected noise readings at 30 sites (for approximately 1 hour at each site)
  - Sites selected to provide wide coverage within residential areas and areas of noise complaints
  - Three person team
  - Used Type 1 Sound Level Meters based on American National Standards Institute (ANSI) standards

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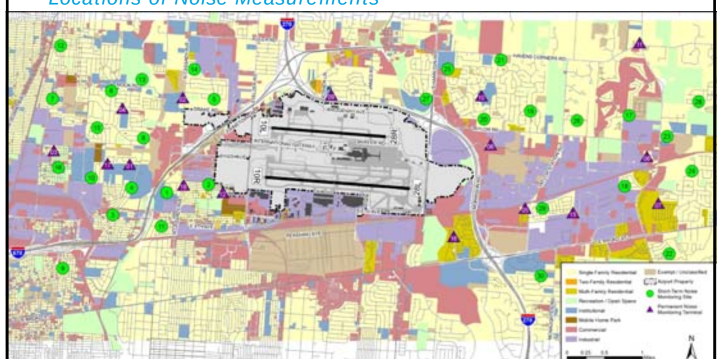
Noise Monitoring Program

Locations of Noise Measurements



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Noise Monitoring Program

Monitoring Results

- Summary Results
  - Loudest aircraft recorded included, Boeing 737-800/900 and Embraer ERJ-175 aircraft
  - Average number of aircraft observed at each site was 11 to 12
  - Some aircraft noise events were combined with community noise sources such as intermittent car/truck traffic
- Next Steps
  - Further analysis to be completed
  - Incorporate data from permanent noise monitors
  - Compare to AEDT noise database

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Existing Data Collection

Noise Monitoring Program Summary (1 of 2)

Site Number	Location	Ambient Noise Level (dB)	Date Monitored	Time Monitored	Type of Events	Number of Events	Aircraft SEL Range	Lmax (loudest noise event)	Loudest aircraft
1	North Cassady near Summit Trace	47.4	11/12/2019	9:11am - 10:11am	Departures	21	69.0 - 87.2	78.1	Boeing 737-700
2	E 13th Ave & Rarig Avenue	47.9	11/12/2019	10:32am - 11:32am	Departures	8	76.0 – 91.2	83.0	Boeing 737-700
3	E 5th Avenue & Sunbury Road	57.1	11/11/2019	12:15pm - 1:15pm	Arrivals & Departures	11	71.9 – 86.1	84.2	Embraer E-175 LR
4	1095 Sunbury Road	47.2	11/12/2019	12:15pm - 1:15pm	Departures	10	69.3 – 88.4	79.1	Boeing 737-800
5	Lone Spruce Rd & Mountain Oak Road	44.1	11/12/2019	9:00am – 10:00am	Arrivals & Departures	21	63.9 – 90.4	80.0	Boeing 737-800
6	Delevan & Brentnell	59.6	11/12/2019	12:30pm – 1:30pm	Arrivals & Departures	10	73.0 – 87.7	82.2	Embraer E-175 LR
7	Joyce Avenue & Maynard Avenue	51.7	11/13/2019	11:45am – 12:45pm	Arrivals & Departures	10	71.1 – 86.6	77.2	Boeing 737-900
8	Thames Drive north of Argyle Drive	56.6	11/12/2019	10:30am – 11:30am	Arrivals & Departures	12	63.9 – 90.1	80.5	Boeing 737-900
9	Parkwood Ave & Pembroke Ave	48.8	11/11/2019	12:50pm – 1:50pm	Arrivals & Departures	7	54.5 – 79.1	75.7	Embraer E-175 LR
10	Eastlawn Cemetery	46.4	11/11/2019	10:58am – 11:58am	Departures	11	64.3 – 88.1	80.7	Boeing 737-800
11	Margaret Street & Drexel Ave	56.3	11/11/2019	3:25pm – 4:25pm	Departures	6	68.7 – 78.3	72.0	Cessna 525
12	Joyce Ave & Genessee Ave	49.3	11/11/2019	12:52pm – 1:52pm	Departures	12	64.5 – 85.9	77.3	Embraer E-175 LR
13	Mock Park - Mock Road & Bar Harbor Road	44.6	11/11/2019	2:02pm – 3:02pm	Departures	11	66.7 – 86.4	76.5	McDonnell-Douglas MD-90
14	Baylor Avenue & Pepper Street	50.3	11/11/2019	3:22pm – 4:22pm	Departures	5	68.4 – 85.9	69.5	Bombardier CRJ-900
15	Marina Drive west of Toni Street	45.5	11/12/2019	6:10am – 7:10am	Arrivals & Departures	14	45.6 – 86.8	79.1	Embraer E-175

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Existing Data Collection

Noise Monitoring Program Summary (2 of 2)

Site Number	Location	Ambient Noise Level (dB)	Date Monitored	Time Monitored	Type of Events	Number of Events	Aircraft SEL Range	Lmax (loudest noise event)	Loudest aircraft
16	American Addition Park	42.1	11/12/2019	6:20am – 7:20am	Departures	20	38.2 – 84.9	77.9	Boeing 737-800
17	Poppy Hills Drive & Keystone Ranch Court	45.4	11/11/2019	4:10pm - 5:10pm	Arrivals	6	64.5 - 73.5	63.9	Embraer E-170
18	Onyx Bluff Lane west of Stone Shadow Drive	45.8	11/12/2019	2:45pm – 3:45pm	Arrivals	12	62.8 – 83.3	74.7	Boeing 737-800
19	Rice Avenue & Spruce Hill Drive	42.1	11/12/2019	1:58pm – 2:58pm	Arrivals & Departures	12	61.5 – 86.5	80.0	Embraer E-175 LR
20	Hunters Run	45.6	11/12/2019	3:00pm – 4:00pm	Arrivals	7	62.5 – 75.6	74.9	Hawker 800
21	Tamara Drive & Helmbright Drive	43.8	11/13/2019	9:20am – 10:20am	Arrivals	8	52.0 – 62.8	54.0	Embraer E-175
22	Serenoa Dr & Endora St	54.0	11/13/2019	1:30pm – 2:30pm	Arrivals & Departures	12	47.6 – 79.4	74.6	Embraer E-175 LR
23	Olde Quarry Park	41.4	11/11/2019	12:50 PM - 1:59 PM	Arrivals	8	67.0 - 78.9	67.5	McDonnell Douglas MD90
24	Sherridon Drive & Streamwater Drive	38.7	11/13/2019	10:43am – 11:43am	Arrivals	14	57.6 – 78.9	73.3	Bombardier CRJ-701
25	Meadow Green Circle	38.4	11/13/2019	9:00am – 10:00am	Arrivals & Departures	16	42.1 – 77.7	71.5	Bombardier CRJ-200
26	Estate View Drive east of Taylor Station Road	48.8	11/12/2019	3:10pm – 4:10pm	Arrivals & Departures	13	52.5 – 80.9	75.7	Bombardier CRJ-701
27	Shepherd Church of the Nazarene	48.2	11/13/2019	12:02pm – 1:02pm	Arrivals	6	66.0 – 71.9	65.2	Boeing 737-700
28	Sand Bar Drive south of Headwater Drive	34.6	11/13/2019	1:10pm – 2:10pm	Arrivals	10	53.7 – 68.0	68.8	Cessna 560 Citation Excel
29	Lakes at Taylor Crossing Subdivision	42.8	11/12/2019	9:00pm – 10:00pm	Arrivals	11	59.0 – 86.9	80.7	Boeing 737-800
30	Forestview Drive & Revere Road	44.0	11/13/2019	10:16am – 11:16am	Arrivals & Departures	11	63.3 – 72.9	66.2	Airbus A319

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Review of Data Collection

Existing Noise Exposure Contour

- Represents an annual-average day (1 year of operations/365 days).
- Data Collection includes:
  - Number of aircraft operations
  - Aircraft types / fleet mix
  - Runway use patterns
  - Flight tracks
- Described with a set of continuous lines that represent equal levels of noise.
- Prepared using the FAA's AEDT (Version 3b)
- Must use specific noise metric: Day-Night Average Sound Level (DNL)
  - DNL represents 24-hour average noise level
  - Penalty for nighttime (10:00 p.m. - 6:59 a.m.) flights (x 10)
  - National standard for all Federal agencies
  - 65 DNL identified as threshold for impact to noise sensitive land uses

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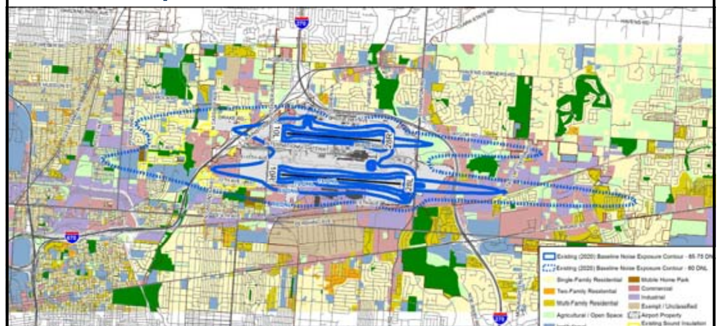
Review of Data Collection

Future Noise Exposure Contour

- Represents an annual-average day in 2025
- Based on a forecast of aviation activity
- No major changes expected to fleet mix or destinations served
- Runway use patterns expected to be similar with east/west split based on long-term averages

Existing (2020) Baseline Noise Exposure Contour



Note: The 60 DNL is shown for informational purposes only and does not represent a noise impact under Federal land use compatibility guidelines. In accordance with Federal land use compatibility guidelines, 65 DNL is the level at which certain land uses are considered to be incompatible with aircraft noise.

Existing (2020) Baseline Noise Exposure Contour

Jurisdiction	65-70 DNL	70-75 DNL	75+ DNL
Housing Counts			
Columbus	0	0	0
Gahanna	0	0	0
Mifflin Township	0	0	0
Jefferson Township	0	0	0
Total	0	0	0
Population			
Columbus	0	0	0
Gahanna	0	0	0
Mifflin Township	0	0	0
Jefferson Township	0	0	0
Total	0	0	0
Noise-Sensitive Facilities			
Schools / Daycares	0	0	0

Existing (2020) Baseline Noise Exposure Contour

- East of the Airport, the noise contour primarily reflects usage by aircraft arriving to the airport (thinner noise contours).
- West of the Airport, the noise contour primarily reflects usage of aircraft departing from the airport (wider and rounder noise contours).
- Contour shape and size also reflects a greater use of Runway 10R/28L
- There are no residences or other noise-sensitive land uses within the 65 DNL noise contour.
- The 60 DNL is shown for informational purposes and does not represent a noise impact under Federal land use compatibility guidelines. There are approximately 3,300 residences and 19 noise-sensitive facilities (schools, daycares, and churches) within the 60-65 DNL Existing (2020) Baseline noise contour.

Pause for Questions

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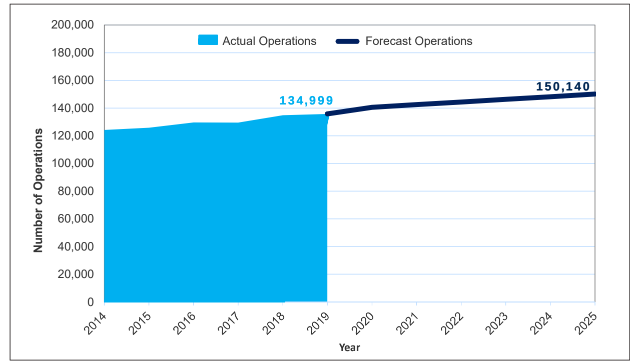
Forecast of Aviation Activity



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Future (2025) Baseline Noise Exposure Contour

Note: The 60 DNL is shown for informational purposes only and does not represent a noise impact under Federal land use compatibility guidelines. In accordance with Federal land use compatibility guidelines, 65 DNL is the level at which certain land uses are considered to be incompatible with aircraft noise.

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Existing (2020) compared to Future (2025) Baseline Noise Exposure Contours

Note: The 60 DNL is shown for informational purposes only and does not represent a noise impact under Federal land use compatibility guidelines. In accordance with Federal land use compatibility guidelines, 65 DNL is the level at which certain land uses are considered to be incompatible with aircraft noise.

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Existing (2020) compared to Future (2025) Baseline Noise Exposure Contours

Note: The 60 DNL is shown for informational purposes only and does not represent a noise impact under Federal land use compatibility guidelines. In accordance with Federal land use compatibility guidelines, 65 DNL is the level at which certain land uses are considered to be incompatible with aircraft noise.

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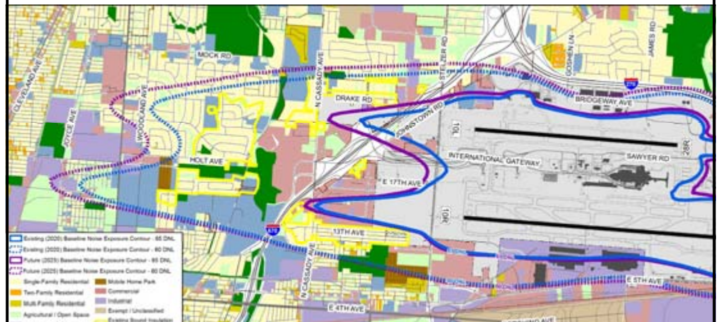
Existing (2020) compared to Future (2025) Baseline Noise Exposure Contours



Note: The 60 DNL is shown for informational purposes only and does not represent a noise impact under Federal land use compatibility guidelines. In accordance with Federal land use compatibility guidelines, 65 DNL is the level at which certain land uses are considered to be incompatible with aircraft noise.

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Existing (2020) compared to Future (2025) Baseline Noise Exposure Contours

23

Existing (2020) compared to Future (2025) Baseline Noise Exposure Contours

24

Existing (2020) compared to Future (2025) Baseline Noise Exposure Contours

25

Existing (2020) compared to Future (2025) Baseline Noise Exposure Contours

26

Future (2025) Baseline Noise Exposure Contour

Jurisdiction	65-70 DNL	70-75 DNL	75+ DNL
Housing Counts			
Columbus	1	0	0
Gahanna	1	0	0
Mifflin Township	0	0	0
Jefferson Township	0	0	0
Total	**2**	**0**	**0**
Population			
Columbus	3	0	0
Gahanna	3	0	0
Mifflin Township	0	0	0
Jefferson Township	0	0	0
Total	**6**	**0**	**0**
Noise-Sensitive Facilities			
Schools / Daycares	1	0	0

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Future (2025) Baseline Noise Exposure Contour

- The Future (2025) Baseline Noise Exposure Contour reflects conditions expected in the future with no noise abatement procedures other than what is already implemented today.
- Serves as the basis for recommending and evaluating any new noise abatement procedures.
- There is an increase in size of the noise contours compared to Existing (2020) Baseline Noise Exposure Contour due to the forecast increase in aircraft operations at CMH.
- Contour retains a similar shape because no major changes in runway use or flight tracks are expected within the Study Area.
- There are two residences and one noise-sensitive facility within the 65 DNL of the Future (2025) noise contour.
- The 60 DNL is shown for informational purposes and does not represent a noise impact under Federal land use compatibility guidelines. There are approximately 4,400 residences and 29 noise-sensitive facilities (schools, daycares, and churches) within the 60-65 DNL of the Future (2025) Baseline noise contour.

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Pause for Questions

Noise Compatibility Program

Types of Program Measures

- Noise Abatement Measures
  - Not applicable outside the 65 DNL
- Corrective Land Use Measures
  - Typically not applicable outside the 65 DNL
- Preventative Land Use Measures
  - Can be applied outside the 65 DNL but typically consist of informational/notification only in areas outside the 65 DNL
- Implementation Measures
  - Designed to assist with the implementation and management of the Noise Compatibility Program (NCP)

Group Comments / Discussion

Next Steps

Public Meeting Information Online

- Project Website: www.airportprojects.net/cmh-part150
- Questions/comments accepted through May 31
- Notify your constituents
  - Social media imagery and language available
  - Email: mkeister@engagepublicaffairs.com

Part 150 Process

- Next TAC meeting Summer/Fall 2020
- Questions or comments?

  CRAA Project Manager
  Justin Anderson
  614-239-6152
  janderson@columbusairports.com

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John Glenn Columbus International Airport
Part 150 Noise Compatibility Update Study

Technical Advisory Committee Meeting 2

Date: Wednesday, April 8, 2020
Time: 10 A.M. to Noon
Location: Online video conference meeting (using Skype for Business)

Meeting Summary

Meeting Purpose

- Review and discuss the Preliminary Draft Noise Exposure Maps (NEMs)
- Discuss the Noise Compatibility Program (NCP)
- Review schedule and next steps
- To gather input and ask questions about the study

Welcome and Introduction

Justin Anderson, Columbus Regional Airport Authority (CRAA) Project Manager, welcomed everyone for attending the online video conference Technical Advisory Committee (TAC) meeting and thanked them for participating. Justin then turned the meeting over to Rob Adams, Principal-in-Charge, and Chris Sandfoss, Project Manager, both of Landrum and Brown.

Rob mentioned that due to circumstances surrounding the COVID-19 pandemic this TAC meeting was converted from an in-person to an online meeting. TAC members were previously emailed a PDF copy of the online presentation. Rob then discussed meeting logistics and provided visual instructions on how to use the online platform and chat feature, reviewed the meeting agenda and identified where the project is within the study process (slide 5).

Rob then gave an update to the study schedule (slide 6) and reminded everyone that the scheduled public meetings, that were to be held later that evening (on April 8 and Thursday, April 9) had been previously cancelled due to COVID-19. Meeting materials have been made available online (through the project website https://www.airportprojects.net/cmh-part150/) and comments will be accepted through May, 31.

Noise Monitoring

Chris provided an overview of the noise monitoring program. The purpose of this program is to validate and verify data that is input into the Aviation Environmental Design Tool (AEDT) and obtain real-life noise measurements to help understand the overall noise environment in and around the airport. A three-person team collected noise data at 30 sites (for one hour each) around the airport during the week of November 11, 2019. The timing of the data collection focused on departures at

CMH (John Glenn Columbus International Airport). Sites were selected to provide a wide coverage within nearby residential areas and areas of noted noise complaint.

A map provided the visual location for each of the 30 data collections sites (slide 8), while a table listed detailed noise collection data (slides 9-10). Data included: ambient, aircraft noise levels, monitoring dates and times, flight events and loudest noise and aircraft. Chris mentioned that on average there were 11 to 12 aircraft observed during each one hour recording and some aircraft noise events included other community noise sources (i.e. intermittent car and truck traffic). This collected data is being further analyzed along with data from the 16 permanent noise monitors around CMH.

Existing Noise Contour

Chris then gave an overview and explanation of the Existing 2020 Baseline Noise Exposure Contour. The existing noise contour represents an annual-average day (1 year/365 days of operations) and utilized data that includes: number of aircraft operations, fleet types, runway use patterns and flight tracks. Future noise contours are based on a forecast of aviation activity (using existing data) on an annual-average day in 2025. Future noise contours also assume similar runway patters and no major changes to the fleet mix or destinations served. Chris also provided an explanation of the Day-Night Average Sound Level (DNL) and noted that 65 DNL is the national standard for all Federal agencies, as the threshold for impacts to noise sensitive land uses, which includes residences, places of worship, schools, libraries, hospitals, nursing homes, and licensed day care facilities.

A visual map was provided showing the Existing 2020 Baseline Noise Exposure Contour (slide 14). Chris explained that the slide included the 75, 70, 65 and 60 DNL noise contour lines and that the 60 DNL was shown for informational purposes only. The slide also included the existing CMH sound insulation program boundary and the basemap was colored by general land use classifications (showing residential, commercial, industrial and other uses). A chart on the slide showed that there are no housing, residents or noise-sensitive facilities within the 65+ DNL existing noise contour (slide 15). Chris also noted that:

- East of the airport, the noise contour primarily reflects usage by aircraft arriving to the airport, resulting in thinner noise contours
- West of the airport, the noise contour primarily reflects usage of aircraft departing from the airport, resulting in wider and rounder noise contours
- Contour shape and size also reflects a greater use of runway 10R/28L
- The 60 DNL contour does not represent a noise impact under Federal land use compatibility guidelines. There are approximately 3,300 residences and 19 noise-sensitive facilities (schools, daycares, and churches) within the 60-65 DNL existing (2020) baseline noise contour

Questions

At this point, Chris paused for the following questions from TAC members:

Tony Celebreeze (City of Columbus) *referenced the "type of events" from the noise monitoring table and asked why some of the 30 noise monitoring data collection sites only show departures or arrivals, while others show both?* ***Chris Sandfoss (L&B)*** *replied that this was based on aircraft operation flow, east or west arrivals, and that during the measurement period some sites only received noise from arrival operations and some sites only received noise from departure operations. Whereas some sites received noise from both arrivals and departures at locations where operations took-off or landed in one direction but were required to circle back to go the other way (i.e. downwind leg) He also mentioned that the 16 permanent noise monitors collect all arrival and departure noise levels.*

Alfonso Hooper (Brittany Hills Civic Association) *asked what happened to the noise monitoring system at former South Milton Elementary school, and why he does not receive noise updates anymore?* ***Chris Sandfoss (L&B)*** *replied that he believes the monitor is still at that location and monitoring noise.*

Alfonso Hooper (Brittany Hills Civic Association) *replied that there is still significant noise at night and what can be done? He would like to receive monitoring notices and would like to see more homes in the area receive sound insulation.* ***Chris Sandfoss (L&B)*** *responded the team can take a look at older reports, but since the 65 DNL noise contour has shrunk over time, the team does not anticipate any more residential sound insulation, as homes were previously eligible to receive.*

Justin Anderson (CRAA) *noted that there are more aircraft operations during the early morning and afternoon "banks" that may be noticeable to the west of the airport and CRAA has a noise hotline for these issues. He thanked Mr. Hooper for his comments and mentioned this is why this study is being conducted and the reason for the TAC involvement. He will look into whether reports can be mailed.*

Tiffany White (North Central Area Commission) *asked how the team was determining noise data as data from slides 10-11 show the loudest noise event decibels were above 65 DNL? She also asked how the team concluded to not recommend more residential sound insulation?* ***Chris Sandfoss (L&B)*** *reviewed slides 10 and 11, showing the noise data collection results and explained that the data showed peak (Lmax) noise levels that may exceed 65 decibels; however, the DNL metric is an average of these peak levels and non-peak levels. This average is then used to calculate the existing 65 DNL noise contour. There are currently no new noise-sensitive facilities within the 65 DNL noise contour so funding for additional noise insulation is not recommended.*

Forecast of Aviation Activity

Rob provided an overview forecast of aviation activity at CMH. A graph showed actual operations through 2019 with projected operations growing from 134,999 to

150,140 in 2025 (slide 18). Daily operations currently average at 369 and are forecasted to increase to 411 (in 2025). Rob noted that current impacts of the COVID-19 outbreak occurred after the forecast was prepared. The graph includes a recession event in 2020 for modeling purposes, as most economists projected some sort of recession to occur sometime between 2019 and 2025. Rob also noted that demand for flight operations has increased steadily by 65 percent throughout the last 50 years, even during many unplanned events like the 1970’s oil embargo, labor strikes in the 1980’s, wars and other economic recessions. During these events demand had a “v” shaped dip, showing the decline and rise of operations. Impacts of the COVID-19 outbreak would be expected to cause a temporary decrease in flight activity and that flight activity would eventually return. Therefore, it is reasonable to continue to use the current forecast for planning purposes.

Future Noise Contour

Chris gave an overview and explanation of the Future 2025 Noise Exposure Contour and showed several slides containing maps. These visual maps included the Future 2025 Baseline Noise Exposure Contour (slide 19) and a comparison map overlapping both the Existing 2020 and Future 2025 noise contours (slide 20). Scaled maps showing more details were also provided (slides 21-26).

A chart showed two housing units, six residents and one noise-sensitive facility within the 65 DNL of the Future 2025 Noise Exposure Contour (slide 27). Chris also noted that:

- The future noise contour reflects conditions expected in the future with no noise abatement procedures other than what is already implemented
- The future noise contour serves as the basis for recommending and evaluating any new noise abatement procedures
- There is an increase in size of the future noise contour compared to the existing noise contour due to the forecast increase in aircraft operations at CMH
- The future noise contour retains a similar shape because no major changes in runway use or flight tracks are expected within the study area
- There are two residences and one noise-sensitive facility within the 65 DNL of the Future (2025) noise contour because the residences were previously sound insulated or built in a new subdivision that was constructed after previous noise contours were published.
- The 60 DNL contour does not represent a noise impact under Federal land use compatibility guidelines. There are approximately 4,400 residences and 29 noise-sensitive facilities (schools, daycares, and churches) within the 60-65 DNL of the future noise contour

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Questions

At this point, Chris paused for the following questions from TAC members:

Michelle Pounds (Greenview Estates) *mentioned that there appears to be a shift of the noise contour to the west of CMH and asked if any residential homes will be able to utilize the noise insulation program.* ***Chris Sandfoss (L&B)*** *concurred that the 65 DNL would be expected to increase in size due to the forecasted increase in aircraft operations. He noted that the 65 DNL is still smaller than it has been in the past and that there are only two residential units, one in Columbus and one in Gahanna within the 65 DNL of the Future (2025) Noise Exposure Contour.* Over time noise contours have shrunk significantly and can be attributed to redirection of most cargo deliveries to Rickenbacker International Airport, changes in flight operations and quieter airplanes. Chris noted that there were approximately 740 housing units within the 65 DNL of the previous future noise exposure contour developed in 2007.

Matt Brown (Franklin County) *commented: Thank you to the CRAA for including Franklin County in this study and for continuing to be proactive in reducing noise impacts in the communities around the airport. I have to exit for another meeting but wanted to raise one point. It looks like there are an additional 1,100 residences and 10 noise-sensitive land uses within the 60-65 DNL under the forecasted model. I recognize that outside of the 65 DNL does not represent a noise impact under Federal guidelines but I encourage the CRAA to look into possible sound insulation programming in the 60-65 DNL. I am assuming sound insulation programs can have additional benefits for homes such as improving energy efficiency. There may be a way to partner with other public agencies that have compatible goals. Thank you again and I look forward to future discussions.*

Noise Compatibility Program

Chris reviewed the four types of noise compatibility program measures (noise abatement measures, corrective land use measures, preventative land use measures, and program management measures). Based on the results of the noise contour modeling, it is unlikely that the study would recommend new noise abatement or corrective land use measures, as there aren't any impacts within the 65 DNL contour. For preventative land use measures, CMH will continue to inform and notify officials and the public on noise matters. This includes working with existing municipalities and jurisdictions through proper zoning and prevention of new noise sensitive development in or near the 65 DNL contour. Implementation measures include continued management of the Noise Compatibility Program (NCP), periodic reviews and permanent coordination and monitoring of the 16 permanent noise monitors around CMH.

Group Comments/Discussion

Alfonso Hooper (Brittany Hills Civic Association) *mentioned that when they originally studied the Brittany Hill neighborhood for noise insulation only about half* *of the homes were recommended, while an entire neighborhood, adjacent to an airport in Kentucky, was provided with noise insulation features. How are these decisions being made at CMH? Why would there be a difference? **Rob Adams (L&B)** replied that 65 DNL contours doesn't follow jurisdictional or even neighborhood boundaries and there are limits when larger neighborhoods are adjacent to a 65 DNL contour (only residences identified as significantly impacted per the Federal guidelines would receive a noise reduction benefit). **Justin Anderson (CRAA)** stated that he can discuss this more offline with Mr. Hooper and CMH airport staff.*

***Alfonso Hooper (Brittany Hills Civic Association)** asked how does a community get their own independent noise study, instead of this airport study? **Rob Adams (L&B)** replied that it is very rare for other independent studies to occur, but a city or county can apply for funding for this type of study (though there are very few occurrences/examples of this happening). The best bet is to talk with your elected officials. **Alfonso Hooper (Brittany Hills Civic Association)** replied "thank you!"*

***Justin Anderson (CRAA) addressed** the TAC by thanking the surrounding communities for their planning efforts in mitigating noise sensitive uses. He also reiterated that it is the Airport's intention of being a good neighbor.*

***Alfonso Hooper (Brittany Hills Civic Association)** asked if could receive noise monitoring notices for the noise monitoring system at the former South Milton Elementary school. **Justin Anderson (CRAA)** replied that he can discuss this more offline with CMH Airport staff.*

Next Steps/Conclusion

Chris and Justin then reviewed the next steps (shown below) before ending the meeting.

- Planned public meetings for April 8/9 have been cancelled but all information is available on the project website for review and comment by May 31 (https://www.airportprojects.net/cmh-part150/)
- Request that TAC members notify their constituents about reviewing the project information on the project website
- Social media imagery and language is available (contact Marie Keister at mkeister@engagepublicaffairs.com) to notify constituents about the online project information
- Contact CRAA Project Manager, Justin Anderson with comments or questions at 614-239-6152 or janderson@columbusairports.com
- Next TAC Meeting – Summer/Fall 2020

Meeting Participants

There were 32 participants at the meeting:

Voda Layne	*Air Canada Express*

Ken Copley	*Airline Pilots Association (ALPA)*
Kyle Lewis	*AOPA*
Alfonso Hooper	*Brittany Hills Civic Association*
Tony Celebrezze	*City of Columbus*
Rory McGuiness	*City of Columbus Department of Development*
Justin Anderson	*Columbus Regional Airport Authority*
Denny Casey	*Columbus Regional Airport Authority*
Kristen Easterday	*Columbus Regional Airport Authority*
Joe Hermann	*Columbus Regional Airport Authority*
Mark Kelby	*Columbus Regional Airport Authority*
Tom McCarthy	*Columbus Regional Airport Authority*
Sarah McQuaide	*Columbus Regional Airport Authority*
Mark Grennell	*Federal Aviation Administration - District Office (Detroit)*
Matt Brown	*Franklin County*
Akila Alston	*Greenview Estates*
Michelle Pounds	*Greenview Estates*
Mike Anderson	*Jefferson Twp.*
Robert Adams	*Landrum and Brown*
Jesse Baker	*Landrum and Brown*
Chris Sandfoss	*Landrum and Brown*
Chris Lottridge	*Limited Brands*
Dina Lopez	*Mid-Ohio Regional Planning Commission*
Paige Kroner	*National Business Aviation Association*
Gib Harris	*Nationwide Insurance*
Artie Clark	*NetJets*
Carl Lee	*North Central Area Commission*
Wallace McLean	*North Central Area Commission*
Tiffany White	*North Central Area Commission*
James Bryant	*ODOT Office of Aviation*
Jeff Talbert	*Signature Flight Support*
R Lemons	*No information provided*

Other attendees:

Nick Hoffman	*MurphyEpson Inc.*
Marie Keister	*Engage Public Affairs*

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Technical Advisory Committee (TAC) Meeting #3
September 2, 2020

Invitation Letters

Presentation

Meeting Summary

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Technical Advisory Committee Invite List - September 2, 2020

Name	Title	Organization
Voda Layne	Airline Station Manager	Air Canada Express
Kyle Lewis	Regional Manager, Government Affairs & Airport Advocacy, Great Lakes	Aircraft Owners and Pilots Association (AOPA)
Ken Copley	Aviation Safety Liaison	Airline Pilots Association
Christiane Thinnes	Airline Station Manager	Alaska Airlines
Sherriale Fleming	Airline Station Manager	Alaska Airlines
Dyshae Dixon	Airline Station Manager	Alaska Airlines
Dilli Dhital	Airline Station Manager	American Airlines
Robert Walters	Airline Station Manager	American Airlines
Marci VanDusen	Airline Station Manager	American Airlines
Ben Kessler	Mayor & Director of Development	City of Bexley
Tony Celebrezze	Assistant Director, Building and Zoning Services	City of Columbus
Carla Williams-Scott	Director, Department of Neighborhoods	City of Columbus
DeLana Scales	Program Specialist, Department of Neighborhoods	City of Columbus
Todd Dieffenderfer	Deputy Director, Department of Neighborhoods	City of Columbus
Rory McGuinnes	Deputy Director of Administration	City of Columbus Department of Development
Michael Blackford	Planning and Zoning Administrator	City of Gahanna
Andrew Bowsher	Development Director	City of Reynoldsburg
Zach Woodruff	Director of Economic Development & Public Service	City of Whitehall Planning Commission
John Stanford	Deputy Superintendent	Columbus City Schools
Scott Varner	Executive Director of Strategic Partnerships	Columbus City Schools
Ken Waite	Facility Manager	Columbus International Air Center
Ben Kirtley	Operations Coordinator	Columbus Regional Airport Authority
Betsy Taylor	Airline Business Development	Columbus Regional Airport Authority
Casey Denny	Chief Operations Officer	Columbus Regional Airport Authority
Joe Hermann	Manager, Airport Operations	Columbus Regional Airport Authority
Kristen Easterday	Director of Communications and Public Affairs	Columbus Regional Airport Authority
Luke Curtis	Supervisor, Airport Operations	Columbus Regional Airport Authority
Mark Kelby	Airport Planner	Columbus Regional Airport Authority
Sarah McQuaide	Manager, Communications & Media Relations	Columbus Regional Airport Authority
Todd Carter	Sr. Manager, Business Development & Customer Experience	Columbus Regional Airport Authority
Tom McCarthy	Chief of Planning and Engineering	Columbus Regional Airport Authority
Justin Anderson	Deputy Project Manager	Columbus Regional Airport Authority
Christina White	Airline Station Manager	Delta Airlines
Rashad Armstrong	Airline Station Manager	Delta Airlines
Michael Johnson	President	East Columbus Civic Association
Lamar Peoples	Member	East Columbus Civic Association
Katherine Delaney	Community Planner	FAA - Detroit Airports District Office
Mark Grennell	Program Manager	FAA - Detroit Airports District Office
Dave Neef	Manager	FAA CMH ATCT
Brad Fisher	Planner	Franklin County
James Schimmer	Director Economic Development & Planning	Franklin County
Matt Brown	Planning Administrator	Franklin County
Kevin White	Airline Station Manager	Frontier Airlines
Faz Raiz	Airline Station Manager	Frontier Airlines
Mike Anderson	Development Director	Jefferson Township
Eric Bylaw	Director of Flight Operations	Lane Aviation Corporation
Chris Lottridge	Chief Pilot	Limited Brands
Mike Wilkinson	Director of Flight Operations	Limited Brands
Dina Lopez	Strategic Projects Manager	Mid-Ohio Regional Planning Commission
Thomas Graham	Planner	Mid-Ohio Regional Planning Commission
Thea Walsh	Director of Transportation	Mid-Ohio Regional Planning Commission
Paige Kroner	Northeast Regional Representative	National Business Aviation Association
Gib Harris	Chief of Maintenance	Nationwide Insurance Company
Dan Wolfe	Manager	Nationwide Insurance Company
Artie Clark	Flight Operations Compliance Manager	NetJets
Kenneth Trahan	Vice President, Repair Station Operations	NetJets
Matt Sturges	Government Affairs	NetJets
Tiffany White	Chairperson, Oriole Heights Commissioner	North Central Area Commission
Wallace McLean	At-Large Commissioner	North Central Area Commission
Carl Lee	Planning Co-Chair	North Central Area Commission
Elwood Rayford	Chair	Northeast Area Commission
Kenneth Van Pelt	Community Relations Officer	Northeast Area Commission
James Bryant	Aviation Administrator	Ohio Office of Aviation
Jeff Lischak	Airline Station Manager	Republic Airways
Fred Bauman	Regional Manager - Airport Operations	Republic Airways
Jeff Talbert	General Manager	Signature Flight Support
Tim Cavanagh	Airline Station Manager	Southwest Airlines
Yacobe Lemma	Airline Station Manager	Spirit Airlines
Stephanie Morgan	Executive Director	The Ohio State University Air Transportation and Aerospace Campus
Brian Kennedy	Airline Station Manager	United Airlines
LaThya Washington	Airline Station Manager	United Airlines

Part 150 Noise Compatibility Study

Technical Advisory Committee Meeting #3
September 2, 2020

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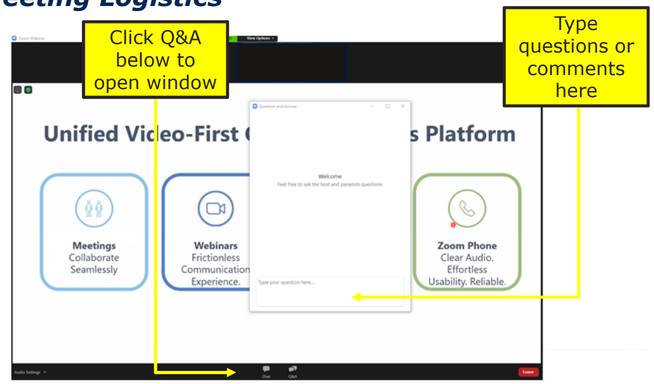
Meeting Logistics



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Agenda

- Welcome and Discussion of Virtual Meeting Resources
- Part 150 Noise Compatibility Study Process and Schedule
- Review of Baseline Noise Exposure Contours
- Preliminary Recommendations on Noise Compatibility Program (NCP) Measures
- Schedule and Next Steps

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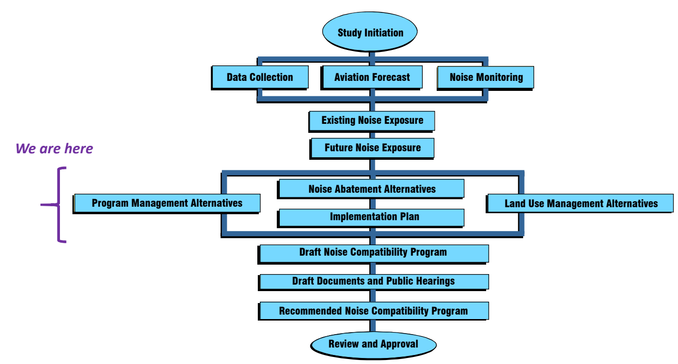
Part 150 Noise Compatibility Study Process



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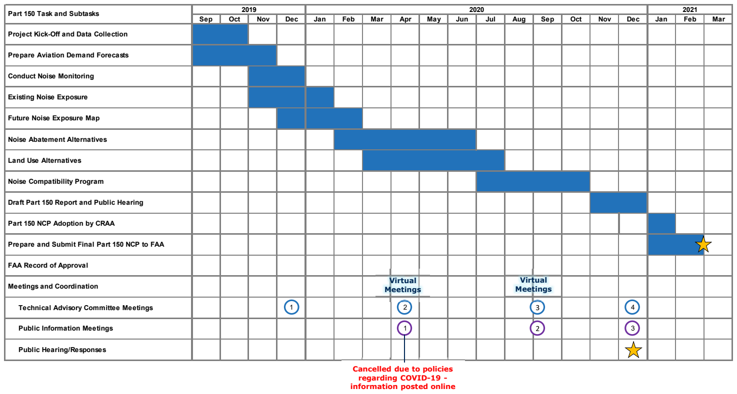
Part 150 Noise Compatibility Study Schedule



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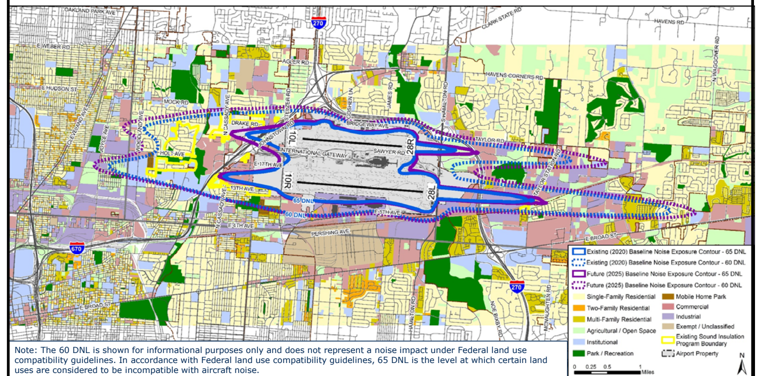
Review of Baseline Noise Exposure Contours



Note: The 60 DNL is shown for informational purposes only and does not represent a noise impact under Federal land use compatibility guidelines. In accordance with Federal land use compatibility guidelines, 65 DNL is the level at which certain land uses are considered to be incompatible with aircraft noise.

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Review of Baseline Noise Exposure Contours

Category	Existing (2020) Baseline	Future (2025) Baseline
Housing Units		
65 – 70 DNL	0	2
70+ DNL	0	0
Population		
65 – 70 DNL	0	6
70+ DNL	0	0
Noise Sensitive Facilities (Churches, Schools, Libraries, and Nursing Homes)		
65 – 70 DNL	1	1
70+ DNL	0	0

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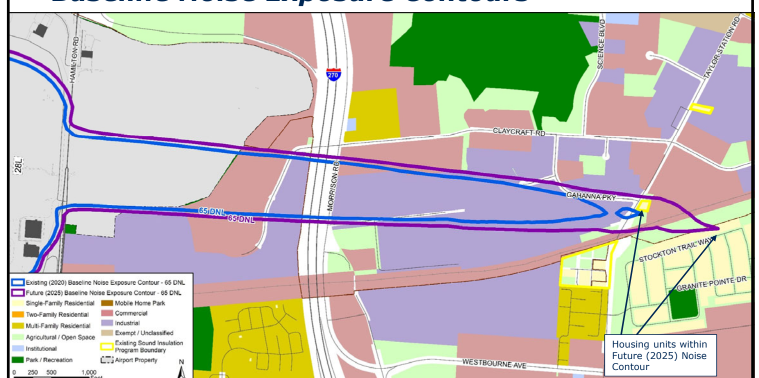
Existing (2020) compared to Future (2025) Baseline Noise Exposure Contours



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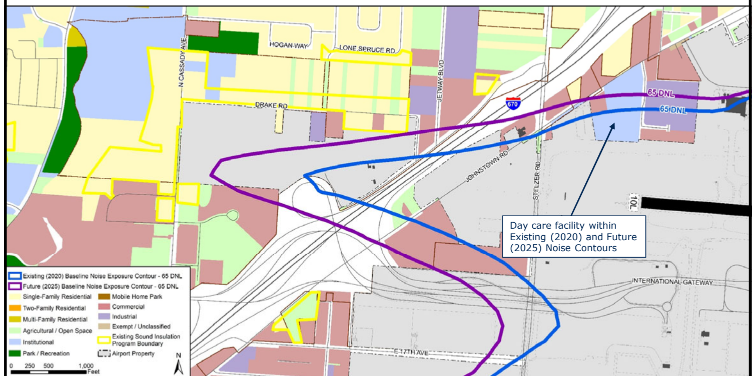
Existing (2020) compared to Future (2025) Baseline Noise Exposure Contours



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Pause for Questions

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Noise Compatibility Program

Types of Program Measures

- Noise Abatement Measures
  - Not applicable outside the 65 DNL
  - Examples include preferential runway use, flight track adjustments, profile/thrust settings
- Corrective Land Use Measures
  - Typically not applicable outside the 65 DNL
  - Examples include property acquisition and sound insulation
- Preventative Land Use Measures
  - Can be applied outside the 65 DNL but typically consist of informational/notification only in areas outside the 65 DNL
  - Examples include compatible use zoning and noise standards in building codes
- Program Management (Implementation) Measures
  - Designed to assist with the implementation and management of the Noise Compatibility Program (NCP)
  - Examples include Airport staff dedicated to program management and outreach

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Current Noise Compatibility Measures

Noise Abatement Measures

- **NA-1:** Amend the John Glenn Columbus International Airport nighttime maintenance Run-up Policy to designate an additional run-up location north of the airfield for the relocation of the NetJets (EJA) facility. This measure will provide attenuation of jet engine maintenance run-ups for adjacent residential areas located along I-270.

  Status: Implemented – Run-ups are performed at the NetJets facility.

  Recommendation: Continue measure

- **NA-2:** Construct a new run-up barrier at the north airfield, if the NetJets building does not adequately attenuate jet engine maintenance run-up noise for adjacent residential areas located along I-270.

  Status: Implemented – A run-up barrier is used at the NetJets facility.

  Recommendation: Continue measure

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Current Noise Compatibility Measures

Noise Abatement Measures

- **NA-3:** Increase nighttime use of Runway 10L/28R, and amend the tower order CMH ATCT 7110.1 to read as follows:
  - Unless wind, weather, runway closure or loss of NAVAIDS dictate otherwise, between the hours of 10:00 p.m. and 8:00 a.m. local time, Runways 28L and 10R are assigned to jet aircraft;
  - Jet aircraft with Stage 3 engines may use Runway 10L/28R for arrival operations between the hours of 10:00 p.m. and 1:00 a.m. local time; and
  - Jet aircraft with Stage 3 engines may use Runway 10L or 28R after 6:00 a.m.

  Status: Partially implemented. The current Tower Order (CMH 7110.1L) includes a provision that unless wind, weather, runway closures, or loss of NAVAIDS dictate otherwise, Runway 10L/28R is a noise-sensitive runway. All arriving and departing aircraft must request Runway 10L/28R with an operational need between the hours of 10:00pm and 6:00am.

  Recommendation: Continue measure

Current Noise Compatibility Measures

Noise Abatement Measures

- **NA-4:** Maximize east flow and amend FAA Tower Order CMH ATCT 7110.1B and the Airports Facilities Directory to reflect implementation of the "East Flow" informal preferential runway use system.

  Status: Partially implemented. Complex conditions at the airport such as winds, flow control policies at destination airports, and taxi times have limited the use of this measure.

  Recommendation: Continue measure

- **NA-5:** Measure previously withdrawn

Current Noise Compatibility Measures

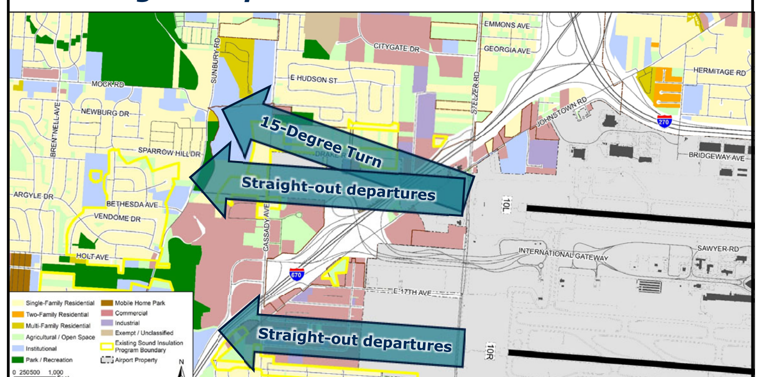
Noise Abatement Measures

- **NA-6:** Implement a 15-degree divergent turn off of Runway 28R, after crossing the runway end to a 295-degree heading, only during peak operating periods when traffic warrants.

  Status: Implemented – This measure is used when traffic conditions warrant.

  Recommendation: Continue measure

15-Degree Departure Turn



Current Noise Compatibility Measures

Noise Abatement Measures

- **NA-7:** Create performance-based overlay procedures for all existing and proposed arrival/departure procedures. (RNAV/RNP/GPS/CDA).

  Status: Currently being implemented – RNAV/RNP procedures are being developed independently by the FAA and are expected to be implemented in April 2021.

  Recommendation: Continue measure

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Current Noise Compatibility Measures

Noise Abatement Measures

- **NA-8:** Construct a noise berm/wall.

  Status: Not Implemented - This measure was considered for the acquisition area along East 13th Avenue as mitigation for the runway relocation. Further investigation and surveys of property owners determined that a noise berm in the location was not desirable.

  Recommendation: Withdraw measure

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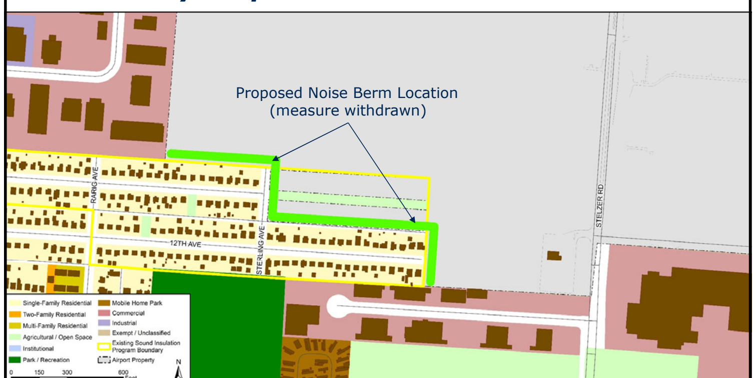
Previously Proposed Noise Berm Location



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Current Noise Compatibility Measures

Noise Abatement Measures

- **NA-9:** Replacement and potential relocation of Ground Run-Up Barrier B

  Status: Not Implemented – Potential replacement and relocation of the Ground Run-Up Barrier B was proposed to accommodate larger aircraft associated with potential new maintenance hangars proposed for the southeast airfield at CMH. The proposed maintenance hangars were not constructed. Therefore, an upgrade to Barrier B was not pursued.

  Recommendation: Continue Measure (if needed)

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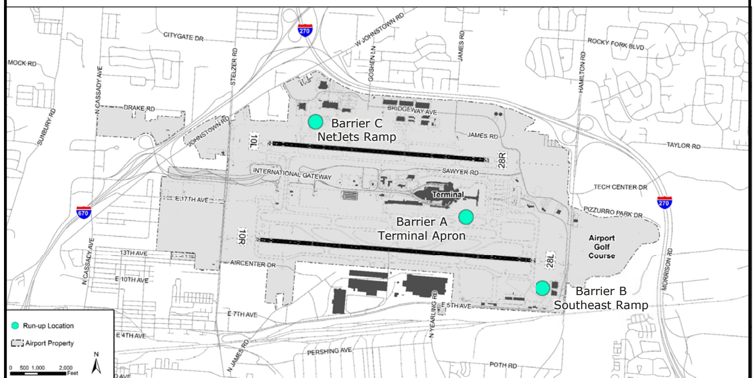
Existing Run-up Barrier Locations



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Pause for Questions

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Current Noise Compatibility Measures

Land Use Measures

- **LU-1:** Offer a program for noise insulation of noncompatible structures for noncompatible residences within the 65+ DNL contour of the Future (2012) Noise Compatibility Program (NCP) condition, in exchange for an avigation easement.

  Status: Implemented, the boundary was updated based on the Future (2012) NEM/NCP Noise Exposure Contour from the 2007 Part 150 Noise Compatibility Program Update. To date, the CRAA has provided for sound insulation of nearly 800 residences.

  Recommendation: Continue measure with modification to update program boundary based upon Future NCP from this Part 150 Study.

  Based on the preliminary results of the noise contour modeling, there would be no new residences located within the 65+ DNL program boundary; therefore, no new noise insulation would be offered.

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Current Noise Compatibility Measures

Land Use Measures

- **LU-2:** Offer a program for noise insulation of noncompatible structures for noncompatible churches within the 65+ DNL contour of the Future (2012) Noise Compatibility Program (NCP) condition in exchange for an avigation easement.

  Status: Implemented – One church, the Wonderland Community Church, was identified within the 65 DNL of the 2002 Part 150 Noise Compatibility Study. The CRAA purchased an avigation easement on the property and it is now considered a compatible land use. One other church, the Mount Judia Church, was contacted for potential inclusion in the program and did not respond. No other churches were identified within the 65+ DNL contour of the Future (2012) NEM/NCP Noise Exposure Contour.

  Recommendation: Continue measure with modification to update program boundary based upon Future NCP from this Part 150 Study.

  Based on the preliminary results of the noise contour modeling, there would be no churches located within the 65+ DNL program boundary; therefore, no new noise insulation would be offered.

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Current Noise Compatibility Measures

Land Use Measures

- **LU-3:** Seek cooperation from the City of Columbus and Franklin County to amend their Land Use Compatibility Standards to achieve the level of compatibility identified in the Recommended Land Use Compatibility Guidelines.

  Status: Partially implemented - Both the City of Columbus and Franklin County have adopted land use development standards similar to what was recommended in the previous NCP. However, in some cases these standards are not as strict as was recommended.

  Recommendation: Continue measure

25

Current Noise Compatibility Measures

Land Use Measures

- **LU-4:** Seek cooperation from the City of Columbus and Franklin County to amend the AEO (Airport Environs Overlay) District boundaries to include the proposed Airport Land Use Management District (ALUMD) corresponding to the 60 DNL of the 20 year NCP contour.

  Status: Not implemented - Both Columbus and Franklin County set the AEO boundary at the 65 DNL contour.

  Recommendation: Continue measure based on previously-approved boundary. Use of the fixed boundary that follows existing physical features provides for consistency for land use planning and avoids changing boundaries in the future.

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Current Noise Compatibility Measures

Land Use Measures

- **LU-5:** Seek cooperation from Franklin County to amend the Franklin County Zoning Resolution, Section 660.07, Avigation Easement, to require applicant for rezoning, change of use, or special use permit to convey an avigation easement to the appropriate airport.

  Status: Partially implemented - Section 660.07 requires conveyance of avigation easements for variance or conditional use permits only.

  Recommendation: Continue measure

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Current Noise Compatibility Measures

Land Use Measures

- **LU-6:** Seek cooperation from Jefferson Township and the City of Gahanna to adopt the proposed Airport Land Use Management District (ALUMD) as part of their official zoning regulations.

  Status: Not implemented - Coordination with local jurisdictions has occurred; however, zoning regulations have not been updated.

  Recommendation: Continue measure

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Current Noise Compatibility Measures

Land Use Measures

- **LU-7:** Seek cooperation from Franklin County, Jefferson Township, Mifflin Township, and the City of Gahanna to adopt subdivision codes applicable to the proposed Airport Land Use Management District (ALUMD).

  Status: Not implemented – Coordination with local jurisdictions has occurred; however, subdivision regulations have not been updated.

  Recommendation: Continue measure

- **LU-8:** Seek cooperation from Franklin County, Jefferson Township, Mifflin Township, and the City of Gahanna to adopt building codes applicable to the proposed Airport Land Use Management District (ALUMD).

  Status: Not implemented – Coordination with local jurisdictions has occurred; however, building codes have not been updated.

  Recommendation: Continue measure

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Current Noise Compatibility Measures

Land Use Measures

- **LU-9:** Seek cooperation from the Board of Realtors to participate in a fair disclosure program for property located within the proposed Airport Land Use Management District (ALUMD).

  Status: Coordination has occurred; however, local jurisdictions elected not to amend their ordinances to include the ALUMD. The CRAA makes the noise exposure maps and other noise compatibility information available on its website.

  Recommendation: Continue measure

- **LU-10:** Periodically place advertisements in a variety of media outlets delineating the boundaries of the proposed Airport Land Use Management District (ALUMD).

  Status: Not implemented – The ALUMD has not been adopted. The CRAA makes the noise exposure maps and other noise compatibility information available on its website.

  Recommendation: Continue measure

- **LU-11:** Measure previously withdrawn

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Current Noise Compatibility Measures

Land Use Measures

- **LU-12:** Develop an Airport Land Use Management District (ALUMD) based on the 2023 Noise Exposure Map/Noise Compatibility Program (NCP) noise contour, and other geographic and jurisdictional boundaries.

  Status: Not implemented – The intent of this measure was to eliminate changing boundaries set by the current noise exposure contours and establish a fixed boundary for consistency. The suggested fixed boundary was not implemented. The City of Columbus and Franklin County continue to apply an Airport Environs Overlay Zone, the boundaries of which correspond to the noise exposure contour from the previous Part 150 Noise Compatibility Study Update which is subject to periodic review and potential revision.

  Recommendation: Continue measure

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Current Noise Compatibility Measures

Program Management Measures

- **PM-1:** Maintain the noise abatement elements of the FAA ATCT Tower Order.

  Status: Implemented – The noise abatement elements are contained in the current Tower Order.

  Recommendation: Continue measure

- **PM-2:** Maintain the Noise Management Office for noise compatibility program management.

  Status: Ongoing – The CRAA continues to operate the Noise Management Office to support the efforts to minimize the noise impact of CMH.

  Recommendation: Continue measure

- **PM-3:** Maintain an ongoing public involvement program regarding the noise compatibility program.

  Status: Ongoing – The CRAA maintains public involvement activities, including the 24-hour noise hotline, WebTrak tracking system, and noise monitoring system.

  Recommendation: Continue measure

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Current Noise Compatibility Measures

Program Management Measures

- **PM-4:** Maintain the noise and flight track monitoring system and expand and upgrade the system as necessary. Add four permanent NMTs and upgrade the computer software and hardware as necessary.

  Status: Implemented – In 2014, four additional permanent noise monitors (NMTs) were installed, two west of the relocated Runway 10R/28L and two east of Runway 10R/28L, which expanded the system to include a total of 16 NMTs. In addition, in 2015, the other existing 12 NMTs were upgraded with newer equipment. The CRAA Airport Operations department continues to monitor the operation of the system and receives ongoing software updates.

  Recommendation: Continue measure with modification to remove the recommendation to install additional NMTs since that recommendation is complete.

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Current Noise Compatibility Measures

Program Management Measures

- **PM-5:** Routinely update the noise contours and periodically update the noise program.

  Status: Ongoing.

  Recommendation: Continue measure

- **PM-6:** Establish a land use compatibility task force which meets periodically to discuss issues relevant to airport noise compatibility planning.

  Status: Implemented (*Not active at this time*)

  Recommendation: Continue measure

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Group Comments / Discussion

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Next Steps

Public Meeting Information Online

- Project Website: www.airportprojects.net/cmh-part150
- Notify your constituents
  - Social media imagery and language available
  - Email: mkeister@engagepublicaffairs.com

Part 150 Process

- Publish Draft Part 150 Noise Compatibility Program
- Next TAC meeting and Public Hearing Winter 2020

Questions or comments? Please provide comments by October 2nd

CRAA Project Manager
Justin Anderson
614-239-6152
janderson@columbusairports.com

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Supplemental Slides

close-in area views of noise contours

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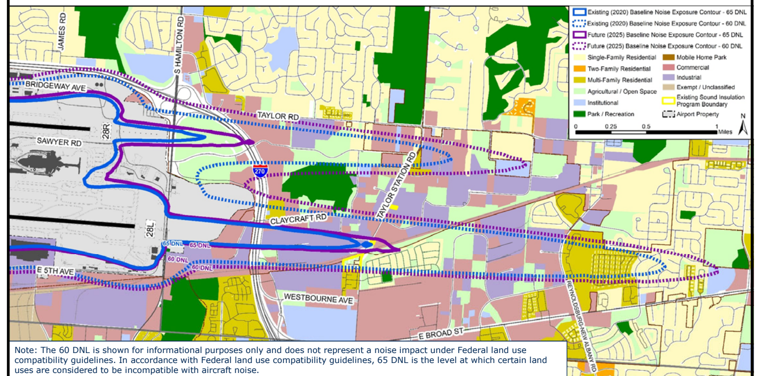
Existing (2020) compared to Future (2025) Baseline Noise Exposure Contours



Note: The 60 DNL is shown for informational purposes only and does not represent a noise impact under Federal land use compatibility guidelines. In accordance with Federal land use compatibility guidelines, 65 DNL is the level at which certain land uses are considered to be incompatible with aircraft noise.

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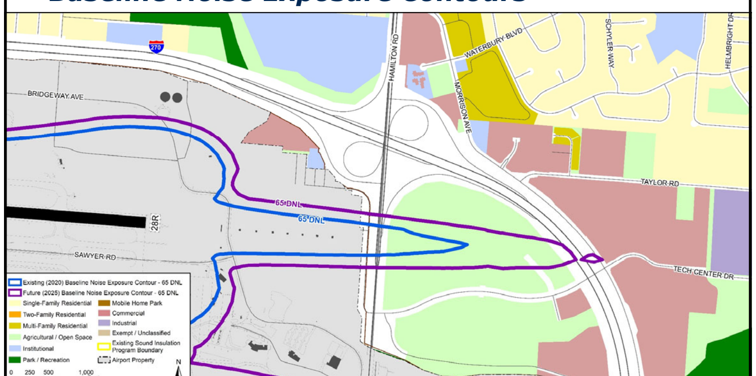
Existing (2020) compared to Future (2025) Baseline Noise Exposure Contours



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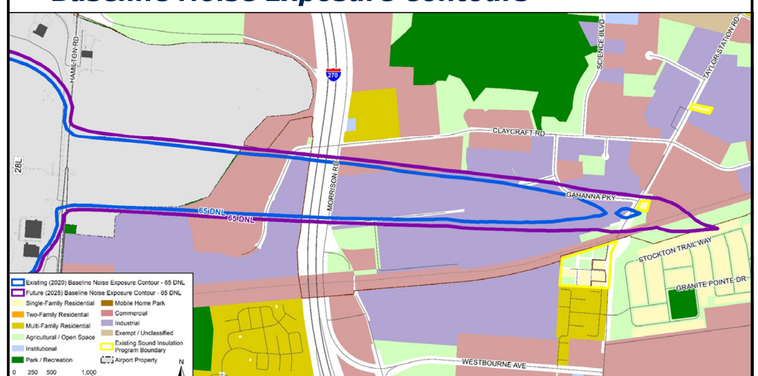
Existing (2020) compared to Future (2025) Baseline Noise Exposure Contours



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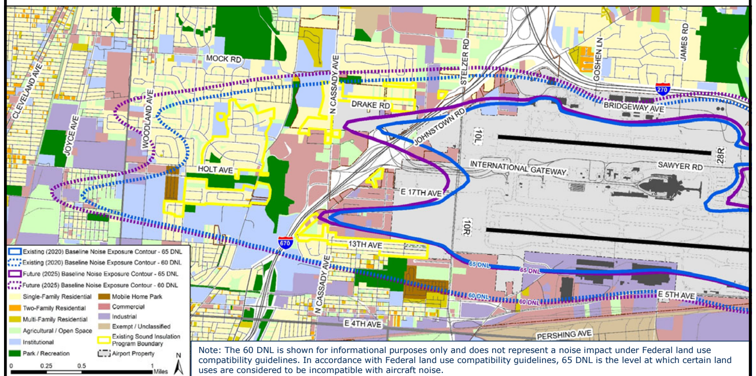
Existing (2020) compared to Future (2025) Baseline Noise Exposure Contours



Note: The 60 DNL is shown for informational purposes only and does not represent a noise impact under Federal land use compatibility guidelines. In accordance with Federal land use compatibility guidelines, 65 DNL is the level at which certain land uses are considered to be incompatible with aircraft noise.

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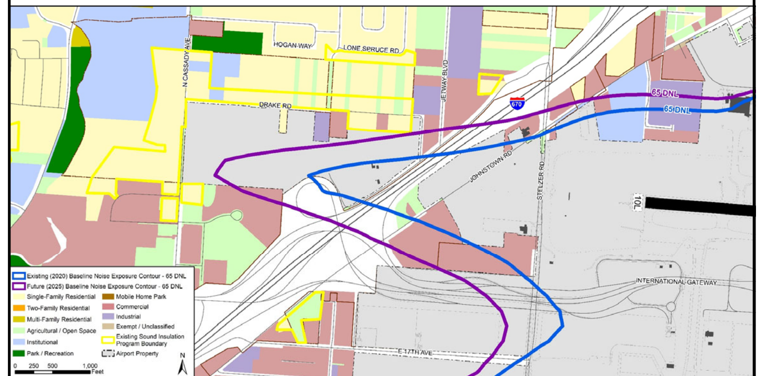
Existing (2020) compared to Future (2025) Baseline Noise Exposure Contours



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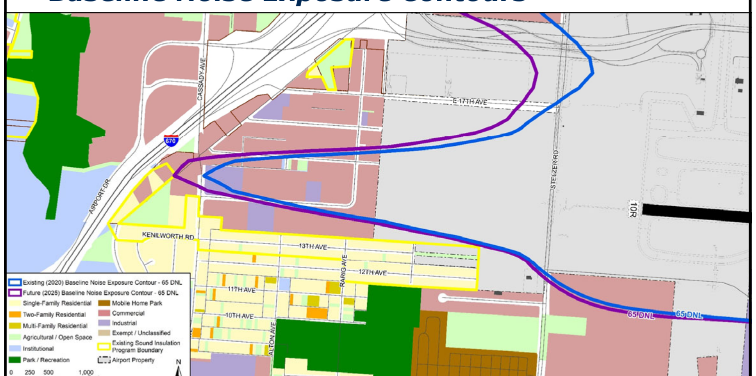
Existing (2020) compared to Future (2025) Baseline Noise Exposure Contours



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John Glenn Columbus International Airport
Part 150 Noise Compatibility Update Study

Technical Advisory Committee Meeting 3

Date: Wednesday, September 2, 2020
Time: 2 to 4 PM
Location: Online video conference meeting (using Zoom Meeting for Business)

Meeting Summary

Meeting Purpose

- Review the baseline noise exposure contours
- Review and discuss the preliminary recommendations on Noise Compatibility Program (NCP) measures
- Review schedule and next steps
- To gather input and ask questions about the study

Welcome and Introduction

Justin Anderson, Columbus Regional Airport Authority (CRAA) Project Manager, welcomed everyone and thanked them for attending the online video conference Technical Advisory Committee (TAC) meeting. Justin then provided a brief recap of the previous two TAC meetings and noted that if members are not able to attend, meeting materials have been made available online (through the project website: https://www.airportprojects.net/cmh-part150/). Justin also reminded everyone about the virtual public meeting being held later in the evening.

Moderator Marie Keister, Engage Public Affairs, provided a brief overview of the meeting logistics and how to ask questions using the video software. Justin then turned the meeting over to Chris Sandfoss, Project Manager, Landrum and Brown.

Chris reviewed the meeting agenda, identified the study process and progress to date (slide 4), and provided an updated study schedule (slide 5). Submittal of the draft Noise Compatibility Program to the Federal Aviation Administration (FAA) would likely be in early 2021.

Baseline Noise Exposure Contours

Chris showed the Existing (2020) Baseline Noise Exposure contour (slide 6), based on existing conditions, and the Future (2025) Baseline Noise Exposure Contour based on operating levels forecasted five years into the future. The analysis is based on the level of operations and forecast prior to COVID-19, taking a more conservative approach to show anticipated noise levels once normal flight activity resumes. The 65 DNL contours are the FAA's regulated threshold for a significant noise impact.

A land use analysis was conducted to show the number of noise sensitive land uses for both the Existing (2020) Baseline and the Future (2025) Baseline Noise Exposure Contours. Zero residential noise sensitive land uses were located within the 2020 65 DNL contour and only one facility (a daycare operated by Franklin County) is impacted. For 2025, there are two impacted residences and the aforementioned daycare facility within the 65 DNL. A table graph and scaled map graphics show these locations in more detail (slides 7, 8 and 9). Of the two residential properties, one was previously eligible and offered sound insulation but declined, and the second was built after the previous noise exposure contour was published and is considered eligible for the program.

Questions

Alfonso Hooper (Brittany Hills Civic Association) *requested airport overlay data for the Brittany Hills neighborhood.*

Justin Anderson (CRAA) *noted that Chris will be explaining the 65 DNL is shrinking due to aircraft becoming quieter. The forecasted operations for 2015 were not as significant as forecasted in the 2007 study. This means there will be fewer properties eligible for sound insultation.*

Chris Sandfoss (L&B) *noted that the current study has confirmed that the Brittany Hills neighborhood is now outside the 65 DNL contour. Chris also reiterated that aircraft technologies have improved, and airlines have phased out some of their older, louder aircraft.*

Tony Celebreeze (City of Columbus *asked if the single-family residence that declined noise mitigation was a rental or owner occupied?*

Chris Sandfoss (L&B) *noted that he believes it was owner occupied but the team would check on this detail.*

Alfonso Hooper (Brittany Hills Civic Association) *asked about zoning requirements for new builds in regard to the airport overlay.*

Chris Sandfoss (L&B) *acknowledged there is an airport zoning overlay but said the airport doesn't have land use approval authority over new construction. That authority falls under the City of Columbus. Though any requests for new construction within the 65 DNL noise contour are reviewed by the Airport Authority for applicability to those areas and recommendations are made for constructing to certain sound attenuation standards.*

Tony Celebreeze (City of Columbus) *stated the Columbus Building and Zoning reviews building plans and would address any of those issues if they are pertinent to the airport overlay.*

Justin Anderson (CRAA) *noted that this information would be noticed on the City's GIS maps which flag the overlay district.*

Marie Keister (Engage Public Affairs) *asked Chris if he could confirm whether or not Brittany Hills is within the airport overlay.*

Chris Sandfoss (L&B) *mentioned some portions of Brittany Hills may still be in the airport overlay district for now, as it is based on noise exposure patterns from the 2007 study. He noted that Brittainy Hills may no longer be in the overlay zone once the noise contour maps are approved the FAA next year.*

Noise Compatibility Program

Chris then provided a discussion of the initial recommendations for the noise compatibility program measures. He first reviewed the three categories of measures (slide 11) followed by the existing measures that are currently approved. (Slides 12 through 34).

Questions

Alfonso Hooper (Brittany Hills Civic Association) *asked again about developer sign-off and sound proofing on residential and other potential noise compatible projects near the airport.*

Justin Anderson (CRAA) *responded that when there is new development within the airport overlay zone the affected cities reach out to the airport for their opinion. Airport staff reviews and provides comments back to the city to make sure that the land use is compatible. He noted that the City of Columbus has a very good working relationship with the airport.*

Alfonso Hooper (Brittany Hills Civic Association) *mentioned he has previous paperwork from several years ago demonstrating a developer signed that acknowledge he was aware of the noise requirements but was willing to proceed with the development anyway. Was the airport familiar with that situation?*

Mark Kelby (CRAA) *said he was not aware of any sign-off procedures but that he and Justin would look into this and include it on the list of items to discuss with Mr. Hooper later.*

Next Steps/Conclusion

Chris reviewed the next steps (shown below) before ending the meeting.

- A virtual public meeting will be held later that evening from 5:00-7:00 PM;
- Comments on this information are being accepted through Oct. 2.
- Request that TAC members notify their constituents about reviewing the project information on the project website
- Social media imagery and language is available (contact Marie Keister at mkeister@engagepublicaffairs.com) to notify constituents about the online project information
- Next task is the publish the draft Part 150 Noise Compatibility Program
- Next TAC Meeting and Public Hearing – Winter 2020/21
- Contact CRAA Project Manager, Justin Anderson with comments or questions at 614-239-6152 or janderson@columbusairports.com

Final Comments

Marie asked TAC members to share their comments on whether the recommendations seemed reasonable.

- One TAC member said it appeared reasonable.
- One TAC member sent a follow up email: “This does seem like a no brainer as the area has shrunk and thus not impacting near as many residential units as in the past.”

Meeting Participants

Kyle Lewis	*AOPA*
Alfonso Hooper	*Brittany Hills Civic Association*
Ben Kessler	*City of Bexley*
Tony Celebrezze	*City of Columbus*
De Lana Scales	*City of Columbus*
Michael Blackford	*City of Gahanna*
Danny Adams	*Columbus Regional Airport Authority*
Justin Anderson	*Columbus Regional Airport Authority*
Luke Curtis	*Columbus Regional Airport Authority*
Matt DeCubellis	*Columbus Regional Airport Authority*
Casey Denny	*Columbus Regional Airport Authority*
Kristen Easterday	*Columbus Regional Airport Authority*
Joe Hermann	*Columbus Regional Airport Authority*
Mark Kelby	*Columbus Regional Airport Authority*
Sarah McQuaide	*Columbus Regional Airport Authority*
Brian Sarkis	*Columbus Regional Airport Authority*
Betsy Taylor	*Columbus Regional Airport Authority*
Marie Keister	*Engage Public Affairs*
Mark Grennell	*FAA - Detroit Airports District Office*
Robert Tykoski	*FAA - Detroit Airports District Office*
Faz Riaz	*Frontier Airlines*
Rob Adams	*Landrum and Brown*
Chris Sandfoss	*Landrum and Brown*
Dina Lopez	*Mid-Ohio Regional Planning Commission*
Nick Hoffman	*MurphyEpson Inc.*
Artie Clark	*NetJets*
James Bryant	*ODOT Office of Aviation*
Stephanie Morgan	*OSU Air Transportation/Aerospace Campus*

Technical Advisory Committee (TAC) Meeting #4
July 29, 2021

To be provided in the Final Document: Invitation Letters

Presentation

Meeting Summary

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Appendix H - Forecast

This appendix includes the Aviation Activity Demand Forecast (Forecast) that was prepared for the John Glenn Columbus International Airport (CMH). This Forecast was prepared based on actual operating data from 2018 and includes a forecast for conditions from 2019 through 2039. The Forecast was submitted to the FAA for review in January 2020. The FAA approved this Forecast on March 3, 2020. A copy of the approval letter is included at the back of this Appendix.

The forecasts for the CMH Part 150 were prepared and submitted to FAA prior to the COVID-19 public health emergency. FAA acknowledges the current impacts of the COVID-19 public health emergency and the resulting decline in aviation and transit travel demand. However, over the long term, demand and airline capacity are expected to grow in line with the US Gross Domestic Product (GDP), a relationship that has been in place since before airline industry deregulation in 1978. Airport passenger activity is historically resilient, as people both want to travel for leisure purposes and need to travel for business purposes. Airline passenger travel and capacity (measured in terms of available seats) fell drastically after the terrorist attacks of September 11, 2001, and during the recession in 2009/2010. At CMH, passenger activity recovered in the following 3 to 4 years after each shock event. Airline passenger activity is expected to recover from COVID-19 impacts in broadly similar ways in the next several years as vaccines become widely available and social distancing measures are discontinued. Airlines for America (A4A), the trade organization of the leading US passenger and cargo airlines, projects that recovery to 2019 passenger volumes could occur in 2023 using optimistic assumptions, but most likely would not occur until after 2024. Similarly, Airports Council International (ACI), the trade association of the world's airports, projects that domestic passenger activity may recover as early as 2023 and international passenger traffic may recover as early as 2024. Leisure travel is expected to lead the recovery in aviation demand (as evidenced by travel spikes during the 2020 Thanksgiving and Christmas holidays, indicating that people desire to travel for leisure). Recovery in business travel is predicted to be comparatively slower as businesses evolve after the COVID-19 public health emergency; but business travel will remain an essential function.

The final 2020 TAF was published in May 2021. Recovery periods for passenger enplanements and operations are anticipated to be between 2024 and 2025, meaning that by 2026 the airport should be at 2019 activity levels and continuing to grow. Although it is impossible to precisely predict future changes to enplanements and operations, historical recovery from other shock events has been taken under consideration. The enplanement and operations forecasts prepared for the Part 150 Study remain valid, as the airport will experience these levels, although with a slight delay. Thus, it is anticipated that passenger and airline activity in the short-term will be lower than forecast but will recover with long-term forecast activity being realized later than stated in Table 8-2, FAA TAF Forecast Comparison.

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Aviation Activity Demand Forecast Report
January 2020

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COLUMBUS
REGIONAL AIRPORT AUTHORITY

Aviation Activity Demand Forecast

January 2020

PREPARED FOR
Columbus Regional Airport Authority

PRESENTED BY
Landrum & Brown, Incorporated

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1 Purpose and Context

This document presents a comprehensive forecast of aviation demand for John Glenn Columbus International Airport (CMH or the Airport) to support the Part 150 Update. Activity levels are forecast through 2039 with a base year of 2018 and an estimate for 2019.

The objective of this forecast is to project the future aviation demand that will provide the basis for future planning analyses. The forecast presented herein represents market driven demand for air service. The forecast is "unconstrained" and as such does not take facility constraints or other outside limiting factors into consideration. In other words, for purposes of estimating future demand, the forecast assumes facilities can be provided to meet the demand.

2 Prior Forecasts

2.1 2014 Loop Road Land Use Study

In April 2014, Ricondo & Associates, Inc. (Ricondo) prepared an aviation activity forecast of enplaned passengers and aircraft operations to determine facility requirements associated with the proposed Loop Road Area development. The forecast used a base year of 2013, which was the last full year of data available at the time, and activity was forecast through 2044.

Ricondo attempted to forecast the enplanements at CMH using socio-economic regression to quantify the relationship of enplanements to population, employment, income, per capita personal income, and gross domestic product. However, this approach did not result in any adequate models.

Therefore, Ricondo used a market share methodology. The approach used a ratio of the historical activity at CMH with the activity in the United States (U.S.) as a whole. The base year ratio of 0.415% was assumed to remain constant through the forecast period and was applied to a national forecast for the U.S. enplaned passengers. The result was that enplaned passengers at CMH would grow from 3.1 million in 2013 to 5.3 million in 2044, representing a compound annual growth rate (CAGR) of 1.8%.

Ricondo used the enplaned passenger forecast, load factor assumptions, and estimated average seats per departure (ASPD) to determine the passenger airline operations. Ricondo projected that load factors at CMH would increase from 77.5% in 2013 to 81.9% in 2044 while ASPD were projected to increase from 84.2 seats to 115.5 seats over the same span. The result was that passenger airline departures would increase from 47,711 (95,422 operations) in 2013 to 56,470 (112,941 operations) in 2044, representing a CAGR (AAGR) of 0.5%. Other air taxi and general aviation (GA) operations were expected to grow in line with the national forecast at 0.5% per year through the forecast period, growing from 32,203 in 2013 to 37,330 in 2044. Military operations were assumed to remain constant at 560 operations per year through the forecast period.

In addition to the base forecast, Ricondo developed low-growth and high-growth forecast scenarios. These were developed to account for economic and industry uncertainty. The result of these scenarios was that by 2044 enplaned passengers ranged between 4.3 million and 6.4 million and operations ranged between 137,641 and 167,270. **Table 2-1, *Loop Road Forecast Summary***, provides a summary of Ricondo's forecast.

Table 2-1 2014 Loop Road Forecast Summary

	Enplaned Passengers			Aircraft Operations		
Year	Low-Growth	Baseline	High-Growth	Low-Growth	Baseline	High-Growth
Historical						
2009		3,122,989			146,439	
2010		3,183,792			136,086	
2011		3,190,068			135,377	
2012		3,174,814			129,450	
2013	3,114,695	3,114,695	3,114,695	128,187	128,187	128,187
Forecast						
2015	3,192,600	3,218,400	3,246,600	127,723	128,223	128,820
2018	3,299,800	3,408,200	3,514,700	128,689	130,469	132,680
2023	3,483,400	3,745,100	3,987,400	130,329	134,259	139,170
2033	3,860,300	4,458,600	5,034,500	133,709	142,009	152,360
2044	4,302,100	5,344,100	6,371,000	137,641	150,831	167,270
CAGR 2013-44	1.0%	1.8%	2.3%	0.2%	0.5%	0.9%

Source: Ricondo & Associates, Inc.

2.2 2015 Planning Forecast

In November 2015, Landrum & Brown, Incorporated (L&B) prepared an unconstrained aviation activity forecast of enplaned passengers and aircraft operations to support the development of facility requirements for airport improvements. The forecast used a base year of 2014, which was the last full year of data available at the time, and activity was forecast through 2035.

L&B used a multivariate regression model to forecast domestic enplanements at CMH using U.S. domestic enplanements, yield, and a dummy variable as independent variables. The result was that domestic enplaned passengers at CMH were forecast to grow from 3.1 million in 2014 to 5.0 million in 2035, representing a compound annual growth rate (CAGR) of 2.2%.

International passenger levels had fluctuated from 2011 to 2014 and represented approximately 0.6% of total passengers at CMH. Therefore, L&B assumed that international enplaned passengers would continue to account for 0.6% of total enplanements through 2018 when new international wide-body service would commence. International enplanements were forecast to grow from 28,356 in 2014 to 272,900 in 2035, an annual average growth rate of 12.7%.

L&B used the enplaned passenger forecast, load factor assumptions, and estimated average seats per departure (ASPD) to determine the passenger airline operations. L&B projected that air carrier load factors at CMH would increase from 75.8% in 2014 to 84.0% in 2035 while ASPD were projected to increase from 150.2 seats to 165.8 seats over the same span. L&B projected that commuter load factors at CMH would increase from 75.2% in 2014 to 84.0% in 2035 while ASPD were projected to increase from 58.3 seats to 69.2 seats over the same span.

In addition to the base forecast, L&B developed a high-growth forecast scenario. The high scenario assumed that CMH's share of national traffic would grow from an estimated 0.48% in 2015 to 0.58% by 2035. The high scenario forecasted 5.9 million enplaned passengers and 183,600 aircraft operations by 2035. **Table 2-2, *2015 Forecast - Total Enplanements*** provides a summary of projected enplanements from the 2015 Forecast.

Table 2-2 2015 Forecast - Total Enplanements

	Enplanements			
Year	Domestic	International	Total	High Case
Historical				
2000	3,452,627	10,293	3,462,920	3,462,920
2001	3,326,605	9,422	3,336,027	3,336,027
2002	3,327,680	20,776	3,348,456	3,348,456
2003	3,123,550	32,970	3,156,520	3,156,520
2004	3,082,360	30,510	3,112,870	3,112,870
2005	3,281,964	24,789	3,306,753	3,306,753
2006	3,339,325	23,675	3,363,000	3,363,000
2007	3,840,993	24,488	3,865,481	3,865,481
2008	3,438,618	20,816	3,459,434	3,459,434
2009	3,109,731	13,258	3,122,989	3,122,989
2010	3,166,387	17,405	3,183,792	3,183,792
2011	3,169,469	20,599	3,190,068	3,190,068
2012	3,165,245	9,569	3,174,814	3,174,814
2013	3,093,217	21,478	3,114,695	3,114,695
2014	3,144,690	28,356	3,173,046	3,173,046
Forecast				
2015E	3,371,637	26,352	3,397,989	3,397,952
2016	3,559,700	20,900	3,580,600	3,626,500
2017	3,713,200	21,800	3,735,000	3,834,400
2018	3,743,200	93,800	3,837,000	3,983,500
2019	3,841,600	104,400	3,946,000	4,112,800
2020	3,919,400	115,000	4,034,400	4,223,500
2021	3,985,600	125,600	4,111,200	4,323,100
2022	4,021,900	136,200	4,158,100	4,424,500
2023	4,097,400	146,800	4,244,200	4,532,000
2024	4,168,800	157,400	4,326,200	4,636,500
2025	4,246,800	168,000	4,414,800	4,748,700
2026	4,301,000	178,600	4,479,600	4,870,200
2027	4,398,000	189,200	4,587,200	5,005,100
2028	4,500,400	199,800	4,700,200	5,146,800
2029	4,603,400	210,400	4,813,800	5,290,500
2030	4,638,500	221,000	4,859,500	5,435,700
2031	4,740,000	231,600	4,971,600	5,581,100
2032	4,846,100	242,200	5,088,300	5,732,300
2033	4,952,400	252,800	5,205,200	5,885,500
2034	5,058,200	263,400	5,321,600	6,039,500
2035	5,167,300	274,000	5,441,300	6,197,000
CAGR				
2000-14	-0.7%	7.5%	-0.6%	-0.6%
2014-35	2.4%	11.4%	2.6%	3.2%
2015-35	2.2%	12.4%	2.4%	3.1%

Note: 2015E is an estimated value based on 2015 year to date values through August.
Sources: CRAA and Landrum & Brown.

The result was that passenger airline departures were forecast to increase from 46,606 (93,212 operations) in 2014 to 60,650 (121,300 operations) in 2035, representing a CAGR (AAGR) of 1.3%. Non-commercial air taxi operations were forecast to grow at 3.6% on average and general aviation (GA) operations were expected to grow in line with the national forecast at 0.6% per year through the forecast period. Cargo freighter and military operations were assumed to remain constant at their respective 2014 levels through the forecast period. **Table 2 3, *2015 Forecast - Total Aircraft Operations,*** provide a summary of L&B's operations forecast.

Table 2-3 2015 Forecast - Total Aircraft Operations

		Annual Operations							
		Air Carrier	Commuter	Total Passenger Operations	Cargo	Military	Non-Commercial Air Taxi	General Aviation	Total
Historical	2008	37,597	72,751	110,348	54	1,451	15,445	28,716	156,014
	2009	33,326	66,272	99,598	68	2,559	13,648	30,674	146,547
	2010	31,666	64,310	95,976	354	931	13,511	25,583	136,355
	2011	32,184	65,949	98,133	172	349	12,624	24,096	135,374
	2012	32,366	60,681	93,047	108	540	12,232	23,263	129,190
	2013	32,538	59,224	91,762	134	559	13,364	21,792	127,611
	2014	32,200	61,012	93,212	200	609	9,457	20,636	124,114
Forecast	2015	33,200	62,200	95,400	200	600	10,400	20,200	126,800
	2016	35,200	63,200	98,400	200	600	10,700	20,200	130,100
	2017	36,000	63,900	99,900	200	600	11,000	20,300	132,000
	2018	36,800	64,600	101,400	200	600	11,400	20,400	134,000
	2019	37,100	65,300	102,400	200	600	11,800	20,500	135,500
	2020	37,300	66,100	103,400	200	600	12,100	20,600	136,900
	2021	37,400	66,800	104,200	200	600	12,500	20,700	138,200
	2022	37,300	67,500	104,800	200	600	12,900	20,900	139,400
	2023	38,000	68,200	106,200	200	600	13,300	21,100	141,400
	2024	38,300	68,900	107,200	200	600	13,800	21,100	142,900
	2025	38,600	69,800	108,400	200	600	14,200	21,400	144,800
	2026	39,000	70,600	109,600	200	600	14,700	21,500	146,600
	2027	39,200	71,300	110,500	200	600	15,200	21,700	148,200
	2028	39,500	72,300	111,800	200	600	15,700	21,900	150,200
	2029	39,800	73,100	112,900	200	600	16,300	22,100	152,100
	2030	40,500	73,100	113,600	200	600	16,800	22,200	153,400
	2031	40,900	74,700	115,600	200	600	17,400	22,400	156,200
	2032	41,300	75,600	116,900	200	600	17,900	22,700	158,300
	2033	41,700	76,400	118,100	200	600	18,500	22,900	160,300
	2034	42,000	77,400	119,400	200	600	19,200	23,100	162,500
	2035	43,000	78,300	121,300	200	600	19,900	23,300	165,300
Growth									
2008-14		-2.5%	-2.9%	-2.8%	24.4%	-13.5%	-7.9%	-5.4%	-3.7%
2014-35		1.4%	1.2%	1.3%	0.0%	-0.1%	3.6%	0.6%	1.4%
2015-35		1.3%	1.2%	1.2%	0.0%	0.0%	3.3%	0.7%	1.3%

Sources: Airport Records; FAA OPSNET; Landrum & Brown analysis.

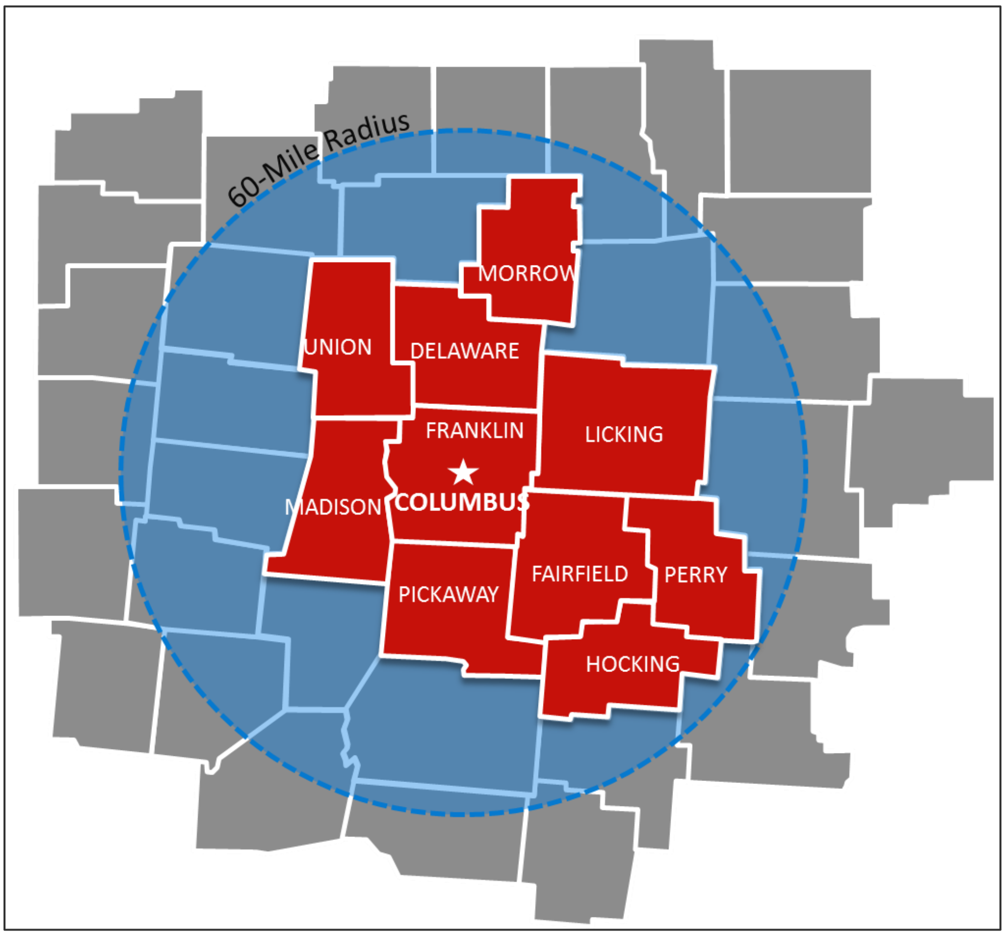
3 Drivers of Air Traffic Demand

Forecasting future aviation activity is an inexact science and there are many factors that influence future aviation trends. This section discusses the various factors that could affect aviation demand at the Airport.

3.1 Catchment Area

The Airport is located approximately 6 miles east of downtown Columbus, Ohio in Franklin County. The majority of the Airport's air passengers originate from the primary market area defined as a 60-mile radius around the City of Columbus.[1] The Columbus Ohio Metropolitan Statistical Area (MSA) has the largest socio-economic impact on the primary market area. Therefore, the socio-economic factors presented in this document will focus on the Columbus Ohio MSA which is illustrated in **Figure 3-1, Columbus Ohio Metropolitan Statistical Area**.

Figure 3-1 Columbus Ohio Metropolitan Statistical Area



Source: Landrum & Brown.

[1] Columbus Regional Airport Authority, Economic Impacts of the Columbus Regional Airport Authority in 2017, January 2019.

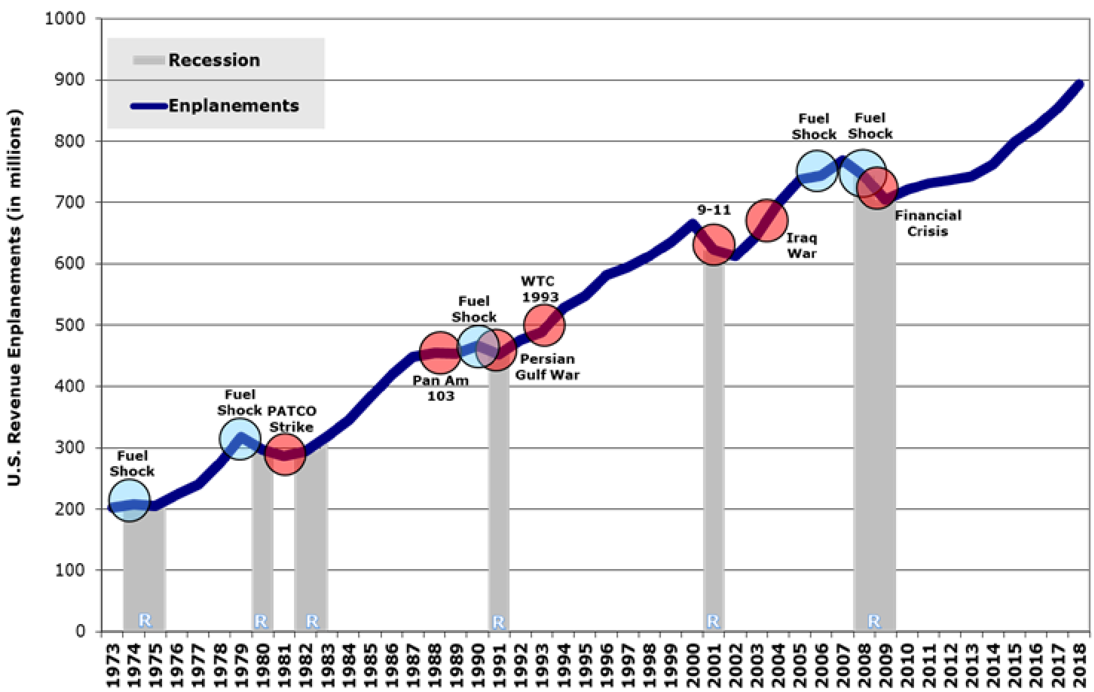
3.2 Economic Cycles

Historically, the U.S. economy, as measured by Gross Domestic Product (GDP), grew at a relatively steady rate, averaging 2.8% per annum between 1970 and 2018. Individual years have fluctuated around the long-term trend for a variety of reasons including pure macro-economic factors, fuel shocks, war, and terrorist attacks.

There have been two official economic recessions in the U.S. thus far in the 21st century. The first occurred between March and November of 2001 and was compounded by the September 11, 2001 terrorist attacks. The negative impact of these events on the airline industry is well documented. The recession itself was short-lived by historical standards and the economy quickly returned to positive growth rates, driven in part by a gradual but prolonged reduction in interest rates.

The second recession, often referred to as the 'Great Recession', occurred between December 2007 and June 2009.[2] This was the worst financial crisis to affect the U.S. since the Great Depression; and it was the longest recession since the time the airline industry was deregulated[3] in 1978. The nation's unemployment rate rose from 5.0% in December of 2007 to a high of 10.0% in October 2009.[4] In 2009, the American Recovery and Reinvestment Act (ARRA) was implemented in response to the economic crisis. This stimulus plan invested over $800 billion, with over half of it being spent during 2010.[5] **Figure 3-2, U.S. Aviation System Recoveries,** illustrates the ongoing trend in aviation growth amidst the impacts of economic system shocks.

Figure 3-2 U.S. Aviation System Recoveries



Sources: Landrum & Brown; BTS air passenger data

2 National Bureau of Economic Research, US Business Cycle Expansions and Contractions, September 20, 2010.

3 Deregulation refers to the Airline Deregulation Act of 1978 which reduced government control over the commercial aviation industry.

4 National Bureau of Economic Research, US Business Cycle Expansions and Contractions, September 20, 2010.

5 Congressional Budget Office, Estimated Impact of the American Recovery and Reinvestment Act on Employment and Economic Output from October 2011 Through December 2011, February 2012.

3.3 Gross Regional Product

From 2000 to 2018, the Columbus Ohio MSA's gross regional product (GRP) increased at a compound annual growth rate (CAGR) of 2.2%, while the State of Ohio (State) experienced annual GRP growth at an average of 1.2%.

Over the next 20 years, the Columbus MSA's GRP is forecast to grow at an average annual rate of 2.2% which is above the national average of 1.7% and the 1.4% expected for the State of Ohio. **Table 3-1, *Historical and Forecast Gross Domestic/Regional Product***, provides the historical and forecast growth of the GDP and GRP of the U.S., the State of Ohio and the Columbus MSA.

Table 3-1 Historical and Forecast Gross Domestic/Regional Product

	Gross Domestic/Regional Product (in billions; 2012USD)		
Year	United States	State of Ohio	Columbus MSA
Historical			
2000	13,020,299	499,952	88,749
2001	13,187,613	496,153	89,846
2002	13,453,344	509,930	92,633
2003	13,824,371	515,937	94,782
2004	14,379,360	527,824	98,377
2005	14,925,744	536,572	100,380
2006	15,399,046	535,112	100,850
2007	15,711,012	536,938	101,440
2008	15,525,015	526,378	99,752
2009	15,251,545	510,470	97,616
2010	15,556,281	519,522	99,689
2011	15,725,298	535,395	103,931
2012	16,083,776	540,819	109,043
2013	16,450,116	553,594	111,376
2014	16,922,535	576,496	115,217
2015	17,558,494	591,154	121,961
2016	17,838,842	595,703	125,313
2017	18,263,108	608,776	127,520
2018	18,647,434	622,201	131,377
Forecast			
2023	20,481,717	672,901	147,099
2028	22,380,351	724,640	164,042
2033	24,333,719	776,784	182,248
2038	26,289,705	827,533	201,441
CAGR			
2000-18	2.0%	1.2%	2.2%
2018-38	1.7%	1.4%	2.2%

Source: Woods & Poole, 2019.

3.4 Population

The population in the Columbus MSA grew from 1.7 million people in 2000 to almost 2.1 million people in 2018, representing a CAGR of 1.2%. During this period, the population of the State of Ohio grew at a CAGR of 0.2% while the nation grew 0.8% annually.

The rate of growth in population for the Columbus MSA is forecast to continue to exceed that of the nation and the State of Ohio. At a CAGR of 0.8% over the next 20 years, the Columbus MSA is forecast to reach 2.5 million people by 2038. From 2018 to 2038, the State of Ohio is forecast to grow at a CAGR of 0.2% while the nation grows at 0.6% annually. **Table 3-2, *Historical and Forecast Population Trends***, provides the historical and forecast population for the U.S., the State of Ohio, and the Columbus MSA.

Table 3-2 Historical and Forecast Population Trends

	Population (in thousands)		
Year	United States	State of Ohio	Columbus MSA
Historical			
2000	282,162	11,364	1,682
2001	284,969	11,387	1,707
2002	287,625	11,408	1,726
2003	290,108	11,435	1,749
2004	292,805	11,452	1,770
2005	295,517	11,463	1,791
2006	298,380	11,481	1,817
2007	301,231	11,500	1,842
2008	304,094	11,515	1,866
2009	306,771	11,529	1,888
2010	309,338	11,539	1,906
2011	311,644	11,543	1,926
2012	313,993	11,547	1,947
2013	316,234	11,568	1,971
2014	318,622	11,594	1,998
2015	321,042	11,606	2,023
2016	323,411	11,623	2,047
2017	325,719	11,659	2,079
2018	328,094	11,689	2,099
Forecast			
2023	339,666	11,822	2,197
2028	351,210	11,939	2,295
2033	362,290	12,025	2,389
2038	372,691	12,074	2,477
CAGR			
2000-18	0.8%	0.2%	1.2%
2018-38	0.6%	0.2%	0.8%

Source: Woods & Poole, 2019.

3.5 Employment

Growth in employment is an important indicator of the overall health of the local economy. Population changes and employment changes tend to be closely correlated as people migrate in and out of areas, largely depending on their ability to find work in the local economy. Employment in the Columbus MSA grew at a slightly higher rate than the nation from 2000-2018, at 1.2% compared to 1.0%, while the State of Ohio experienced average annual growth of 0.2% in employment.

At 1.4% average annual growth, the Columbus MSA is forecast to continue to outpace the State of Ohio's projected growth of 0.8% and the nation's 1.1% through 2038. **Table 3-3, *Historical and Forecast Employment Trends***, provides the historical and forecast employment for the U.S., the State of Ohio, and the Columbus MSA through 2038.

Table 3-3 Historical and Forecast Employment Trends

	Employment (in thousands)		
Year	United States	State of Ohio	Columbus MSA
Historical			
2000	165,371	6,789	1,132
2001	165,522	6,726	1,142
2002	165,095	6,640	1,136
2003	165,922	6,621	1,137
2004	168,840	6,667	1,151
2005	172,338	6,709	1,167
2006	175,869	6,747	1,181
2007	179,544	6,795	1,206
2008	179,214	6,725	1,204
2009	173,637	6,455	1,174
2010	172,902	6,418	1,173
2011	176,092	6,522	1,201
2012	178,980	6,606	1,228
2013	182,325	6,681	1,257
2014	186,236	6,771	1,286
2015	190,318	6,860	1,315
2016	193,369	6,929	1,345
2017	196,132	6,995	1,370
2018	199,426	7,091	1,396
Forecast			
2023	212,499	7,418	1,506
2028	225,416	7,726	1,618
2033	237,961	8,005	1,730
2038	249,606	8,239	1,839
CAGR			
2000-18	1.0%	0.2%	1.2%
2018-38	1.1%	0.8%	1.4%

Source: Woods & Poole, 2019.

3.6 Per Capita Personal Income (PCPI)

Income statistics are broad indicators of the relative earning power and wealth of an area and inferences can be made relative to an individual's or community's ability to purchase air travel. Since 2000, the Columbus MSA has had a higher per capita personal income (PCPI) than the State, but it has been lower than that of the U.S. as a whole since 2001. The Columbus MSA's PCPI grew at an average rate of 1.0% per annum since 2000 which is a slightly lower rate than the State of Ohio and the U.S. as a whole.

Current projections indicate continued growth in PCPI for the Columbus MSA and the State of Ohio, averaging 1.4% and 1.4%, respectively, per year through 2038. This growth is slightly higher than that projected for the U.S. as a whole. **Table 3-4, *Historical and Forecast Per Capita Personal Income Trends***, provides the PCPI for the U.S., the State of Ohio, and the Columbus MSA.

Table 3-4 Historical and Forecast Per Capita Personal Income Trends

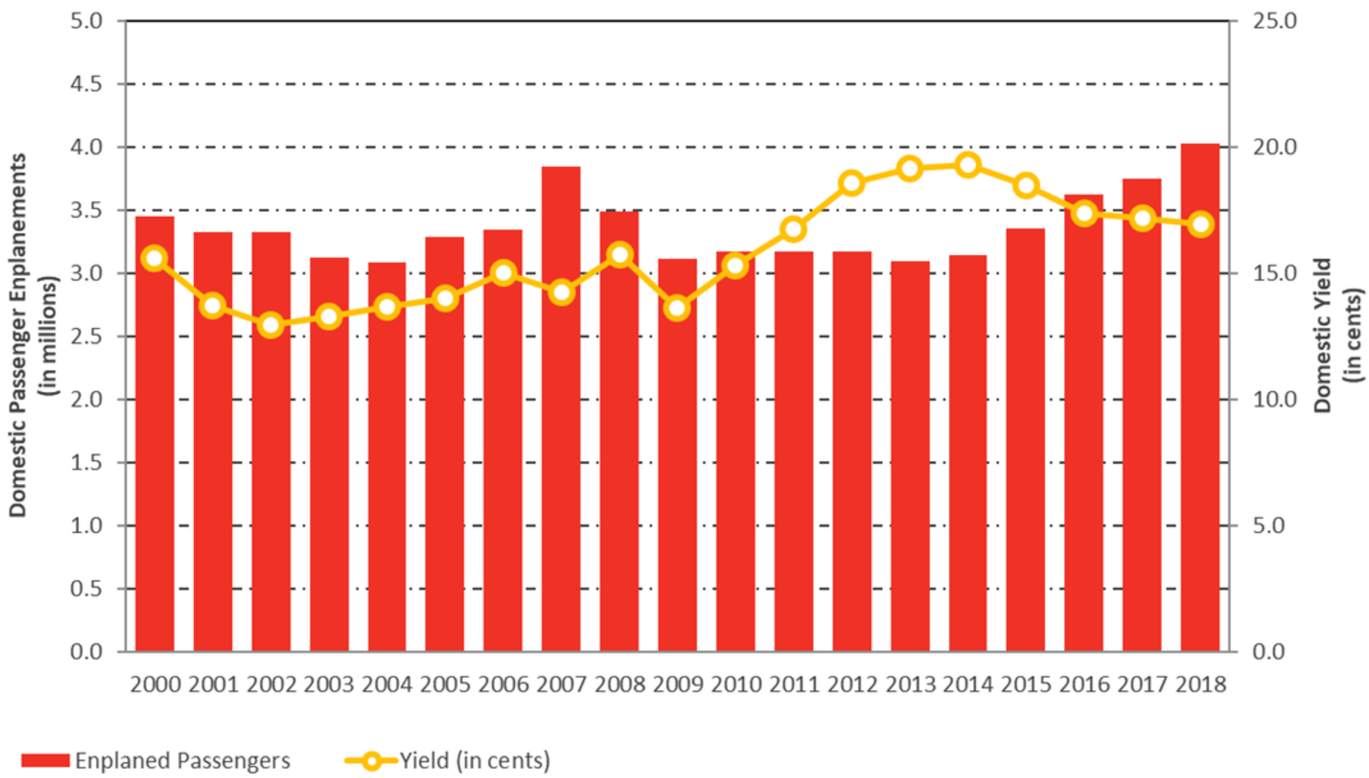
	Per Capita Personal Income (2012USD)		
Year	United States	State of Ohio	Columbus MSA
Historical			
2000	$39,186	$36,664	$39,669
2001	$39,616	$36,862	$39,071
2002	$39,401	$36,881	$39,254
2003	$39,681	$37,143	$39,356
2004	$40,576	$37,576	$39,789
2005	$41,295	$37,589	$39,905
2006	$42,742	$38,396	$40,530
2007	$43,575	$38,960	$41,154
2008	$43,431	$38,994	$40,946
2009	$41,750	$37,875	$39,964
2010	$42,364	$38,308	$40,353
2011	$43,540	$39,894	$42,060
2012	$44,582	$40,695	$43,719
2013	$44,231	$40,640	$43,463
2014	$45,714	$41,632	$44,293
2015	$47,456	$43,104	$45,976
2016	$47,806	$43,340	$46,238
2017	$48,684	$44,056	$46,801
2018	$49,448	$44,893	$47,681
Forecast			
2023	$53,372	$48,654	$51,561
2028	$57,224	$52,378	$55,476
2033	$60,675	$55,708	$59,159
2038	$63,898	$58,834	$62,783
CAGR			
2000-18	1.3%	1.1%	1.0%
2018-38	1.3%	1.4%	1.4%

Source: Woods & Poole, 2019.

3.7 Airline Yield

Yields are the aviation industry's measure for average ticket prices. Yield is the average fare paid by customers to fly one mile. As prices decline, passengers can better afford to fly and thus, traffic typically increases. **Figure 3-3, *CMH Historical Yield and Domestic Enplanements***, provides a graphical representation of how domestic yields have changed over the years in relationship to domestic enplanements at CMH.

Figure 3-3 CMH Historical Yield and Domestic Enplanements



Sources: Airport; FAA O&D Passenger Survey.

The Federal Aviation Administration (FAA) projects national domestic mainline passenger real yield (adjusted for inflation) will decline 0.6% annually from 2018 through 2038.

The FAA forecast for international mainline real yield is expected to decrease 0.6% annually through 2038.

This forecast of declining yield is a result of continued penetration of the total airline market by low cost carriers and the gradual transition of the airline industry towards larger capacity aircraft and a lower fare structure. Local yields at CMH are expected to follow national trends over the forecast period.

Table 3-5, *FAA Aerospace Yield Forecast*, displays the yield growth rates forecast by the FAA Aerospace Forecast Fiscal Years 2018-2038.

Table 3-5 FAA Aerospace Yield Forecast

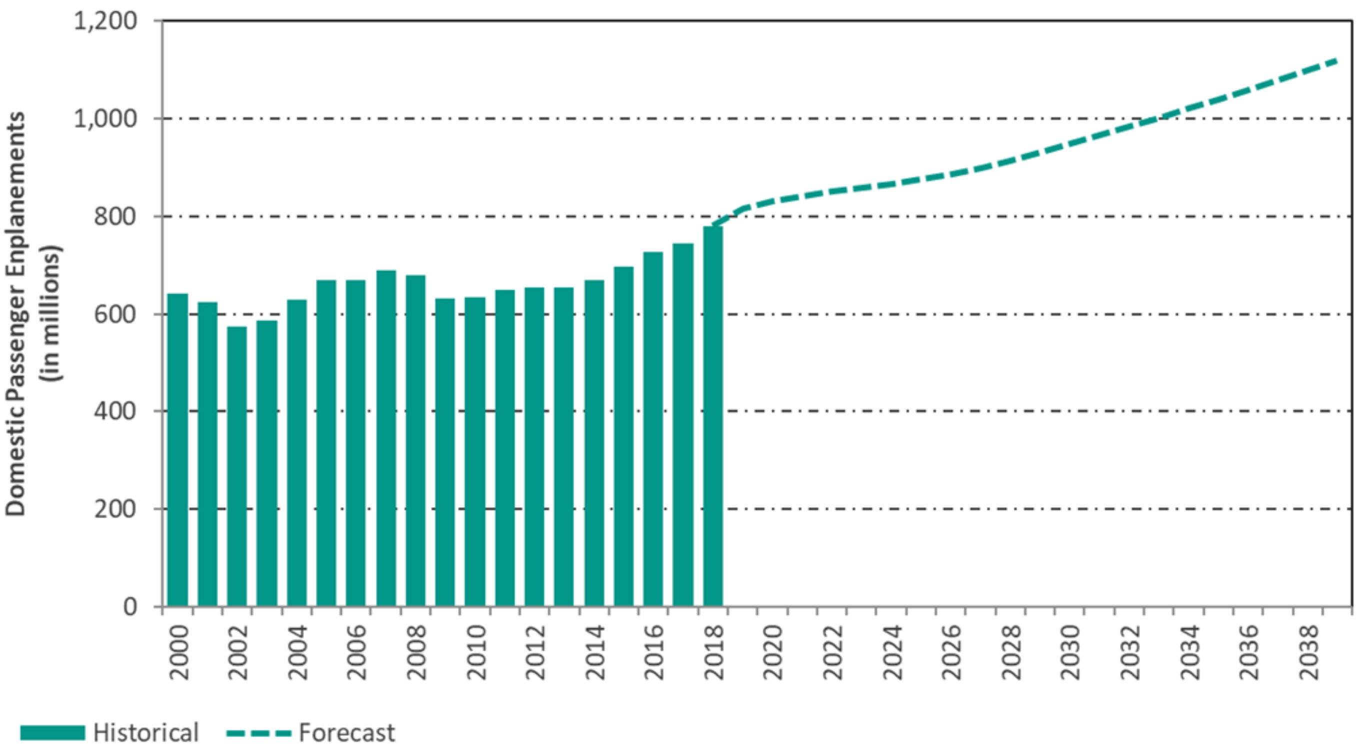
	Passenger Yield (in 2018 cents)		
Year	Domestic	International	Total
Historical			
2010	14.49	14.74	14.58
2011	15.24	15.77	15.42
2012	15.39	16.11	15.62
2013	15.50	15.91	15.64
2014	15.99	15.80	15.93
2015	15.60	14.94	15.39
2016	14.59	13.46	14.24
2017	14.25	13.20	13.93
2018	13.91	13.60	13.82
Forecast			
2023	13.31	13.20	13.27
2028	13.01	12.82	12.95
2033	12.68	12.47	12.61
2038	12.30	12.06	12.22
CAGR 2018-38	-0.6%	-0.6%	-0.6%

Notes: System refers to all of the airports in the nation’s aviation system.
The total yield reflects the weighted average of the proportional domestic and international traffic segments.
Source: FAA Aerospace Forecast: Fiscal Years 2019-2039.

3.8 National Domestic Enplanement Trends

The FAA projects U.S. domestic revenue passenger enplanements will grow from 780 million in 2018 to 1,100 million by 2038, representing a CAGR of 1.7%. **Figure 3-4, *FAA Aerospace Domestic Enplanement Forecast***, graphically depicts the historical and forecast U.S. revenue passenger enplanements.

Figure 3-4 FAA Aerospace Domestic Enplanement Forecast



Source: FAA Aerospace Forecast Fiscal Years 2019-2039.

3.9 Airline Industry

The financial health of the airlines will play a major role in the determination of future forecasts for CMH. This section contains a summary of the airline industry factors that were considered in developing the CMH Forecast.

3.9.1 Low Cost Carriers

When Low Cost Carriers (LCC) enter air markets, prices tend to decline and discretionary leisure travel increases. America West began hubbing operations at CMH in the 1990s but significantly reduced operations in 2003 due to financial losses. In 2006, JetBlue Airways began service at CMH. Just a year later, Skybus Airlines, an ultra LCC, began hubbing operations at the Airport. These two LCCs, combined with Southwest Airlines, prompted competing carriers to offer lower fares. However, in 2008 Skybus filed for Chapter 11 Bankruptcy thereby ceasing all operations. Additionally, JetBlue ended operations at CMH in the same year. Since then, Southwest fares have increased and are now more in line with the legacy airlines such as American Airlines and Delta Air Lines. At this time, the only true LCCs operating at the Airport are Spirit and Frontier which started service at CMH in 2013 and 2018, respectively.

3.9.2 Airline Bankruptcies

There have been dramatic changes to the financial health of the airline industry in the 21st century. Numerous airlines have declared Chapter 11 bankruptcy at least once, including five of the six legacy carriers (before the latest round of mergers). There was a rash of bankruptcies between 2001 and 2005, and another more recent round in 2008 as a result of the economic recession. The most recent airline to declare bankruptcy was American Airlines which entered bankruptcy protection in November 2011. As shown in **Table 3-6, *Airline Bankruptcy Status***, nine airlines that operated at CMH have declared bankruptcy this century. CMH's largest carrier, Southwest, has never declared bankruptcy.

Table 3-6 Airline Bankruptcy Status

Airline	Status
Trans World Airways (TWA)	Filed Chapter 11 in January 2001 as part of acquisition by American.
US Airways	Filed Chapter 11 in August 2002 and again in September 2004; emerged in September 2005 in conjunction with acquisition by America West. Acquired by American Airlines in 2013.
United Airlines	Filed Chapter 11 in December 2002; emerged in February 2006.
Air Canada	Filed Chapter 11 in April 2003; emerged in September 2004.
Northwest Airlines	Filed Chapter 11 in September 2005; emerged in May 2007. Acquired by Delta in 2008.
Delta Air Lines	Filed Chapter 11 in September 2005; emerged in April 2007. Wholly owned subsidiary Comair Airlines taken in bankruptcy with Delta Airlines
Skybus Airlines	Filed Chapter 11 in April 2008; ceased operations.
Frontier Airlines	Filed Chapter 11 in April 2008; emerged in October 2009.
American Airlines	Filed Chapter 11 in November 2011. Wholly owned subsidiary American Eagle Airlines taken into bankruptcy with American Airlines. Emerged in December 2013.

Source: Landrum & Brown.

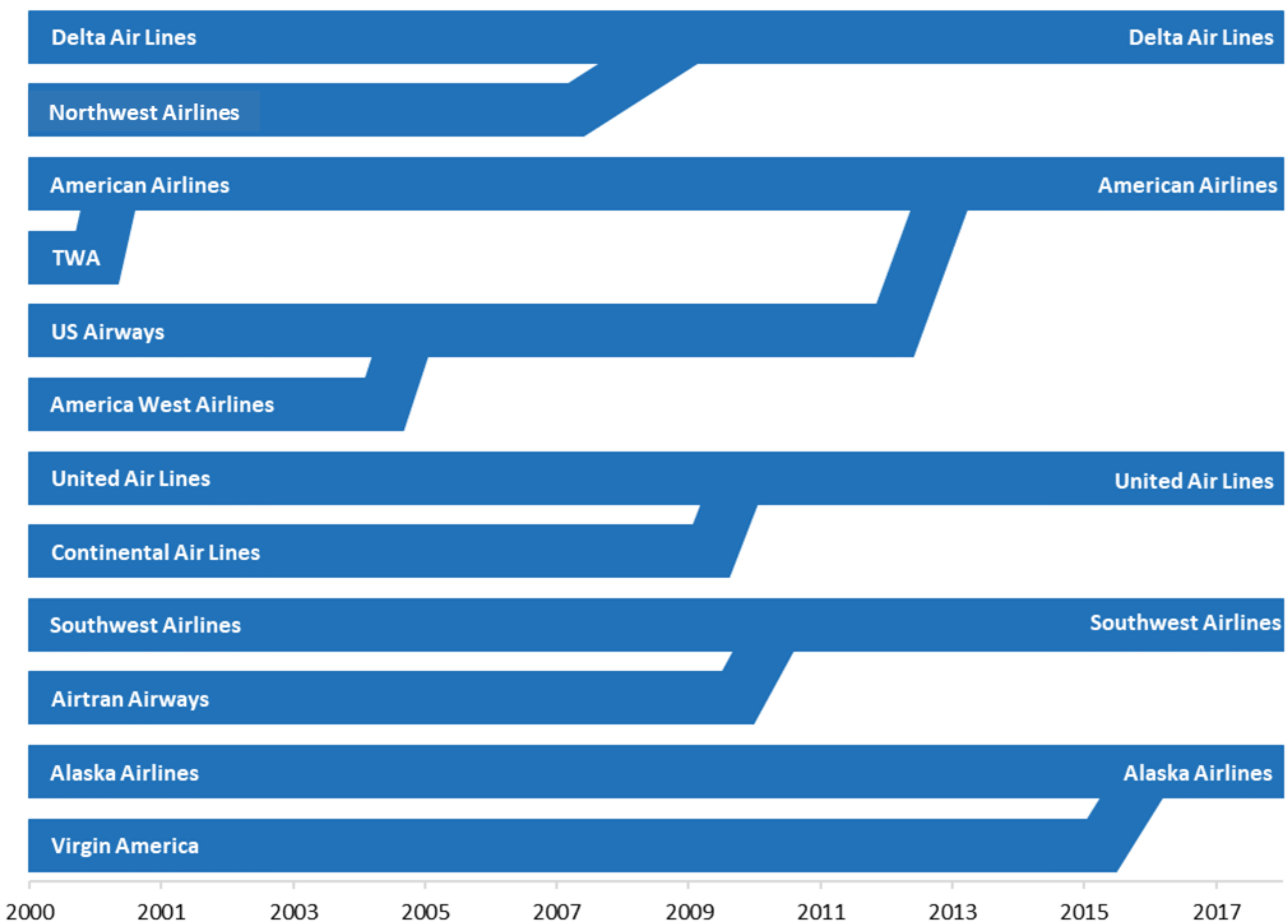
3.9.3 Mergers and Alliances

Many airlines have merged or been acquired since the turn of the 21st century, including American/TWA in 2001, US Airways/America West in 2005, Delta/Northwest Airlines in 2008-2010, Southwest/AirTran in 2010, United/Continental Airlines in 2010-2012, American/US Airways in 2013, and Alaska/Virgin America in 2016-2017.

In addition, airlines form alliances in order to reduce costs and improve service offerings. The alliances provide revenue generating opportunities and cost savings through the codeshare benefits of linked networks, frequent flyer programs, facilities, and services.

Figure 3-5, ***Major U.S. Airline Mergers in the 21st Century***, provides a graphical summary of the various mergers in the 21st century.

Figure 3-5 Major U.S. Airline Mergers in the 21st Century



Source: Airlines for America, U.S. Airline Mergers and Acquisitions, accessed September 2019 online at http://airlines.org/dataset/u-s-airline-mergers-and-acquisitions/.

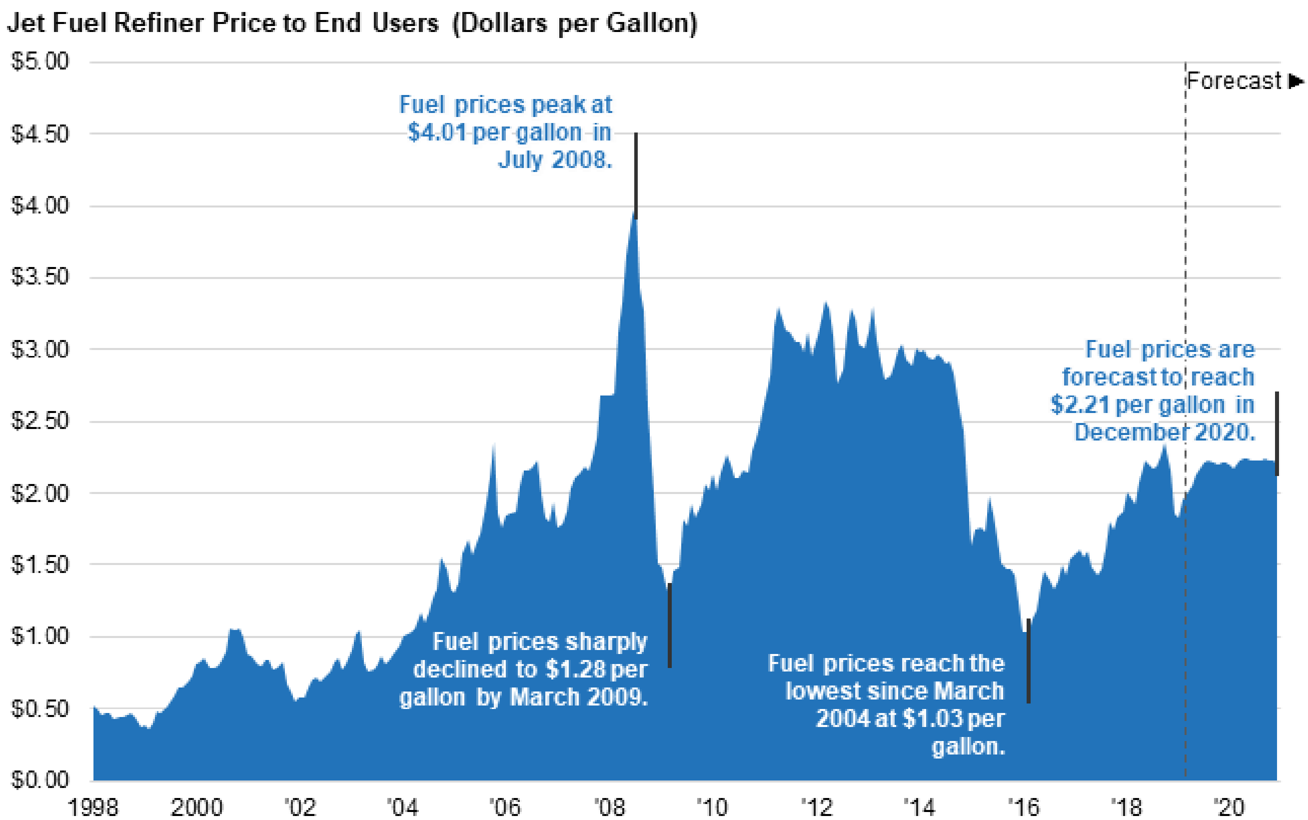
3.10 Price of Fuel

The price of oil and the associated cost of jet fuel is the largest single cost affecting the airline industry. In 2000, the cost of jet fuel to end-users averaged $0.89 per gallon. The average cost of jet fuel climbed steadily through 2007. However, in 2008, crude oil prices and, consequently, jet fuel surged in price as a result of strong global demand, a weak U.S. dollar, commodity speculation, political unrest, and a reluctance to materially increase supply. In July 2008, jet fuel reached an average price of $4.01, nearly double the price the year prior. Reduced demand in 2009 stemming from the global financial crisis and subsequent economic downturn resulted in a sharp decline in price. However, as the economic climate improved and political unrest continued in the Middle East, oil prices increased in the subsequent three years. The increase in the price of jet fuel put upwards pressure on airline operating costs.

As a result, airlines were faced with cutting capacity or increasing fares, and sometimes both. The average price of jet fuel dropped significantly in 2015 and 2016, reaching a low of $1.03 per gallon in February 2016. Since then, jet fuel prices have steadily climbed.

The U.S. Energy Information Administration (EIA) provides forecasts of jet fuel refiner price to end-users in a report entitled Short-Term Energy Outlook. In the May 2019 release, the EIA projects that jet fuel prices will reach $2.21 per gallon by December 2020. **Figure 3-6, *Historical and Forecast Jet Fuel Prices (Jan. 1998 – Dec. 2020)***, presents the historical price for jet fuel refiner price to end-users and the EIA's forecast of that price.

Figure 3-6 Historical and Forecast Jet Fuel Prices (Jan. 1998 – Dec. 2020)



Source: U.S. Energy Information Administration, Short-Term Energy Outlook (February 2019), accessed online at https://www.eia.gov/outlooks/steo/data/browser/.

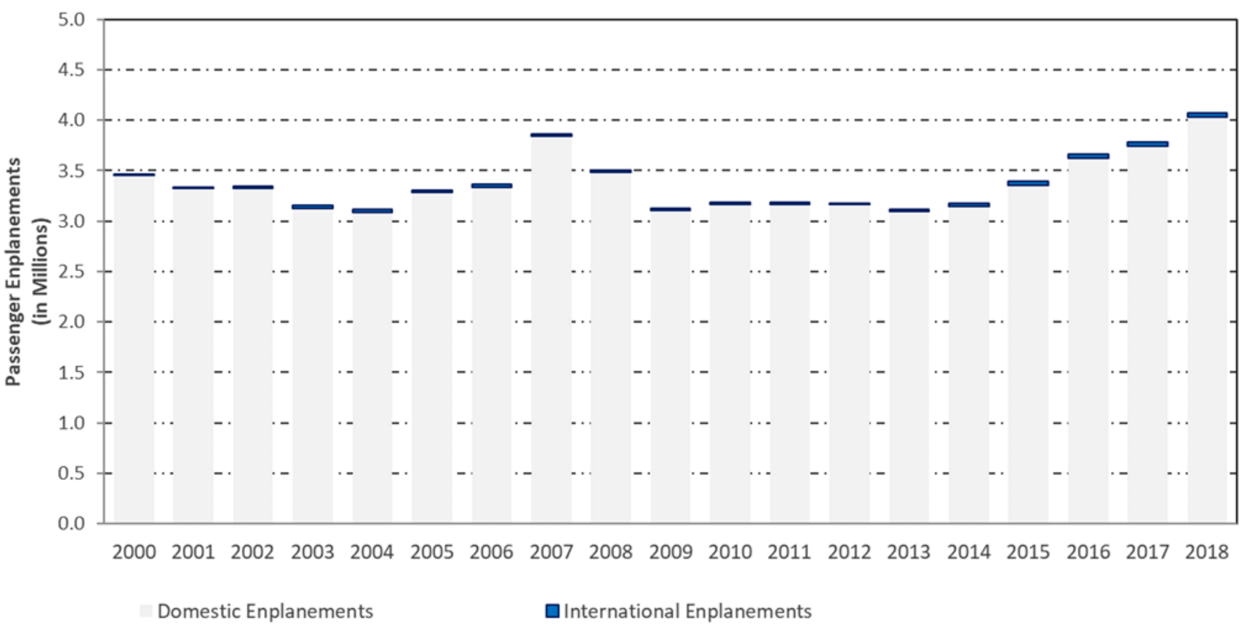
4 Historical Air Traffic

This section provides a discussion of CMH's role in the region and within the U.S. transportation system in terms of serving aviation demand. This section also provides a summary of historical activity levels and current domestic and international passenger air service. The purpose of this section is to start building a context for the forecast. The past is not always a perfect predictor of the future; however, analysis of historical data provides the opportunity to understand those factors which have either caused traffic to increase or decrease and how they may change in the future, thus influencing the forecast. While the socioeconomic base is one of the fundamental underpinnings of the forecast, demand cannot be realized without air service being offered at a price that induces demand. Ultimately, understanding the historical relationships between the economy and aviation activity at CMH will form the building blocks of the forecast.

4.1 Historical Enplanements

CMH is designated as a "Medium Hub Primary Commercial Service Airport" by the FAA.[6] From 2000 through 2018, domestic enplanements at CMH increased at an average annual rate of 0.9%, international enplanements increased at an average annual rate of 8.8%, and total enplanements increased at a CAGR of 0.9%. International growth was fuelled by new service by Vacation Express and Southwest which had a larger impact on the average annual growth rate since 2000 due to a smaller baseline compared to domestic enplanements. **Figure 4-1, *Historical Enplanements***, presents the historical passenger enplanements at CMH from 2000 through 2018.

Figure 4-1 Historical Enplanements



Source: CRAA.

[6] 2019-2023 National Plan of Integrated Airport Systems (NPIAS)

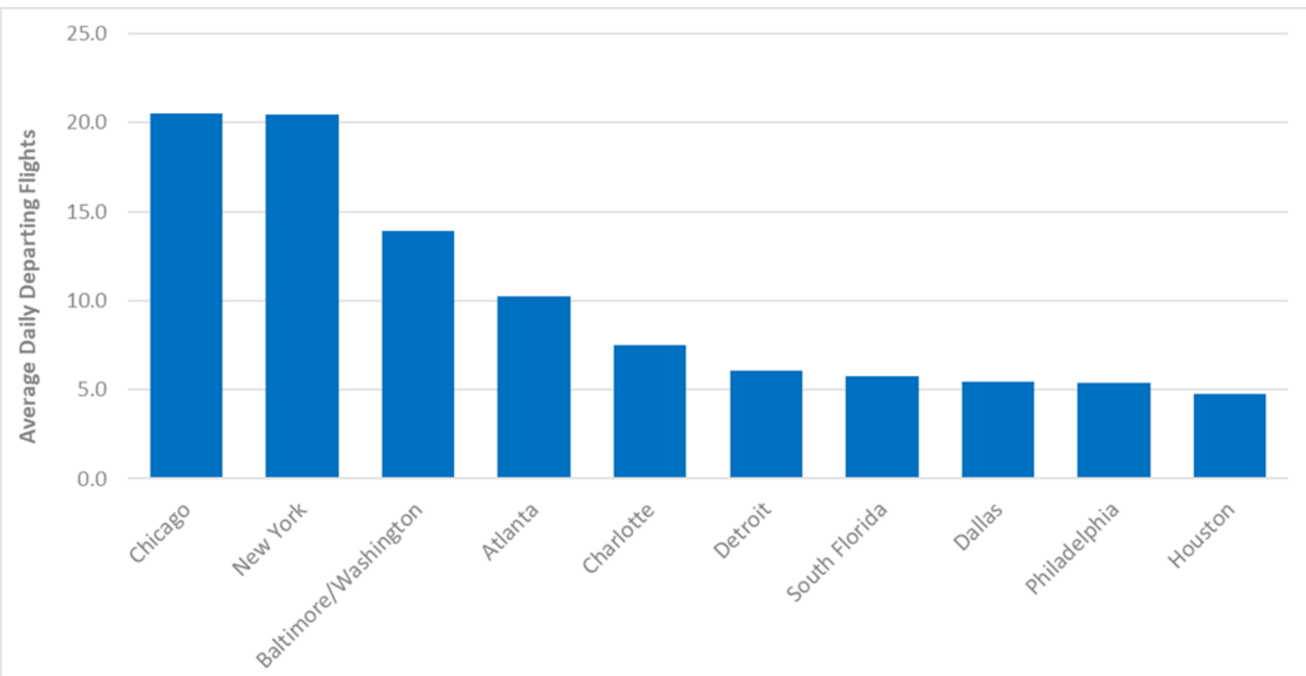
From 2000 to 2014, international enplanements accounted for 1.0% or less of the total enplanements at the Airport. Recent growth increased international enplanements to 1.2% by 2018.

Passenger activity at CMH is almost entirely origin and destination (O&D) in nature with passengers beginning or terminating their itineraries at the Airport. Essentially there is very little or no real connecting traffic at CMH due to the carriers operating at the Airport and the manner in which they schedule traditional point to point operations. The passenger activity analysis will therefore maintain that passengers at CMH are O&D and it is assumed that future activity will be similar assuming no significant level of connecting traffic during the forecast period.

4.2 Scheduled Passenger Air Service

According to airline schedule filings with the Official Airline Guide (OAG), in 2019 the airlines operating scheduled commercial passenger service at CMH provided at least weekly service to 36 domestic destinations, representing 26 markets, and international flights to Toronto, Canada (YYZ) with seasonal service to Cancun, Mexico (CUN). Although not included in the OAG filings, there is limited seasonal charter service to Punta Cana, Dominican Republic from CMH. In 2019, scheduled domestic air service accounted for 98.7% of total scheduled passenger flights and 99.3% of scheduled seats at CMH. **Figure 4-2, *Top 10 Scheduled Passenger Markets by Daily Departures***, provides a graphical representation of the top ten markets by number of daily departures served at CMH in 2019.

Figure 4-2 Top 10 Scheduled Passenger Markets by Average Daily Departures

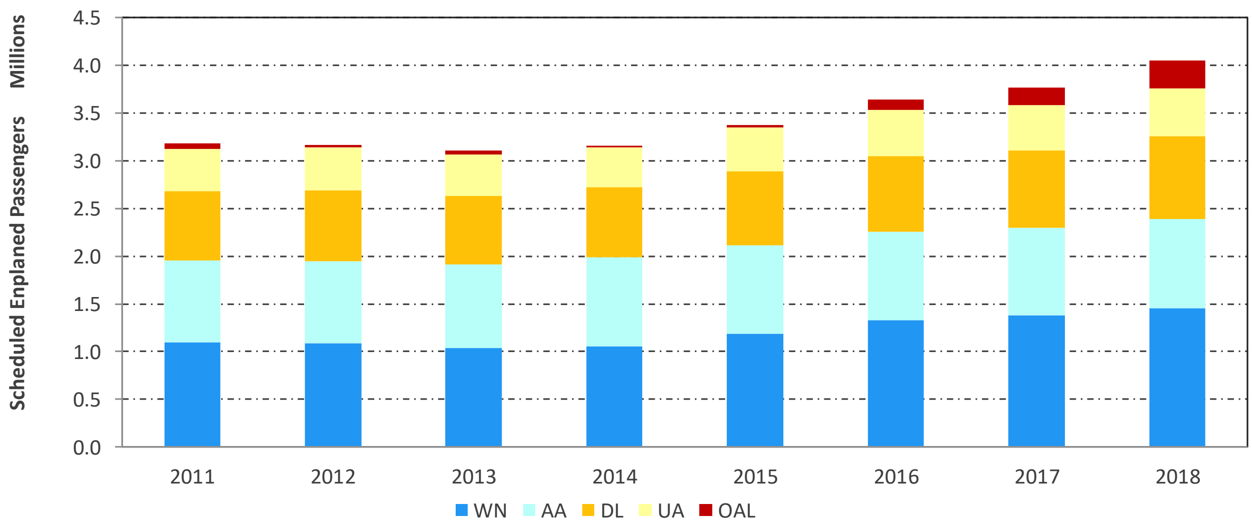


Source: OAG via Diio
Notes: New York = Kennedy, LaGuardia, and Newark
Baltimore/Washington = Dulles, National, and BWI
South Florida = Miami, Ft. Lauderdale, and West Palm Beach

4.3 Passenger Airline Market Share

Southwest Airlines is the largest carrier at the Airport with 1.5 million enplanements accounting for 35.7% of the total enplaned passengers in 2018. American Airlines was the second largest carrier in 2018, accounting for 23.0% of total passenger enplanements, followed by Delta Air Lines at 21.3% and United Airlines at 12.3%. The remaining carriers, including charter services, accounted for 7.7% of the traffic. Note that Allegiant Air does not operate at CMH but has scheduled operations at Rickenbacker International Airport. **Figure 4-3, *Historical Enplanements by Airline***, displays the enplaned passengers of the top carriers at CMH from 2011 to 2018.

Figure 4-3 Historical Enplanements by Airline



Carrier	2011	2012	2013	2014	2015	2016	2017	2018	CAGR 2011-18
Southwest Airlines	1,092,420	1,086,756	1,038,707	1,056,989	1,189,877	1,326,922	1,381,720	1,453,801	4.2%
American Airlines	865,615	860,519	879,044	934,094	923,886	925,489	920,629	935,721	1.1%
Delta Air Lines	726,261	743,930	711,403	733,138	776,838	800,711	810,079	868,062	2.6%
United Airlines	440,098	450,990	440,821	415,119	459,185	480,275	475,198	502,355	1.9%
All Other	65,674	32,619	38,108	33,706	43,723	125,308	196,881	315,642	25.1%
Total	3,190,068	3,174,814	3,108,083	3,173,046	3,393,509	3,658,705	3,784,507	4,075,581	3.6%

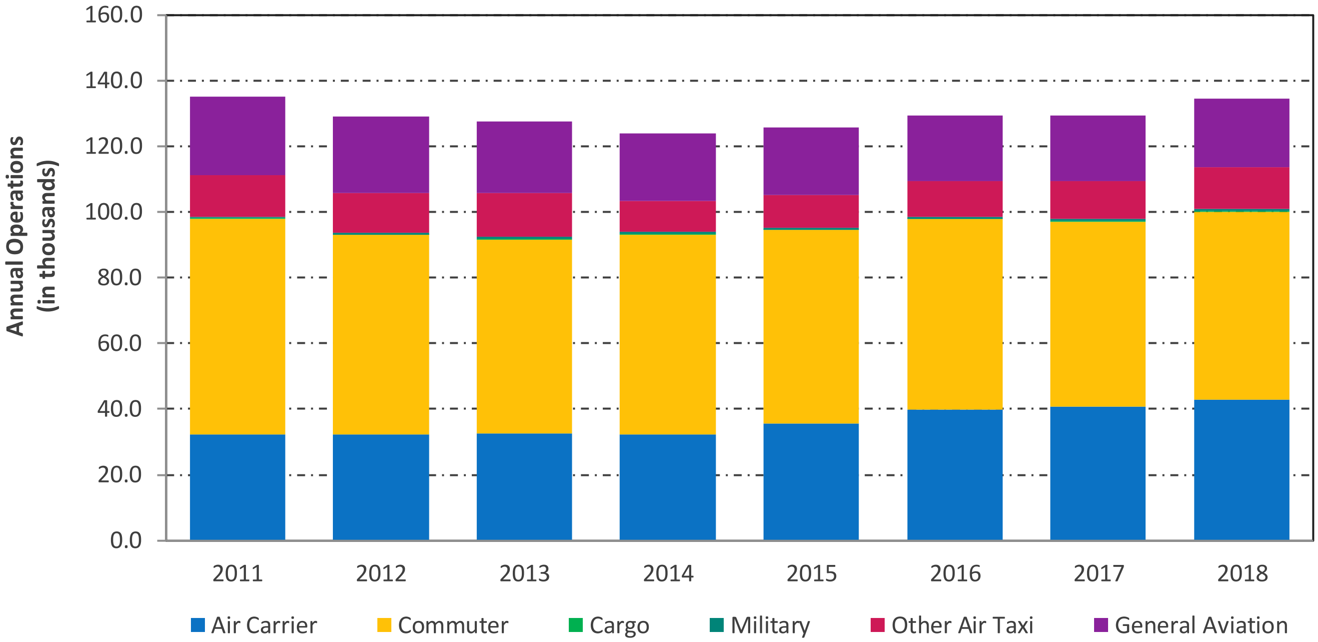
Notes:
1. OAL = All Other (includes Frontier, Spirit, Air Canada and charter services)
2. Southwest (WN) includes AirTran
3. American (AA) includes US Airways
4. Delta (DL) includes Northwest
5. United (UA) includes Continental

Sources: CRAA and Landrum & Brown analysis

4.4 Historical Aircraft Operations

Figure 4-4, *Historical Aircraft Operations*, provides a graphical representation of the historical aircraft operations at CMH from 2011 through 2018. Total operations have been relatively steady during this period declining 0.1% per year on average but have been increasing very modestly since the recent low in 2014.

Figure 4-4 Historical Aircraft Operations



Type	2011	2012	2013	2014	2015	2016	2017	2018	CAGR 2011-18
Air Carrier	32,184	32,366	32,538	32,200	35,548	39,718	40,752	42,814	4.2%
Commuter	65,949	60,681	59,224	61,012	59,050	58,268	56,480	57,366	-2.0%
Cargo	172	108	134	200	212	136	240	248	5.4%
Military	349	540	559	609	577	438	500	632	8.9%
Other Air Taxi	12,624	12,232	13,364	9,457	9,779	10,995	11,605	12,792	0.2%
General Aviation	24,096	23,263	21,792	20,636	20,561	20,007	19,869	20,930	-2.0%
Total	135,374	129,190	127,611	124,114	125,727	129,562	129,446	134,782	-0.1%

Sources: CRAA; FAA Operational Network (OPSNET).

4.5 Passenger Aircraft Fleet Mix

Narrow-body aircraft form the majority of passenger operations at the Airport followed by large regional jets and small regional jets. **Table 4-1, *2019 Scheduled Passenger Aircraft Fleet Mix***, gives a breakdown of the passenger fleet mix based on operations (total of take-offs and landings). A narrow-body aircraft is an airliner with seating arranged 2 to 6 abreast along a single aisle and a fuselage diameter of three to four meters, or up to 13 feet. A regional jet describes short to medium haul aircraft. A large regional jet will typically accommodate between 65 and 100 passengers, while small regional jets handle 50 or fewer passengers. The 2019 passenger fleet mix reflects a recent trend of upgauging to larger aircraft with fewer small regional jets operating at CMH and more larger regional jets and narrow-body jets in the fleet.

Table 4-1 2019 Scheduled Passenger Aircraft Fleet Mix

Aircraft Category	Operations	% Share
Narrow-body	46,664	45.1%
Large RJ	43,066	41.6%
Small RJ	13,808	13.3%
Total	**103,538**	**100.0%**

Sources: OAG via Diio; Landrum & Brown analysis.

5 Passenger Forecast

This section presents the forecast of passenger enplanements for CMH through 2039 including the methodology and assumptions used to develop these forecasts. The enplanement forecast provides the basis for the commercial passenger operations forecast which is derived based on assumptions related to average aircraft size and load factor.

5.1 Enplanement Forecast Methodology

The first step in developing the passenger forecast model was to collect and analyze demographic data, socioeconomic data, and trends in the airline industry. The enplanement forecast was guided by an approach that quantifies the relationship between passengers and these independent variables. The forecast models were developed using the classical technique of linear regression, where the relationship of the dependent variable (passenger enplanements) to one or more independent variables is modelled through a linear function.
This methodology recognizes that the key independent variables will change over time but assumes their fundamental relationships to the dependent variables will remain and support the forecasts.

5.2 Domestic Enplanement Forecast

In order to develop the forecast model for domestic enplanements, several potential independent variables were tested against the dependent variable. Historical domestic enplanements at CMH were used as the dependent variable in the regression models for the years 2009 to 2018.

A multivariate linear regression model using data for Columbus Ohio MSA PCPI and airline yield specific to CMH in constant 2018 USD as independent variables was selected to forecast domestic enplanements at the Airport. The regression inputs used in the model are displayed in **Table 5-1, *Domestic Regression Inputs***.

The model equation is provided below:

$$\hat{Y} = 665{,}307.7 + 108.611 * X_{MSA\ PCPI} - 113{,}347 * X_{CMH\ Yield}$$

The summary output from the regression model is shown below. The model exhibits relatively strong regression statistics (coefficient of determination, t-statistics, and p-values) compared to the models using other combinations of independent variables.

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.9738
R Square	0.9482
Adjusted R Square	0.9335
Standard Error	83963
Observations	10

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	9.0415E+11	4.5208E+11	64.12628	3.1538E-05
Residual	7	49348346405	7049763772		
Total	9	9.53499E+11			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	665303.6828	532686.824	1.2489584	0.251826	-594300.5	1924907.865
MSA PCPI	108.6110171	10.60394095	10.2425143	1.83E-05	83.53668117	133.685353
CMH Yield	-113346.864	18029.08151	-6.2868906	0.000409	-155978.867	-70714.8604

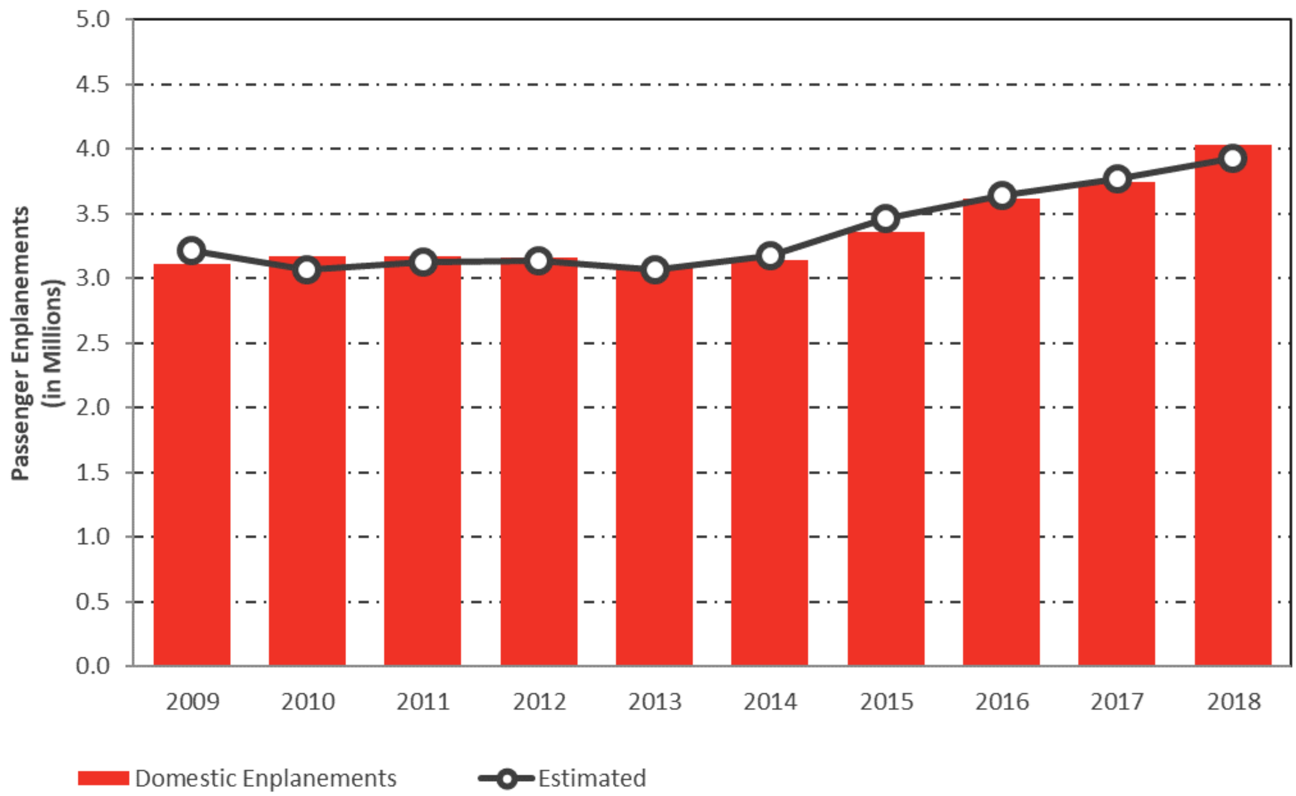
Table 5-1 Domestic Regression Inputs

Year	Domestic CMH Enplanements	Columbus Ohio MSA PCPI (2018 $)	CMH Average Airline Yield (in cents, 2018 $)
2009	3,109,731	39,964	15.80
2010	3,166,387	40,353	17.45
2011	3,169,469	42,060	18.60
2012	3,165,245	43,719	20.13
2013	3,093,217	43,463	20.42
2014	3,144,690	44,293	20.25
2015	3,356,639	45,976	19.33
2016	3,619,806	46,238	18.04
2017	3,744,014	46,801	17.47
2018	4,028,310	47,681	16.94
2019		48,515	16.77
2020		49,290	16.54
2021		50,014	16.50
2022		50,800	16.42
2023		51,561	16.35
2024		52,337	16.24
2025		53,131	16.11
2026		53,918	16.00
2027		54,699	15.90
2028		55,476	15.79
2029		56,254	15.68
2030		57,017	15.55
2031		57,741	15.41
2032		58,451	15.27
2033		59,159	15.13
2034		59,878	14.99
2035		60,628	14.85
2036		61,372	14.71
2037		62,088	14.59
2038		62,783	14.46
2039		63,474	14.29

Sources: CRAA; Woods and Poole; Landrum & Brown.

Figure 5-1, *Domestic Enplanement Model*, illustrates the model fit when plotted against the actual historical traffic at CMH. The model predicted traffic compares well to the actual traffic.

Figure 5-1 Domestic Enplanement Model



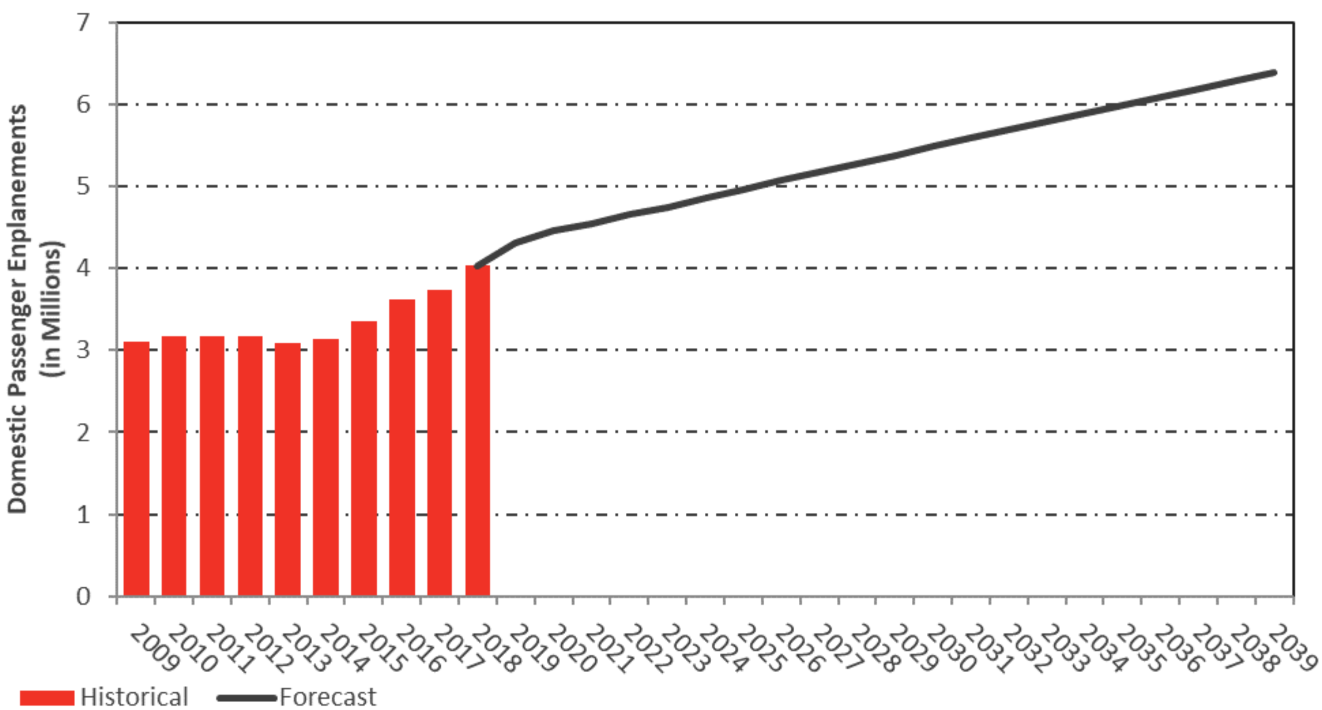
Note: Estimated values are recalculated enplanement figures using the regression inputs and formula.
Sources: CRAA; Landrum & Brown

The regression statistics and model-predicted traffic comparison indicate that the model provides a reasonable basis from which to forecast passenger traffic for CMH. The model equation was applied to the forecasts of MSA PCPI and CMH yield to determine the growth rates for the Airport's domestic passenger demand.

Based on the model, domestic enplanements for the Airport are forecast to increase from just over 4.0 million in 2018 to nearly 6.4 million in 2039, representing an average annual growth rate of 2.2%.

Figure 5-2, *Domestic Enplanement Forecast*, displays the result of the domestic enplanement forecast.

Figure 5-2 Domestic Enplanement Forecast



Sources: CRAA; Landrum & Brown

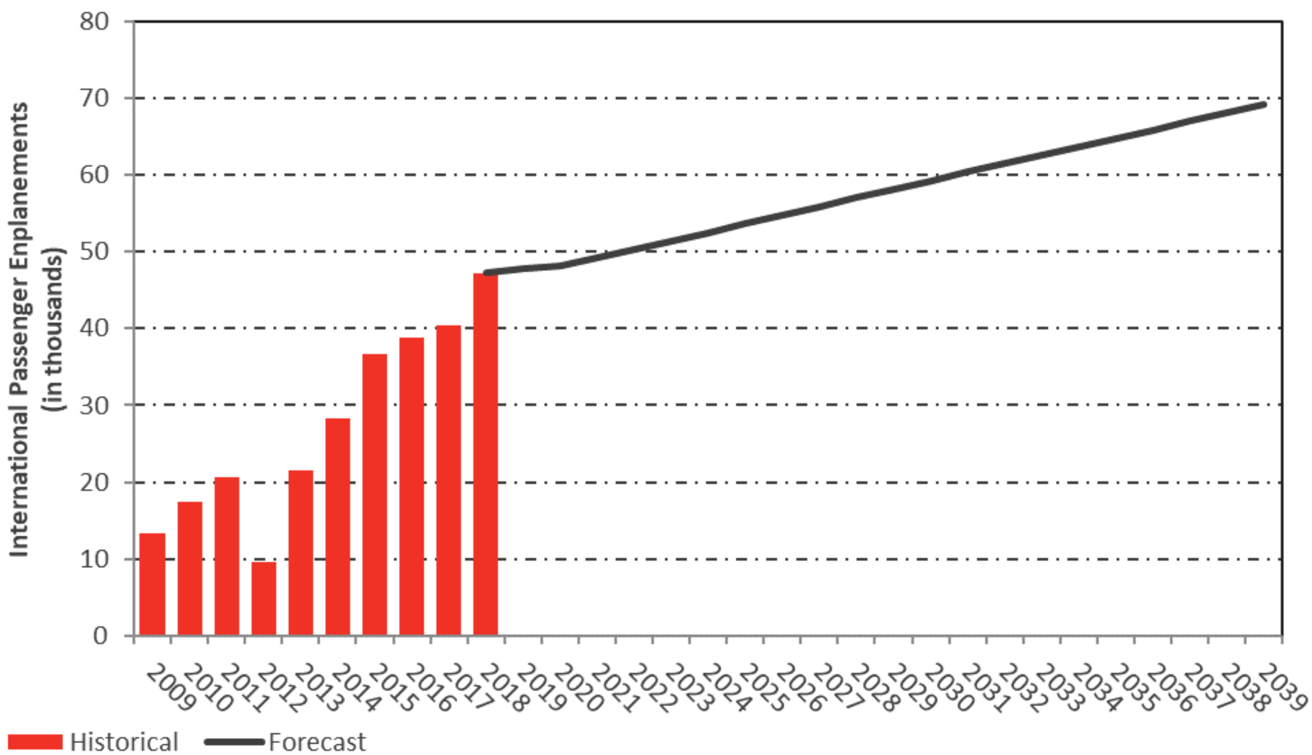
5.3 International Enplanement Forecast

International enplanements represent non-stop traffic to an international destination and does not show the passengers connecting to an international destination through another domestic airport. International enplanements have historically fluctuated at CMH. As such, an acceptable model obtained through linear regression was not reasonably possible.

Since 2014, international enplanements have accounted for an average of 1.1% of the total enplanements at CMH. Near-term scheduled activity into 2020 did not suggest increases in international traffic which is comprised mainly of daily service to Canada on small regional jets and seasonal traffic to leisure destinations in Mexico (and some charter services to the Dominican Republic). Therefore, it was assumed international enplanements would continue to account for approximately 1.1% of the total enplanements at the Airport during the forecast period through 2039. It is possible, but was not presumed reasonable at this time, to assume specific new international services would commence at CMH during this base forecast scenario, and based on industry benchmark trends and available CMH airlines air service plans. Demand may stimulate growth among existing markets or through new markets.

International enplanements for the Airport are forecast to increase from an estimated 47,271 in 2018 to 69,200 in 2039, representing a CAGR of 1.8%. **Figure 5-3, *International Enplanement Forecast***, displays the result of the international enplanement forecast.

Figure 5-3 International Enplanement Forecast

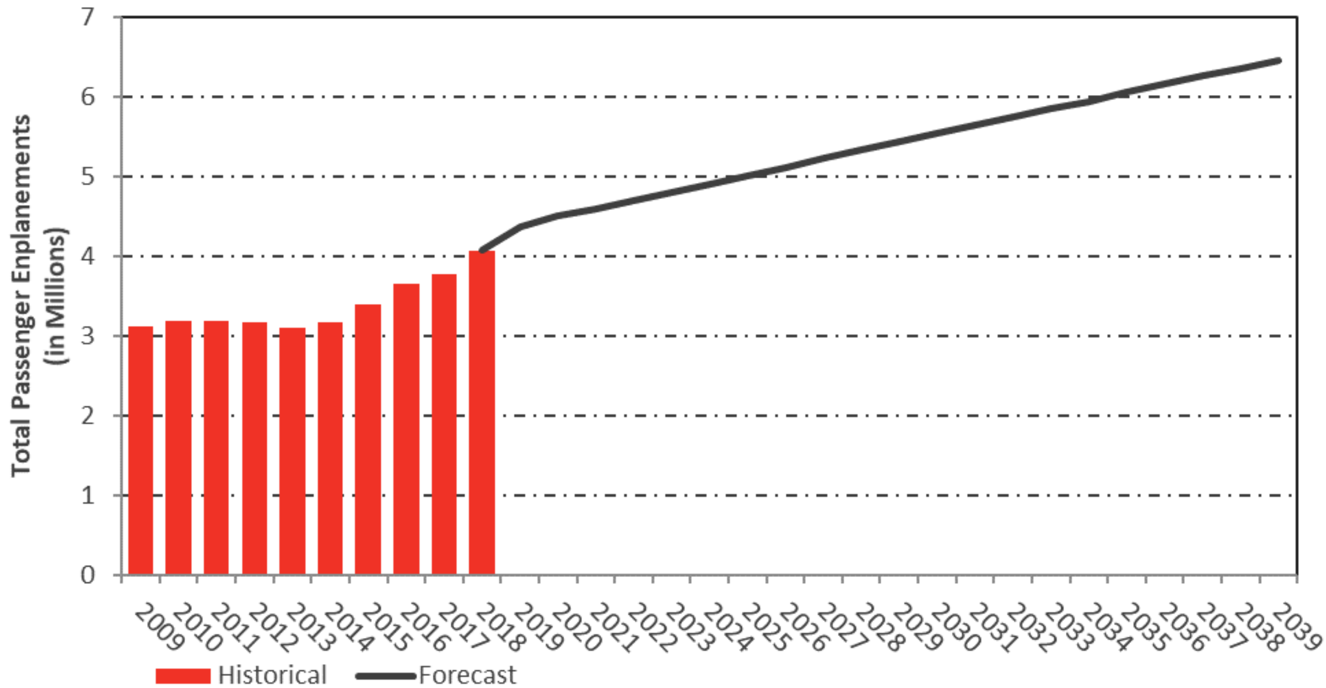


Sources: CRAA; Landrum & Brown

5.4 Enplanement Forecast Summary

The total enplanement forecast is the aggregation of the separately developed domestic and international enplaned passenger demand forecasts. Overall, the total enplaned passengers at CMH are forecast to increase from an estimated 4.1 million in 2018 to nearly 6.5 million by 2039, averaging growth of 2.2% per year. **Figure 5-4, *Total Enplanement Forecast,*** and **Table 5-, *Total Enplanement Forecast by Segment***, provide the results of the enplaned passenger forecasts.

Figure 5-4 Total Enplanement Forecast



Sources: CRAA; Landrum & Brown

Table 5-2 Total Enplanement Forecast by Segment

	Enplanements		
Year	Domestic	International	Total
Historical			
2000	3,452,627	10,293	3,462,920
2001	3,326,605	9,422	3,336,027
2002	3,327,680	20,776	3,348,456
2003	3,123,550	32,970	3,156,520
2004	3,082,360	30,510	3,112,870
2005	3,281,964	24,789	3,306,753
2006	3,339,325	23,675	3,363,000
2007	3,840,993	24,488	3,865,481
2008	3,483,618	20,816	3,504,434
2009	3,109,731	13,258	3,122,989
2010	3,166,387	17,405	3,183,792
2011	3,169,469	20,599	3,190,068
2012	3,165,245	9,569	3,174,814
2013	3,086,605	21,478	3,108,083
2014	3,144,690	28,356	3,173,046
2015	3,356,875	36,634	3,393,509
2016	3,619,806	38,899	3,658,705
2017	3,744,014	40,493	3,784,507
2018	4,028,310	47,271	4,075,581
Forecast			
2019	4,316,700	47,800	4,364,500
2020	4,460,900	48,200	4,509,100
2021	4,550,600	49,200	4,599,800
2022	4,652,100	50,300	4,702,400
2023	4,750,300	51,400	4,801,700
2024	4,854,800	52,500	4,907,300
2025	4,962,700	53,700	5,016,400
2026	5,068,800	54,800	5,123,600
2027	5,172,600	55,900	5,228,500
2028	5,276,300	57,100	5,333,400
2029	5,381,300	58,200	5,439,500
2030	5,486,300	59,300	5,545,600
2031	5,588,000	60,400	5,648,400
2032	5,687,600	61,500	5,749,100
2033	5,787,200	62,600	5,849,800
2034	5,888,400	63,700	5,952,100
2035	5,993,700	64,800	6,058,500
2036	6,097,000	65,900	6,162,900
2037	6,196,300	67,000	6,263,300
2038	6,292,900	68,100	6,361,000
2039	6,394,500	69,200	6,463,700
CAGR			
2000-18	0.9%	8.8%	0.9%
2018-19	7.2%	1.1%	7.1%
2019-39	2.0%	1.9%	2.0%
2018-39	2.2%	1.8%	2.2%

Sources: CRAA and Landrum & Brown.

6 Aircraft Operations Forecast

Aircraft operations, defined as the total of all arrivals and departures, were forecast for five major categories of users at CMH: passenger airlines, all-cargo, non-commercial air taxi, general aviation, and military.

6.1 Passenger Airline Operations

Passenger airline aircraft operations were derived from the enplaned passenger forecast. The aggregate number of passenger operations at an airport depends on three factors: total passengers, average aircraft size (number of available seats), and average load factor (percent of seats occupied). The relationship is shown in the equation below.

$$Operations = \frac{TotalPassengers}{AverageLoadFactor * AverageAircraftSize}$$

This relationship permits all combinations of load factors, average aircraft size, and operations to accommodate a given number of passengers. The fundamental approach to deriving the passenger operations forecast is essentially the same at all airports. However, the underlying assumptions at each airport are inherently different due to differences in how airlines choose to serve the demand for air travel to, from, and over each airport. These differences may result, if there is a strategic focus on unit revenues versus unit costs, or an emphasis on a hub-and-spoke operation versus a point-to-point operation.

Average seats per departure (ASPD) for each of the major groups of passenger activity was calculated from total departures and total departing seats. Aircraft load factors were calculated for each group of passenger operations by dividing total enplaned passengers by total departing seats. To calculate total operations, the total number of departures was multiplied by a factor of two.

6.1.1 Average Seats Per Departure and Load Factor Assumptions

Table 6-1, *Average Seat Per Departure and Load Factor Assumptions*, presents the ASPD and load factor assumptions, respectively, for each segment of passenger activity at the Airport. The following sections provide discussions on the assumptions used to develop the average seats per departure and load factor forecasts.

Over the past 11 years, from 2008 to 2018, passenger aircraft operations at CMH decreased from 114,596 operations to 100,180 operations at 1.3% per annum. However, passenger aircraft operations have shown an overall general increase since reaching a low of 93,304 in 2014. Average annual growth from 2014 to 2018 is 1.8%. Load factors for air carrier aircraft operations fluctuated somewhat up and down between 2008 to 2018, with a low of 71.7%, a high of 81.2%, and 81.1% estimated for 2018. Likewise, the load factors for commuter aircraft operations fluctuated between 2008 and 2018, peaking at 77.5% in 2018 with a low of 71.6% in 2011. Average aircraft size (measured in available seats) increased at 1.2% per annum from 2008 to 2018 for the air carrier segment (widebody and narrowbody passenger aircraft) and 1.7% per annum for the commuter aircraft segment (regional and air taxi commercial passenger aircraft). Average seats per departure (ASPD) increased to 150.6 seats on air carrier aircraft and 65.3 seats on commuter aircraft at CMH in 2018.

Table 6-2, Domestic and International Average Seats Per Departure Assumptions, shows the general variance between the domestic and international aircraft gauges. International flights to Canada were nearly 95% commuter aircraft in 2018 and are expected to remain the majority the fleet during the forecast period.

Table 6-1 Average Seats Per Departure and Load Factor Assumptions

Year	ASPD Air Carrier	Load Factor Air Carrier	ASPD Commuter	Load Factor Commuter
Historical				
2008	**134.1**	**71.7%**	**55.4**	**74.2%**
2009	134.1	74.1%	56.1	73.3%
2010	136.5	80.2%	56.2	77.0%
2011	136.1	81.2%	57.8	71.6%
2012	136.7	80.8%	57.6	74.7%
2013	139.5	77.0%	58.5	74.8%
2014	143.8	78.4%	59.9	75.1%
2015	145.2	78.7%	61.1	76.5%
2016	146.8	78.4%	63.5	74.7%
2017	147.7	80.0%	65.3	75.0%
2018	150.6	81.1%	65.3	77.5%
Forecast				
2019	152.7	80.1%	67.5	80.1%
2020	153.3	80.3%	67.4	80.3%
2021	153.6	80.4%	67.8	80.4%
2022	153.8	80.6%	68.2	80.6%
2023	154.1	80.7%	68.5	80.7%
2024	154.5	80.9%	68.9	80.9%
2025	154.8	81.0%	69.2	81.0%
2026	155.2	81.2%	69.5	81.2%
2027	155.6	81.3%	69.8	81.3%
2028	156.0	81.5%	70.1	81.5%
2029	156.5	81.6%	70.7	81.6%
2030	156.9	81.8%	70.9	81.8%
2031	157.4	81.9%	71.2	81.9%
2032	158.0	82.1%	71.4	82.1%
2033	158.6	82.2%	71.6	82.2%
2034	159.2	82.4%	71.8	82.4%
2035	159.9	82.5%	72.0	82.5%
2036	160.6	82.7%	72.3	82.7%
2037	161.4	82.8%	72.5	82.8%
2038	162.2	83.0%	72.7	83.0%
2039	162.4	83.0%	72.8	83.0%
CAGR				
2008-18	1.2%	1.2%	1.7%	0.4%
2018-19	1.3%	-1.2%	3.4%	3.4%
2019-39	0.3%	0.2%	0.4%	0.2%
2018-39	0.4%	0.1%	0.5%	0.3%

Sources: Airport Records; Official Airline Guide; U.S. DOT, Schedule T-100; Landrum & Brown analysis.

Table 6-2 Domestic and International Average Seats Per Departure Assumptions

Year	ASPD Domestic	ASPD International
2008	83.0	38.9
2009	83.6	38.7
2010	82.7	38.4
2011	83.5	39.9
2012	84.9	38.3
2013	87.1	38.2
2014	90.0	40.9
2015	94.1	41.8
2016	98.8	49.4
2017	101.3	52.6
2018	103.2	54.4
Forecast		
2019	106.9	55.4
2020	108.1	54.2
2021	108.8	54.4
2022	109.5	54.6
2023	110.2	54.8
2024	111.0	55.0
2025	111.7	55.2
2026	112.5	55.3
2027	113.3	55.5
2028	114.1	56.7
2029	115.1	56.9
2030	115.9	56.8
2031	116.7	57.4
2032	117.6	58.0
2033	118.4	58.6
2034	119.3	59.2
2035	120.2	59.8
2036	121.2	60.4
2037	122.2	60.9
2038	123.3	61.5
2039	123.6	62.0
CAGR		
2008-18	2.2%	3.4%
2018-19	3.6%	1.9%
2019-39	0.7%	0.6%
2018-39	0.9%	0.6%

Sources: Airport Records; Official Airline Guide; Landrum & Brown analysis.

Narrow-body aircraft comprised the entire passenger air carrier traffic segment at CMH in 2018 (no widebody) and accounted for 42.8% of total passenger operations. The narrowbody aircraft fleet at the Airport consists mainly of Boeing 737-700, -800, -900; MD80 series, MD90 and the Airbus 319/320/321 family. Considering the following fleet plans by airlines it is assumed that the narrowbody ASPD will increase from 150.6 seats in 2018 to 162.4 seats in 2039:

- Alaska Airlines has introduced more Airbus 320s and 321s into the fleet
- American Airlines retired all MD80 and MD90 series by September 2019, and replaced them with Boeing 737-800s
- American Airlines is increasing the use of Airbus 319s in the near term rather than increasing usage of Airbus 320s
- Delta Air Lines introduced the Airbus 220-100 aircraft into the market in 2019 as a replacement to the Boeing 717 and should increase utilization during the forecast period
- Southwest Airlines has been forced to delay adding additional frequencies with the Boeing 737 MAX 8, but will likely use this aircraft more notably in the future
- Spirit Airlines is expected to utilize the Airbus 320 more in the future, converting some activity from the Airbus 319
- United Airlines is increasing frequencies of Boeing 737-800 and -900 aircraft

Commuter operations consist of large and small regional jets. Large regional jets (more than 50 seats) accounted for 40.2% of commercial passenger operations at CMH in 2018 and are anticipated to increase in share of the total passenger operations as small regional jets may be progressively phased out and replaced by large regional jets.

This aircraft operations forecast still maintains a smaller share of small regional jets as there is currently no accepted replacement in the industry. The latest attempt at a replacement in 2019 is the Bombardier CRJ-550 which is a CRJ-700 retrofitted with a 3-class 50 seat configuration, and not a true small regional jet replacement. Typically, ERJ 170s, CRJ-700s, and CRJ-900s are being deployed at the Airport in the larger regional jet segment of commuter aircraft. It is anticipated that the commuter ASPD will increase from 65.3 seats in 2018 to 72.8 seats in 2039, and the average load factor will increase from 77.5% in 2018 to 83.0 in 2039.

6.1.2 Passenger Operations Forecast

Air carrier operations at CMH are forecast to grow from 42,856 in 2018 to 70,400 in 2039 growing at 2.4% CAGR, while the commuter operations are forecast to be relatively constant with a nearly 0.0% CAGR during the forecast, dropping slightly from 57,324 in 2018 to just 56,900 operations in 2039.

The result of the enplanements forecasts and the primary assumptions regarding load factors and ASPD project that total commercial passenger traffic will increase from 100,180 operations in 2018 to 127,300 operations by 2039, representing average annual growth of 1.1%.

Table 6-4, *Total Aircraft Operations Forecast*, provides a summary of the operations forecasts for the Airport.

6.2 All-Cargo Operations

All-Cargo freighter operations represent a very small and inconsistent traffic segment at the Airport. Traditionally, all freighter air cargo activity in the Columbus, Ohio region is expected to be handled at Rickenbacker International Airport (LCK), but some smaller express freight or critical freighter operations do occur at CMH each year. In Airport data from 2008 and 2018, as many as 354 and as few as 54 operations were reported at CMH with an average of nearly 210 operations during the last five years. With the lack of a significant historical trend and the focus on all-cargo freighter activity at LCK, operations at CMH are forecast to remain steady through 2039 at the recent average of 210 operations per annum.

6.3 Non-Commercial Air Taxi Operations

The Airport has two fixed base operators (FBO), Lane Aviation and Signature Flight Support. In addition to the FBOs, NetJets also has a large operation at the Airport.

The non-commercial or ‘other’ air taxi traffic segment had shown no real growth at CMH from 2009 to 2015 which could be attributed to the slow recovery in the economy and the rising cost of fuel. However, as the U.S. economy has improved and the price of fuel has dropped since July 2014, there has been an increase in other air taxi operations at the Airport beginning in 2016.

Projections by the FAA in the FAA Aerospace Forecast Fiscal Years 2019-2039 and a general consensus in industry outlooks, such as the General Aviation Manufacturers Association (GAMA) 2018 Annual Report, it is suggested that other commercial air taxi operations may grow at between 2.8% and 4.3% per annum based on hours flown.

A reasonable correlation was determined for other air taxi operations at CMH and Columbus Ohio MSA GRP for the short period of historical data from 2012 to 2018. A single variable linear regression analysis resulted in an adjusted R^2 value of 0.84. Regression inputs are listed in **Table 6-3, *Non-Commercial Air Taxi Regression Inputs***. The model equation is provided below:

$$\hat{Y} = -8365.1 + 0.1561 * X_{MSA\ GRP}$$

The summary output from the regression model is shown below. The model exhibits reasonable regression statistics (coefficient of determination, t-statistics, and p-values) compared to other models using less significant combinations of independent variables.

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.93435
R Square	0.87301
Adjusted R Square	0.84761
Standard Error	555.112
Observations	7

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	10592123.58	10592123.58	34.37331	0.002046862
Residual	5	1540748.134	308149.6268		
Total	6	12132871.71			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-8365.053407	3207.939699	-2.6076093	0.047808	-16611.32493	-118.781887
GRP	0.156059906	0.02661832	5.862875832	0.002047	0.087635336	0.224484476

The regression model predicts that through the correlation to MSA GRP the other air taxi operations at CMH are forecast to grow from 12,792 in 2018 to 25,000 in 2039 growing at 3.2% per annum during the forecast period.

Table 6-3 Non-Commercial Air Taxi Regression Inputs

Year	Other Air Taxi Operations	Columbus Ohio MSA GRP (Millions of 2012 USD)
2012	9,073	109,043
2013	9,215	111,376
2014	9,365	115,217
2015	9,779	121,961
2016	10,995	125,313
2017	11,598	127,520
2018	12,792	131,377
Forecast		
2019		134,641
2020		137,733
2021		140,729
2022		143,922
2023		147,099
2024		150,375
2025		153,703
2026		157,087
2027		160,541
2028		164,042
2029		167,601
2030		171,207
2031		174,853
2032		178,533
2033		182,248
2034		185,999
2035		189,794
2036		193,631
2037		197,513
2038		201,441
2039		205,420

Sources: CRAA; Woods and Poole; Landrum & Brown.

6.4 General Aviation Operations

Traditional general aviation activity at the Airport has declined since peak traffic levels in 2009, which is comparable with a general trend throughout the U.S. This can be attributed to a decline in piston engine operations which is expected to either continue to slow down or remain flat, with no foreseeable growth in well established markets. Since the peak in 2009 with 30,676 operations, operations decreased to the 20,000 operations per year level and have been fairly stable for the last five years.

Based on industry trends in traditional general aviation, the recent lack of growth at CMH and current general projections by the FAA in the Aerospace Forecast Fiscal Years 2019-2039, it is proposed to forecast a conservative approach in that general aviation aircraft operations will remain flat and exhibit no observable growth at the Airport during the forecast period. Although there is a large share of jet aircraft in the general aviation segment, the assumed growth in business jet activity by the FAA is considered most likely from the other air taxi operators and less from the independent business jet owners or private jet owners at CMH. Future annual general aviation operations are therefore set at 20,930 operations per annum through 2039.

6.5 Military Operations

Military operations at the airport have been declining since 2008 with some variability in traffic. Operations increased from 500 in 2017 to 632 operations in 2018. Generally, military or government operations occur as needed at each U.S. airport. As is customary in FAA forecasts, total military operations are projected annually at essentially the last year’s level of activity as a constant value in the forecast. Thus, military operations at CMH are forecast to remain steady through 2039 at 630 operations per annum.

6.6 Total Aircraft Operations

Total aircraft operations at CMH as independently developed in Sections 6.1 to 6.5 are collectively forecast to grow at 1.2% annually from 134,782 in 2018 to 174,070 in 2039.

Table 6-4 Total Aircraft Operations Forecast

Annual Aircraft Operations											
	Passenger				Non-Passenger						
Year	Air Carrier	Commuter	Passenger Total	% Pax Ops	Cargo	Other Air Taxi	General Aviation	Military	Non-Pax Total	% Non-Pax Ops	Airport Total
Historical											
2008	41,032	73,564	114,596	81%	54	5,742	19,936	1,345	27,077	19%	141,673
2009	35,841	67,697	103,538	71%	68	9,598	30,676	2,559	42,901	29%	146,439
2010	32,013	67,031	99,044	73%	354	10,172	25,585	931	37,042	27%	136,086
2011	32,446	68,678	101,124	75%	172	9,636	24,096	349	34,253	25%	135,377
2012	32,733	63,703	96,436	74%	108	9,073	23,287	546	33,014	26%	129,450
2013	32,879	62,543	95,422	74%	134	9,215	22,854	562	32,765	26%	128,187
2014	33,022	60,282	93,304	75%	200	9,365	20,641	609	30,815	25%	124,119
2015	36,096	58,502	94,598	75%	212	9,779	20,561	577	31,129	25%	125,727
2016	40,329	57,657	97,986	76%	136	10,995	20,007	438	31,576	24%	129,562
2017	41,278	55,954	97,232	75%	240	11,598	19,876	500	32,214	25%	129,446
2018	42,856	57,324	100,180	74%	248	12,792	20,930	632	34,602	26%	134,782
Forecast											
2019	46,500	56,900	103,400	75%	210	13,330	20,930	630	35,100	25%	138,500
2020	48,300	56,700	105,000	75%	210	13,840	20,930	630	35,610	25%	140,610
2021	49,400	56,900	106,300	75%	210	14,330	20,930	630	36,100	25%	142,400
2022	50,500	57,200	107,700	75%	210	14,860	20,930	630	36,630	25%	144,330
2023	51,700	57,400	109,100	75%	210	15,380	20,930	630	37,150	25%	146,250
2024	52,900	57,600	110,500	75%	210	15,920	20,930	630	37,690	25%	148,190
2025	54,100	57,800	111,900	75%	210	16,470	20,930	630	38,240	25%	150,140
2026	55,300	58,000	113,300	74%	210	17,030	20,930	630	38,800	26%	152,100
2027	56,500	58,100	114,600	74%	210	17,600	20,930	630	39,370	26%	153,970
2028	57,700	58,200	115,900	74%	210	18,180	20,930	630	39,950	26%	155,850
2029	58,900	58,200	117,100	74%	210	18,770	20,930	630	40,540	26%	157,640
2030	60,100	58,200	118,300	74%	210	19,360	20,930	630	41,130	26%	159,430
2031	61,300	58,200	119,500	74%	210	19,960	20,930	630	41,730	26%	161,230
2032	62,400	58,100	120,500	74%	210	20,570	20,930	630	42,340	26%	162,840
2033	63,600	57,900	121,500	74%	210	21,180	20,930	630	42,950	26%	164,450
2034	64,700	57,700	122,400	74%	210	21,800	20,930	630	43,570	26%	165,970
2035	65,900	57,500	123,400	74%	210	22,420	20,930	630	44,190	26%	167,590
2036	67,000	57,300	124,300	73%	210	23,050	20,930	630	44,820	27%	169,120
2037	68,100	57,000	125,100	73%	210	23,690	20,930	630	45,460	27%	170,560
2038	69,100	56,600	125,700	73%	210	24,340	20,930	630	46,110	27%	171,810
2039	70,400	56,900	127,300	73%	210	25,000	20,930	630	46,770	27%	174,070
CAGR											
2008-18	0.4%	-2.5%	-1.3%		16.5%	8.3%	0.5%	-7.3%	2.5%		-0.5%
2018-19	8.5%	-0.7%	3.2%		-15.3%	4.2%	0.0%	-0.3%	1.4%		2.8%
2019-39	2.1%	0.0%	1.0%		0.0%	3.2%	0.0%	0.0%	1.4%		1.1%
2018-39	2.4%	0.0%	1.1%		-0.8%	3.2%	0.0%	0.0%	1.4%		1.2%

Sources: Airport Records; FAA OPSNET; Landrum & Brown analysis

6.7 Passenger Airlines Aircraft Fleet Mix Forecast

Future aircraft fleet plans announced by airlines operating at CMH and general trends throughout the commercial aviation industry were considered in the development of the passenger aircraft fleet mix forecast for the Airport. The existing passenger airlines fleet mix at CMH along with the future trends and forecast of passenger aircraft operations are presented in **Table 6-5, *Passenger Airlines Fleet Mix Forecast***.

Table 6-5 Passenger Airlines Fleet Mix Forecast

Aircraft Type	Seats	2018	2020	2023	2025	2028	2035	2039
Passenger								
Air Carrier								
221	109	-	484	714	930	1,371	3,336	4,998
319	134	4,592	5,314	5,393	5,446	5,509	5,560	5,562
320	162	1,344	1,931	1,971	1,997	2,030	2,074	2,042
321	230	148	144	212	274	402	960	1,408
32A	182	1,858	3,285	3,748	4,095	4,658	6,180	7,111
717	110	8	242	-	-	-	-	-
738	161	2,088	5,314	5,920	6,364	7,064	8,862	9,927
739	180	1,556	2,899	3,318	3,633	4,147	5,544	6,337
73G	126	12	48	52	54	58	66	70
73H	174	4,454	5,072	5,940	6,598	7,698	10,842	12,813
73W	143	20,122	21,154	23,292	23,171	22,355	15,742	9,431
7M8	175	532	724	1,139	1,538	2,408	6,734	10,701
MD80/82/88	140/149	4,930	1,449	-	-	-	-	-
MD90	158	1,212	242	-	-	-	-	-
Total Air Carrier		42,856	48,300	51,700	54,100	57,700	65,900	70,400
Commuter								
CRJ	50	5,842	5,104	4,301	3,834	3,214	1,899	1,650
CR7	66	9,890	7,371	6,881	6,566	6,097	4,989	4,552
CR9	76	3,600	4,366	4,618	4,785	5,033	5,504	5,748
ERJ/ER4/ERD	44/50	10,806	8,051	7,019	6,406	5,575	3,961	3,246
E70	69	9,206	10,773	10,484	10,284	9,955	8,972	8,478
E75	76	17,514	20,637	23,560	25,268	27,441	30,455	30,895
E90	99	86	398	536	656	884	1,721	2,332
BE4 Turboprop	7	380	-	-	-	-	-	-
Total Commuter		57,324	56,700	57,400	57,800	58,200	57,500	56,900
Total Passenger		**100,180**	**105,000**	**109,100**	**111,900**	**115,900**	**123,400**	**127,300**

Note: Future CRJ550 operations as they occur could be included in the forecasted CR7 or CRJ operations.
Sources: Airport Records; Official Airline Guide; Landrum & Brown analysis.

6.8 Non-Passenger Airlines Aircraft Fleet Mix Forecast

The fleet mix of the non-passenger airlines segments at CMH (cargo, other air taxi, general aviation and military) consists of small piston aircraft up through large business jets and cargo freighter aircraft. Future trends in these fleet segments and the forecast of operations are presented in **Table 6-6, *Non-Passenger Airlines Fleet Mix Forecast***.

Table 6-6 Non-Passenger Airlines Fleet Mix Forecast

Aircraft Type	2018	2020	2023	2025	2028	2035	2039
Cargo							
C310, C208, DC-9	248	210	210	210	210	210	210
Total Cargo	248	210	210	210	210	210	210
Other Air-Taxi							
Jet							
BE40	770	833	836	808	805	897	1,000
C25B	640	692	805	902	1,042	1,345	1,500
C56X	1,863	2,016	2,486	2,865	3,273	4,036	4,500
C680	1,774	1,919	2,210	2,453	2,806	3,587	4,000
C750	397	430	538	649	807	1,121	1,250
CL30	1,310	1,418	1,566	1,667	1,829	2,242	2,500
CL60	386	417	498	572	678	897	1,000
E55P	1,184	1,281	1,372	1,417	1,508	1,794	2,000
F2TH	268	290	318	337	368	448	500
GLEX	418	452	559	666	817	1,121	1,250
GLF5	246	267	356	457	606	897	1,000
H25B	319	346	306	260	229	224	250
LJ35	222	240	231	165	91	-	-
LJ60	142	154	198	246	314	448	500
Turbo Prop							
B350	607	656	699	717	759	897	1,000
PC12	1,639	1,773	1,751	1,668	1,636	1,793	2,000
Piston (Twin)							
BE58	607	656	651	621	612	673	750
Total Other Air-Taxi	12,792	13,840	15,380	16,470	18,180	22,420	25,000

Aircraft Type	2018	2020	2023	2025	2028	2035	2039
General Aviation							
Jet	15,162	15,162	15,162	15,162	15,162	15,162	15,162
(C25B, C56X,CL60, E550 GLF4, GLF5,LJ60)							
Turbo Prop	2,084	2,084	2,084	2,084	2,084	2,084	2,084
(B350, C441, PC12 TBM7)							
Piston (Twin)	404	404	404	404	404	404	404
(BE58)							
Piston (Single)	3,280	3,280	3,280	3,280	3,280	3,280	3,280
(BE36, C152, C172, C182 P28A, SR22)							
Total General Aviation	20,930	20,930	20,930	20,930	20,930	20,930	20,930
Military							
Non-specified							
Total Military	632	630	630	630	630	630	630

Sources: Airport Records; Official Airline Guide; Landrum & Brown analysis.

6.9 Based Aircraft Fleet Mix Forecast

Aircraft based at an airport are typically classified as GA or air taxi aircraft that use the airport as a domicile or base of operations and are associated with FBOs, aircraft hangars or tie downs and apron areas for aircraft parking. The FAA Form 5010 reported a total of 78 based aircraft at CMH for 2018 and 73 based aircraft in the 2019 5010 report. Based aircraft are generally segmented by the FAA into four categories (single-engine, multi-engine, jets and helicopters). The largest based aircraft segment at CMH is jets which represented 61.5% of based aircraft in 2018 and 57.5% estimated in the November 2019 report by number of aircraft. The drop of five recorded based aircraft at CMH in 2019 (+1 multi-engine and -6 jets) is representative of the variances often observed in based aircraft figures which are influenced by reporting concerns and shifting of aircraft between competing airports and FBOs. Most of the based aircraft at CMH can be linked to the business jet and charter services at the Airport. Based aircraft numbers typically do not change dramatically year by year, and the forecast for CMH projects a small increase of two aircraft from 73 aircraft in 2019 to 75 aircraft in 2039, for a CAGR of 0.1% from 2019 to 2039.

Table 6-7, *Based Aircraft Fleet Mix Forecast* presents the expected transition of the based aircraft fleet at CMH though 2039 based on the 2019 reported fleet with the total fleet growing at the FAA TAF estimate of 0.1% annually, and each segments share changing with the FAA Aerospace Forecast's overall growth rate by segment.

Table 6-7 Based Aircraft Fleet Mix Forecast

	Based Aircraft							
Aircraft Group	2018	2019	2020	2023	2025	2028	2035	2039
Single-Engine	23	23	23	22	21	20	17	16
Multi-Engine	5	6	6	6	6	5	5	5
Jet	48	42	42	43	45	47	51	52
Helicopters	2	2	2	2	2	2	2	2
Total	**78**	**73**	**73**	**73**	**74**	**74**	**75**	**75**

Sources: FAA Form 5010; Landrum & Brown.

7 Average Annual Day Forecast

7.1 Average Annual Day Operations

The average annual day forecast by operations category is presented in **Table 7-1, *Average Annual Day Aircraft Operations***. Average-annual day operations simply represent the annual operations in each category divided by 365 (the number of days in a given year). Average day total aircraft operations are projected to increase from an estimated 369 daily operations in 2018 to 477 daily operations in 2039.

Table 7-1 Average Annual Day Aircraft Operations

Operations	2018	2020	2023	2025	2028	2035	2038	2039
Passenger Airlines								
Annual	100,180	105,000	109,100	111,900	115,900	123,400	125,700	127,300
Average Annual Day	274	288	299	307	318	338	344	349
Cargo								
Annual	248	210	210	210	210	210	210	210
Average Annual Day	1	1	1	1	1	1	1	1
Other Air-Taxi								
Annual	12,792	13,840	15,380	16,470	18,180	22,420	24,340	25,000
Average Annual Day	35	38	42	45	50	61	67	68
General Aviation								
Annual	20,930	20,930	20,930	20,930	20,930	20,930	20,930	20,930
Average Annual Day	57	57	57	57	57	57	57	57
Military								
Annual	632	630	630	630	630	630	630	630
Average Annual Day	2	2	2	2	2	2	2	2
Total Operations								
Annual	134,782	140,610	146,250	150,140	155,850	167,590	171,810	174,070
Average Annual Day	369	386	401	412	428	459	471	477

Note: AAD total operations figures equal the aggregate or sum of each individual segment.
Sources: CRAA; FAA OPSNET; Landrum & Brown.

7.2 Average Annual Day Hourly Distributions

The average annual day forecast of hourly distributions is expected to remain consistent during the forecast period with no major operational shifts or capacity constraints foreseen that would materially change the hourly distributions from the base levels of 2018/2019. The hourly operational distributions are segmented by arrivals/ departures and commercial passenger/general aviation across the day while also acknowledging the daytime (7am to 10pm) and night-time (10pm to 7am) operational periods at CMH. These distributions will provide guidance with the average annual daily operations forecast in separate noise modelling efforts for CMH.

Table 7-2, *Average Annual Day Hourly Distributions (Arrivals) and* Table 7-3, *Average Annual Day Hourly Distributions (Departures)* present the percentage distributions of average activity by segment at CMH.

Table 7-2 Average Annual Day Hourly Distributions (Arrivals)

Time Period	Hour	Passenger Operations	General Aviation / Other Operations
Daytime	7:00 - 7:59	1.1%	1.9%
	8:00 - 8:59	3.1%	4.4%
	9:00 - 9:59	5.2%	5.0%
	10:00 - 10:59	5.8%	5.5%
	11:00 - 11:59	6.5%	5.3%
	12:00 - 12:59	3.6%	5.6%
	13:00 - 13:59	6.0%	5.9%
	14:00 - 14:59	5.4%	7.2%
	15:00 - 15:59	5.7%	7.8%
	16:00 - 16:59	6.4%	8.9%
	17:00 - 17:59	8.0%	9.0%
	18:00 - 18:59	6.4%	7.6%
	19:00 - 19:59	4.6%	6.0%
	20:00 - 20:59	4.3%	4.2%
	21:00 - 21:59	6.2%	3.2%
	Daytime Sub-Total	78.4%	87.5%
Nighttime	22:00 - 22:59	6.9%	2.5%
	23:00 - 23:59	7.9%	3.6%
	0:00 - 0:59	3.7%	1.2%
	1:00 - 1:59	1.2%	1.2%
	2:00 - 2:59	0.3%	1.0%
	3:00 - 3:59	0.1%	0.6%
	4:00 - 4:59	0.2%	0.9%
	5:00 - 5:59	0.5%	0.5%
	6:00 - 6:59	0.9%	1.0%
	Nighttime Sub-Total	21.6%	12.5%
Total		100.0%	100.0%

Note: Total may not equal 100% due to rounding.
Sources: CRAA ANOMS flight tracking data; Landrum & Brown.

Table 7-3 Average Annual Day Hourly Distributions (Departures)

Time Period	Hour	Passenger Operations	General Aviation / Other Operations
Daytime	7:00 - 7:59	8.8%	6.2%
	8:00 - 8:59	5.6%	7.4%
	9:00 - 9:59	6.2%	6.8%
	10:00 - 10:59	5.6%	6.8%
	11:00 - 11:59	5.8%	5.8%
	12:00 - 12:59	6.5%	6.4%
	13:00 - 13:59	3.8%	6.4%
	14:00 - 14:59	5.3%	7.6%
	15:00 - 15:59	5.4%	8.1%
	16:00 - 16:59	5.6%	7.6%
	17:00 - 17:59	5.7%	6.2%
	18:00 - 18:59	8.2%	5.4%
	19:00 - 19:59	5.8%	4.0%
	20:00 - 20:59	3.8%	3.6%
	21:00 - 21:59	1.7%	2.0%
	Daytime Sub-Total	83.9%	90.5%
Nighttime	22:00 - 22:59	0.8%	1.2%
	23:00 - 23:59	0.4%	2.2%
	0:00 - 0:59	0.1%	0.7%
	1:00 - 1:59	0.1%	0.3%
	2:00 - 2:59	0.0%	0.3%
	3:00 - 3:59	0.0%	0.2%
	4:00 - 4:59	0.0%	0.4%
	5:00 - 5:59	2.9%	1.0%
	6:00 - 6:59	11.8%	3.1%
	Nighttime Sub-Total	16.1%	9.5%
Total		100.0%	100.0%

Note: Total may not equal 100% due to rounding.
Sources: CRAA ANOMS flight tracking data; Landrum & Brown.

8 Comparison to the TAF

The FAA publishes its own forecast annually for each U.S. airport, including CMH. The Terminal Area Forecast (TAF) is “prepared to assist the FAA in meeting its planning, budgeting, and staffing requirements. In addition, state aviation authorities and other aviation planners use the TAF as a basis for planning airport improvements.” The most recent release is the 2018 TAF which was issued in early 2019.

If the independent airport forecast (Sponsor Forecast) is used for FAA decision-making, such as key environmental issues, noise capability planning, airport layout plan, and initial financial decisions, the FAA requires that the Sponsor Forecast is compared to the most recent TAF to determine if they are consistent. For all classes of airports, forecasts for total passenger enplanements and total aircraft operations are considered consistent with the TAF if they meet the following criterion:[7]

- Forecasts differ by less than 10% in the five-year forecast period
- Forecasts differ by less than 15% in the ten-year forecast period

If the Sponsor Forecast is not consistent with the TAF, differences must be resolved before proceeding.

The TAF is prepared on a U.S. Government Fiscal Year (FY) basis (October through September) rather than a calendar year. The forecast presented herein was developed on a calendar year basis. When an airport’s traffic is growing rapidly, a timing difference between the FY base year and the calendar base year can be significant. This timing difference distorts a straight future year comparison between the two forecasts. The true comparison that needs to be made is between the projected growth rate of the TAF and the projected growth rate of the Sponsor forecast.

The 2018 TAF includes historical information on aircraft operations from FY1990 through FY2017 and forecasts for FY2018[8] to FY2045. At airports with FAA towers like CMH, historical aircraft operations data is provided by FAA air traffic controllers, which count landings and take-offs. These aircraft operations are recorded as either air carrier, commuter & air taxi, GA, or military. Air carrier is defined as an aircraft with seating capacity of more than 60 seats or a maximum payload capacity of more than 18,000 pounds carrying passengers or cargo for hire or compensation. Commuter & air taxi aircraft are designed to have a maximum seating capacity of 60 seats or a maximum payload capacity of 18,000 pounds carrying passengers or cargo for hire or compensation.

According to the 2018 TAF, aircraft operations at CMH have increased from 127,172 in FY2013 to 132,941 in FY2018, representing an AAGR of 0.9%. The 2018 TAF projects that aircraft operations at CMH will increase from 132,941 in FY2018 to 144,876 in FY2028, representing an AAGR of 0.9%.

The enplaned passenger information in the 2018 TAF includes historical values from FY1990 through FY2017, estimated enplaned passenger figures for FY2018, and forecasts from FY2019 to FY2045. Historical enplaned passenger data is obtained through the U.S. Department of Transportation T-100 Reports.

[7] Federal Aviation Administration, Review and Approval of Aviation Forecasts, June 2008.
[8] Operations data for FAA towers and Federal contract towers for FY2018 are actual.

According to the 2018 TAF, enplaned passengers at CMH increased from 3.1 million in FY2013 to an estimated 3.9 million in FY2018, representing an AAGR of 4.9%. During this span, enplaned passengers provided in the 2018 TAF have been on average within 2.5% of the Airport's records. There are two reasons for this difference. The data provided in the TAF is on a fiscal year basis. Additionally, the enplaned passengers provided in the TAF exclude non-revenue passengers and military charter passengers. In CY2018, there were 4.1 million enplaned passengers at CMH, which is nearly 5.0% higher than the 3.9 million estimated for FY2018 in the 2018 TAF. The 2018 TAF projects that enplaned passengers will increase from an estimated 3.9 million in FY2018 to 5.6 million in FY2039, representing an AAGR of 1.8%.

Enplanements comparison figures have been adjusted to account for non-revenue enplaned passengers at CMH which are not included in the TAF.

In order to compare the forecast presented herein to the 2018 TAF, Appendix B and C templates from the FAA Office of Aviation Policy and Plans (APO) document, Forecasting Aviation Activity by Airport, have been completed and are provided in **Table 8-1, *FAA TAF Forecast Comparison-Appendix B***, and **Table 8-2*, FAA TAF Forecast Comparison-Appendix C***, respectively.

Table 8-1 FAA TAF Forecast Comparison – Appendix B

	Base Year 2018	Base Year + 1 year 2019	Base Year + 5 yrs 2023	Base Year + 10 yrs 2028	Base Year + 15 yrs 2033	Base Year to + 1 year 2018-2019	Base Year to + 5 yrs 2018-2023	Base Year to + 10 yrs 2018-2028	Base Year to + 15 yrs 2018-2033
Passenger Enplanements						Compound Annual Growth Rates			
Air Carrier	2,463,886	2,760,800	3,134,600	3,578,900	4,041,400	12.1%	4.9%	3.8%	3.4%
Commuter	1,420,731	1,494,590	1,547,060	1,621,170	1,662,160	5.2%	1.7%	1.3%	1.1%
TOTAL ENPLANEMENTS	3,884,617	4,255,390	4,681,660	5,200,070	5,703,560	9.5%	3.8%	3.0%	2.6%
Operations									
Itinerant						Compound Annual Growth Rates			
Air Carrier	43,104	46,710	51,910	57,910	63,810	8.4%	3.8%	3.0%	2.6%
Commuter/Air Taxi	70,116	70,230	72,780	76,380	79,080	0.2%	0.7%	0.9%	0.8%
Total Commercial Operations	113,220	116,940	124,690	134,290	142,890	3.3%	1.9%	1.7%	1.6%
General Aviation	20,930	20,930	20,930	20,930	20,930	0.0%	0.0%	0.0%	0.0%
Military	632	630	630	630	630	-0.3%	-0.1%	0.0%	0.0%
Local									
General Aviation	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%
Military	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%
TOTAL OPERATIONS	134,782	138,500	146,250	155,850	164,450	2.8%	1.6%	1.5%	1.3%

	Base Year 2018	Base Year + 1 year 2019	Base Year + 5 yrs 2023	Base Year + 10 yrs 2028	Base Year + 15 yrs 2033
Average aircraft size (seats)					
Air carrier	150.6	152.7	154.1	156.0	158.6
Commuter	65.3	67.4	68.5	70.1	71.6
Average enplaning load factor					
Air carrier	81.1%	80.1%	80.7%	81.5%	82.2%
Commuter	77.5%	80.1%	80.7%	81.5%	82.2%

Note: Commuter Passenger operations at CMH as prepared in the Part 150 Aviation Demand Forecast include large regional jets with more than 50 seats. Air carrier operations were limited in the forecast to traditional narrowbody aircraft manufacturers definitions.
Total Commercial Operations includes **all** Air Taxi operations for comparison to FAA TAF.

Sources: Airport Records, FAA; Landrum & Brown.

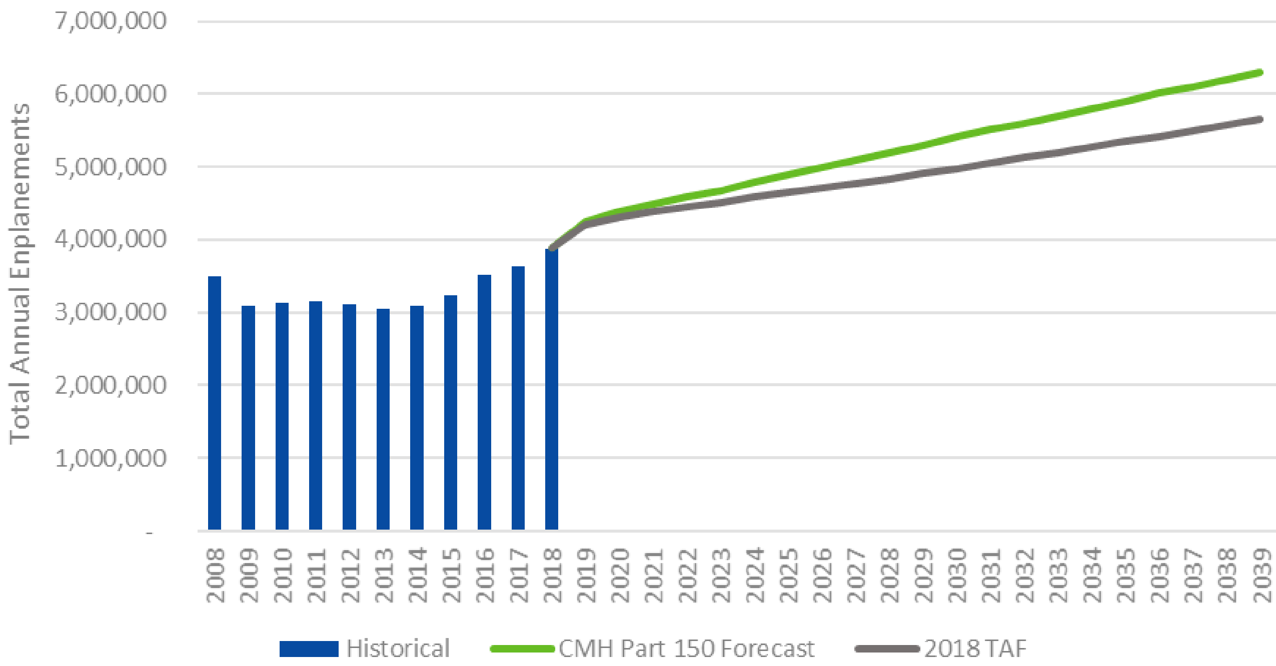
Table 8-2 FAA TAF Forecast Comparison – Appendix C

Segment	Forecast Year	Sponsor Forecast	2018 FAA TAF	% Variance Sponsor vs 2018 TAF	
Passenger Enplanements					
Base year	2018	3,884,617	3,884,617	0.0%	2/
Base year + 5 years	2023	4,681,660	4,519,899	3.6%	
Base year + 10 years	2028	5,200,070	4,837,744	7.5%	
Base year + 15 years	2033	5,703,560	5,198,517	9.7%	
Commercial Operations[1/]					
Base year	2018	113,220	111,880	1.2%	3/
Base year + 5 years	2023	124,690	115,955	7.5%	
Base year + 10 years	2028	134,290	123,174	9.0%	
Base year + 15 years	2033	142,890	131,942	8.3%	
Total Operations					
Base year	2018	134,782	132,941	1.4%	3/
Base year + 5 years	2023	146,250	137,447	6.4%	
Base year + 10 years	2028	155,850	144,876	7.6%	
Base year + 15 years	2033	164,450	153,854	6.9%	

Notes: 1/ Forcasted commercial operations in this table include passenger airline operations, all-cargo operations and all air-taxi operations for comparison to the FAA TAF.
2/ Base year 2018 enplanements for the Part 150 Forecast represent the Airport's calendar year total and were adjusted for comparison to the sponsor forecast.
3/ Base year 2018 operations were not adjusted and represent a comparison of Calendar Year to Fiscal Year.
Sources: CRAA; FAA TAF 2018; Landrum & Brown.

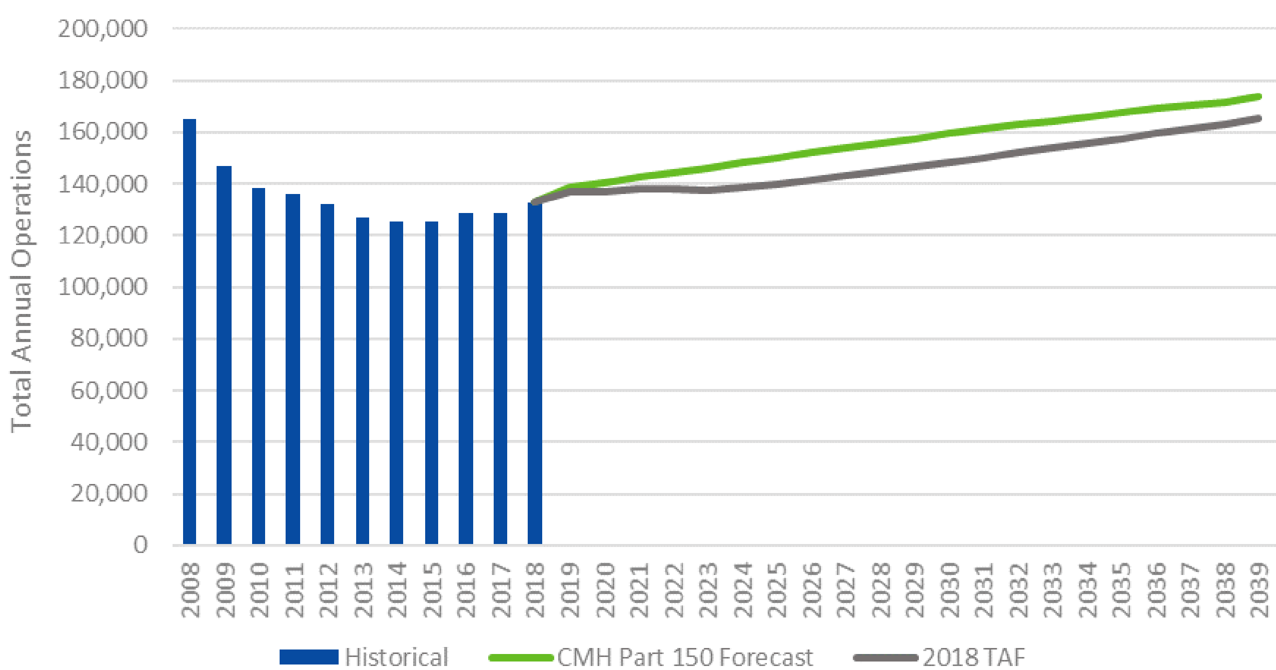
Figure 8-1, ***Passenger Enplanement Forecast vs. FAA TAF*** and **Figure 8-2,** ***Total Aircraft Operations Forecast vs. FAA TAF*** are presented to graphically illustrate the comparison of the two forecasts.

Figure 8-1 **Passenger Enplanement Forecast vs FAA TAF**



Sources: Airport Records, FAA 2018 TAF, Landrum & Brown analysis.

Figure 8-2 **Total Aircraft Operations Forecast vs FAA TAF**



Sources: Airport Records, FAA 2018 TAF, Landrum & Brown analysis.

FAA Approval Letter
March 3, 2020

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U.S. Department
of Transportation
Federal Aviation Administration

Detroit Airports District Office
Metro Airport Center
11677 South Wayne Road, Ste. 107
Romulus, MI 48174

March 3, 2020

Mr. Tom McCarthy, Chief of Planning and Engineering
Columbus Regional Airport Authority
John Glenn International Airprot
4600 International Gateway
Columbus, OH 43219

FAA Review & Approval for Part 150 Study at John Glenn International Airport (CMH) – AIP Grant # 3-39-0025-0090-2019

Dear Mr. McCarthy:

The Federal Aviation Administration (FAA) Detroit Airports District Office (DET ADO) has completed a review of the John Glenn Columbus International Airport – Part 150 Study and ALP Update Aviation Activity Forecast, received by this office via email on January 14, 2020 from Justin Anderson.

The forecasts were developed for the preparation of the Part 150 Noise Study being undertaken by the sponsor. These forecasts will also be used in the development of the airports Airport Layout Plan (being funded locally without Airport Improvement Program funding). The FAA approves these forecasts for planning purposes, including the development of the Noise Exposure Maps (NEMs) and ALP. The FAA approval is based on Table 8-2, *FAA TAF Forecast Comparison – Appendix C*. Based on our approval we also offer the following:

- The comparison of the airport sponsor forecast and the FAA Terminal Area Forecast (TAF) are within the 10 percent and 15 percent allowance for the 5- and 10-year planning horizons. This is based on both the TAF January 2019 (airport calculated) and TAF January 2020 (FAA calculated). A copy of both the 2019 and 2020 TAF should be included with the final documents.
- The forecasts are based on current data and appropriate methodologies.

The approval of the forecast does not automatically constitute a commitment on the part of the United States to participate in any development recommended in the Part 150 Study or shown on the Airport Layout Plan. All future development must be justified by current activity levels at the time of proposed implementation.

Further, the approved forecasts may be subject to additional analysis or the FAA may request a sensitivity analysis if at time of submittal of the Noise Exposure Maps (NEMs) there have been any significant changes at the airports (increase or decline) prior to the FAA's processing and acceptance of the NEMs and approval of the Noise Compatibility Program (NCP).

If you have any questions about this forecast approval, please contact me at (734)229-2958.

Sincerely,

Katherine S Delaney

Katherine S. Delaney
Community Planner

Attachment:
2019 TAF (CMH)
2020 TAF (CMH)

FAA 2020 Terminal Area Forecast
May 2021

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APO TERMINAL AREA FORECAST DETAIL REPORT
Forecast Issued May 2021

CMH

	Enplanements			AIRCRAFT OPERATIONS										
				Itinerant Operations					Local Operations					
Fiscal Year	**Air Carrier**	**Commuter**	**Total**	**Air Carrier**	**Air Taxi & Commuter**	**GA**	**Military**	**Total**	**Civil**	**Military**	**Total**	**Total Ops**	**Total Tracon Ops**	**Based Aircraft**
REGION:AGL **STATE:**OH **LOCID:**CMH														
CITY:COLUMBUS **AIRPORT:**John Glenn Columbus International														
2019	2,752,180	1,372,075	4,124,255	88,343	26,019	20,219	738	135,319	0	0	0	135,319	335,346	73
2020*	1,505,365	777,465	2,282,830	63,164	17,478	14,900	408	95,950	28	0	28	95,978	271,912	73
2021*	1,315,837	660,956	1,976,793	55,814	14,863	15,658	408	86,743	0	0	0	86,743	263,266	73
2022*	1,745,899	874,184	2,620,083	65,407	13,885	18,527	408	98,227	0	0	0	98,227	284,628	73
2023*	2,218,872	1,114,016	3,332,888	80,993	11,907	21,815	408	115,123	0	0	0	115,123	313,869	74
2024*	2,634,791	1,328,571	3,963,362	92,097	11,645	21,858	408	126,008	0	0	0	126,008	331,816	74
2025*	2,889,628	1,462,875	4,352,503	100,693	11,948	21,901	408	134,950	0	0	0	134,950	346,632	74
2026*	3,032,786	1,538,017	4,570,803	105,793	12,075	21,945	408	140,221	0	0	0	140,221	355,512	74
2027*	3,101,732	1,574,430	4,676,162	108,239	12,198	21,988	408	142,833	0	0	0	142,833	360,133	74
2028*	3,154,465	1,601,831	4,756,296	110,055	12,321	22,032	408	144,816	0	0	0	144,816	363,649	74
2029*	3,208,643	1,629,799	4,838,442	111,927	12,445	22,075	408	146,855	0	0	0	146,855	367,219	74
2030*	3,263,500	1,658,099	4,921,599	113,808	12,571	22,119	408	148,906	0	0	0	148,906	370,803	74